IBM

DEPARTMENT OF EDUCATION

DIVISION OF CUSTOMER ENGINEERING

IBM ACCOUNTING COURSE

IBM ACCOUNTING

PAYROLL AND LABOR ACCOUNTING

APPLICATION

INTERNATIONAL BUSINESS MACHINES CORPORATION
NEW YORK, NEW YORK

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IBM

ACCOUNTING

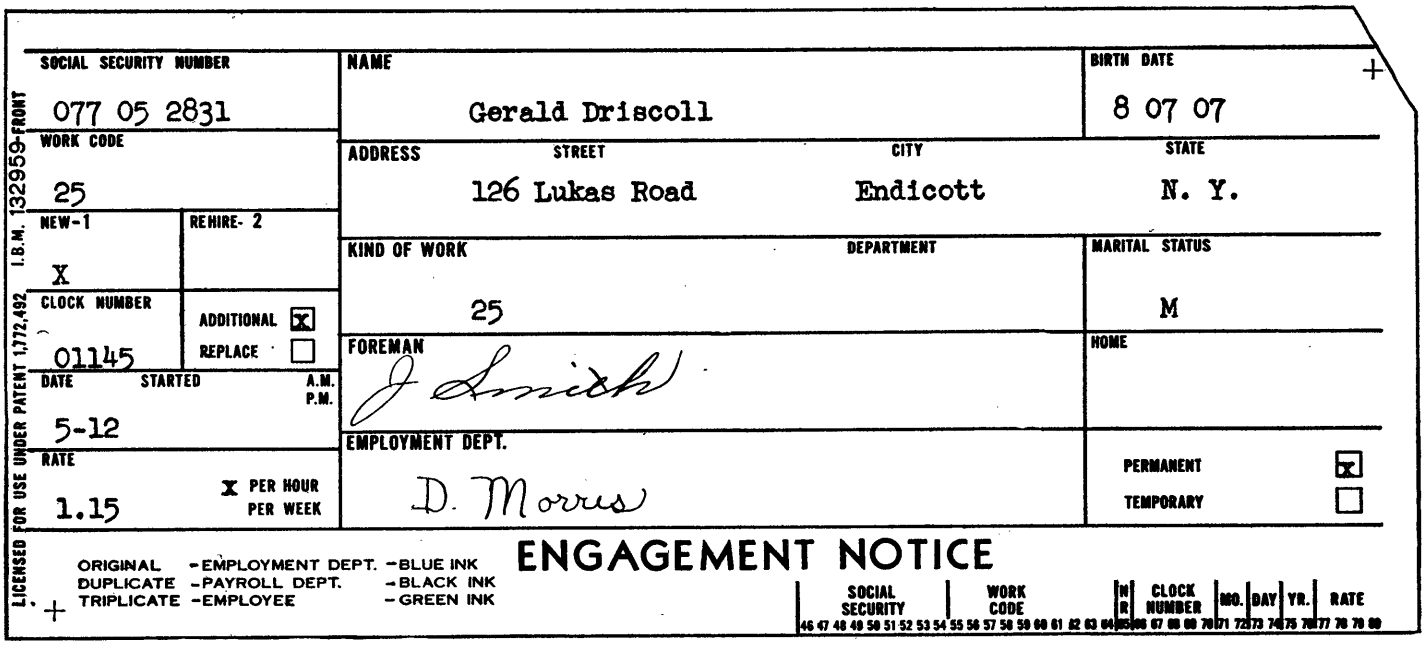
PAYROLL AND LABOR ACCOUNTING

PAYROLL and Labor Accounting is reporting to the employee, to governmental agencies, and to the owners of a business, the amount of money paid for services rendered the employer by the employee. It includes the recording of the time the employee worked, the computation of his earnings and taxes, and the deduction from earnings of taxes and other deductible items to establish the net pay.

The following are the objectives of the Payroll and Labor application:

- Establish source documents, such as attendance and job records, which can also be used for payroll, cost, and production records.
- Make available complete, timely, accurate, and legible source records.
- Balance attendance time with job time.
- Establish good accounting control over payroll expenditures.
- Verify the accuracy of rates and extensions.
- Summarize earnings to compute Withholding Taxes.
- Prepare the Payroll Register.
- Prepare individual pay checks or envelopes.
- Prepare earnings and deduction statements for each employee.
- Prepare Deduction Registers.
- Prepare Federal Social Security records, Withholding Tax and Annual Income Tax figures.
- Produce State Unemployment Insurance and statistical reports.
- Produce cost accounting records.

When an individual is employed, a "notification of employment" is prepared for the purpose of providing interested departments with data needed to establish employment and personnel records.



A Master Payroll Card is prepared from the personnel card (notification of employment) to provide, in punched hole form, the data needed to process the payroll records.

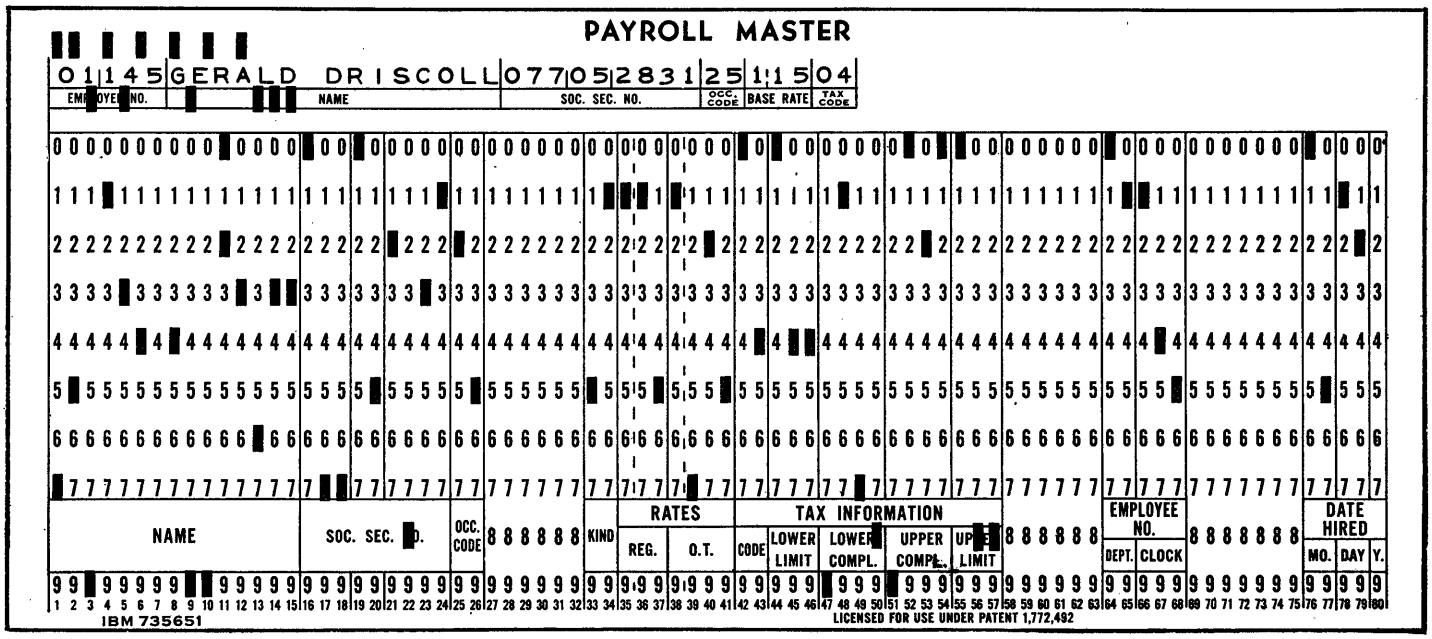
The employee fills out and signs a W-4 Form (U. S. Treasury Department) which provides the employer with the information necessary to compute the Withholding Tax on the employee's earnings.

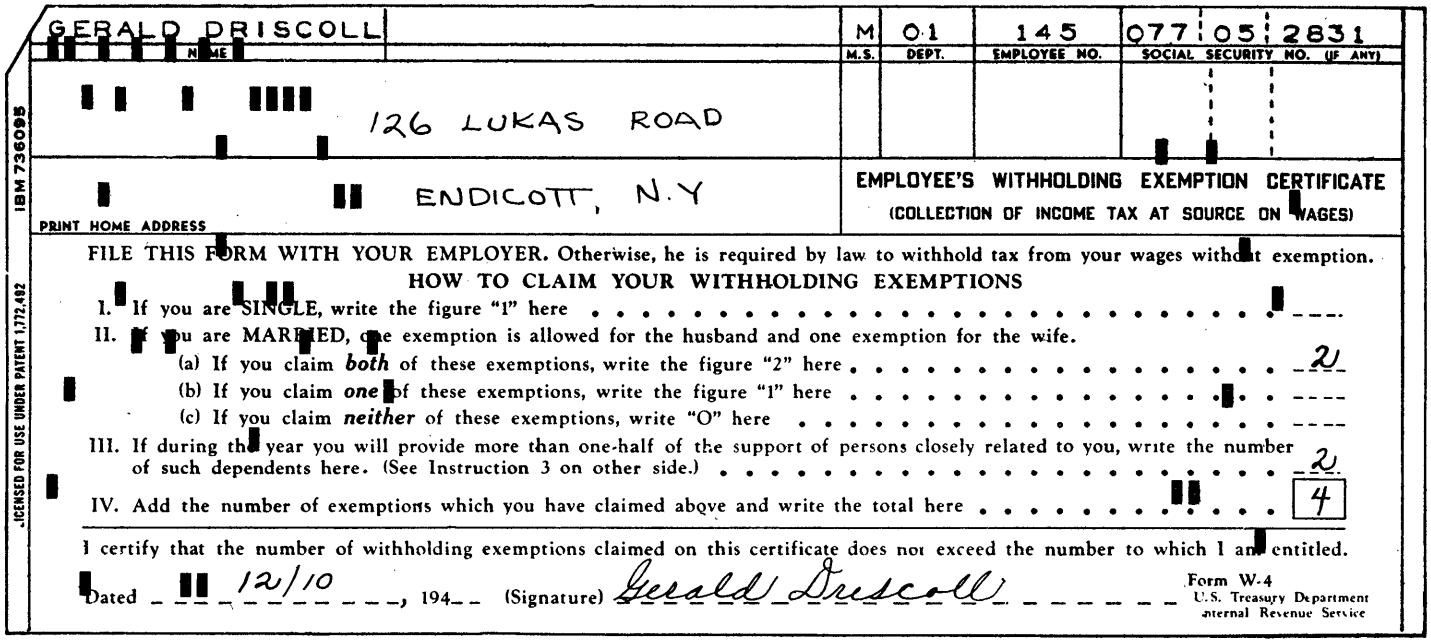
The employee also signs authorizations covering deductions to be made from earnings, such as War Bonds, insurance, charitable donations, etc.

There are two major types of Deductions which the employer must deduct from Gross Earnings to determine the employee's Net Pay:

Compulsory types are:

Withholding Tax
Old Age and Survivors Insurance
State Unemployment Compensation Insurance



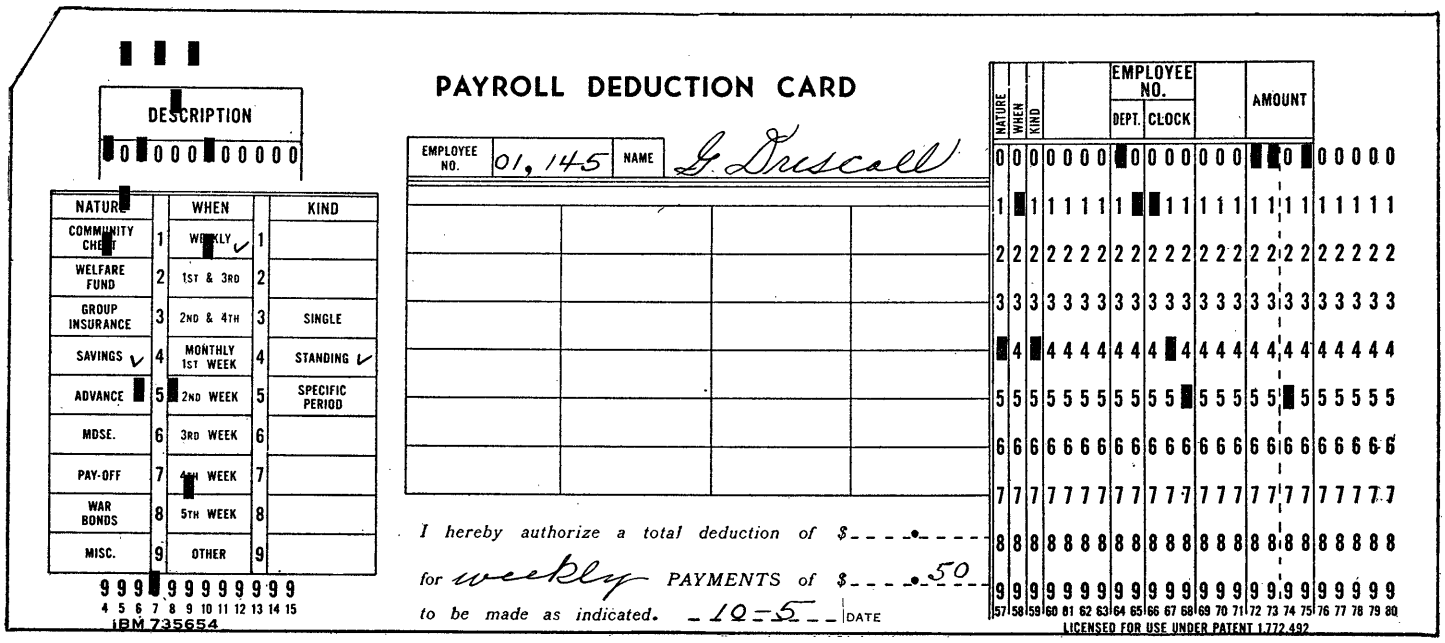


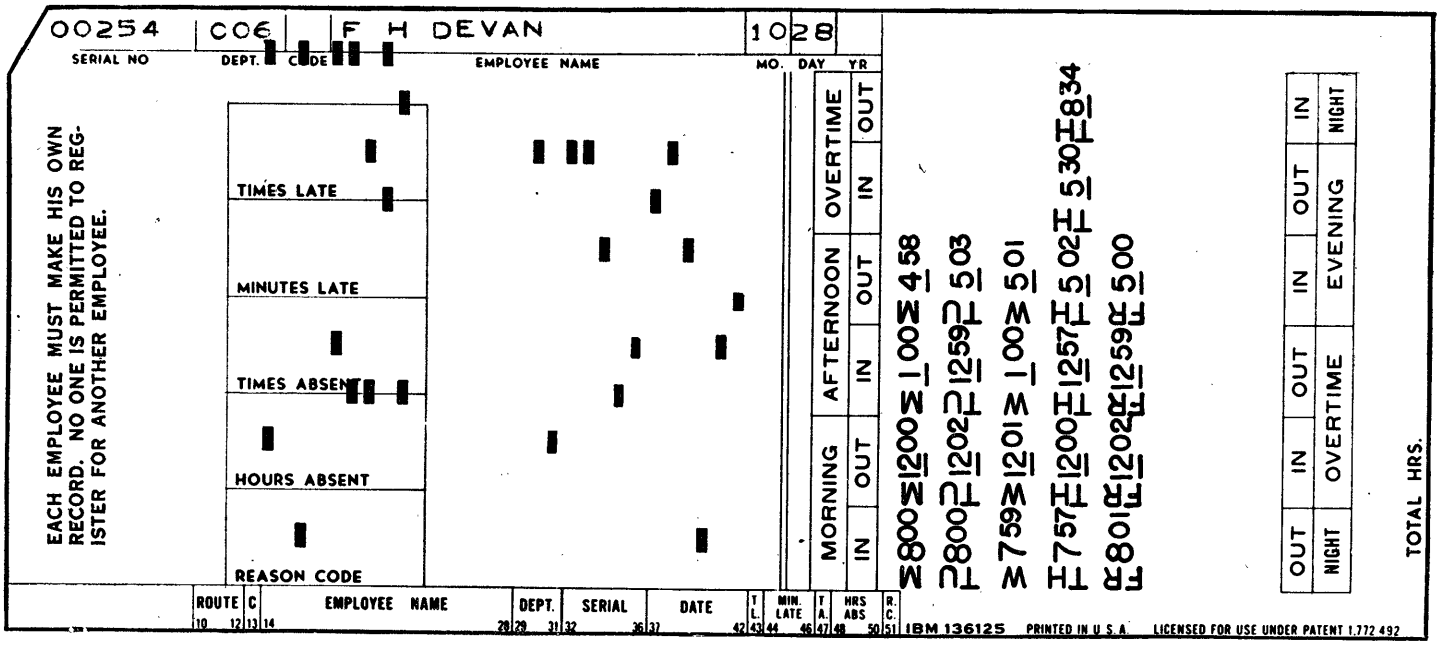
Form W-4 (Withholding Tax Authorization)

Optional types are:

War Bond Purchases
Insurance
Contributions—Red Cross, Community fund, etc.
Tools
Uniforms
Lunch tickets
Advances
Union dues
Other purchases

Attendance time is the time the employee spends at the plant each day. Attendance time is the basis upon which the employee's pay is figured, except when piece work or incentive plans are used. If incentive or piece work plans are used, the employee's pay is figured on the basis of production. It is frequently necessary, how-





IBM Weekly Attendance Card

ever, to calculate the employee's earnings on an hourly basis to determine whether or not the employee, at piece work rates, is earning the minimum hourly rate required by law.

Even though attendance time may not be needed as a basis of figuring earnings, it is necessary to record "in" and "out" time. Accurate and legible recording of the time the employees spend in the plant provides:

Legally acceptable evidence in connection with compensation cases.

A basis for checking and setting piece rates.

Factual data required by the Federal Wages and Hours Law.

IBM "in" and "out" Time Recorders are recognized as the most accurate and efficient means of recording attendance time.

HASKEL SUPPLY COMPANY

18050

16								
15					FR 2104			
14					FR 1800			
13								
12	M 1731	TU 1732		TH 1730	FR 1733			
11			W 1729					
10								
9								
8								
7		TU 1259	W 1258	TH 1258	FR 1300			
6		TU 1200	W 1201	TH 1204	FR 1202			
5	M 1158							
4	M 1100							
3								
2		TU 8 31						
1	M 825		W 825	TH 830	FR 829			
Daily Totals	8-	8-	8-	8-	11-			Weekly Total 43

PRESS OF I. B. M. CORPORATION, ENDICOTT, N. Y., U. S. A.

ITR Weekly Attendance Card

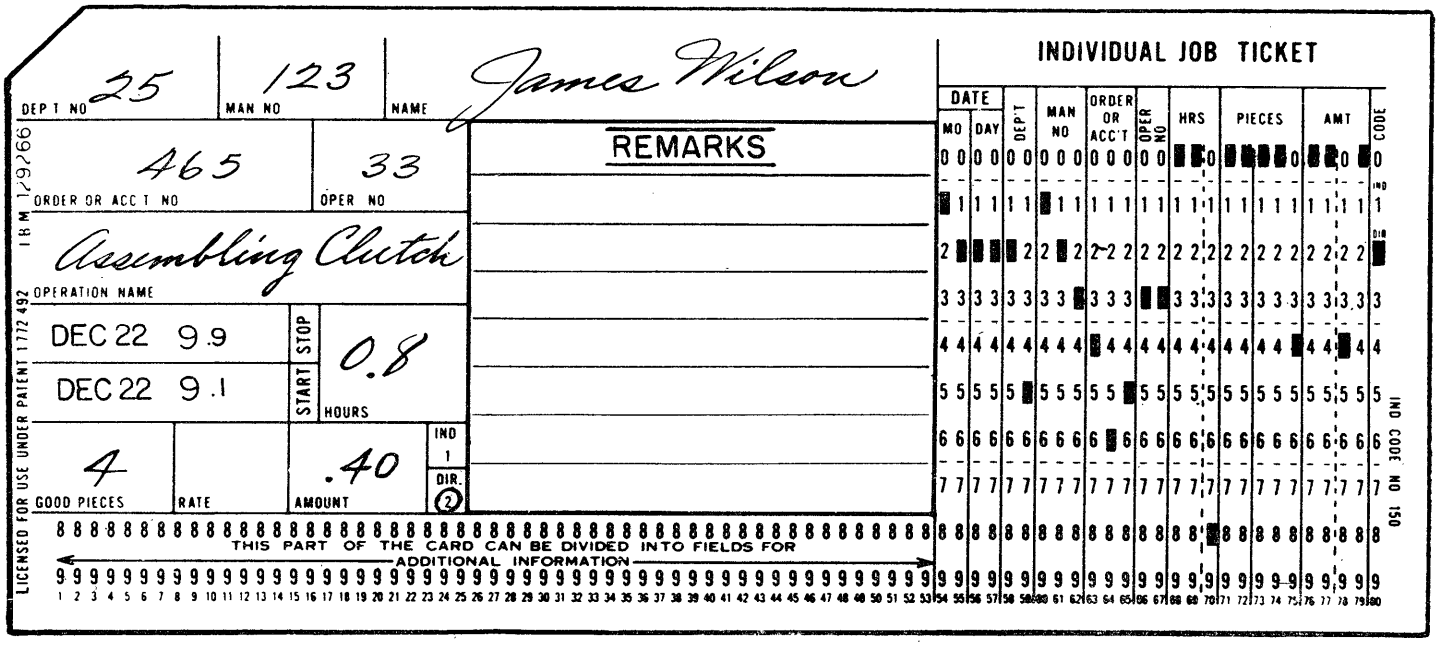
1	857 1201 1257 502
2	859 1202 100 504
3	858 1231 127 503
4	900 1202 1257 502
5	859 1201 100 507
6	900 1233 129 503
7	857 1231 127 502
8	858 101 200 510
9	900 1202 1257 504
10	857 1201 1259 502
11	900 102 200 512
12	858 1231 127 503
13	900 103 200 502
14	857 1202 1259 507
15	858 1201 1257 503
16	1200 508
17	857 1231 128 502
18	900 101 200 505
19	859 1232 129 509
20	857 1201 1258 503
21	857 1201 1257 502
22	859 1202 100 504
23	858 1231 127 503
24	900 1202 1257 502
25	859 1201 100 507
26	900 1233 129 503
27	857 1231 127 502
28	858 101 200 510
29	900 1202 1257 504
30	857 1201 1259 502
31	854 102 200 512
32	858 1231 127 503
33	900 103 200 502
34	857 1202 1259 507
35	858 1201 1257 503
36	859 1202 1250 508
37	857 1231 128 502
38	900 101 200 505
39	859 1232 129 509
40	857 1201 1258 503
41	857

Dial Record

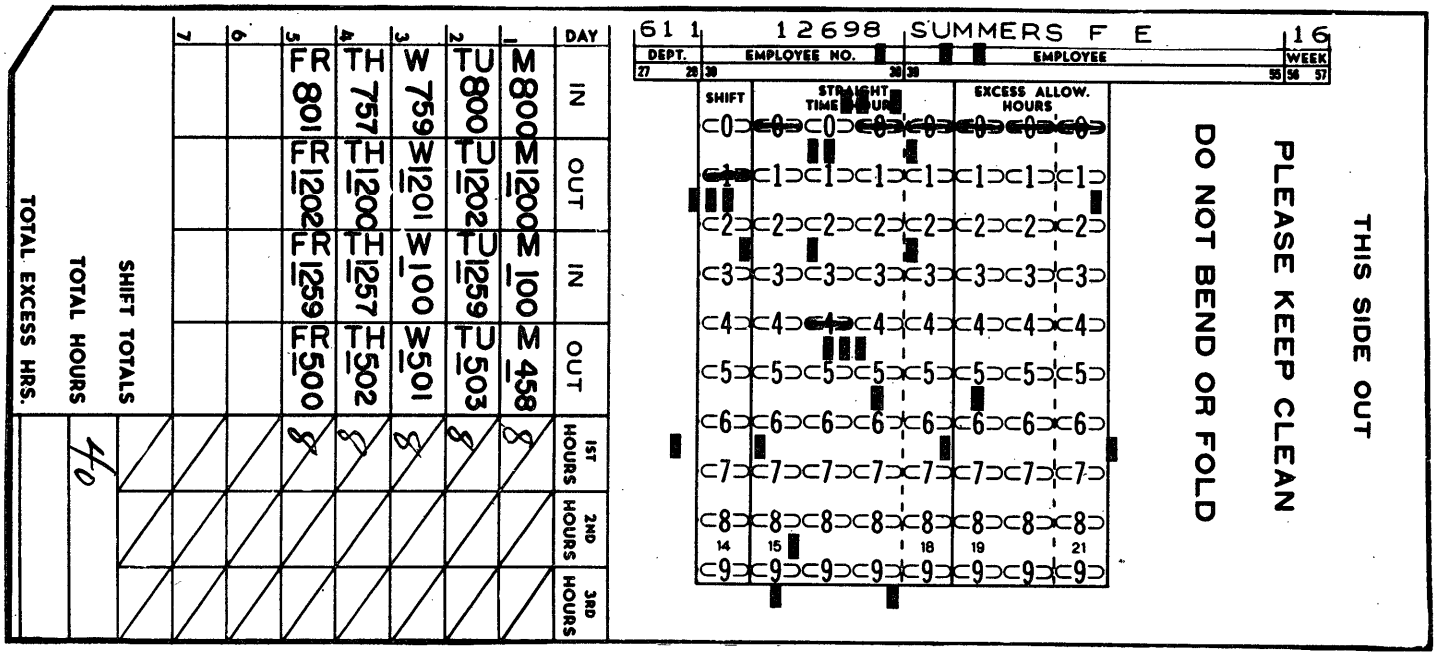
Job time is the time which the employee spends on particular jobs, processes, operations, etc. Accurate and legible recording of job time is necessary to provide accurate cost records. The best means of recording job time is through the use of the IBM Job Recorder.

The following forms may be used for recording and distributing job time:

Individual job card
Continuous job card
Gang job card
Daily time card, and trailer card punched from daily time card.



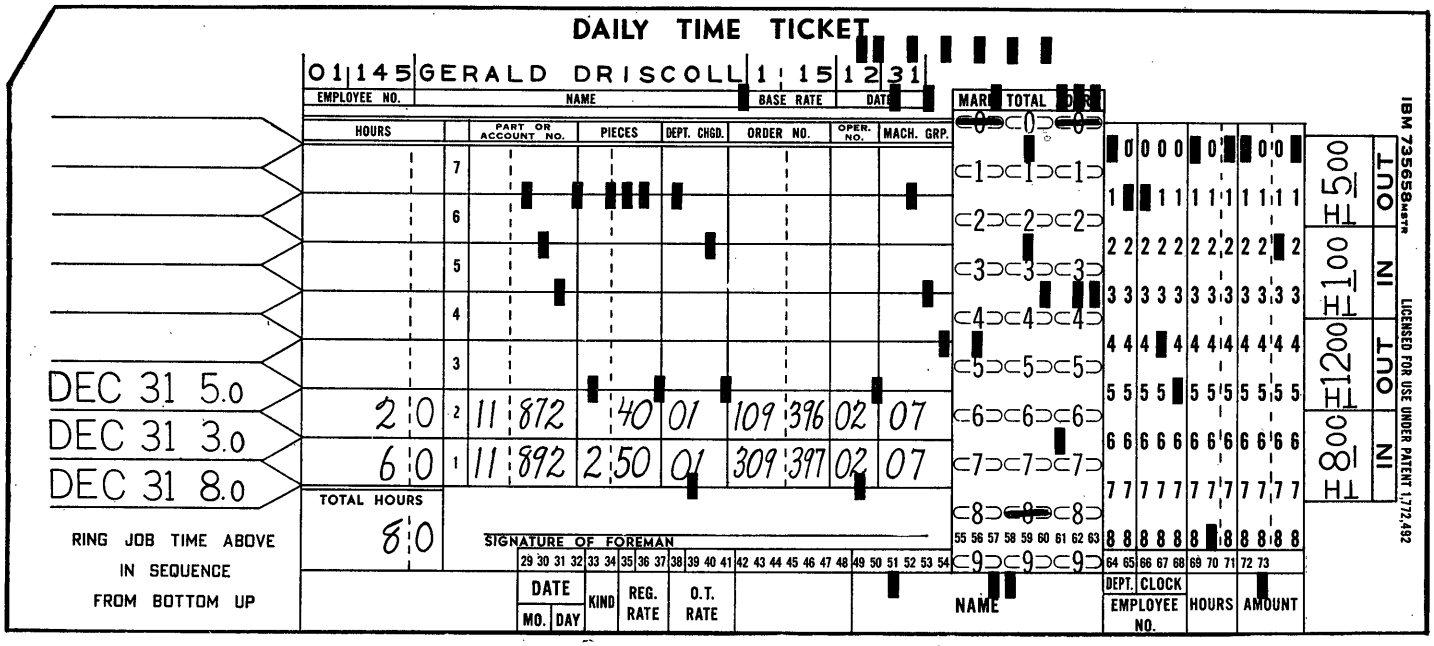
Individual Job Card



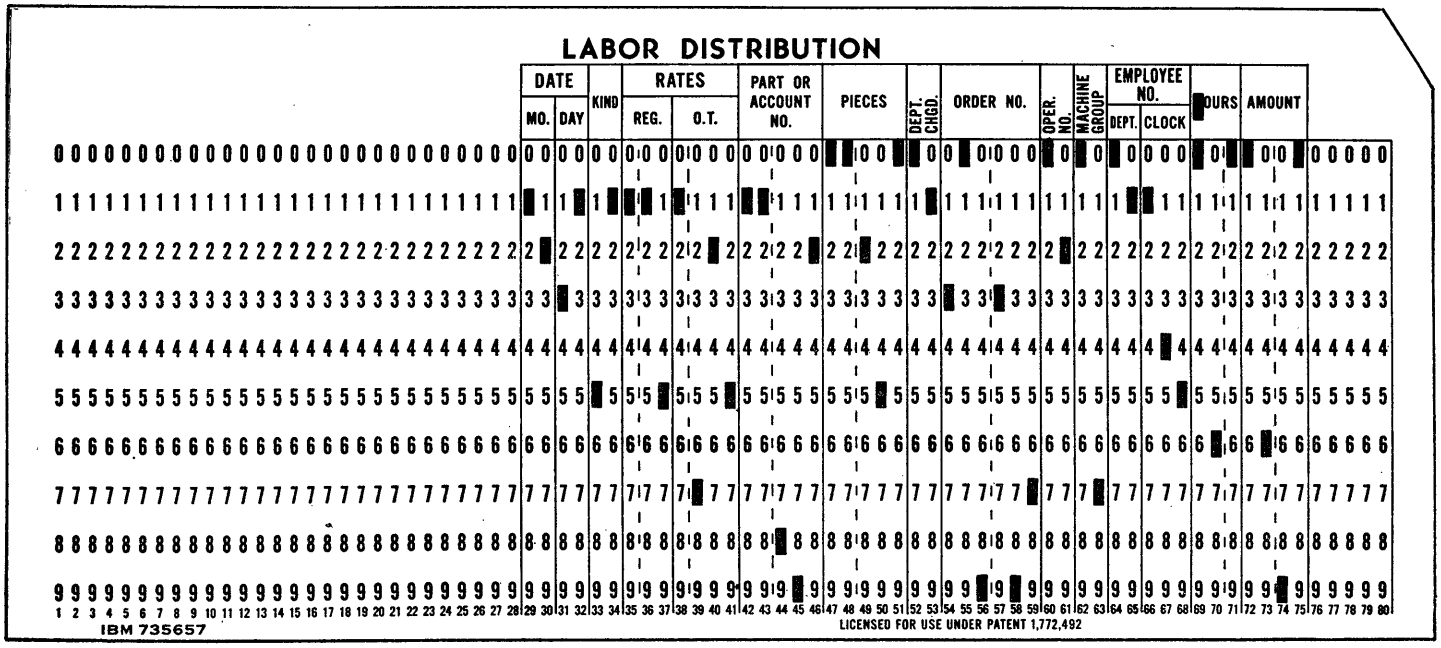
Weekly Attendance Card with Mark Sensing

When the employee is employed, he is assigned a clock number for identification and is issued an attendance clock card. The clock card may be either "daily" or "pay period." This card is used to determine (1) the time the employee works for the employer and (2) the amount earned.

Daily, or at the end of the pay period, the attendance time is figured and entered on the clock card, either by writing or by marking for mark-sense punching.



Daily Time Card



Trailer Card

Each day, or as they are received, the attendance and job time cards are punched, and all information needed for both the payroll and the labor distribution reports is transferred into the IBM cards in the form of punched holes. Whenever the man number and rate, or the job number, can be predetermined and prepunched, the time required for the punching operation can be reduced.

Attendance time is multiplied by the hourly rate to determine the amount of gross earnings. Other factors which may be involved in computing the gross earnings are shift and overtime premiums and production incentives. The IBM Payroll method provides automatic means of making the necessary cross footings for these factors and for computing deductions which are based on gross earnings.

The IBM method provides the following two ways of making extensions on job and attendance cards:

The IBM Multiplying Punch, which automatically computes and punches the extension of hours by rate or quantity produced by piece rate.

The IBM Reproducing Punch, which punches the extensions into the cards from prepunched master extension cards.

Control totals of hours and amounts are established for departments by days.

In some cases the distribution cards are sorted with the payroll cards by man number and listed on a report generally called the Payroll and Labor Distribution Register. In other cases, the payroll cards and the distribution cards are separated after the balancing operation and the Registers are listed separately. In this case the registers are usually prepared for each pay period.

SHEET 1 OF 30

GENERAL MANUFACTURING COMPANY

PAYROLL AND LABOR DISTRIBUTION REGISTER

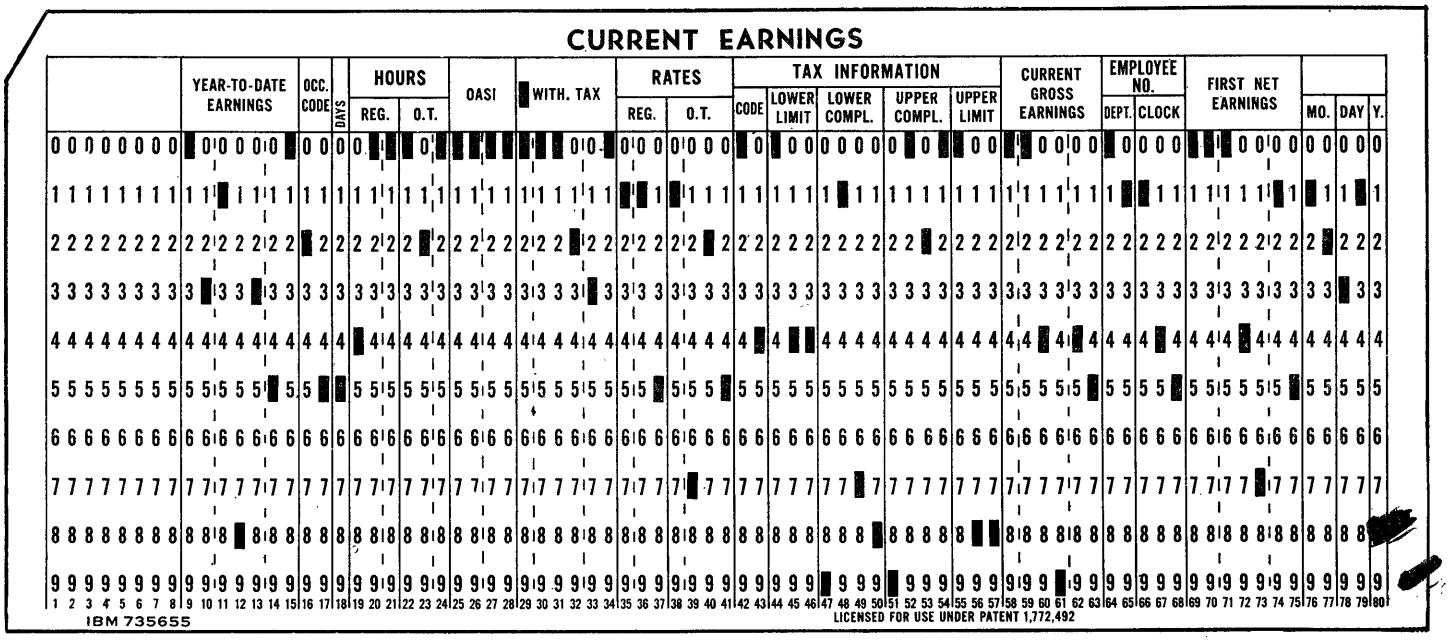
DATE December 31

EMPLOYEE NAME	EMPL. No. DEPT.	EMPL. No. CLOCK	DATE MO.	DATE DAY	ENTRY	RATE	PART No.	OPER.	ORDER No.	HOURS	LABOR COST
FRED ACKERLY	1	13	12	31	53	115				80	920
	1	13	12	31	53	115	212			80	920
										80*	920*
										80*	920*
MILTON CARGIN	1	100	12	31	51	80				80	640
	1	100	12	31	51	80	11895	3	309401	25	200
	1	100	12	31	51	80	11876	3	309384	10	80
	1	100	12	31	51	80	11707	3	309369	10	80
	1	100	12	31	51	80	11892	3	309397	35	280
	1	100	12	31	52	120				20	240
	1	100	12	31	52	120	11892	3	309397	20	240
										100*	880*
										100*	880*
GERALD DRISCOLL	1	145	12	31	51	115				80	920
	1	145	12	31	51	115	11872	2	109396	20	230
	1	145	12	31	51	115	11892	2	309397	60	690
	1	145	12	31	52	1725				20	345
	1	145	12	31	51	1725	11872	2	109396	20	345
										100*	1265*
										100*	1265*
JAMES DUHLMEIER	1	150	12	31	51	65				80	520
	1	150	12	31	51	65	12067	3	409399	80	520
	1	150	12	31	52	975				20	195
	1	150	12	31	52	975	12067	3	409399	20	195
										100*	715*
										100*	715*
CLEMENT EDWARDS	1	170	12	31	51	80				80	640
	1	170	12	31	51	80	12067	1	409399	80	640
	1	170	12	31	52	120				20	240
	1	170	12	31	52	120	12067	2	409399	20	240
										100*	880*
										100*	880*

It is necessary to prepare for each pay period a report called a Payroll Register showing the name, social security number, clock number, hours worked, earnings, deductions, and net pay of each employee.

The Master card, the Gross Earnings card and the Deduction cards automatically compute and print this report on the IBM Accounting Machine.

The same IBM cards are then used to prepare automatically the payroll checks or payroll envelopes (used when payments are made in cash) and statements of earnings and deductions.



Gross Earnings Card

SHEET 1 OF 18

GENERAL MANUFACTURING COMPANY

PAYROLL REGISTER

DATE December 31

NAME / DESCRIPTION	EMPL. No. DEPT.	EMPL. No. CLOCK	TAX CODE	DAYS	BASE RATE	HOURS REGULAR	HOURS OVERTIME	CURRENT GROSS EARNINGS	DEDUCTIONS O. A. S. I.	DEDUCTIONS WITH. TAX	DEDUCTIONS OTHER	CURRENT NET PAY	YEAR TO DATE EARNINGS	YEAR TO DATE O. A. S. I.	YEAR TO DATE WITH. TAX
FRED ACKERLY	1	13	3		115						4				
WELFARE FUND											50				
GROUP INS											75				
ADVANCE											500				
WAR BOND											209				
				5		400		4600	46	360	834	3360	296894	2973	46185*
MILTON CARGIN	1	100	3		80										
SAVINGS											50				
				5		400	20	3440	34	110	50	3246	191991	1922	23950*
GERALD DRISCOLL	1	145	4		115										
WELFARE FUND											50				
SAVINGS											50				
WAR BOND											1875				
				5		400	20	4945		230	1975	2740	318350	3000	42140*
JAMES DUHLMEIER	1	150	6		65										
SAVINGS											50				
				5		400	20	2795	28	50	50	2667	200882	2011	8550*
CLEMENT EDWARDS	1	170	6		80										
WAR BOND											625				
				5		400	20	3440	34	60	625	2721	85256	854	6082*
JOHN EGGLESTON	1	175	5		80										
WELFARE FUND											50				
SAVINGS											50				
				5		400	20	3440	34	60	100	3246	164437	1648	5410*
WILLIAM FRISBIE	1	220	6		75										
SAVINGS											48				
PAYOFF											1714				
				3		240		1800	18	20	1762		231393	2317	14720*
SOCRATES GLEZEN	1	230	6		87										
WELFARE FUND											50				
SAVINGS											50				
				5		400	20	3741	37	70	100	3534	67074	673	4306*

HASKEL SUPPLY COMPANY

PAY TO
PAUL G RUGG

MO.	DAY	YEAR
12	31	

EMPLOYEE NUMBER
2594 $*3567

NOT GOOD FOR AN AMOUNT EXCEEDING 250 DOLLARS

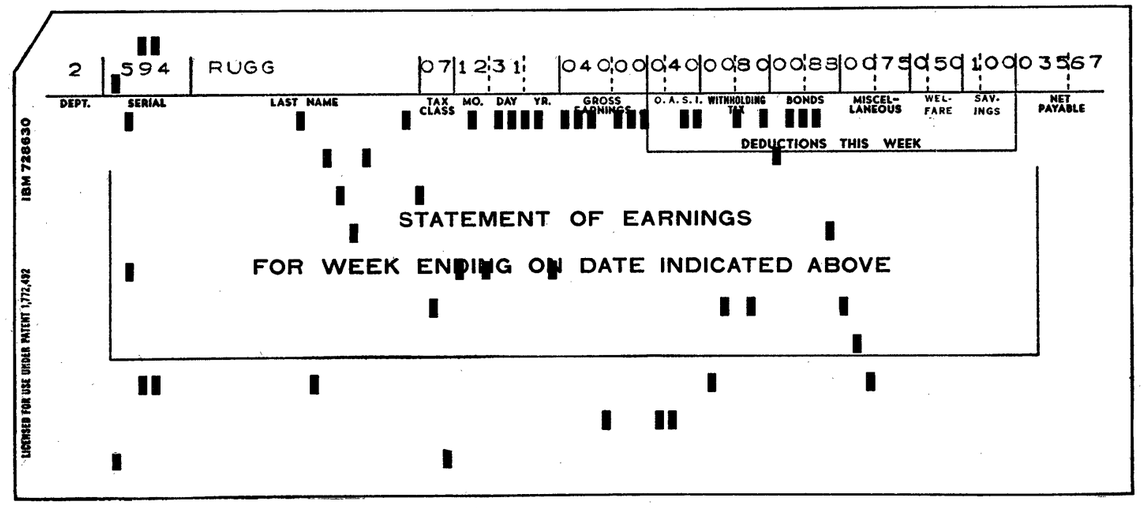
FOR WAGES DUE

PAYABLE, IF PRESENTED WITHIN 60 DAYS FROM DATE, AT

THE STATE BANK

AUTHORIZED SIGNATURE

IBM Card Check



Employee Earnings Statement

GENERAL MANUFACTURING COMPANY
ENDICOTT, NEW YORK

NAME
GERALD DRISCOLL

DEPT.	CLOCK NO.	GROSS	O A S. I.	TAX	
1	145	4945		230	

MO.	DAY	YR.	BONDS	INS.	OTHER	NET PAY
12	31		1875	50	50	2740

SAVE THIS STUB.

IT IS YOUR RECORD OF EARNINGS AND DEDUCTIONS FOR THE WEEK ENDING ON THE ABOVE DATE.

GENERAL MANUFACTURING COMPANY

ENDICOTT, NEW YORK

DO NOT
PAY TO THE ORDER OF

GERALD DRISCOLL

DEPT.	CLOCK NO.
1	145

DATE 12-31-

077-05-2831
SOCIAL SECURITY NUMBER

EXACTLY *27 DOLLARS 40 CENTS

$ *27 40

PAYABLE AT GENERAL BANK AND TRUST CO., ENDICOTT

IBM Card Check with Stub for Employee Earnings Statement

STATEMENT OF EARNINGS AND DEDUCTIONS

SOCIAL SECURITY NUMBER	PAY PERIOD ENDING	GROSS EARNINGS
067041382	1014	4000

PAYROLL DEDUCTIONS

WELFARE	75
GROUP INS	100
SAVINGS	200
O.A.S.I.	40
WITHHOLDING TAX	620

AMOUNT OF CHECK 2965

KEEP THIS STUB

THIS IS A RECORD OF YOUR WAGES AND DEDUCTIONS FOR THE PAY PERIOD ENDING AS SHOWN.

JOHNSON STORES, INC.

NO.

PAY TO THE ORDER OF
THOMAS SCOTT

PAY PERIOD ENDING	DEPT.	SH.	BADGE NUMBER
1014	611	1	201269

PLEASE CASH THIS CHECK PROMPTLY

NOT GOOD FOR MORE THAN $200.00

PAY THIS AMOUNT
$ *2965

TO THE FIRST BANK
PITTSBURGH

FORM 8570 (70-1)

Paper Check

The IBM deduction cards are also used to prepare Deduction Registers. It is common practice to prepare a separate register for each type of deduction. These registers are used for reference, and as a basis of remitting money deducted, i.e., the total Withholding Tax is remitted to the government, total insurance deductions are paid to an insurance company, or the amount deducted to purchase War Bonds is allocated for that purpose.

SHEET 1 OF 2

GENERAL MANUFACTURING COMPANY

DEDUCTION REGISTER December 31

EMPLOYEE NAME	EMPL. No. DEPT.	EMPL. No. CLOCK	DEDUCTION CODE	DEDUCTIONS
FRED ACKERLY	1	13	8	209
GERALD DRISCOLL	1	145	8	1875
CLEMENT EDWARDS	1	170	8	625
BERT GRAHAM	1	245	8	150
MARVIN HIBBARD	1	285	8	150
PAUL HURLBUT	1	315	8	938
ADDISON MANNING	1	397	8	188
JESSIE ROBIE	1	580	8	150
ROBERT BIRD	2	55	8	625

Form SS-1 b
TREASURY DEPARTMENT
INTERNAL REVENUE SERVICE
(Revised Nov. 1940)

SCHEDULE A—EMPLOYER'S REPORT OF TAXABLE WAGES PAID TO EACH EMPLOYEE
CONTINUATION SHEET

PAGE NO.____

Date Quarter Ended December 31

GENERAL MANUFACTURING COMPANY,
ENDICOTT, NEW YORK

Type or print in this space employer's name, address of principal place of business, and identification number exactly as shown in Items 10 and 13 on Form SS-1 a

A SUMMARY SHEET MUST ACCOMPANY THIS FORM
READ INSTRUCTIONS CAREFULLY

↓	Employee's Account Number (17)	Name of Employee (Type or Print) (18)	Taxable Wages Paid Under Federal Insurance Contributions Act (19)	State (20)
	077 05 8948	FRED ACKERLY	750 45	
	077 04 8213	MILTON CARGIN	519 00	
	077 05 2831	GERALD DRISCOLL	795 87	
	077 05 7869	JAMES DUHLMEIER	506 02	
	077 05 2389	CLEMENT EDWARDS	247 75	
	077 05 9832	JOHN EGGLESTON	411 02	
	077 05 2314	WILLIAM FRISBIE	613 39	

SECTIONS ON REVERSE OF FORM SS-1a

SS-1 b Report

Government regulations require the following reports to the Federal Government:

Social Security Report of employee's gross earnings. This is due within thirty days after end of each calendar quarter.

Income Tax Report of employee's gross earnings and Withholding Tax deductions. This is prepared annually or upon the termination of a man's employment with the company. The accumulated earnings can be carried forward from pay period to pay period by the use of the IBM Summary Punch.

Form W-2 (Rev.)
U. S. Treasury Department
Internal Revenue Service

WITHHOLDING RECEIPT
For Income Tax Withheld on Wages

ORIGINAL - 1

To EMPLOYEE: This Withholding Receipt may be used as your income tax return if your 1944 income meets the TEST.
A married couple may make a combined return on this Withholding Receipt, if their total income meets the test. Their incomes should be combined on Lines 1, 2, and 3, and shown separately on Line 4. The Collector of Internal Revenue will figure the tax on either the combined or the separate incomes, whichever is to the taxpayers' advantage.
LINE 1 Write total of wages shown on this and all your other 1944 Withholding Receipts (Form W-2) . . . . . $_____
LINE 2 If you got any wages from which no tax was withheld, or any dividends or interest, write total . . . . $_____
LINE 3 Add Lines 1 and 2. Write total here $_____

TEST: If Line 2 is not over $100 AND Line 3 is less than $5,000, you may use this Withholding Receipt as your return provided you had no income other than wages, dividends, and interest. If your income does not meet this test, use Form 1040.
LINE 4 If Line 3 includes income of both husband and wife, show husband's income here $_____; wife's income here $_____
LINE 5 If you filed a 1944 Declaration of Estimated Tax (Form 1040-ES), write total of estimated tax paid . . $_____
To EMPLOYEE: Change name and address if not correctly shown

Employee No.	EMPLOYEE TO WHOM PAID (Name and Address)	Marital Status Code 1-Single 2-Married 3-Head of Family	Social Security No.	Gross Wages Paid During the Calendar Year 1944	Federal Income Tax Withheld
1145	MR GERALD DRISCOLL 126 LUKAS ROAD ENDICOTT NY	3	077052831	318350	42140

EMPLOYER•BY WHOM PAID (Name and Address of Employer)

GENERAL MANUFACTURING COMPANY.
ENDICOTT. NEW YORK

DO NOT WRITE IN THIS SPACE

(over)

W-2 (Income Tax Report)

0812 06 3792 JOHN MORRIS
SOCIAL SECURITY NUMBER — ITEM 1. — EMPLOYEE NAME

UC-2A

654 00	692 25	585 00	600 00	2531 25
FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER	ITEM 3. TOTAL WAGES

ITEM 2.
EMPLOYER
NAME
ADDRESS
PA. NO.

Union Merchandising Corp.
Center, N. Y.
01-72-541

DEFINED BY THE PENNSYLVANIA UNEMPLOYMENT COMPENSATION LAW AND RULES AND REGULATIONS PAID TO EMPLOYEE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF LABOR AND INDUSTRY

EMPLOYER'S ANNUAL REPORT OF
WAGES PAID TO EACH EMPLOYEE

BUREAU OF EMPLOYMENT AND
UNEMPLOYMENT COMPENSATION

THERE MUST BE ONE COPY OF THIS FORM FOR EACH EMPLOYEE ATTACH TO FORM UC-2'S SUMMARY

IBM 729703

LICENSED FOR USE UNDER PATENT 1,772,492

Pennsylvania Unemployment Compensation Report

Regulations of the various States require the following reports:

Unemployment Compensation Employee Wage Report. The type of report and the reporting period vary in different states. Two representative forms are shown.

Income Tax Report of employee's gross earnings; required annually by states having income tax laws.

In some states, employers furnish statistical data on employment to Federal Reserve Banks and other government agencies.

Many employers must furnish reports to State Labor Departments concerning employment by sex, age group, etc.

In addition to the records prepared for the employee and for the Federal and State agencies, the employer maintains historical records of each employee's earnings.

FORM N. C. U. C. 47—12-27 —1,600M

1. PERIOD ENDED	2. EMPLOYEE'S ACCOUNT NUMBER	3. EMPLOYEE'S NAME	4. TAXABLE WAGES PAID TO WORKERS
12 31	716593	G E BROWN	A. TOTAL SUM OF (B) AND (C) . . . . . $ 2 7 5 6 0 0
			B. MONEY WAGES . . . $ 2 6 0 0 0 0
			C. OTHER REMUNERATION $ 1 5 6 0 0

5. EMPLOYER'S N. C. U. C. NUMBER, NAME AND ADDRESS:

JOHN SMITH CORP.
NEW YORK, N. Y.
54-11-003

6. DATE IN _____ 7. DATE OUT _____

A REPORT MUST BE PREPARED FOR EACH WORKER FOR EACH QUARTER, OR UNTIL YOU HAVE REPORTED $3,000 FOR A WORKER WITH RESPECT TO EMPLOYMENT IN A CALENDAR YEAR. DO NOT REPORT WAGES IN EXCESS OF $3,000 WITH RESPECT TO EMPLOYMENT IN A CALENDAR YEAR.

THE TOTAL OF ITEMS 4 (A) FOR A QUARTER MUST AGREE WITH ITEM 2 ON FORM N.C.U.C. No. 46, EMPLOYER'S QUARTERLY SUMMARY REPORT OF WAGES PAID TO WORKERS.

EMPLOYER'S REPORT OF WAGES PAID TO INDIVIDUAL WORKER

ONE ORIGINAL COPY OF THIS FORM FOR EACH EMPLOYEE MUST BE ATTACHED TO AND FILED WITH FORM N. C. U. C. 46, UNEMPLOYMENT COMPENSATION COMMISSION OF NORTH CAROLINA, RALEIGH, N. C. READ CAREFULLY INSTRUCTIONS ATTACHED TO FORM N. C. U. C. 46.

North Carolina Unemployment Compensation Report

Form 105 Special
NEW YORK STATE
INCOME TAX

RETURN OF INFORMATION AT SOURCE
FOR CALENDAR YEAR

NAME AND ADDRESS TO WHOM PAID

WILLIAM MORRIS
BANK STREET
CENTER NY

(IF EMPLOYEE IS A MARRIED WOMAN, NAME OF HUSBAND SHOULD BE FURNISHED)

M. OR S.	SALARIES, WAGES, FEES, COMMISSIONS, BONUSES
M	2 1 0 4 5 0

SINGLE 1 ☐
☐ MARRIED 2

The Taxpayer is required to file a return with the New York State Income Tax Bureau on or before April 15, 1944 if his combined gross income and capital gain equals or exceeds $5,000, or if his combined net income and net capital gain equals or exceeds $ 1,000, if single, or $2,500, if married. The $2,500, limitation is to be applied against the aggregate net income and net capital gain of both husband and wife.

By Whom Paid (Name and Address)

NATIONAL CORPORATION
NEW YORK, NEW YORK

13-0871985

IBM 730782

INSTRUCTIONS TO PAYORS

Prepare one of these forms for each payee in accordance with the instructions on return Form 106.

Forward with return Form 106 so as to reach the New York State Income Tax Bureau, Albany, N. Y., on or before February 15, 1944.

This form to be used only for personal service compensation.

IBM 730072

ISSUED FOR USE UNDER PATENT 1,772,492

New York State Income Tax Report

EMPL. No. 7743 NAME OF EMPLOYEE GEORGE JOHNSON

EMPLOYEE'S EARNINGS RECORD

EMPL. No.	NAME	DATE MO.	DATE DAY	HOURS	EARNINGS * IF NON-TAXABLE	FEDERAL O A B TAX	WITHHOLDING TAX	EARNINGS TO DATE
7743	GEORGE JOHNSON	8	07	400	3200	32	560	150000
7743	GEORGE JOHNSON	8	14	400	3200	32	560	153200
7743	GEORGE JOHNSON	8	21	400	3200	32	560	156400
7743	GEORGE JOHNSON	8	28	400	3200	32	560	159600
7743	GEORGE JOHNSON	9	04	400	3200	32	560	162800
7743	GEORGE JOHNSON	9	11	400	3200	32	560	166000
7743	GEORGE JOHNSON	9	18	400	3200	32	560	169200

Ledger Prepared by IBM Facsimile Posting Machine

1145 CLOCK NUMBER — GERALD DRISCOLL NAME — 4 QTR — 19 YEAR — 077052831 SOCIAL SECURITY NO.

EMPLOYEE'S EARNINGS RECORD

ROLL	CLOCK NUMBER	ATTN. HOURS	WEEKLY GROSS	WEEKLY F.O.A.B.	WEEKLY WITH. TAX	YEAR TO DATE GROSS	YR. TO DATE F.O.A.B.	YR. TO DATE WITH. TAX	S.S. NUMBER
1	1145	432	5152	52	270	243915	2438	36350	2831
2	1145	550	7188	72	670	251103	2510	37020	2831
3	1145	541	7032	70	670	258135	2580	37690	2831
4	1145	473	5859	59	410	263994	2639	38100	2831
5	1145	551	7205	72	710	271199	2711	38810	2831
6	1145	480	5980	60	430	277179	2771	39240	2831
7	1145	490	6153	62	460	283332	2833	39700	2831
8	1145	440	5290	53	290	288622	2886	39990	2831
9	1145	510	6498	65	550	295120	2951	40540	2831
10	1145	480	5980	49	430	301100	3011	40970	2831
11	1145	480	5980		430	307080	3070	41400	2831
12	1145	500	6325		510	313405	3134	41910	2831
13	1145	420	4945		230	318350	3183	42140	2831
SPEC.									
SPEC.									
SPEC.									

Ledger Prepared by IBM Electric Accounting Machine with Bill Feed

IBM Accounting makes possible the preparation of all of the following records and reports which are essential to good control of Payroll accounting:

Pre-written time cards
Control totals
Payroll Register
Deduction Registers
Payroll checks or envelopes
Denominated Cash Payroll
Employees' pay statements
Social Security statement
State and Federal Income Tax Reports
State Unemployment Compensation Wage Reports
Employee Earnings Records
State Workmen's Compensation Reports

Management also needs other figure facts, more related to management control than to accounting, in order to control a business profitably. Answers to questions like the following are needed:

How many employees are on the payroll?
What are the average hourly earnings per employee?
What is the average number of hours worked?
What is the average age of the employee?
How many employees by age group?
What is the labor turnover? Number hired? Number separated?
In what departments is the labor turnover excessive?
What is the average hourly earnings rate by occupations?
How many employees are contributing to the Community Chest?
How many man-hours are available by departments?
How many man-hours are needed by departments?
How much idle time, by departments?
Is the absenteeism excessive? Where? Why?
What are the average hourly earnings by sex, age, marital status, etc.?
What are the average incentive and overtime earnings?

LABOR ACCOUNTING

Labor accounting is the classifying and accumulating of labor costs by order numbers and department expense accounts. This phase of accounting reveals to management the labor cost of the finished products.

The manner in which costs are distributed varies according to the nature of the product. Most cost systems fall into one of two general classes:

Process Cost Systems—A company manufacturing a staple or standard product for a steady market usually operates under a process cost system. In this type of industry, the same products are being continually processed. Process cost systems are used in the manufacturing of such products as oil, chemicals, paper, flour and textiles.

Job Order Cost Systems—A company manufacturing a specialty that has to conform to individual specifications would be required to quote selling prices in advance of production and would maintain job order costs to determine the profit on each job and to use as a guide in quoting prices and establishing selling prices on future orders. Job order cost systems are used by such industries as machine shops, foundries, and machine tool manufacturers.

Under either the process cost system or the job cost system, there are two classes of labor cost to be distributed:

Direct or production labor—charges which can be applied directly to a specific product, job, process, or department.

Indirect or non-productive labor—charges which cannot be applied to a specific product, job, process, or department, such as cleaning, sweeping, supervising, clerical, or maintenance costs. Indirect costs, as a group, are commonly called "burden," "overhead," or "manufacturing expense."

Standard labor cost affords a means of determining what the labor used in producing a commodity should be. This value is established by calculating the time it should take to perform an operation and the money evaluation of the labor skill required. This is set as a standard, and costs are figured on the standard only, or on both the standard and the actual. The difference between the standard cost and the actual cost is called the variance. Standards may be used in either the process system or the job cost system.

IBM Accounting Machines, because of their flexibility, are successfully applied to the accumulation of labor cost on process or job cost systems, with or without standards.

The source records for payroll distribution, in most cases, are the job tickets which are initially used to prepare payroll records. They may be either individual job cards, daily time cards, continuous job cards, or gang job cards.

IBM distribution cards punched for each job are balanced with the payroll controls by departments. They are then listed by man number on a report which is generally called the Labor Distribution Register. This is used for reference and to balance to control totals.

DETAIL COST STATEMENT

5012 CYLINDER LINER 61538 DATE _____

ORDER No.	MATERIAL CODE CLASS / OPER.	MATERIAL CODE ASSEMBLY No.	DEPT	QUANTITY	HOURS	MATERIAL	LABOR	BURDEN	TOTAL
5012	1	11	3	7	34		221	442	663
						*	221 *	442 *	663 *
5012	821	12		7		82922			82922
5012	1	12	6		193		1544	3088	4632
5012	1	12	6		14		1190	2380	3570
5012	1	12	6	7	196		1666	3332	4998
5012	1	12	6		26		2080	4160	6240
5012	2	12	6	2	54		513	1026	1539
5012	2	12	6	5	13		1235	2470	3705
5012	4	12	7		27		135	270	405
5012	4	12	7		315		1575	3150	4725
5012	4	12	7	1	16		80	160	240
5012	5	12	6	2	85		808	1616	2424
5012	5	12	6		71		674	1348	2022
5012	5	12	6	5	176		1672	3344	5016
5012	6	12	1	7	226		1130	2260	3390
5012	7	12	1		16		1360	2720	4080
5012	7	12	1	1	197		1576	3152	4728
5012	7	12	1	6	197		1674	3348	5022
5012	7	12	1		136		1088	2176	3264
5012	8	12	4		24		96	192	288
5012	8	12	4	7	161		644	1288	1932
5012	9	12	1	7	162		1539	3078	4617
						82922 *	22279 *	44558 *	149759 *
5012	423	13		315		595			595
						595 *	*	*	595 *
5012	720	25		21		23			23
						23 *	*	*	23 *

The direct labor job tickets are sorted out and filed in the work-in-process cost file behind the heading cards showing the order number, product number or operation number, depending on the basis for determining costs.

Periodically, or when an order is completed, the IBM cards are removed from the file and used to prepare detailed cost statements.

The indirect labor job tickets are filed in the expense file by date and account number. At the end of the accounting period, they are removed from the file and used to prepare a report of indirect labor by accounts.

SHEET 2 OF 3

GENERAL MANUFACTURING COMPANY

INDIRECT LABOR

CLASSIFIED BY ACCOUNTS AND DEPARTMENTS December 31

ACCOUNT No.	ACCOUNT NAME	DEPT.	HOURS	AMOUNT
211	SUPERVISION			
211		1	640	8800
211		2	640	8896
211		3	640	10240
211		4	640	9920
211		12	640	9120
211		14	640	10560
211		16	640	9760
211		23	640	9280
211		26	640	9120
211		28	640	8800
211		40	320	5440
211		41	320	4800
211		43	320	4160
211		45	240	3720
			7600	112616*
212	SET UP			
212		1	640	7360
212		2	320	4000
212		3	640	8320
212		4	640	9920
212		12	320	4000
212		14	320	4320
212		16	320	4000
			3200	41920*
221	ACCOUNTANT			
221		40	320	5440
			320	5440*
222	TIMEKEEPER			
222		40	960	14720
			960	14720*
223	SECRETARY			
223		40	320	4800
			320	4800*
224	STENOGRAPHER			
224		40	320	5280
			320	5280*
225	CLERK			
225		40	640	9120
			640	9120*

Estimates on jobs are usually made before production is started, and management needs to determine whether these estimates are met. Management also needs to furnish the department heads with Performance Reports, in order that they may do an effective supervisory job.

DAILY PERFORMANCE RECORD

PART No.	OPER. No.	MACHINE GROUP	PIECES FINISHED	MAN No.	STANDARD HOURS	ACTUAL HOURS
17334	5	98	95	5007	1 5	1 2
17334	900	98	1	5007	2 5	2 3
122104	5	99	300	5008	2 9	2 8
122104	900	99	1	5008	1 3	1 1
122104	900	99	1	5008	1 3	1 2
109305	5	99	150	5008	1 7	1 3
122104	10	99	205	5008	2 3	2 1
106391	5	99	230	5012	1 0	8
106391	900	99	1	5012	1 3	1 1
107451	900	99	1	5012	1 3	1 2
152214	5	99	250	5013	2 3	1 9
133099	5	98	500	5013	8 5	7 6
152214	900	99	1	5013	1 3	1 2
68902	5	99	525	5013	5 3	4 3
145869	5	98	400	5014	12 0	11 7
133085	10	98	50	5014	1 0	1 0
133085	900	98	1	5014	2 5	2 2
102824	10	93	256	5015	19 7	18 0
112820	5	98	117	5017	16 5	13 2
4436	5	93	98	5020	2 35	2 03
25807	5	93	37	5028	8 3	8 0
28712	15	94	222	5031	18 2	16 4
85282	10	93	27	5033	2 8	2 8
115037	5	97	146	5038	8 3	8 0
106607	15	93	35	5041	7 5	6 8
115033	5	98	216	5044	15 1	13 5
25574	900	99	1	5050	1 3	1 3
152228	900	90	1	5050	1 3	1 1
152228	5	99	150	5050	1 7	1 3
151100	15	99	89	5050	9	7
68656	5	99	525	5057	3 1	2 9
133120	10	99	300	5057	4 8	4 6

DEPARTMENTAL EFFICIENCY
COSTS HIGHER THAN STANDARD

PIECE	HOURS			COST		
	ACTUAL	STANDARD	VARIANCE	ACTUAL	STANDARD	VARIANCE
127392	8 6	8 2	4 CR	6 88	6 60	28 CR
127482	10 5	10 5		8 93	7 56	1 37 CR
128825	18 0	17 2	8 CR	14 04	12 42	1 62 CR
128920	2 3	2 0	3 CR	2 25	1 96	29 CR
132072	6 2	6 1	1 CR	5 46	5 24	22 CR
132180	12 3	12 5	2	7 38	7 20	18 CR

The president, treasurer, controller, auditor, paymaster, and other department heads use IBM Payroll and Labor Accounting because:

It furnishes complete control over the payroll figures.

It furnishes an automatic audit by employee between the Payroll and Labor Distribution.

It supplies necessary reports for Federal and State Social Security records.

It provides ready means of locating errors resulting from incorrect time reporting.

It reveals the cost of the finished product.

It provides a basis for establishing selling prices.

It provides a basis for analyzing payrolls in order to check distribution of time (productive and non-productive, piece work, day work, etc.).

It supplies a check on time study allowances and piece work rates.

It serves as a basis for securing current information regarding shop activities in order to correct unsatisfatcory conditions immediately.

It furnishes a sound basis for bank loans.

It provides a foundation for efficient supervision over waste, such as scrap loss, idle time, etc.

It provides a basis for the standardization of products.

It provides a basis for determining machine tool requirements and practical operating capacities.

It supplies the means of analyzing the details of costs.

It provides the basis for pricing inventories.

It furnishes a ready means of deciding whether it is more profitable to manufacture certain parts or to purchase them from another company.

Outstanding payroll checks can be reconciled automatically to the bank statement.

It reveals waste caused by:
- Piece work allowances
- Day rate guarantees
- Idle time (showing reasons and costs)
- Production delays
- Bad stock
- Machine breakdowns
- Excessive overtime
- Excessive indirect labor
- Excessive re-operative labor

It can show the relative efficiency of the day and night shifts.

It can show the relative efficiency of various types and ages of machines.

It can supply figures to aid in judging the effect of any new plan of labor compensation.

It compiles group statistics concerning employees' earnings, occupation, marital status, educational background, previous experience, health, age, nativity, accidents and similar elements.

With information compiled in this manner, it becomes possible for management to formulate broad general policies relevant to wages, employee welfare, insurance coverage, retirement plans, expansion or contraction of working forces, establishment of employment qualifications and other personnel matters.

It permits the control of expense through adoption of budgetary control and the furnishing of managerial control figures showing budget figures, actual performance, and variations from budget estimates.

It furnishes operating executives with information that may be studied to show the performance of men, machines, and products which are failing to meet established standards.

It will improve planning because analysis of work completed, work-in-process and work ahead may be analyzed by department, machine group, product or part, manufacturing period, reasons for delays, etc.

IBM Payroll and Labor Accounting provides the following advantages:

IBM cards, once punched and proved, are permanent and unalterable; they eliminate errors resulting from omissions and transposition of figures.

The IBM Sorting Machine eliminates the costly filing of source data for compilation.

Mechanical sorting removes errors caused by incorrect filing.

Labor cost analyses can be used effectively as a means of control, because the reports are furnished immediately after the activity takes place.

The IBM method assures positive agreement of distribution and payroll costs; without such agreement, the way is open for distortions of operating facts and figures which may assume dangerous proportions.

The IBM Summary Punch provides automatically the recapitulation of detail figures.

The IBM Summary Punch automatically prepares cumulative reports.

The IBM Multiplying Punch eliminates the costly manual operation of rating, checking and extending time cards.

Accrued Payrolls can be furnished daily, if desired.

The accurate splitting of weekly payroll, when the payroll period overlaps the end of the accounting period, is facilitated.

The foreman can secure quickly a current analysis of labor expense in his department.

Daily report of individual earnings and efficiency can be furnished as required by some wage incentive plans.

Development of methods to meet changing conditions is simplified.

Management is furnished with facts needed to make sound decisions and correct unprofitable company policies.

Peak loads can be reduced to a minimum.

IBM Accounting Machines make it possible to prepare additional reports, required by Social Security and labor control legislation, on an economical basis.

Supervision is simplified, because the IBM method provides the means of obtaining a maximum of production in the office through the elimination of routine drudgery and fatiguing operations.

Internal and external audits are completed rapidly and with a minimum of disturbance to the regular accounting routine.

Audit by spot checking is simplified through the use of the automatic sorting operation to segregate the detail transaction cards for the specific classifications to be checked.

The IBM method enables management to make decisions based on *facts*.

GLOSSARY

ATTENDANCE CARD—A card showing the time an employee spent at his place of employment. Except under piecework and incentive systems, the employee's pay is usually computed from this card. The card may cover an entire pay period, or only one day. IBM "in" and "out" Time Recorders should always be used to record attendance time on the attendance card.

ATTENDANCE TIME—The time an employee spent at his place of employment. IBM Time Recorders are recognized as the most accurate and efficient means of recording attendance time.

BEDAUX PLAN—A wage incentive plan in which a standard is established for each job or operation in terms of the amount of work that may be finished in one minute by an average worker, operating at normal speed. The employee who finished during an 8-hour day jobs or operations on which the total allowed time (standard) was 480 minutes (8 hours x 60 minutes) or less, would be paid at his regular hourly rate. If he finished jobs or operations on which the total allowed time was in excess of 480 minutes, he would receive a premium on 75 per cent of the excess minutes at his regular hourly rate. It is customary to express the time factor in "B's" and one minute is called one B.

BONUS PLAN, GROUP—The earnings of each employee are increased when the production by the group of several employees with whom he works is in excess of a set standard.

BONUS PLAN, INDIVIDUAL—The earnings of an employee are increased when his individual production is in excess of a set standard.

BURDEN—That part of the cost of manufacturing which is not directly productive. It is usually composed of items of cost that do not change with variations in production. It includes such items as rent, telephone, secretarial service, etc. In cost accounting it is synonymous with "overhead."

CLOCK CARD—This item is synonymous with the term "attendance card." Attendance time is most accurately and efficiently recorded by use of the IBM Time Recorders.

CLOCK NUMBER—A serial number assigned to an employee for identification purposes to simplify accounting for his time and earnings.

CONTINUOUS JOB CARD—A card containing all pertinent facts concerning the work of one employee on one order number, process, department, operation, etc., during successive days within a pay period.

CONTROL—In payroll and labor distribution, the totals of hours, amounts, etc., set up from attendance cards or other source documents, as figures with which all subsequent reports must balance.

COST SYSTEM—A systematic record of all financial transactions pertaining to factory work, and the relation of these transactions to production factors, properly interpreted to disclose the cost of performing a given task.

DAILY TIME CARD—A card containing all pertinent facts concerning every order number, process, department, operation, etc., on which one employee worked on one day.

DEDUCTION CARD—A card containing pertinent facts concerning an amount to be deducted from an employee's pay for such items as charity contributions, insurance premiums, War Bond purchases, etc.

DEDUCTION REGISTER—A list showing the amounts deducted from each employee's earnings as well as the reason for the deduction. The lists are usually prepared by type of deduction.

DENOMINATING CASH PAYROLL—Determining the total number of bills and coins of each denomination required to make up each employee's pay with the minimum number of bills and coins.

DIRECT LABOR—The work applied directly to the product being manufactured.

DUAL CARD—A card on which data are recorded in writing as well as by punched holes.

EARNINGS RECORD, EMPLOYEE—A record containing the earnings data of an employee for all pay periods.

EARNINGS STATEMENT, EMPLOYEE—A report given an employee, usually at the time he is paid, showing the factors pertinent to calculating his earnings, deductions, and net pay.

FORM S S-1b—A report submitted quarterly to the Federal Government showing each employee's Social Security Number, name, and earnings for the quarter.

FORM W-1—A form which the U. S. Treasury Department requires each employer to submit quarterly, reporting in summary the taxes withheld from employees.

FORM W-2—A form which the U. S. Treasury Department requires the employer to prepare annually in quadruplicate for each employee from whom a tax has been withheld. The original and first copy are furnished to the employee. The second copy (Form W-2a) is forwarded to the U. S. Treasury Department with the employer's return of income tax withheld on wages, Form W-1, for the fourth quarter of the year. The third copy (Form W-2b) is retained by the employer.

FORM W-3—A form which the U. S. Treasury Department requires each employer to submit at the end of the year to reconcile any differences in the total amount of taxes withheld as reported quarterly (Form W-1) and the total reported yearly (Form W-2).

FORM W-4—A form which the U. S. Treasury Department requires each employee to fill out and submit to his employer as the basis of calculating the withholding tax deduction.

GANG JOB CARD—A card containing all pertinent facts concerning the work of several employees working as a unit on one order number, process, department, operation, etc., during one day.

GROSS EARNINGS—An employee's earnings before considering taxes and other deductions which are made in determining his "net pay."

INCENTIVES, WAGE—Money inducements, other than regular time or overtime wages, for the accomplishment of definite standards.

INDIRECT LABOR—The work which is not physically applied directly to the product, but which contributes to its manufacture.

INDIVIDUAL JOB CARD—A card containing all pertinent facts concerning the work of one employee within one day on one order number, process, department, or operation. If two or more orders, processes, departments or operations were worked on, a separate card is prepared on each.

JOB NUMBER—A serial number assigned to a manufacturing order to simplify accumulating the cost applicable to that particular order.

JOB ORDER COST SYSTEM—A system wherein the labor costs are classified and accumulated by job numbers.

JOB TIME—The productive time spent working on a job number, process or operation. IBM Job Recorders are recognized as the most accurate and efficient means of recording job time.

LABOR COST, DIRECT—The charges that are directly applicable to an order number, process, department, operation, etc.

LABOR COST, INDIRECT—The charges other than direct charges that are incurred in the production of a product.

LABOR DISTRIBUTION—The classifying and accumulating of labor costs by order numbers, processes, departments, operations, etc.

LABOR TURNOVER—The ratio of separations to the average number of employees per period, usually month or year.

MAN-HOURS—The total number of hours worked by all employees.

MAN NUMBER—A serial number assigned to an employee for identification purposes to simplify accounting for his time and earnings.

MASTER PAYROLL CARD—A card containing all constant or semi-constant data concerning an em-

ployee, such as name, clock number, Social Security number, occupation, rate, etc. It is used to print these factors automatically as needed on the payroll, check, payroll register, government reports, etc., as well as for other purposes.

NET PAY—The money actually paid the employee after taxes and all other deductions have been made from his gross earnings.

NOTIFICATION OF EMPLOYMENT—A form prepared at the time of employment to notify all interested parties of the employment. It usually contains all pertinent facts concerning the individual employed. This form is often called an Engagement Notice.

NON-PRODUCTIVE LABOR—The work which is not physically applied directly to the product, but which contributes to its manufacture.

OVERHEAD—The expenses of direction and administration necessary to conducting a business. It includes such items as rent, telephone, secretarial service, etc. In cost accounting, it is synonymous with "burden."

OVERTIME—The time an employee works in excess of the normally established work schedule. In most instances the employee's hourly earnings are greater for overtime.

PARALLEL BALANCE—A means of verifying accuracy by adding in separate counters the same information from two types of cards, when the procedure calls for the punching of two types of cards from the common source. By comparing the two columns of resulting totals the errors may be easily located. Example: In payroll and labor distribution parallel balancing could be used to balance job time with attendance time by adding job time in one counter from the labor distribution and adding attendance time in another counter from the daily time cards. The resulting totals would then be compared to verify the fact that they are the same.

PAY ENVELOPE—An envelope on the face of which the factors pertinent to calculating an employee's earnings, deductions, and net pay are recorded, and into which is placed his net pay in cash.

PAY PERIOD—The number of days established for the accumulation of a payroll. It may be one week, two weeks, half a month, or one month.

PAYROLL REGISTER—A report prepared each pay period containing employee's name, man number, hours worked, gross earnings, deductions, net pay, and any other detail required by the employer.

PERSONNEL CARD—A card containing all pertinent facts concerning an employee such as age, sex, marital status, date employed, etc.

PIECE WORK, GROUP—The earnings of each employee are based on the number of units produced by the group of several employees with whom he works.

PIECE WORK, INDIVIDUAL—The earnings of each employee are based on the number of units produced by him.

PREMIUM—A money inducement, other than regular time or overtime wages, for the accomplishment of definite standards. It may also refer to additional money offered to induce employees to work on less desirable shifts, perform more hazardous tasks, etc.

PROCESS COST SYSTEM—A system wherein the labor costs are classified and accumulated by department, operation, or other similar units rather than by order number.

PRODUCTIVE LABOR—The work applied directly to the product being manufactured.

STANDARD COST SYSTEM—The term applied to cost systems in which standard labor costs are established by determining the time it should take and the money value of the labor skill required to perform an operation. This standard is used as a means of measuring and analyzing the variance of actual costs from standard costs.

TAYLOR DIFFERENTIAL PLAN—A wage incentive plan in which a quota in terms of units of production per hour is established for each job or operation, and in which an employee is paid at a rate from 25 per cent to 50 per cent greater than his standard rate for equaling or exceeding the quota.

TRAILER CARD—A card to which is transcribed, by means of punched holes, the pertinent data concerning one order number, department, operation, etc., appearing on a card such as the daily time card. For example, the several cards punched from the daily time card to distribute the job time reported thereon would be called trailer cards.

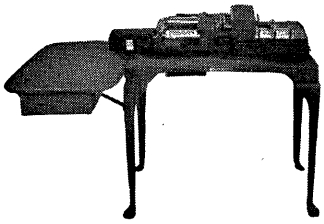
UNION CHECK-OFF—By agreement with the union, the employer deducts the employees' union dues from the employees' earnings.

VARIANCE ANALYSIS—Classifying the differences between the actual and the standard (predicted) cost, by their causes.

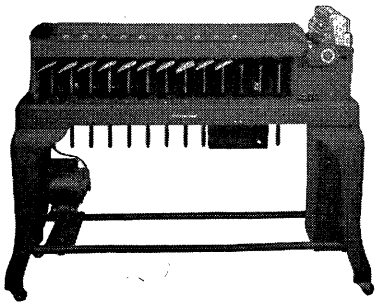
WORK-IN-PROCESS—Costs which have accumulated on a product which is in a partially completed condition of manufacture.

ZERO BALANCING—A means of verifying accuracy by subtracting one type of card from another, when the procedure calls for the punching of two types of cards from a common source. By scanning the resulting tabulation, one quickly locates any errors because the balance will be zero (blank) unless there is an error. Example: In payroll and labor distribution zero balancing could be used to balance job time with attendance time by setting one counter to add attendance time from the daily time card and subtract job time from the trailer cards. One would scan the resulting report for balances other than zero.

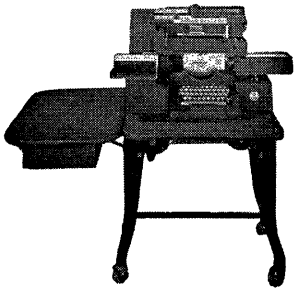
IBM ELECTRIC ACCOUNTING MACHINES



Card Punching Machine
with Duplicating Feature

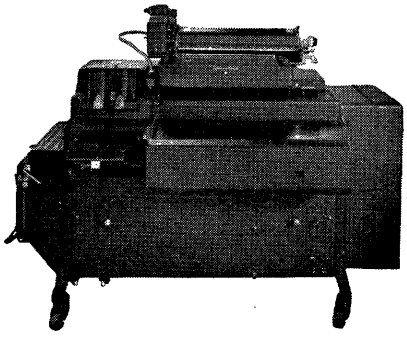


Card Sorting Machine

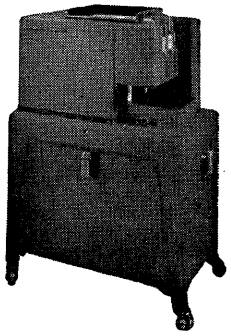


Card Punching Machine
with Printing and
Duplicating Features

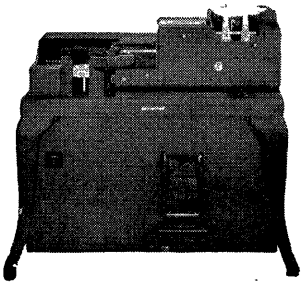
Card Reproducing Punch



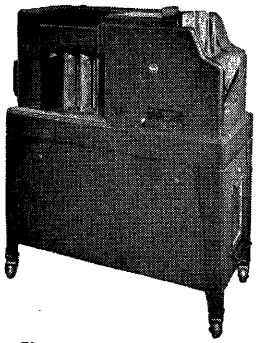
Accounting Machine



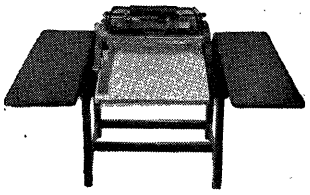
Card Interpreter



Multiplying and
Computing Punch



Collating Machine



Facsimile Posting Machine

Form No. 22-4933-3—ME4000—1-49

IBM ACCOUNTING

ACCOUNTS PAYABLE

APPLICATION

INTERNATIONAL BUSINESS MACHINES CORPORATION
NEW YORK, NEW YORK

Published by
Department of Education
International Business Machines Corporation
Endicott, N. Y.

Printed in U.S.A.

Form 22-4967-2

IBM
ACCOUNTING

ACCOUNTS PAYABLE

THE TERM "Accounts Payable" means the amount of money a business owes for materials, machinery and equipment, and services purchased.

Accounts Payable accounting is recording what is owed, paying it promptly to secure the benefit of any discounts offered for prompt payment, and keeping the management of the business currently informed regarding how much they are spending and for what purposes.

The company or individual from whom something is purchased is commonly called the "vendor," and he submits his bill, which is known as an "invoice."

In addition to invoices from vendors, there are expenses which originate inside the company. An example of this is the fact that a small cash fund is generally maintained for the payment of miscellaneous small bills, rather than paying them by check. These small cash funds are generally called "Petty Cash Funds," and expenditures made from such funds are usually supported by a form known as a "Petty Cash Disbursement Voucher."

Another type of expense originating within a business is "Traveling Expense," which is supported by a "Traveling Expense Statement."

Other expenses which originate within the business are usually supported by a form commonly called a "Journal Voucher."

ABBOT BRASS COMPANY
117 WATER STREET
ERIE, PENNSYLVANIA

DATE: 12 (MO.) 21 (DAY) (YR)

SOLD TO
GENERAL MANUFACTURING CO
ENDICOTT
NEW YORK

SHIPPED TO
ABOVE

VIA
FREIGHT ERIE

TERMS	F.O.B. ERIE	CUST ORDER No.	OUR ORDER No.		INVOICE NUMBER
2 10 NET 30		6542	11137		24027

QUANTITY	ITEM No.	DESCRIPTION	AMOUNT
18	20400	SOFT BRASS ROD	32 97
35	10300	BRASS ROD	28 60
3950	20023	BRASS CASTING	97 21
			158 78 *

GENERAL MANUFACTURING CO.

PETTY CASH DISBURSEMENT VOUCHER

RECEIVED CASH Forty-seven and 40/100 DOLLARS

REASON FOR: Postage

REQUESTED BY H. L. Morgan

SIGNED B. Chamberlain

DATE 12-31

AMOUNT $ 47.40

ACCOUNT Postage

CODE 913-730

GENERAL MANUFACTURING COMPANY
TRAVELING EXPENSE

Account 411
Due date 12/31

VOUCHER No. 12163
BRANCH OFFICE St Louis No. 934
FOR PERIOD ENDING Dec 31st

DATE	FROM AND TO	861 AUTO MILEAGE	862 AIR & RR FARE	863 ROOM & MEALS	864 ENTER-TAINMENT	865 PERSONAL SERVICE	866 MISC.	TOTAL
12/26	Detroit – Chicago		15.95	12.70				28.65
12/27	Chicago			4.85				4.85
12/28	Chicago			3.75				3.75
12/29	Chicago – St Louis		17.10	19.90				37.00
	TOTAL		33 05	41 20				74 25

DEDUCT: ADVANCES	
DEDUCT: TRANSPORT. NOT PAID	
NET TOTAL	74 25

NAME H. B. Archer MAN. No. 91004

OCCUPATION Salesman APPROVED BY M. E. Stanley

Date 12/04

GENERAL MANUFACTURING COMPANY

Journal Voucher No. 12024
Month of Account Dec.

REFERENCE	ACCOUNT GEN.	SUB.	DETAIL	DEPT. OFFICE	DEBIT	CREDIT
Factory Payroll	212	121			6769 79	
	212	122			3200 25	
	215	001				69 98
	216	001				681 20
	217	004				50 00
	217	008				311 33
	211					8857 53*

The petty cash disbursement voucher, the traveling expense account, and the journal voucher contain, as will be noted, an account number representing the purpose for which the expenditure was made.

Occasionally, something is bought and an invoice is received for it which is not to be paid in full because the amount charged was not justified, some of the material received was defective, or perhaps not all of the material billed was actually received, the latter being termed a "short shipment." In such cases, it is customary for the vendor to issue a "Credit Memorandum" through which he reduces the amount of his original invoice to the new amount agreed upon.

CREDIT MEMORANDUM

ABBOT BRASS COMPANY
117 WATER STREET
ERIE, PENNSYLVANIA

SOLD TO
GENERAL MANUFACTURING CO
ENDICOTT
NEW YORK

DATE: MO. 1 DAY 18 YR.

SHIPPED TO

VIA

TERMS	F.O.B. ERIE	CUST. ORDER No.	OUR ORDER No.	CREDIT MEMO No.	INVOICE NUMBER
		6542	11137	99706	24027

QUANTITY	ITEM No.	DESCRIPTION	AMOUNT
10	20400	SOFT BRASS ROD	18 30
			18 30 *

Vendors' invoices constitute the bulk of the transactions and go through every step of Accounts Payable accounting. We shall follow what happens to an invoice; when this is understood, it will be apparent how the petty cash disbursement voucher, the traveling expense account, the journal voucher, and the credit memorandum fit into this application.

The vendor's invoice is checked to assure that the amount charged is the amount agreed upon, and that the item is what was desired, both as to quantity and quality. Account numbers (representing the vendor and the purpose for which the expenditure was made) are entered on the invoice or a piece of paper attached thereto (frequently called an "apron," "sticker," or "jacket").

INVOICE DATE	VENDOR No.	OUR INVOICE	RECEIVED	APPROVED BY:
12/21	1179	12120		WMC

ENTRY	ORDER No.	DUE DATE	DEPT. USING	INSPECTED	PURCHASING AGENT
30		12/31			

ACCOUNT GEN.	NUMBER SUB.	DEPT. CHARGED	MATERIAL	QUANTITY	UNIT	AMOUNT
123	360		20400	18		32.97
123	350		10300	35		28.60
124	420		20023	3950		97.21

APPROVED BY: M Hedden — ACCOUNTING

INVOICE AMOUNT	158.78
DISCOUNT	3.18
NET	155.60

Voucher Apron

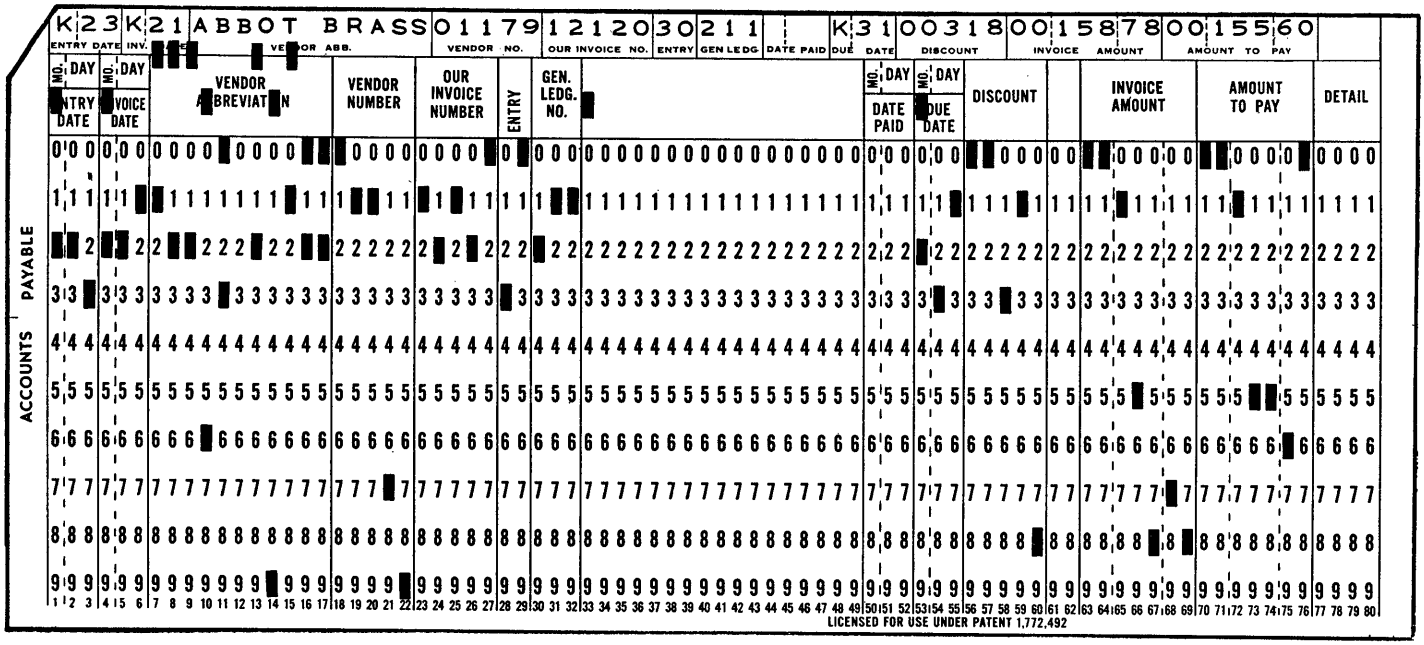
Some invoices, even those containing several items, will represent an expenditure for only one purpose, and in other cases, there will be several items on one invoice, two or more of which will represent different purposes. This will be apparent from the apron or sticker previously mentioned. If the whole invoice represents an expenditure for one purpose, the total of the invoice will be for one account number. An expenditure for two purposes will show part of the total amount for one account number and the remainder for another account number.

If account numbers are regarded merely as the different purposes for which the money is being spent, and a means by which the management of the business is going to find out *how much was spent for what purposes,* the part played by account numbers will be easily understood.

The pertinent information on the vendor's invoice is recorded by means of holes in the IBM card, which is the operating unit of the IBM accounting machines.

One card is punched for each purpose or type of expenditure represented on the invoice. These cards are called "Payables Distribution Cards."

One card is punched for the total amount of the invoice, containing the gross, discount and net amounts. This card is called the "Accounts Payable Card."



ACCOUNTS PAYABLE CARD

It is necessary to record how much is owed and to whom. The Accounts Payable card prepares this record, which is commonly called the "Invoice Register."

The date on which an invoice is to be paid is commonly called the "due date." In order to assure having the cash available to pay invoices as they fall due, it is necessary to know how much cash will be required on each due date. The Accounts Payable card produces this record which is called a "Cash Requirements Report."

SHEET 1 OF 2

GENERAL MANUFACTURING COMPANY

INVOICE REGISTER

DATE December 23

ENTRY DATE Mo.	ENTRY DATE DAY	INVOICE DATE Mo.	INVOICE DATE DAY	VENDOR ABBREVIATION	VENDOR NUMBER	OUR INVOICE NUMBER	ENTRY	DEPT. USING	ACCOUNT No. GEN. LEDG.	ACCOUNT No. SUB. LEDG.	DEPT. CHG.	MAT. OR PART NUMBER	ORDER NUMBER	DUE DATE MO	DUE DATE DAY	QUANTITY OR DISCOUNT	UNIT	ITEM OR INVOICE AMOUNT	AMOUNT TO PAY OR GEN. LEDG. AMT.	DETAIL
12	23	12	21	ABBOT BRASS	1179	121200	30		123350			10300		12	31	35		2860		
12	23	12	21	ABBOT BRASS	1179	121200	30		123360			20400		12	31	18		3297		
12	23	12	21	ABBOT BRASS	1179	121200	30		124420			20023		12	31	3950		9721		
12	23	12	21	ABBOT BRASS	1179	121200	30		211					12	31	318		15878**	15560	
12	23	12	22	ABBOT BRASS	1179	121211	30		124430			40232		12	31	28		1238		
12	23	12	22	ABBOT BRASS	1179	121211	30		124460			34102		12	31	50		5305		
12	23	12	22	ABBOT BRASS	1179	121211	30		124470			12080		12	31	65		3270		
12	23	12	22	ABBOT BRASS	1179	121211	30		211					12	31	196		9813**	9617	
12	23	12	17	BR WILLIAMS	6195	121223	30		125810		430			12	24			31052		
12	23	12	17	BR WILLIAMS	6195	121223	30		211					12	24	621		31052**	30431	
12	23	12	17	BENSON MFG	4123	121233	30		124460			34102		12	24	35		3277		
12	23	12	17	BENSON MFG	4123	121233	30		211					12	24	66		3277**	3211	
12	23	12	18	EL TRUST CO	29521	121243	35		217004					12	31			5125		
12	23	12	18	EL TRUST CO	29521	121243	35		211					12	31			5125**	5125	
12	23	12	18	NY GAS EL	61221	121255	30		913700		41			12	31			67595		
12	23	12	18	NY GAS EL	61221	121255	30		211					12	31			67595**	67595	
12	23	12	17	WISELO INC	88213	121266	30		913690		45			12	31			19518		
12	23	12	17	WISELO INC	88213	121266	30		211					12	31			19518**	19518	
12	23	12	17	AMER STEEL	1281	121273	30		123325			10006		12	24	6		1200		
12	23	12	17	AMER STEEL	1281	121273	30		124470			12080		12	24	30		1525		
12	23	12	17	AMER STEEL	1281	121273	30		211					12	24	55		2725**	2670	
12	23	12	21	LEHIGH COAL	48678	121283	30		913660		41			12	31			69178		
12	23	12	21	LEHIGH COAL	48678	121283	30		211					12	31	1384		69178**	67794	

5

SHEET 1 OF 2

GENERAL MANUFACTURING COMPANY

CASH REQUIREMENTS STATEMENT

December 31 19

VENDOR ABBREVIATION	VENDOR NUMBER	DUE DATE MO.	DUE DATE DAY	DISCOUNT	INVOICE AMOUNT	AMOUNT TO PAY	TOTAL BY DATE
ABBOT BRASS	1179	12	31	3 18	158 78	155 60	
ABBOT BRASS	1179	12	31	1 96	98 13	96 17	
ABRAMS COAL	1180	12	31	8 31	277 35	269 04	
ABRAMS COAL	1180	12	31	10 50	300 00	289 50	
BARR MACH	3076	12	31	150 77	3015 27	2864 50	
EL TRUST CO	29521	12	31		51 25	51 25	
KARTAGE INC	44860	12	31		218 75	218 75	
LEHIGH COAL	48678	12	31	13 84	691 78	677 94	
MAIZE REF	58091	12	31		118 23	118 23	
N MILT SUPP	60035	12	31		214 15	214 15	
N Y GAS EL	61221	12	31		675 95	675 95	
STATE N Y	74213	12	31		1792 86	1792 86	
W COR TEL	81469	12	31		237 29	237 29	
WICKWIRE BR	86341	12	31		360 43	360 43	
WISELO INC	99217	12	31		105 18		

To make the actual payment of the various invoices, it is necessary to prepare a check and a statement of the invoices being paid to a given vendor on this particular due date. A number of invoices may have accumulated for the same vendor, all falling due on the same date. The statement of the invoices being paid is usually called a "Remittance Statement." This is accompanied by the check. The desire and convenience of the customer dictate whether there should be a separate remittance statement and check or a single form which combines the remittance statement and the check. The combined form is called a "Voucher Check."

GENERAL MANUFACTURING COMPANY

STATEMENT OF REMITTANCE

DATE MO.	DATE DAY	VENDOR ABBREVIATION	VENDOR NUMBER	CODE	INVOICE AMOUNT	DISCOUNT	AMOUNT PAID
12	21	ABBOT BRASS	1179		158 78	3 18	155 60
12	22	ABBOT BRASS	1179		98 13	1 96	96 17
							251 77*

GENERAL MANUFACTURING COMPANY,

ENDICOTT, NEW YORK

MO.	DAY	YEAR
12	31	

EXACTLY *251 DOLLARS 77 CENTS $*251.77

PAY TO THE ORDER OF

1179 CHECK NO.

ABBOT BRASS CO
117 WATER ST
ERIE PA

GENERAL MANUFACTURING COMPANY

PAYABLE AT GENERAL BANK AND TRUST CO., ENDICOTT

AUTHORIZED SIGNATURE

Voucher Check

GENERAL MANUFACTURING COMPANY
ENDICOTT, NEW YORK

REMITTANCE STATEMENT

ABBOT BRASS
117 WATER ST
ERIE PA

CHECK No.
1179

MO.	DAY	YR.
12	31	

VENDOR NUMBER	VENDOR NAME	INVOICE No. OR DATE	GROSS AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
1179	ABBOT BRASS	12120	158.78	3.18	155.60
1179	ABBOT BRASS	12121	98.13	1.96	96.17
			256.91	5.14	251.77*

ENDICOTT, NEW YORK

CHECK NO.	DATE
1179	12 31

PAY *251 DOLLARS 77 CENTS $ *251.77

ENDICOTT BANK, ENDICOTT

TO THE ORDER OF

ABBOT BRASS CO
117 WATER ST
ERIE PA

GENERAL MANUFACTURING COMPANY

AUTHORIZED OFFICER

IBM Card Check

It is necessary to have a record of the invoices paid on each due date. This record is frequently called a "Cash Disbursement Register."

The process of receiving bills and paying bills always leaves unpaid certain bills whose due dates are sometime in the future, and which, therefore, are unpaid as of any given date. As stated previously, the total of all unpaid bills constitutes the Accounts Payable at any given date. It is necessary periodically, usually at the end of each month, to see that the sum of all of the individual invoices unpaid at that time equals the total amount of Accounts Payable. The IBM Accounts Payable card performs this function by printing a list of all unpaid invoices, which list is generally called a "Trial Balance of Accounts Payable." The total of the Trial Balance must equal the total Accounts Payable, which is represented by the total Accounts Payable at the beginning of the month, plus invoices received and approved, less invoices paid.

This completes the basic accounting functions of the Accounts Payable card, i.e., recording the amount owed, paying it promptly, and recording the payment.

Another purpose served by the Accounts Payable card is the preparation of an "Analysis of Purchases by Vendor."

This Analysis of Purchases by Vendor furnishes valuable information to the purchasing department. The use of this information enables the purchasing agent to obtain the most advantageous discount arrangements and also to control desired distribution of purchases.

The Analysis of Purchases by Vendor is also used by the sales manager of some companies as a basis of soliciting business.

SHEET 1 OF 1

GENERAL MANUFACTURING COMPANY

CASH DISBURSEMENTS

DATE December 31

VENDOR ABBREVIATION	CHECK No. VENDOR NO.	DATE MO.	DATE DAY	DEBIT ACCOUNTS PAYABLE	CREDIT DISCOUNT	CREDIT CASH
ABBOT BRASS	1179	12	31	25691	514	25177
ABRAMS COAL	1180	12	31	57735	1881	55854
BARR MACH	3076	12	31	301527	15077	286450
EL TRUST CO	29521	12	31	5125		5125
KARTAGE INC	44860	12	31	21875		21875
LEHIGH COAL	48678	12	31	69178	1384	67794
MAIZE REF	58091	12	31	11823		11823
N MILT SUPP	60035	12	31	21415		21415
N Y GAS EL	61221	12	31	67595		67595
STATE N Y	74213	12	31	179286		179286
W COR TEL	81469	12	31	23729		23729
WICKWIRE BR	86341	12	31	36043		36043
WISELO INC	88213	12	31	19518		19518
PETTY CASH	90000	12	31	147654		147654
W B ARCHER	91004	12	31	7425		7425
BOSTON	93001	12	31	29000		29000
CHICAGO	93004	12	31	14232		14232
CLEVELAND	93007	12	31	14469		14469
HOUSTON	93013	12	31	25952		25952
LOS ANGELES	93016	12	31	14051		14051
NEW ORLEANS	93019	12	31	16870		16870
NEW YORK	93022	12	31	26720		26720
PHILA	93025	12	31	14190		14190
SAN FRAN	93031	12	31	17864		17864
				1168967	18856	1150111*

SHEET 1 OF 2

GENERAL MANUFACTURING COMPANY

TRIAL BALANCE

OPEN ITEMS

DATE December 31

VENDOR ABBREVIATION	VENDOR NUMBER	INVOICE DATE Mo.	INVOICE DATE DAY	DUE DATE Mo.	DUE DATE DAY	ACCOUNTS PAYABLE	DISCOUNT	CASH
ACE INS CO	1181	12	31	1	07	2400-		2400
						2400*	*	2400*
EL TRUST CO	29521	11	30	1	03	9160		9160
		12	31	1	07	8400		8400
						17560*	*	17560*
EL PRINT CO	29542	12	28	1	04	61193	1224	59969
						61193*	1224*	59969*
HASK SUPP	36512	12	28	1	04	13835	277	13558
						13835*	277*	13558*
KARTAGE INC	44860	11	30	1	03	9862		9862
						9862*	*	9862*
LEHIGH COAL	48678	11	30	1	03	1250		1250
						1250*	*	1250*

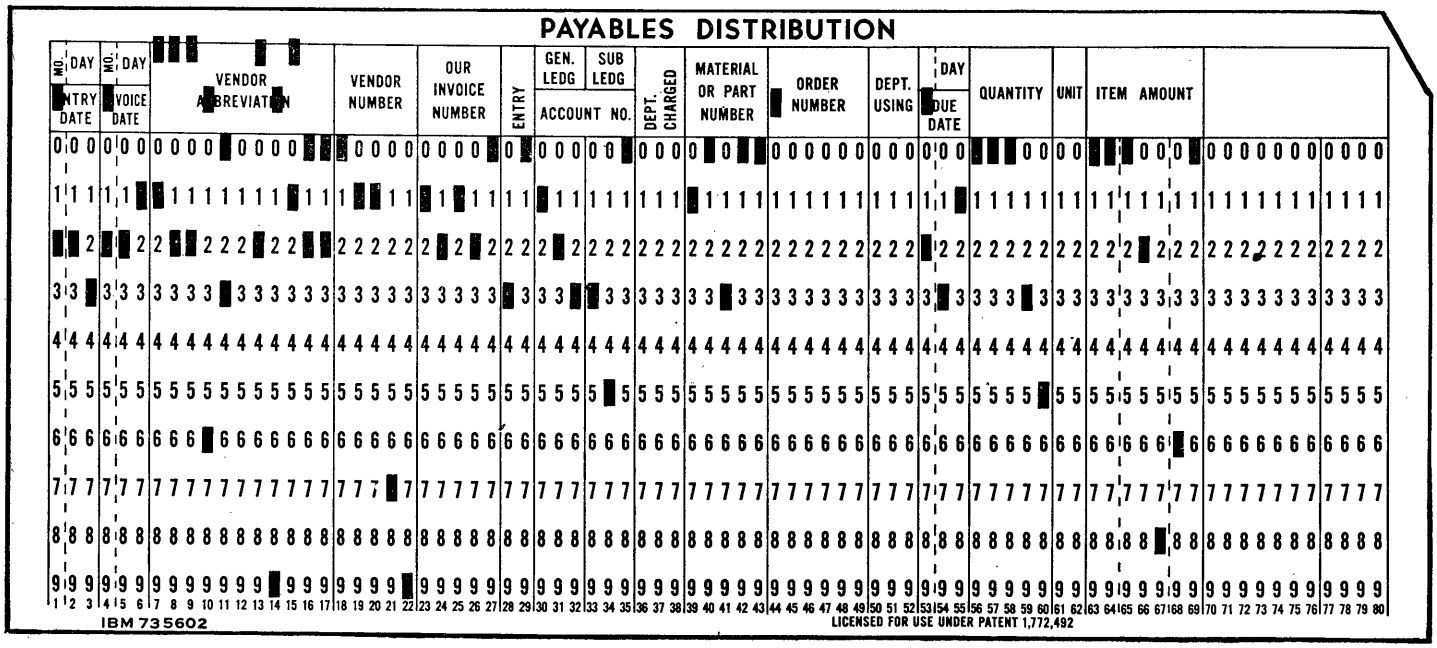
GENERAL MANUFACTURING COMPANY

PURCHASE ANALYSIS

BY VENDOR — COMPARATIVE

DATE December

VENDOR NAME	VENDOR No.	AMOUNT THIS MONTH	AMOUNT YEAR-TO-DATE	AMOUNT LAST YEAR-TO-DATE	INCR.	DECR.
ABBOT BRASS	1179	25691	394045	325680	*	
AMER STEEL	1281	29194	397564	408162		*
APAL LUM CO	2179	36730	466895	348900	*	
BARR MACH	3076	301527	1382487	1299060	*	
BENSON MFG	4123	14602	156021	178460		*
BR WILLIAMS	6195	62482	869841	847225	*	
CHOL FURN	14910	84629	754425	628296	*	
COLUMBIA MFG	15035	226800	1265183	1090929	*	
COVTRY OIL	19285	26359	397425	315944	*	



PAYABLES DISTRIBUTION CARD

Distribution in Accounts Payable accounting is simply another way of saying "How much did we spend and for what did we spend it?"

For convenience in obtaining the answer to this question, management gives account numbers to the various purposes for which money is spent.

Depending upon the size and complexity of the business and the desire of the management for information by which expenses can be controlled, there will be few or many account numbers used by the business.

For example, one management may wish to know the total amount spent for telephone service. It would assign a number, let us say 100, to "Telephone Expense." This account number would facilitate the accumulation in one total of the cost of all telephone service wherever it occurred in the business. In such a company, the item of telephone service would appear as illustrated on a statement of expenses.

	Account	*Amount*
Telephone Service	100	$1,000.00

Another management may wish to have telephone expense broken down into regular telephone service and telephone toll charges. It would assign account number 100 01 to "Telephone Service—Regular" and account number 100 02 to "Telephone Toll Charges." On the statement of expenses, it would appear as illustrated.

	Major Account	*Sub Account*	*Amount*
Telephone Service—Regular	100	01	$ 600.00
Telephone Toll Charges	100	02	400.00
			$1,000.00

Another management may wish to know the cost of telephone service and telephone toll charges not only in total for the whole business but, also, by the various branch offices. On the statement of expenses, it would appear as in the following illustration.

	Major Acct.	*Sub Acct.*	*Office Acct.*	*Amount*
Tel. Service Regular—Akron Office	100	01	01	$30.00
Tel. Toll Charges—Akron Office	100	02	01	10.00
Tel. Service Regular—Albany Office	100	01	02	40.00
Tel. Toll Charges—Albany Office	100	02	02	15.00

Another management may wish to know telephone toll charges not only in total and by office but, also, by the individuals making the long distance call. Such a management would obtain a report similar to the following illustration.

	Major Acct.	*Sub Acct.*	*Office Acct.*	*Detail (Man No.)*	*Amount*
Tel. Toll Charges—					
Akron Office—J. Doe....	100	02	01	1000	$ 7.40
Tel. Toll Charges—					
Akron Office—J. Smith..	100	02	01	1500	2.10
Tel. Toll Charges—					
Akron Office—R. Roe....	100	02	01	1700	.50
					$10.00

The Payables Distribution Card prepares reports which answer for management, "How much has been spent and for what was it spent?" in whatever detail is required (as evidenced by the account numbers established by that management).

In practice, it will be found that account numbers, in addition to being assigned to expense accounts, are also assigned to the various types of inventories maintained by the management, such as Raw Materials Inventory, Supplies Inventory, and Parts Inventory, and to assets such as Land, Buildings, Machinery, and Equipment. The same principles explained above in connection with expenses are equally applicable to purchases representing something other than expense—the Payables Distribution tells the management for what purpose the money was spent.

SHEET 2 OF 50

GENERAL MANUFACTURING COMPANY

DISTRIBUTION SUMMARY

DATE December 31

ENTRY DATE Mo.	ENTRY DATE DAY	INVOICE DATE Mo.	INVOICE DATE DAY	VENDOR ABBREVIATION	VENDOR NUMBER	OUR INVOICE NUMBER	ENTRY	DEPT. USING	ACCOUNT No. GEN. LEDG.	ACCOUNT No. SUB. LEDG.	DEPT. CHG.	MAT. OR PART NUMBER	ORDER NUMBER	DUE DATE Mo.	DUE DATE DAY	QUANTITY OR DISCOUNT	UNIT	ITEM OR INVOICE AMOUNT	AMOUNT TO PAY OR GEN. LEDG. AMT.	DETAIL
12	01	11	26	HASK SUPP	36512	12002	30		123350			30236		12	03	300		312 00		
12	10	12	08	GEN PORT EQ	30541	12065	30		123350			51689		12	14	592		411 38 2		
12	23	12	21	ABBOT BRASS	1179	12120	30		123350			10300		12	31	35		28 60		
																		4454 42*		
12	09	12	07	AMER STEEL	1281	12053	30		123355			20300		12	10	161		82 35		
12	31	12	28	TRI CIT GL	78009	12165	30		123355			10207		1	04	3050		59398		
																		67633*		
12	10	12	07	AMER STEEL	1281	12063	30		123358			30042		12	14	103		18234		
																		18234*		
12	01	11	26	HASK SUPP	36512	12002	30		123360			40500		12	03	50		10150		
12	07	12	03	HASK SUPP	36512	12038	30		123360			40500		12	10	12		2280		
12	23	12	21	ABBOT BRASS	1179	12120	30		123360			20400		12	31	18		3297		
12	31	12	28	HASK SUPP	36512	12166	30		123360			40500		1	04	6		1310		
																		17037*		
12	03	11	30	APAL LUM CO	2179	12022	30		123365			20343		12	10	117		14890		
																		14890*		
																			4942994	
12	01	11	27	HASK SUPP	36512	12004	30		124405			30120		12	03	15		2250		
12	07	12	03	HASK SUPP	36512	12038	30		124405			10120		12	10	23		1835		
12	08	12	04	HASK SUPP	36512	12049	30		124405			10210		12	10	73		4120		
12	18	12	16	HASK SUPP	36512	12114	30		124405			20120		12	24	172		16264		
12	31	12	28	HASK SUPP	36512	12166	30		124405			10120		1	04	77		6175		
																		30644*		
12	03	12	01	TIDE CHEM	74292	12023	30		124410			20003		12	10	4500		12525		
12	07	12	03	HASK SUPP	36512	12038	30		124410			10002		12	10	2000		5120		
12	10	12	07	TRI CIT GL	78009	12064	30		124410			20003		12	14	930		2875		
12	11	12	07	TIDE CHEM	74292	12071	30		124410			20003		12	17	1925		5199		
12	31	12	28	HASK SUPP	36512	12166	30		124410			10002		1	04	2500		6350		
																		32069*		

IBM Accounting makes possible the preparation of all the following records and reports, which are essential to good accounting control of Accounts Payable, *from one recording of the basic information in the IBM card.*

1. An Invoice Register
2. Control Totals (Credit Accounts Payable)
3. A Ledger (the cards are filed as the Ledger)
4. Trial Balance
5. Analysis of Cash Requirements
6. Remittance Advice
7. Check
8. Check Register
9. Control Totals (Debit Accounts Payable)
10. Distribution to General Ledger and Subsidiary Accounts

Management needs not only good accounting, but also supplemental figure facts which perhaps border more on the field of management control than accounting, but which are essential to management techniques. Management needs answers to questions like the following:

What was the total volume of purchases from each vendor?

What cash discounts have been lost, and why?

How much of each class of materials did each vendor supply?

Who were the 100 largest suppliers of materials?

Which vendors had the greatest volume of returns?

How large are the year-to-date purchases of each materials class?

What are the weekly, monthly, and year-to-date detailed operating expenses of each department, and how do they compare with the same period last year?

What are the departmental operating costs for each dollar of gross or net sales?

Are we receiving the maximum in anticipation discounts?

SHEET 1 OF 30

GENERAL MANUFACTURING COMPANY

EXPENSE DISTRIBUTION
BY DEPARTMENT OR BRANCH

DATE December 31

DEPT. OR BRANCH	ACCOUNT No. GEN. LEDG.	ACCOUNT No. SUB. LEDG.	OUR INVOICE NUMBER	DATE MO.	DATE DAY	AMOUNT	AMOUNT BY ACCOUNT	AMOUNT BY DEPT. OR BRANCH
41	913	660	12042	12	07	687.50		
41	913	660	12084	12	14	721.92		
41	913	660	12128	12	23	691.78		
41	913	660	12138	12	24	277.35		
	•					2378.55*		
41	913	700	12125	12	23	675.95		
						675.95*		
41	913	760	12086	12	15	2119.50		
						2119.50*		
41	913	850	12148	12	28	15.63		
						15.63*		
							5189.63	5189.63
43	913	730	12171	12	31	47.40		
						47.40*		
43	913	740	12164	12	31	611.93		
						611.93*		

The unique principle of IBM Accounting, securing all this information from one recording, results in the following advantages:

1. Permits earlier closing of books and gives up-to-the-minute facts for action by the president of a company or the board of directors.
2. Analysis of payments by due dates to permit the treasurer to plan his cash position to make payment when due, and thereby take advantage of discounts.
3. Gives the accountant a machine listed trial balance complete with detail of open items.
4. Controls source documents sent to respective departments for approval.
5. Reduces peak loads.
6. Machine preparation of all necessary records and reports from one recording results in accuracy exceeding that of other methods, and eliminates duplication and the necessity for checking, reconciling and balancing.
7. Budget and expense analysis becomes an automatic by-product of accounting.
8. Economy of operation.
9. Vendors' analysis permits the sales manager to follow prospects and is valuable to the purchasing agent.

The accountant, treasurer, and controller like IBM Accounting for Accounts Payable because it provides:

1. A permanent, legible, easily audited record of every transaction affecting Accounts Payable.
2. Assurance that all discounts are taken.
3. Elimination of peak loads and end-of-month overtime.
4. Good impression created with vendors through appearance of check and remittance statement and the saving of their time in the application of the remittance to their Accounts Receivable.
5. Facility of reconciling bank statements and listing of outstanding checks.
6. Analysis of expenses to a degree that would be impossible or impractical under other methods because of time and expense required.
7. Accuracy exceeding that of other methods because with IBM Accounting all records and reports are produced from one recording instead of through multiple posting, with its attendant risk of error.
8. The ability to supply the management with information more quickly, not only through earlier closings, but also through faster results in responding to requests for special information.

GLOSSARY

ACCOUNT NUMBER—In order to avoid lengthy and confusing word descriptions of the many accounts required to record business transactions, numbers are usually assigned to identify the accounts. These are known as Account Numbers. It is customary to set up account numbers in such a manner as to establish major and sub-classifications so that accounting entries may be distributed to detail or general accounts. Major account classifications correspond to General Ledger Accounts, and sub-account classifications correspond to Subsidiary Ledger Accounts.

Likewise, in accounts payable accounting an account number is assigned to each vendor. These account numbers are usually established from a list of the vendors already on the books, and are generally set up in alphabetical sequence.

ALLOWANCES — Concessions or reductions against an invoice, brought about by varying conditions and reasons, and agreed to between the purchaser and the seller.

APRON—A term used to denote a form attached to vendor's invoices, which are approved and distributed separately, with provision for executive approval, vendor code number and voucher number, account distribution code and amount.

CASH DISCOUNT—An allowance by the vendor to be deducted when remitting for the amount of the invoice, if payment is made within the time limits specified on the invoice.

CASH REQUIREMENTS—Frequently will vary with different businesses. Some companies have agreements whereby they make payments regularly three times per month. Others pay all bills according to Due Date. Among these, many require that statements of cash requirements be prepared periodically. This may be daily, or at less frequent intervals. In any event the statement will indicate the amount to be paid by Due Date. The purpose of the Cash Requirements Statement is to allow the Treasurer time to transfer funds to the proper accounts so that invoices may be paid without loss of discount.

CREDIT—In accounts payable accounting this is a term applied to the act of increasing the indebtedness in a vendor's account.

DEBIT—In accounts payable accounting this is a term applied to the act of decreasing the indebtedness in a vendor's account.

DISCOUNT ANTICIPATION — Some businesses, particularly those of a seasonal nature, enter into sales agreements for delivery several months in the future. This is done by vendors to guide their production planning, and by buyers to assure their supply when they want it. The vendor may offer extra discounts to induce the buyer to accept shipment of, or make payment for goods, or both, in advance of the buyer's needs for the articles. A good example is the toy industry. Sales are usually made in February for the following Christmas trade. Manufacturing usually begins in March. In order to decrease their own storage requirements, manufacturers will allow their customers extra discounts as an inducement to them to permit immediate shipment or make an early payment for the toys purchased for the Christmas trade.

DUE DATE—The date on which, according to the terms of and the date on the invoice, payment must be made in order to take advantage of the cash discount allowed.

OFFICERS OF A CORPORATION—Usually the officers of a corporation who are most directly involved in accounting activities are the Chief Accountant, the Controller, and the Treasurer. Of these, the Chief Accountant is not always an officer of the Corporation.

While no general definition of their specific duties and responsibilities can be made, the usual duties are outlined below. It must be remembered that different corporations assign responsibilities to suit their own circumstances and that there will be many variations.

1. Chief Accountant—Usually the man who has charge of the accounting functions of a business. He may be an officer of the corporation, and may have other responsibilities in addition.
2. Controller—An officer of a corporation who has authority to check or control expenditures.
3. Treasurer—An officer of a corporation in whom is vested responsibility for the corporation's funds.

PAYABLES DISTRIBUTION—Generally there are two practices in recording the amounts involved in Accounts Payables Distribution. Some companies distribute the net amount (gross price less discount allowed). In order to do this they compute the discount amount on the total cost price of all items distributed to each account. Other companies distribute the gross amount to the various accounts. In the former practice, an account called "Discounts Lost" will be established to absorb the difference between the amount distributed, and the amount charged to "Accounts Payable." In the latter case, a "Discounts Taken" account will be established to record the difference between the amounts distributed at gross, and the charge to Accounts Payable at net.

PEAK LOAD—That point in the work of a day, week, month, or other period, when the heaviest volume of work is received.

PROVING—The procedure followed in order to establish the correctness of totals of items received. This procedure usually consists of listing the items involved and comparing their total with the total or proof figure submitted or established.

PURCHASE ANALYSIS—Use of:

1. Trade Discounts:

   Purchase Analysis advises the purchasing agent what he has bought, how much of it, and from whom. He can use this information to seek greater trade discounts through quantity purchase agreements.

2. Increased Markets:

   Under certain circumstances it may be desirable to keep sources of supply for emergency requirements, or to insure competitive prices.

RECIPROCITY—The practice of placing business with other companies, in relation to the amount of business purchased from, or sold to, another company is known as reciprocity. It may work either way; one company may solicit business from another because it has purchased a certain amount of that company's products, or a company may desire to purchase from various vendors in proportion to the volume of its sales to these vendors. Use of reciprocity in sales is not considered ethically sound, since it prevents obtaining the advantages of open market buying.

RETURNS—Items of merchandise which are sent back to the vendor for one reason or another, and for which a credit is given for its corresponding value or original charge.

SHORT-SHIPMENT—As shipments are received from vendors, the Receiving Department checks the articles received against the vendor's invoice. Occasionally the quantity received is less than the quantity billed. This is known as a "Short Shipment."

STICKER—Identical to an Apron, excepting that it is a gummed form and is pasted either on the face or the back of the vendor's invoice.

TELEPHONE CHARGES—Charges for telephone service are usually divided into three classes:

1. Regular—
   The monthly rental charged for use of the instruments installed.
2. Toll Charges—
   These are charges at flat rates per call, either to any other station within a telephone exchange, or between exchanges within a metropolitan area.
3. Long Distance Charges—
   These are charges placed on telephone calls made between cities and are based on established rates per minute

TRIAL BALANCE—Usually a listing of unpaid vendors' invoices represented by cards in the Due Date file. It is prepared to balance the totals of the cards against the control figures.

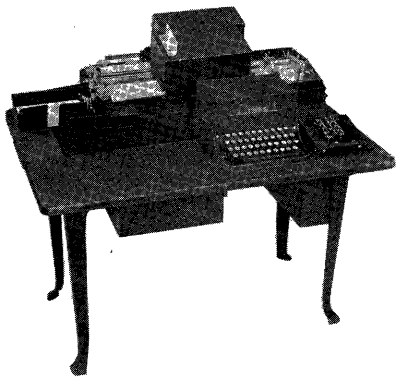
VOUCHER JACKET—Usually a folder or cover containing various documents relating to receiving and approval of materials purchased (such as invoices and receiving slips) on the face of which a summary of items from the several invoices is shown. It also contains appropriate space for executive approval for payment, together with provision for vendor code number and voucher number, account distribution codes and amounts.

VOUCHER—A paper which certifies the correctness of, and authorizes detailed entry for, a transaction.

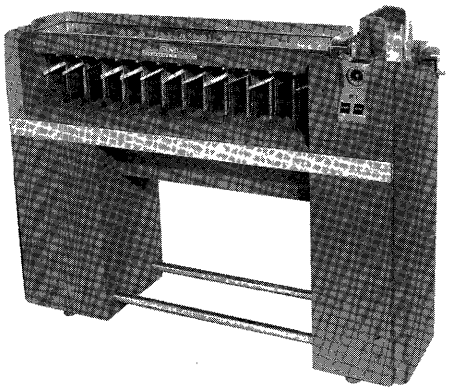
In accounting the term voucher is applied to many types of documents. More specifically, in Accounts Payable, the following are common forms of vouchers:

1. Petty Cash Voucher—
   A form authorizing expenditure of money from the petty cash fund. It is usually required that an official or employee other than the one responsible for the petty cash fund, sign the voucher authorizing the expenditure.
2. Journal Voucher—
   In Accounts Payable certain expenses, such as Insurance, Donations, and Rent, become due and are authorized for payment on vouchers known as Journal Vouchers. The name comes from the fact that such documents are originated for the purpose of authorizing entries to the Journal.

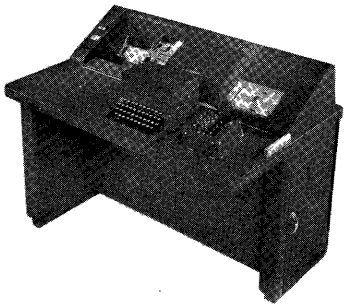
IBM ELECTRIC PUNCHED CARD ACCOUNTING MACHINES



Card Punching Machine
with Duplicating Feature

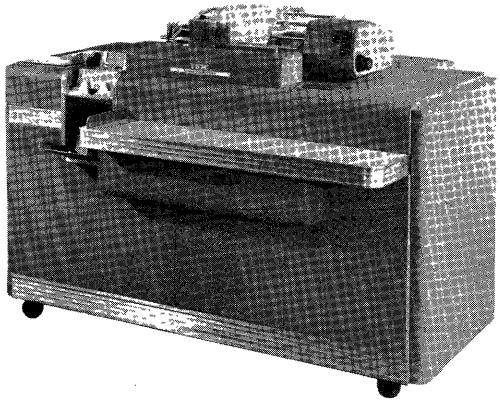


Sorter



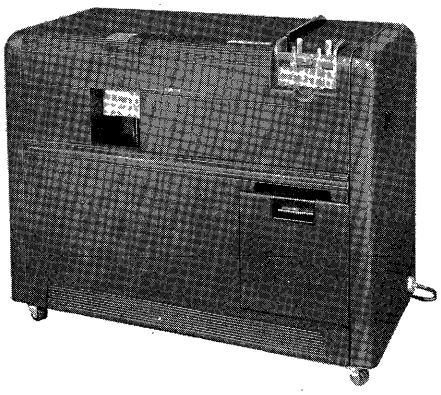
Verifier

Electric Document-
Originating Machine

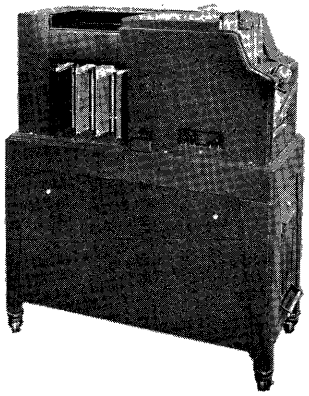


Accounting Machine

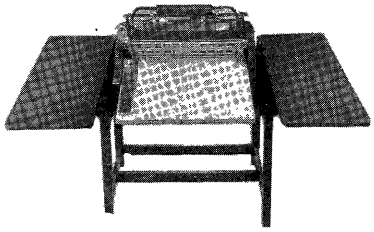
Card Interpreter



Calculating Punch



Collator



Facsimile Posting Machine

IBM ACCOUNTING

INVENTORY AND MATERIAL ACCOUNTING

APPLICATION

INTERNATIONAL BUSINESS MACHINES CORPORATION
NEW YORK, NEW YORK

Published by
Department of Education
International Business Machines Corporation
Endicott, N. Y.

Printed in U.S.A.
Form 22—4934-2

IBM
ACCOUNTING

INVENTORY AND MATERIAL ACCOUNTING

INVENTORY and Material Accounting is the recording of all transactions which affect the stock or supply of goods on hand, such as:

Raw materials
Parts and assemblies
Finished stock
Supplies
Packing material

If a business is to operate at a profit, current inventory and material control is vital because material shortages and inventory discrepancies are losses which consume the profits of a company. The over or understocking of materials, material shortages, and inventory deficits often represent the hidden losses of a business. Overstocks cause waste because they create a loss through deterioration and obsolescence. Insufficient stock can cause a loss through inability to meet the demands and the requirements of the business, delaying the manufacturing processes, or losing profitable sales.

Stock should be maintained at an economical minimum in order to limit both the funds tied up in stock, and stockroom space.

Unless proper records are maintained, losses of stock will go undiscovered to the end of the year, appearing only when physical inventory is taken. They will then have to be "written off" as a loss, thus reducing profits for the year.

The control of inventory affects profits. Control by observation is inadequate; control by records and management reports is imperative. There are two essential objectives of Inventory and Material Accounting:

Control of physical movement—quantity only
Control of investment—money values, price and cost

A good Inventory and Material Accounting Method should accomplish the following objectives:

Record and price each item of material received and issued.

Maintain a stock record for each item of material, in order to keep stocks at a level sufficient to meet demand but not in excess of requirements.

Distribute the cost of material issued to proper accounts.

Reveal discrepancies between stock records and physical count of inventories, so that adjustments can be made and adequate preventive controls can be established.

An IBM card is used to record all the basic data concerning transactions which affect inventory records. Whenever material is ordered, received, reserved, or disbursed, the IBM Accounting Machines automatically sort and accumulate the cards to furnish all the required information. IBM Accounting is applied succesfully to Inventory and Material Control in businesses of all types and sizes.

RECEIPTS AND REQUISITIONS

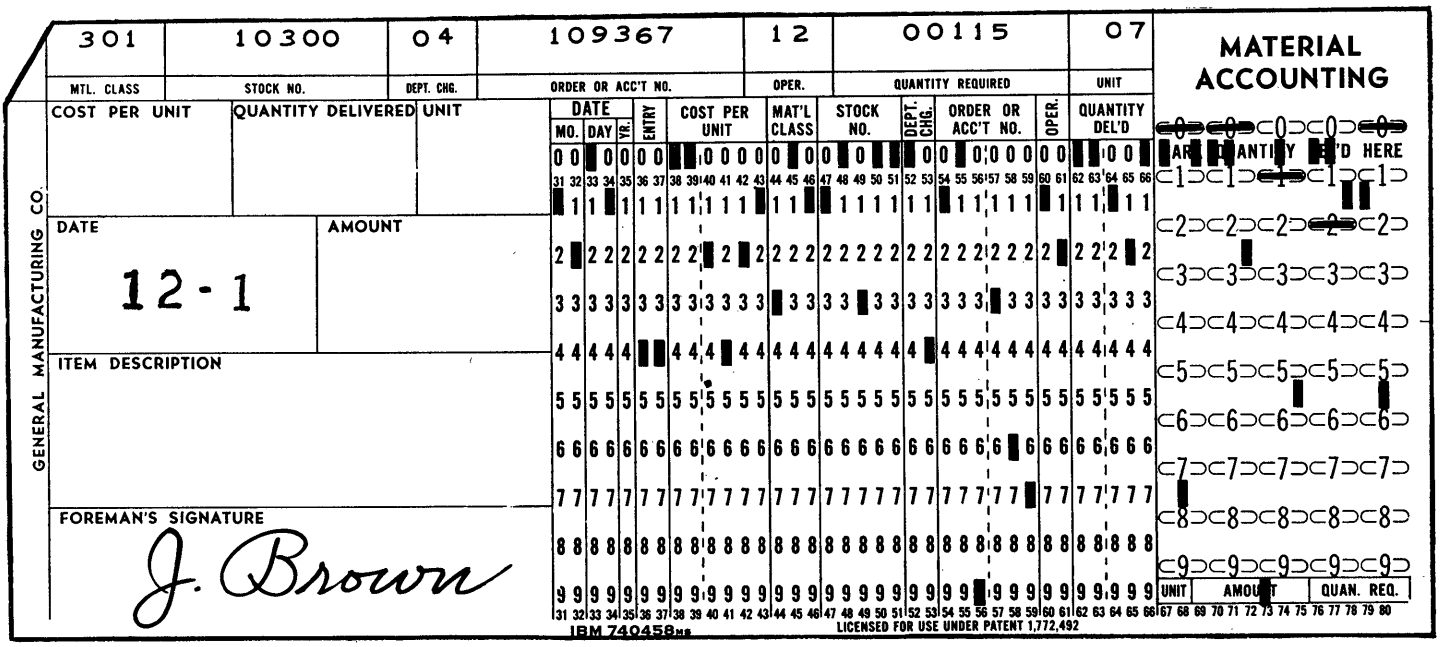
The initial stock record is established by punching an IBM Material Accounting card for the balance of each item on hand.

All subsequent transactions in the stock record have one of two effects: they increase the record of quantity on hand, or they decrease the record of quantity on hand. An entry code identifies the type of transaction and will cause the IBM Accounting Machine automatically to add or sub-

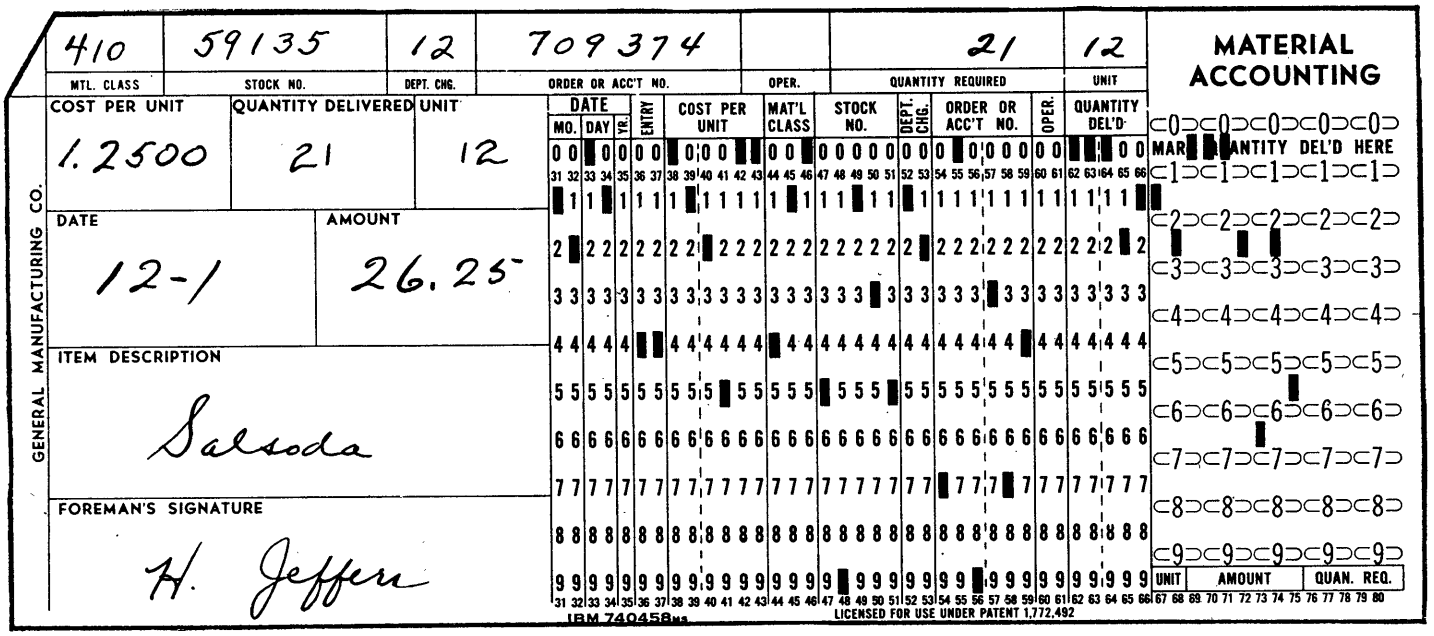
tract the quantity recorded for each transaction.

Receipts are additions to stock, either from production or from purchases. Although returns of stock which has previously been released from the stock room increase the quantity on hand, they are not classified as receipts.

Requisitions are decreases or disbursements from stock. They are generally authorized through the medium of a dual IBM card on which are written a description of the item required, the quantity desired, and the department order number and operation to be charged for the cost. When signed by a person authorized to request material, the dual IBM card is known as a material requisition. When the written data are punched, the IBM card becomes a requisitions



Prepunched and Mark Sensed Requisitions Card



Handwritten Requisitions Card

card. A requisitions card may also be prepunched at the time an order for manufacture or assembly is created.

All transactions which affect the records of stock balances are recorded in the same IBM Material Accounting card forms.

Daily, the various cards are listed in the IBM Accounting Machine to prepare a register which establishes control, and furnishes a record of stock disbursements for the day. A similar report is also prepared to furnish a record of stock receipts for the day.

Monthly, cards for requisitions and returns to stock are used to prepare a report called Credits to Inventories. It is used to decrease each inventory account by the amount of material issued.

SHEET 1 OF 1

GENERAL MANUFACTURING COMPANY

TRANSACTION REGISTER

DATE December 1

ENTRY	DATE MO.	DATE DAY	MATERIAL CLASS	STOCK NUMBER	DEPT.	ORDER NUMBER	OPER.	COST PER UNIT	UNIT	QUANTITY		AMOUNT	
44	12	01	301	10300	4	109367	12	2421	07	120		2905	
44	12	01	301	10300	2	109368	11	2421	07	10		242	
45	12	01	301	10300	1	200100	12	2421	07	30	CR	726	CR
44	12	01	301	20400	3	109368	02	13781	07	15		2067	
44	12	01	305	20012	2	109367	15	5152	08	10		515	
44	12	01	305	40834	2	109367	10	77870	08	27		21025	
44	12	01	410	59135	12	709374		12500	12	21		2625	
44	12	01	410	86284	12	709375		11000	09	17		1870	
44	12	01	425	14197	26	709377		18000	18	30		5400	
44	12	01	425	26917	14	709377		22500	18	39		8775	
44	12	01	425	72981	16	709377		21329	18	10		2133	
44	12	01	460	25781	28	809379		21000	08	19		3990	
												50821	*

SHEET 1 OF 3

GENERAL MANUFACTURING COMPANY

CREDITS TO INVENTORIES

DATE December 31

MAT'L. CLASS	STOCK OR PART No.	QUANTITY	AMOUNT	MAT'L. CLASS TOTAL	TOTAL AMOUNT
301	10300	967	23411		
301	20400	786	10831	8	
301	29648	13	765	8	
301	30623	66	26400	0	
301	38942	500	25746	0	
301	40732	30	10551	1	
301	41693	212	15981	4	
301	50800	180	15242	0	
301	52634	210	13935	0	
301	60900	347	21147	5	
				1429417	
305	10005	60	1	74	
305	20012	710	365	79	
305	20023	373	739	66	
305	30023	15	29	75	
305	40834	72	560	66	
305	50945	7	69	87	
305	61056	216	913	70	
305	71167	1275	45532	7	
305	81278	1152	22782	0	
305	91389	304	30400	0	
				1255264	

The above transactions make possible the preparation of a report indicating the in-stock position of each item of material. In order to maintain stocks at proper levels from the stock report, it becomes necessary to introduce additional factors. When purchase orders or manufacturing orders are placed for additional items, "on order" cards are introduced to reflect these quantities that will be received.

Another type of card is also included to indicate future requirements or requisitions. This is a "minimum inventory" card or, if a manufacturing control system of planning is in use, it is a "reservation" card which represents requirements for each work order scheduled but not yet in process.

These additional factors make it possible to include on the Stock Status Summary an "available" figure which reflects the future position of stock. The available quantity is stock on hand, plus material ordered but not yet received, minus minimum inventory (or material reserved for work scheduled ahead).

Under this procedure, the on order cards are replaced by receipts cards when material is received. The reservations cards are replaced by requisition cards when the material is actually removed from stock, if the manufacturing control system is used.

Whenever a Stock Status Report is desired, it is necessary only to combine by stock number the various IBM cards — old balance, receipts, returns, requisitions, on order and minimum inventory or reservations. The IBM Accounting Machine automatically adds and subtracts the various transactions, and prepares a report showing for each item the total of each type of transaction, and the net quantity available. At the time this report is prepared, a new summary or balance card is automatically created. The new balance cards, together with the on order and minimum inventory or reservation cards, constitute the Perpetual Inventory File.

The IBM Accounting method produces a separate Stock Status Report for each stock location, in businesses where materials are stored in branches or departments.

If it is desirable to have a posted ledger card for a stock record, it may be prepared by the IBM Facsimile Posting Machine. This record, posted from the Stock Status Report, shows material receipts, requisitions, and balance for each stock item number.

SHEET 1 OF 3

GENERAL MANUFACTURING COMPANY

STOCK STATUS SUMMARY

DATE December 31

MATERIAL	STOCK No.	DESCRIPTION	OLD BALANCE	RECEIPTS	REQUISITIONS	ON HAND	ON ORDER	MINIMUM INVENTORY	AVAILABLE
301	10300	BRASS ROD	1357	345	967	735	3000	3100	635
301	20400	SOFT BRASS ROD	1130	66	786	410		760	350 CR
301	29648	C D BRASS	637		13	624		81	543
301	30623	H H CLOCK BRASS	60	100	66	94		73	21
301	35369	BRASS DISC	186			186	250	215	221
301	38942	BRASS TUBING	923		500	423		37	386
301	40732	HARD SPRING BRASS	88	100	30	158		50	108
301	41693	BRASS PINION	325		212	113		275	162 CR
301	50800	EXTRUDED BRASS	260	500	180	580	1000	786	794
301	52634	BERYLLUIM COPPER	475		210	265		225	40
301	60900	BRONZ TUBING	270	500	347	423		274	149
305	10005	ALUMINUM CASTING	4210		60	4150		295	3855
305	20012	ALUMINUM ALLOY CAST	455	5304	710	5049		322	4727
305	20023	BRASS CASTING		2000	373	1627		32	1595
305	30023	BRONZ ALLOY CASTING	243	81	15	309	500	400	409
305	40834	HARD BRONZ CASTING	560	500	72	988		160	828
305	47263	BRASS FORGING	347			347		69	278
305	50945	BRONZ FORGING	270	300	7	563		250	313
305	52186	CAST IRON NUTS	156			156		91	65
305	61056	MISC CAST IRON	591	500	216	875		85	790
305	64398	SURFACE PLATE	182			182		190	8 CR
305	71167	IRON CASTING	681	600	1275	6	1000	550	456
305	78946	GUN METAL CASTING	346			346		275	71
305	81278	STEEL CASTING	880	800	1152	528		560	32 CR
305	91389	STEEL FORGINGS	790	500	304	986		425	561
320	10106	BLANKED WHEEL DISC	335	130	439	26	400	250	176
320	10204	BLANK BEARING GUIDE	350	217	350	217		275	58 CR
320	20001	BLANKED FORKS	210	99	54	255	3000	2700	555
320	30301	BLANKED WASHERS	700	496	122	1074		775	299
325	10006	BEVEL GEAR	1218	2580	1968	1830	25	915	940
330	20122	PLATE GLASS	20	86	8	98		50	48
330	30069	SHEET GLASS	1163	10		1173		900	273
335	33062	HINGES	625	95	558	162	600	150	612
								1200	10327

Material cost has to be allocated to the proper finished product to determine manufacturing cost. The IBM cards which were used to record requisitions from stock serve another purpose in that they contain not only the quantity but also the unit price needed to determine the amount to be charged to the finished product. This amount can be computed automatically by the IBM Multiplying and Computing Punch.

Materials used are classified into two groups—direct and indirect.

Direct materials enter immediately into the finished product and are charged to the job or order number.

SHEET 1 OF 4

GENERAL MANUFACTURING COMPANY

MATERIAL CHARGES

✓ PRODUCTION ORDERS
EXPENSE ACCOUNTS

MONTH OF December

DEPT. CHGD.	ORDER OR ACC'T. No.	MAT'L. CLASS	STOCK OR PART No.	QUANTITY	AMOUNT	TOTAL AMOUNT
4	109367	301	10300	120	29 05	
14	109367	301	10300	25	6 05	
4	109367	301	10300	832	201 43	
1	109367	301	20400	756	1041 84	
1	109367	301	29648	13	76 58	
2	109367	305	20012	10	5 15	
2	109367	305	40834	27	210 25	
2	109367	305	40834	45	350 41	
12	109367	305	50945	7	69 87	
12	109367	320	10106	15 CR	5 19 CR	
12	109367	320	10204	30	11 04	
12	109367	320	10204	319	117 39	
12	109367	320	30301	15	3 23	
12	109367	320	30301	93	20 01	
12	109367	320	30301	14	3 01	
23	109367	355	10207	15 CR	7 54 CR	
						2132 58 *
2	109368	301	10300	10	2 42	
3	109368	301	20400	15	20 67	
3	109368	301	30623	66	2640 00	
3	109368	301	38942	500	2574 60	
4	109368	305	30023	15	29 75	
4	109368	305	30023	6	11 90	
14	109368	305	61056	216	913 70	
12	109368	320	20001	12	4 49	
14	109368	325	10006	3	6 12	
14	109368	340	30730	85	96 41	
						6300 06 *
3	109386	305	30023	6 CR	11 90 CR	
3	109386	305	71167	39 CR	139 28 CR	
12	109386	325	10006	3	6 12	
						145 06 CR
28	109394	360	40500	86	166 88	
28	109394	360	40500	8	15 52	
						182 40 *
26	109396	350	30236	3	3 08	
26	109396	350	51689	1	10 30	
						13 38 *

Indirect materials, such as oil, grease, or cleaning supplies, cannot be charged directly to a finished product, and, because of this, are accumulated by Account Number and Department and distributed periodically by direct labor hours, machine hours, or some other equitable basis.

There are three elements in manufacturing costs. These elements are material, labor, and burden or overhead. Accumulation of the expenditures for these three elements, and distribution of these expenditures to products, processes, operations, manufacturing orders, periods of time, or specific jobs, is known as cost accounting. The profit or loss of a business depends largely on the accuracy of its cost accounting.

Determination of the cost of materials used in manufacturing is an important function of Material Accounting.

The IBM cards used for material issues may be filed with the labor distribution cards to complete the work-in-process file.

Whenever an order is completed or when it is necessary to obtain a statement showing the details of the cost of work-in-process, this file is run in the IBM Accounting Machine and a Cost Statement is prepared.

SHEET 1 OF 3

GENERAL MANUFACTURING COMPANY

MATERIAL CHARGES

PRODUCTION ORDERS
✓ EXPENSE ACCOUNTS

MONTH OF December

DEPT. CHGD.	ORDER OR ACC'T. No.	MAT'L. CLASS	STOCK OR PART No.	QUANTITY	AMOUNT	TOTAL AMOUNT
1	809380	420	10002	153	375	
					375 *	
1	809384	465	21032	4	1290	
					1290 *	
						1665
2	709381	460	13165	4CR	546CR	
2	709381	460	29191	4CR	1648CR	
					2194CR *	
2	809382	415	20601	2	6440	
2	809382	465	30006	7	5174	
					11614 *	
2	909393	405	45723	9	297	
2	909393	425	14197	60	10800	
					13797 *	
						23217

GENERAL MANUFACTURING COMPANY

SHEET 1 OF 3

COST STATEMENT

DATE December 31

ORDER OR ACC'T. No.	MATERIAL	LABOR	OVERHEAD	TOTAL COST
109367	213258	123862	247724	584844
109368	630006	308990	617980	1556976
109370	18240	6892	13095	38227
109388	54775	27350	54700	136825
109396	13092	5975	11651	30718
200100	25892	16256	32512	74660
202716	368243	189236	378472	935951
209385	151175	81114	158172	390461
209388	69823	35624	71248	176695
215600	418500	197213	394426	1010139
234765	89346	48234	94456	232036
283373	141675	70550	130463	342688
309125	300259	161008	319458	780725

The purpose of a Physical Inventory is to check stock control records against an actual physical count of each item in the stockroom, and to adjust records of quantity and value where discrepancies are discovered.

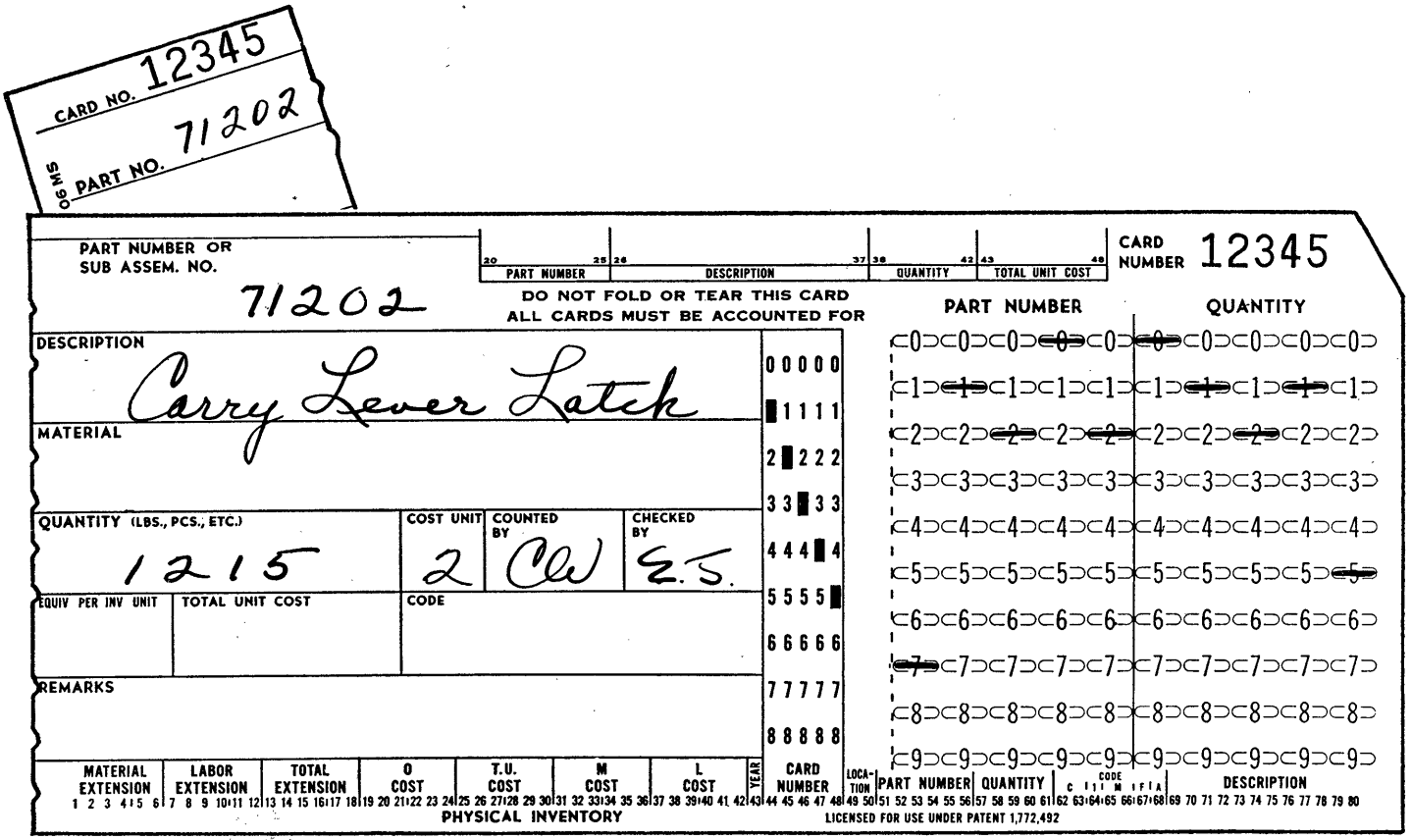
A second and equally important purpose is to analyze stock on hand to facilitate executive control over the disposition of stock and the planning of future activities. Examples of classifications for such analyses are: location, size, age, unit value, activity, and obsolete materials.

IBM Physical Inventory cards are usually numbered and prepunched to maintain an accurate record of all cards issued to the people taking inventory. This is necessary to account for all cards issued and to insure that all items inventoried have been reported.

A week or two before taking the inventory, the cards are sent to the department or section where inventory is to be taken and are attached to bins or material. The part number and location of the stock is copied from the bin card to the IBM inventory card, although, in some instances, this information is prepunched before being sent to the stock location. A mark-sensed card can be used to advantage under these conditions to record the quantity counted.

After the material has been counted, the quantity is marked on the card. Later the quantity is checked by another person to see that the count was correct and to see that all items were inventoried. The cards are then sent to the Cost Department and a check run is made to account for all cards.

After the cards are punched, checked, arranged in the desired sequence, and extended by the IBM Multiplying and Computing Punch, they are placed in the IBM Accounting Machine and the complete inventory is listed.



FINISHED STOCK CONTROL

Finished Stock Control is the regulation of finished items available for sale. Properly established, it enables management to plan production or purchases on the basis of sales turnover for the current period as against the year-to-date sales, and also on the basis of orders received and as yet unfilled, quantity of stock on hand, and the amount due from the factory or from vendors.

The Finished Stock Control Report reveals prevailing trends of consumer demand and provides the basis for executive action. The Sales Department record of orders received, the Production Department record of production and purchases, and the Stock Record Department record of stock on hand, when combined, show the current stock position of each item and also the volume and rate of increase or decrease in manufacture and distribution. IBM Accounting produces this information in complete and accurate form, ready for immediate executive action.

SHEET 1 OF 4

GENERAL MANUFACTURING COMPANY

FINISHED STOCK REPORT

WEEK ENDING December 31

DESCRIPTION	STOCK OR PART No.	SALES		UNFILLED ORDERS	STOCK ON HAND	DUE FROM FACTORY	REMARKS
		YEAR TO DATE	MONTH TO DATE				
SQ SHANK RIGID	11102	4950			21855		
SQ SHANK SWIVEL	11202	1750	1500		4160	20	
FLAT TOP RIGID	13102	56600	6250	11880	210106		
RT ANGLE HEAD FITT	14202	6500	500	1000	27565		
RT ANGLE HEAD FITT	14203	23500	1500		39510		
RIGID FORK OFFSET	14702	17510	8010	990	20515	4570	
SQ SOCKET RIGID	16102	10015		1985	1090	12160	
EXT SHANK WITH BRK	17203	20980	5000	1020	22517	4000	
SQ SHANK RIGID	21103	9642	1005		15503	. 900	
ROUND SHANK RIGID	21302	20482	1965	965	30465	13615	
TOOTHED ADAPTER	21502	27567	5033	257	15938	19875	
FLAT TOP RIGID	23103	11900	4540	190	25646		
FLAT TOP RIGID	23104	71790	7500	4250	64133	12085	
EXTENSION SHANK	23302				299		
EXTENSION SHANK	23303	5350	1350	200	3560	1050	
EXTENSION SHANK	23304	1570	300		400	545	
ADJ ADAPTER SQUARE	23702	4692	501	165	350	510	
RT ANGLE FITT	24204	10450	1010	450	250	1060	
SQ SOCKET RIGID	26104	32500	1575	750	2345	950	
SQ SOCKET SWIVEL	26304	9475	260		1800		
SQ SHANK RIGID	31104	4590	1865	750		2050	
ROUND SHANK SWIVEL	31414	1750	245	150	600	350	
STD PIPE THRD STEM	31703	4950	50	200	2055		
BOLT AND NUT SHANK	32103	20475	1950	550	450	3540	
BOLT AND NUT SHANK	32104	9145	675		1050	750	

The president, treasurer, comptroller and factory executives use IBM Inventory and Material Accounting reports because:

Proper accounting for materials used assures correct cost records for the finished product.

Shortages due to carelessness or theft are quickly detected.

Records of goods on hand as to total value and unit cost are readily available.

Material on hand can be efficiently tied in with production and sales.

Excessive accumulations of stock are prevented.

Frequent analysis of direct and indirect material costs make it possible to control expenses and obtain greater manufacturing efficiency through timely correction of adverse conditions.

A complete and comprehensive Stock Status Report simplifies the checking of inventories and assures accurate cycle checking, which eliminates the necessity of costly plant closures for the purpose of taking a physical inventory.

Control of inventory by warehouses or locations enables management to place responsibility for inventory shortages, inefficient operation, and excess handling costs, and also establishes values for insurance purposes.

Material charges to work orders, the basis of cost control, assist in simplifying the closing out of jobs, and maintain the work-in-process cost file.

Balances are computed automatically, thus eliminating errors of manual calculations.

Sales turnover figures, incorporated in finished stock reports, prevent wasteful manufacturing practices.

The IBM method places complete facilities for planning in the hands of executives.

Planning can be based on facts.

IBM Electric Accounting Machines offer the following advantages:

Better control over inventory.

More information regarding inventory assets.

The control of purchasing based on more accurate facts.

Periodic reports and analyses from all angles which facilitate comparison and follow-up.

Reduction of investment in inventories to the lowest possible point consistent with requirements, in order to insure a continuous supply of material.

A flexibility, not inherent in any other method, which permits individual ingenuity in improving the management of inventories, and makes all the foregoing advantages possible.

GLOSSARY

AVAILABLE—This is the quantity of material on hand, plus the quantity on order, minus the quantity reserved for specific purposes.

BALANCE CARD—The IBM card in which the quantity of stock on hand is recorded. This card may also include other quantities, such as Maximum and Minimum, Reservations, Issues, Receipts, and Available Stock.

BIN CARD—This is usually a small card on which each movement and the new balance on hand as a result of that movement are recorded. It is usually kept either at the physical location of the stock or at the desk of the stock clerk in the stock room.

CONTROL OF PHYSICAL MOVEMENT — This term is applied to the management of stock on hand and is primarily concerned with quantities received and issued, and the quantity available for future needs, so that stocks are kept at adequate but not excessive levels.

CONTROL OF INVESTMENT—Money is invested in a business for the purpose of making a profit. Materials in stock required money to purchase or produce, and therefore can be converted to monetary values. The management of these values to produce reasonable profits by reducing the amount invested is known as control of investment.

COST, DIRECT—That part of the cost of manufacturing which is applied directly to a product, process, manufacturing order, or operation. Examples are labor and materials which are used to make or become part of the product.

COST, INDIRECT—That part of the cost of manufacturing which cannot be applied directly to a product, process, manufacturing order, or operation. Examples are rent, heat, light, and janitor services.

COST, MATERIAL—The cost of materials used in the manufacture of products, or the maintenance or construction of facilities and equipment.

COST, MANUFACTURING—The total amount of money expended in manufacturing. It includes all elements — labor, materials, and burden or overhead.

COST STATEMENT, LABOR AND MATERIAL—A report, or statement, of expenditures for labor performed and materials used in the manufacture of commodities.

CYCLE CHECKING—This is a variation of complete physical inventory. It is often used to augment physical inventory. It is the frequent checking of actual stock on hand against stock records, taking a portion of the items at one time, another portion at another time, etc., thus rotating the physical count.

FACSIMILE POSTING—A posting process developed by IBM, by which a special carbon deposit from a ribbon or sheet of paper is made on the back of a report produced on the IBM Accounting Machine, and then transferred to a ledger card by means of the IBM Facsimile Posting Machine.

FINISHED STOCK—Items or products which have been manufactured or purchased, and are ready for sale or use without further manufacturing processing.

INVENTORY ASSETS—Any property or commodity which can be converted to cash is an asset. Inventory assets are those which are represented by materials in stock.

MATERIAL TRANSACTION REGISTER—A list of transactions—issues, receipts, and adjustments—affecting the balance of material on hand.

MINIMUM INVENTORY — The amount of stock needed to carry on operations until replacements can be obtained.

OBSOLESCENCE—The process of becoming obsolete, or unusable, or worthless. Obsolescence of materials may come about through change in designs, development of superior materials, or through termination of need.

PERPETUAL INVENTORY FILE—A file of IBM cards which is kept up to date with activity of stock movements, so that the record of balances on hand is continuously available.

PRICING—There are several methods of determining the price to be used in computing the cost of materials. Among these methods are:

1. Standard Price. The price over a period of time is determined, and this price is used as "standard" regardless of changes in market value.

2. Average Price. When this method is used, the average price of the material on hand is re-computed each time the market or manufacturing cost changes.

3. Last Price. Some companies price their materials at the last purchase price or manufacturing cost.

4. First In—First Out. This method requires figuring material cost on actual purchase price or manufacturing cost. Under this method, materials issued will be priced at actual cost until the quantity purchased or produced for that cost is exhausted. Later issues will be priced higher or lower, depending on the purchase price or manufacturing cost of the remaining quantity.

RECEIPTS—Quantities of items which are added to stock.

REQUISITIONS—Authorizations to release quantities of items from stock.

RESERVATION—When a definite future need for material is known, stock records are marked, thus reserving the required quantities to assure availability when needed. These are reservations.

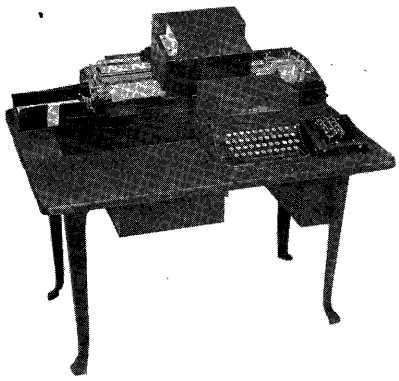
SALES TURNOVER—The relationship of quantities sold to the quantities in stock. To illustrate, if one hundred units are sold in a year, and the normal quantity on hand is twenty, the sales turnover is five.

STOCK ON HAND—The quantity of any item or commodity actually located in a stock room, and available for use or issue.

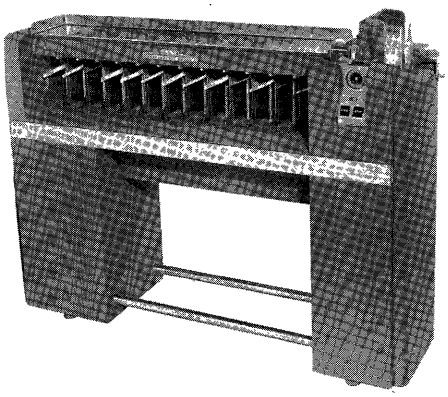
STOCK STATUS REPORT—A report prepared on the IBM Accounting Machine which shows, by item, the quantity on hand, on order, reserved or set up as minimum inventory, and available for issue. This report may also show the quantity issued over a period of time, the quantity received over a period of time, and the maximum and minimum.

WORK-IN-PROCESS FILE—A file of IBM cards containing labor distribution and material requisition cards for commodities which are being manufactured. The file is relieved of IBM cards when manufacturing is completed. This file is usually maintained in sequence by commodity.

IBM ELECTRIC PUNCHED CARD ACCOUNTING MACHINES



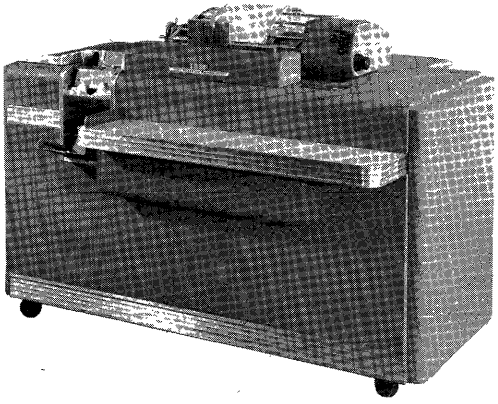
CARD PUNCHING MACHINE
WITH DUPLICATING FEATURE



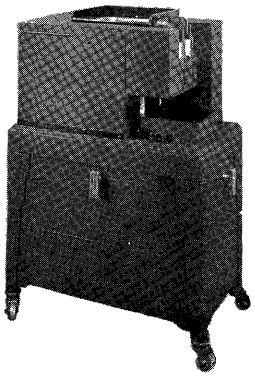
SORTER

VERIFIER

ELECTRIC DOCUMENT-
ORIGINATING MACHINE

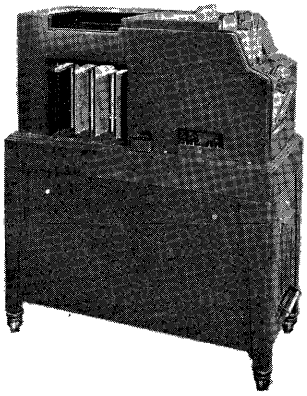


ACCOUNTING MACHINE

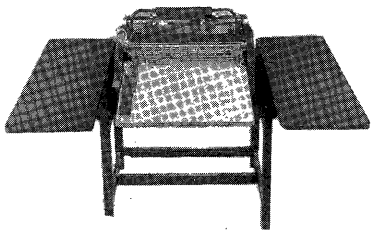


CARD INTERPRETER

CALCULATING PUNCH



COLLATOR



FACSIMILE POSTING MACHINE

IBM ACCOUNTING

BILLING
APPLICATION

INTERNATIONAL BUSINESS MACHINES CORPORATION
NEW YORK, NEW YORK

Published by
Department of Education
International Business Machines Corporation
Endicott, New York

Printed in U. S. A.
Form 22—4966-2

IBM
ACCOUNTING

BILLING

"BILLING" is the preparation by the seller of a document describing to the customer the goods or services that have been purchased. This document is commonly known as a bill or invoice.

The invoice is an important accounting document. It is the means of telling the customer what was shipped to him, and how much is to be paid. It is also the means of telling the seller, who is the vendor, what he has shipped to his customer, and how much he will receive in payment.

INVOICE

GENERAL MANUFACTURING COMPANY

ENDICOTT, NEW YORK

SOLD TO: NEW MEXICO COMPANY
216 WYSOR BUILDING
HOUSTON TEXAS

SHIP TO: ABOVE

BRANCH	CUSTOMER'S NO.
13	59751

MAKE ALL CHECKS PAYABLE TO AND FORWARD REMITTANCE DIRECTLY TO

GENERAL MANUFACTURING COMPANY,
ENDICOTT, NEW YORK

SHIPPED VIA: TRUCK PREPAID

TERMS: 2% 10 DAYS NET 30

CUSTOMER'S ORDER NO.	SALESMAN'S NAME	SALESMAN'S NO	INVOICE DATE	INVOICE NUMBER
311	MACY	67	12 31	12349

QUANTITY	DESCRIPTION	COMMODITY NO.	UNIT PRICE	AMOUNT
	CASTERS			
40	SQ SHANK SWIVEL	11202	.83	33.20
75	FLAT TOP RIGID	13102	.84	63.00
5	EXT SHANK WITH BRK	17203	1.62	8.10
2	BOLT AND NUT SHANK	32105	2.64	5.28
4	RND SPR RING STEM	44104	3.51	14.04
40	BOLT AND NUT SHANK	62110	7.25	290.00
	FREIGHT			78
				414.40

The vendor's Billing Department starts the preparation of an invoice when the customer's purchase order is received. The customer's purchase order is the most common form of source document. Purchase orders usually specify name and address of customer, shipping directions, items to be furnished, and desired delivery dates. They may also specify prices previously agreed upon.

There are other forms which are correctly classified as source documents. Among these are letters from customers, salesmen's orders, and vendor's orders. The vendor order is filled out by the vendor for orders which are placed verbally, by telephone, or by telegram. Usually such orders are confirmed by purchase order.

Upon receipt of the customer's purchase order or letter, the salesman's order, or the vendor order blank, a review is made to determine that all information on the order is correct and that the customer's credit is satisfactory. The order is then forwarded to the Billing Department where the invoice is prepared.

PURCHASE ORDER

NEW MEXICO COMPANY

HOUSTON, TEXAS

SHOW OUR ORDER NO. ON ALL INVOICES. PACKAGES AND SHIPPING PAPERS.

REQ. 56 DATE 12/29

ORDER No. 311

MAIL INVOICES IN TRIPLICATE UNLESS OTHERWISE SPECIFIED.

TO GENERAL MANUFACTURING COMPANY

ENDICOTT, N. Y.

SHIP TO ABOVE VIA BEST WAY F. O. B.

QUANTITY	DESCRIPTION		PRICE
40	SQUARE SHANK SWIVEL	11202	
75	FLAT TOP RIGID	13102	
5	EXT SHANK WITH BRK	17203	
2	BOLT AND NUT SHANK	32105	
4	RND SPR RING STEM	44104	
40	BOLT AND NUT SHANK	62110	

NOTIFY DEPT.	ORD. BY DEPT.	DEL. TO DEPT.	APPROPRIATION	CLASS	CODE	

SUBJECT TO THE TERMS AND CONDITIONS ON THE BACK HEREOF WHICH ARE INCORPORATED AND MADE A PART HEREOF

W. C. Dawson
PURCHASING AGENT

Customer's Purchase Order

ORDER

GENERAL MANUFACTURING CO.

ENDICOTT. NEW YORK

MANUFACTURERS OF CASTERS

OFFICE USE ONLY

CREDIT DEPT. OK_____

SOLD TO Square Deal Oil Co
255 Essex St.
Cleveland, Ohio

SHIP TO Arnold Simpson
1487 Smith St.
Cleveland, Ohio

DATE TO BE SHIPPED Jan. 3

DATE 12/27 CUST. ORDER No. 48762 9AL SALESMAN Nelson SALESMAN No. 69 INV. No. 12345

PLEASE SHOW COMMODITY NUMBER

QUANTITY	DESCRIPTION	COMMODITY NUMBER	PRICE	
25	Sq. Shank Rigid	21103		
20	Sq. Shank Rigid	51105		
2	Sq Socket Rigid	26104		
35	Adj Adapter Square	23702		
3	Round Socket Swivel	55706		
35	Flat top Swivel	33202		
5	Flat top Swivel	53209		
125		264131		
				CUSTOMER'S AUTHORIZATION TO PURCHASE
				H. E. Robertson
	Freight		1.17	

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

DELIVERIES WILL BE MADE FROM NEAREST BRANCH

1 — LIGHT DUTY
2 — MED. LT. DUTY
3 — LT. MED. DUTY
4 — MED. DUTY
5 — MED. HVY. DUTY
6 — HEAVY DUTY

BRANCHES ARE LOCATED IN ALL PRINCIPAL CITIES

FORM NO. EB-4

Salesman's Order

Sanborn Industrial Co.
36 Albert Street
York, Pa.

December 30, 19

General Manufacturing Co.
Endicott, New York

Gentlemen:

Please ship via best way to the above the following items on our Order Number 3281:

1. 25 Square Socket Rigid #16103
2. 4 Flat Top Swivel #53209
3. 25 Round Socket Swivel #55706
4. 25 Adj Adapter Square #63706
5. 50 Round Shank Swivel #31404

Yours very truly,

K. B. Daniels

K. B. Daniels,
Purchasing Agent
Sanborn Industrial Co.

Customer's Letter

ORDER
GENERAL MANUFACTURING CO.
ENDICOTT, NEW YORK
MANUFACTURERS OF CASTERS

OFFICE USE ONLY

CREDIT DEPT. OK_____

SOLD TO Empire Equipment Co
21 East Eighth St.
Los Angeles, Calif.

SHIP TO Above

DATE TO BE SHIPPED_____

DATE 12/31/44 CUST ORDER No. Telephone Call SALESMAN House SALESMAN No._____ INV No._____

PLEASE SHOW COMMODITY NUMBER

QUANTITY	DESCRIPTION	COMMODITY NUMBER	PRICE	
10	Square Socket Rigid	16102		
5	Custom Built	35105		
50	Flat top Swivel	53208		
15	Rnd. Spr. Ring Stem	44104		

Vendor Order

The invoice must show basically the same information as shown on the customer's purchase order. This information is commonly classified as:

Heading Information
- Customer's Name and Address
- Customer Number
- Shipping Instructions
- Date of Invoice

Miscellaneous Data
- Customer's Purchase Order No.
- Date of Order
- Vendor's Invoice Number
- Salesman's Number

Body of Invoice (Commodity)
- Description of Items
- Quantity
- Unit and Total Price

Much of the above data is repetitive, in that goods are shipped to the same customers regularly, and the same commodities are shipped from day to day.

The repetitive information is recorded by means of holes in IBM cards, in advance of its use. In addition, other information such as cost amount and commission class is also recorded. Cards in which information is recorded in advance of its use, are known as pre-punched cards.

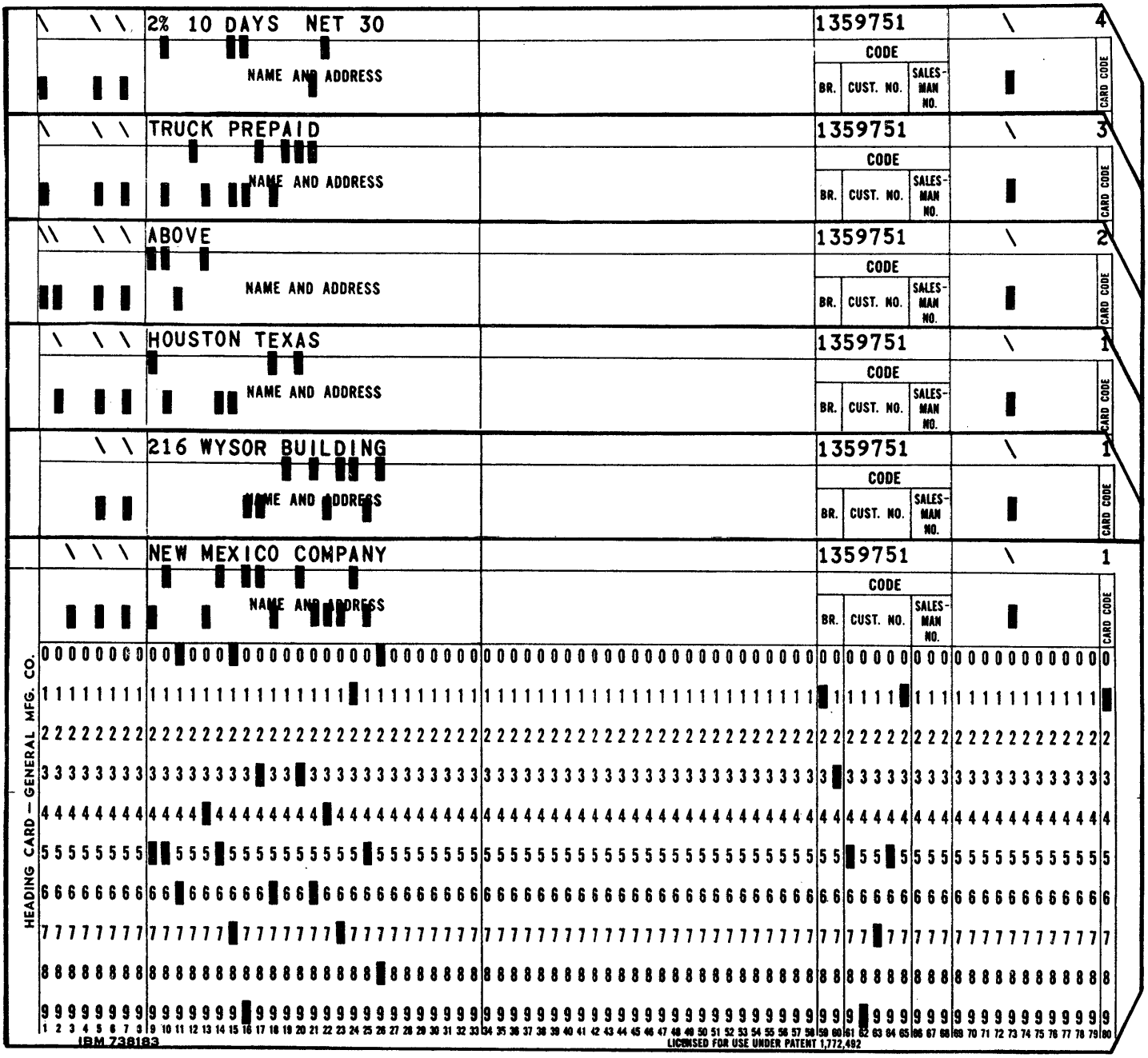
The Heading cards and Commodity cards are prepared in advance and, together with corresponding indexes, are stored in files known as tub files.

When the customer's purchase order is received in the Billing Department, pre-punched IBM cards are pulled from the tub files for the name and address of the customer, and for the items on the purchase order.

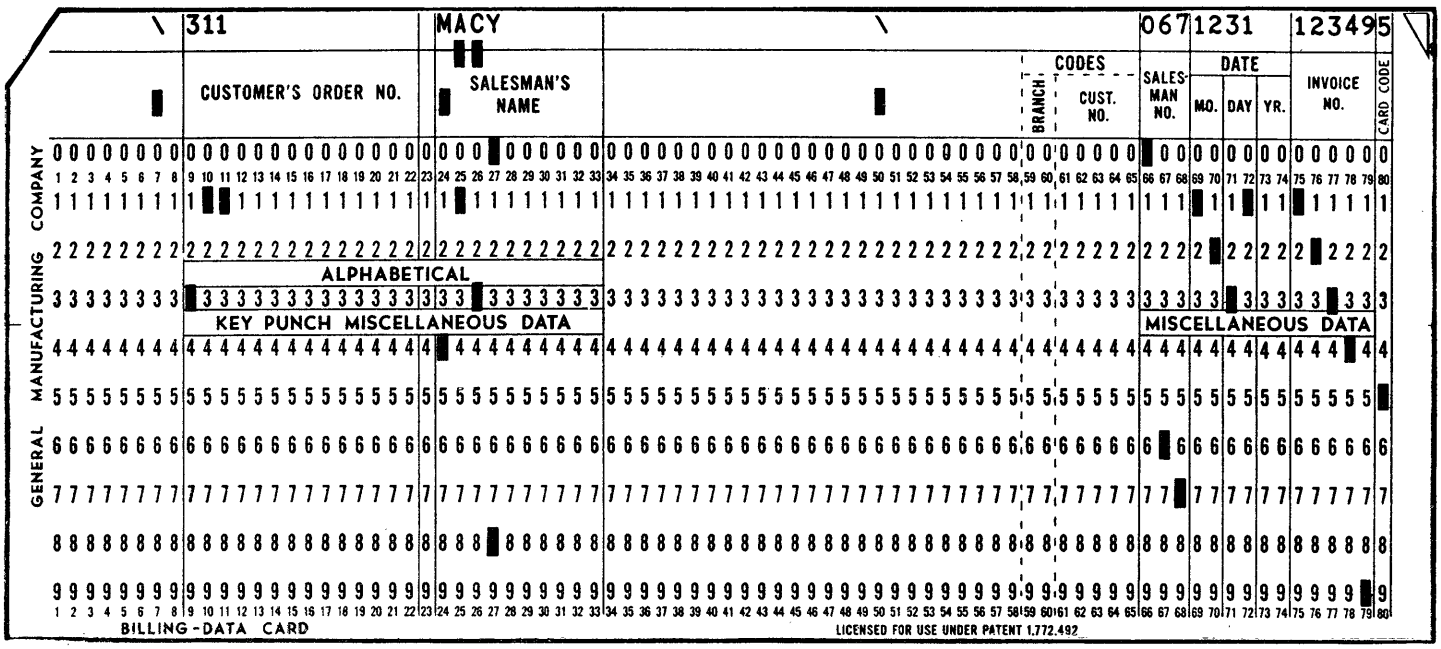
Miscellaneous data are key punched into an IBM card.

The three types of IBM cards—Heading cards, Miscellaneous Data cards, and Commodity cards —are assembled in that order, and placed in the IBM Accounting Machine. The IBM Accounting Machine automatically prepares the complete invoice by means of the holes in the cards.

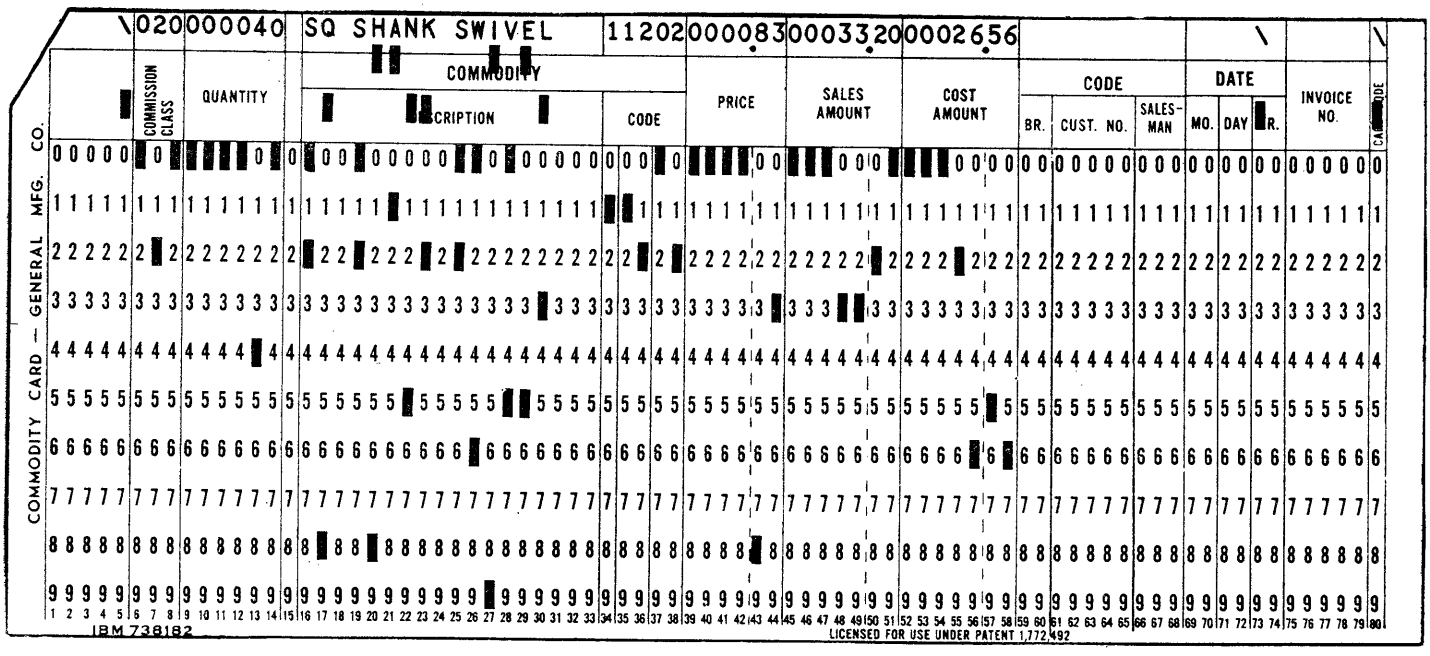
Tub Files



Heading Cards



Miscellaneous Data Card



Commodity Card

An Accounts Receivable card is automatically summary punched at the time each invoice is prepared.

After completion of the invoice preparation, the invoice number and date, customer number, and salesman number are automatically transferred to the Commodity cards from the Heading and Miscellaneous Data cards.

The IBM Billing cards are then separated; Heading cards are returned to the tub file for reuse, Miscellaneous Data cards are discarded, and Commodity cards are available for compiling accounting records and statistical reports. The Accounts Receivable cards are used for Accounts Receivable purposes.

The principal function of Billing is the preparation of the invoice. When this operation is accomplished with IBM cards, other useful documents are easily prepared from the same cards. These documents are:

Packing list, used by stock pickers to select items from warehouse bins, and later attached to the item for identification.

Shipping label, used to address the Parcel Post package for shipment.

Sales Register, that is, a list of the items billed during a day's operation.

Credit Memorandum. This is an invoice in reverse. It tells the customer his account has been credited with the amount shown. A credit memorandum usually results from failure to ship items shown on the invoice, or from return of goods for which the charge is to be cancelled.

GENERAL MANUFACTURING COMPANY
ENDICOTT, NEW YORK

QUANTITY	DESCRIPTION	COMMODITY NO
	CASTERS	
40	SQ SHANK SWIVEL	11202
75	FLAT TOP RIGID	13102
5	EXT SHANK WITH BRK	17203
2	BOLT AND NUT SHANK	32105
4	RND SPR RING STEM	44104
40	BOLT AND NUT SHANK	62110
	FREIGHT	

PACKING LIST

SHIPPING LABEL

GENERAL MANUFACTURING COMPANY

ENDICOTT, NEW YORK

NO.

BRANCH	CUSTOMER'S NO.
13	59751

SOLD TO
NEW MEXICO COMPANY
216 WYSOR BUILDING
HOUSTON TEXAS

SHIP TO
ABOVE

SHIPPED VIA TRUCK PREPAID

SHEET 2 OF 2

GENERAL MANUFACTURING COMPANY

SALES REGISTER AND PROOF SHEET

DATE December 31

COMMODITY DESCRIPTION	COMMODITY NUMBER	BR.	CUSTOMER NUMBER	SALES-MAN	DATE MO.	DAY	YR.	ENTRY	INVOICE NUMBER	CREDIT SALES	FREIGHT	DEBIT ACCOUNTS RECEIVABLE
SQ SHANK SWIVEL	11202	13	59751	67	12	31		11	12349	3320		3320
FLAT TOP RIGID	13102	13	59751	67	12	31		11	12349	6300		6300
EXT SHANK WITH BRK	17203	13	59751	67	12	31		11	12349	810		810
BOLT AND NUT SHANK	32105	13	59751	67	12	31		11	12349	528		528
RND SPR RING STEM	44104	13	59751	67	12	31		11	12349	1404		1404
BOLT AND NUT SHANK	62110	13	59751	67	12	31		11	12349	29000		29000
FREIGHT	70651	13	59751	67	12	31		11	12349		78	78
										41362 *	78 *	41440 *
RIGID FORK OFF SET	14702	22	41314	22	12	31		11	12350	2700		2700
ROUND SOCKET SWIVL	55706	22	41314	22	12	31		11	12350	32550		32550
SQ SOCKET RIGID	46106	22	41314	22	12	31		11	12350	1910		1910
FREIGHT	70651	22	41314	22	12	31		11	12350		61	61
										37160 *	61 *	37221 *
SQ SHANK RIGID	21103	22	11234	79	12	31		11	12351	885		885
BOLT AND NUT SHANK	32103	22	11234	79	12	31		11	12351	13450		13450
RND SPR RING STEM	54107	22	11234	79	12	31		11	12351	9960		9960
EXT SHANK WITH BRK	17203	22	11234	79	12	31		11	12351	2430		2430
FREIGHT	70651	22	11234	79	12	31		11	12351		61	61
										26725 *	61 *	26786 *
SQ SOCKET RIGID	16102	16	30523	76	12	31		11	12352	1530		1530
CUSTOM BUILT	35105	16	30523	76	12	31		11	12352	1640		1640
FLAT TOP SWIVEL	53208	16	30523	76	12	31		11	12352	24250		24250
RND SPR RING STEM	44104	16	30523	76	12	31		11	12352	5265		5265
FREIGHT	70651	16	30523	76	12	31		11	12352		438	438
										32685 *	438 *	33123 *
ADJ ADAPTER ROUND	53605	7	78050	69	12	31		11	12353	13225		13225
BOLT AND NUT SHANK	62110	7	78050	69	12	31		11	12353	25375		25375
EXTENSION SHANK	23302	7	78050	69	12	31		11	12353	985		985
FREIGHT	70651	7	78050	69	12	31		11	12353		84	84
										39585 *	84 *	39669 *
RT ANGLE HEAD FITT	14202	16	30541	76	12	31		11	12354	1760		1760
STD PIPE THRD STEM	31703	16	30541	76	12	31		11	12354	13350		13350
CUSTOM BUILT	65112	16	30541	76	12	31		11	12354	119600		119600
FREIGHT	70651	16	30541	76	12	31		11	12354		438	438
										134710 *	438 *	135148 *
FLAT TOP SEIVEL	53208	25	73557	44	12	31		11	12355	21825		21825
CUSTOM BUILT	15102	25	73557	44	12	31		11	12355	9075		9075
FLAT TOP RIGID	13102	25	73557	44	12	31		11	12355	6300		6300
CUSTOM BUILT	65110	25	73557	44	12	31		11	12355	52965		52965
FLAT TOP RIGID	63108	25	73557	44	12	31		11	12355	26180		26180
FREIGHT	70651	25	73557	44	12	31		11	12355		148	148
										116345 *	148 *	116493 *

CREDIT MEMORANDUM

GENERAL MANUFACTURING COMPANY

ENDICOTT, NEW YORK

BRANCH	CUSTOMER'S NO
13	59751

SOLD TO
NEW MEXICO COMPANY
216 WYSOR BUILDING
HOUSTON TEXAS

SHIP TO

SHIPPED VIA

MAKE ALL CHECKS PAYABLE TO AND FORWARD REMITTANCE DIRECTLY TO

GENERAL MANUFACTURING COMPANY,
ENDICOTT, NEW YORK

TERMS.

CUSTOMER'S ORDER NO.	SALESMAN'S NAME	SALESMAN'S NO	CREDIT MEMORANDUM DATE	CREDIT MEMORANDUM NUMBER
311	MACY	67	125	99206

QUANTITY	DESCRIPTION	COMMODITY NO.	UNIT PRICE	AMOUNT
10	CASTERS FLAT TOP RIGID SHORT SHIPMENT REFERENCE INVOICE NO 12349	13102	84	840

These, then, are the essential or useful documents which a good Billing Department will prepare:

Invoices
Shipping tags
Package labels
Sales Registers
Credit Memoranda

One of the most important advantages of the IBM method of Billing is the preparation of important accounting and statistical reports, which can be made from the same IBM cards after they have been used to prepare the invoice. These reports are:

Sales Analysis reports
Sales Accounting reports
Cost of Sales reports
Commission Statements
Tax reports
Inventory Control and Finished Stock reports

The IBM Billing method takes full advantage of an important, unique feature: pre-proven, pre-punched information recorded by means of holes in the IBM card. Pre-punched cards provide:

Speed in preparation of invoices.

Positive accuracy of invoices.

Definite assurance that product description and other data are always the same.

Accurate subsequent reports and records through re-use of the IBM Billing cards.

The sales manager, controller, treasurer, chief accountant, and warehouse manager of a company, and its customers, like the IBM Billing method because it offers the following advantages:

Prompt shipment of goods.

Current forwarding of invoices to the customer.

Current posting of Accounts Receivable.

The ability to prepare accounting and statistical records on time.

Improvement in appearance of invoices.

Accuracy through automatic pricing and extending.

The ability to automatically arrange items on the invoice in sequence as they are stored in the warehouse.

Economy of operation, because the prepunched IBM cards automatically provide customer numbers, branch numbers, commodity numbers and description, prices, and extensions, thereby eliminating the necessity for manual typing, and minimizing the proof reading and checking ordinarily required.

Fewer copies of the invoice are required because accounting and statistical reports ordinarily compiled from copies of the invoice are prepared from the IBM Billing cards. This means added economy.

Speed.

GLOSSARY

BACK ORDER—When it is not possible to ship all commodities on a customer's order in a complete shipment to the customer, a Back Order is prepared for those items which could not be included with the original shipment. Those items are considered as being "back ordered" because they will be shipped at a later date. A Back Order is prepared in the same way as a regular order. The most frequent reason for "back ordering" items is that there is insufficient stock on hand from which to ship the items.

CARD PULLING VOLUME — Experience has shown that on an average, approximately 3500 commodity cards can be pulled in an 8 hour day, and 500 sets of name and address cards can be pulled and refiled in an 8 hour day. These figures will fluctuate depending upon the type of industry, source document, and size of file, plus the training and experience of the operators doing the pulling and refiling.

COMBINED BILLING AND ORDER PREPARATION—This means that the Invoice is prepared before the commodities are selected and shipped. This is known as Pre-Billing. A copy of the Invoice serves as the warehouse order. This practice is sound only in those instances where Back Orders are at a minimum.

CUSTOMER NUMBER — An account number assigned in order to identify each customer is known as a customer number. These numbers are usually assigned from a list of customers already on the books, and are generally set up in alphabetical sequence. In some instances, however, they may be further grouped according to geographical area, by branch, or by type of customer, depending upon conditions in and requirements of the particular company.

CUSTOMER ORDER NUMBER — The number on the purchase order or other authorization received from the customer.

DISCOUNT—It is a common business practice to allow customers to deduct a certain amount from the listed or established price of commodities. The

amount deducted is known as discount, usually expressed in terms of a percentage. Among the several types of discount are:

Cash Discount—An allowance by the seller to be deducted by the buyer when remitting for the amount of the invoice, if payment is made within the time limits specified on the invoice. The cash discount is in addition to any other type of discount, and is figured on the net amount of the invoice.

Commodity Discount — Discounts may be allowed on some commodities and not on others. The purpose of such discounts is to induce customers to buy those commodities.

Industry or Trade Discount — Discounts are some times based on the type of industry or business. For a given commodity, department stores might be allowed one discount rate, and drug stores another. Some discounts are allowed on a chain discount basis, i. e., 40-10-5%.

DISCOUNT PRACTICE — Industry or Trade Discounts, and Commodity Discounts, are usually computed by the billing firm. They may be shown for each item on the invoice, or they may be shown in total only. The practice will vary with requirements of the billing firm or its customers.

DROP SHIPMENT—A shipment billed to one concern but shipped to another. Some wholesale houses frequently have shipments made to their customers direct from the suppliers; these are known as drop shipments. The "Shipped To" name differs from the "Billed To" name on the invoice for a drop shipment.

GROSS PRICE—This is the selling price before Commodity or Trade discount is applied.

INVOICE DATE—The date the invoice is issued.

INVOICE NUMBER—The number assigned to the Invoice, from a consecutive number series.

NET AMOUNT — This is the selling price after Commodity or Trade discount is applied.

SALESMAN—The person to whom credit will be given for the sale, covered by the invoice being rendered.

SHIP TO—The company and destination to which the goods will be shipped.

SHIPPED VIA — The transportation routing by which the goods are to be shipped.

SOLD TO—The customer to whom the goods have been sold. This is also the account to which this invoice will be charged on the Accounts Receivable record.

TERMS—The basis on which the sale has been made. This may be on a Net basis, or subject to a Cash Discount for payment within a stipulated period indicated on the invoice.

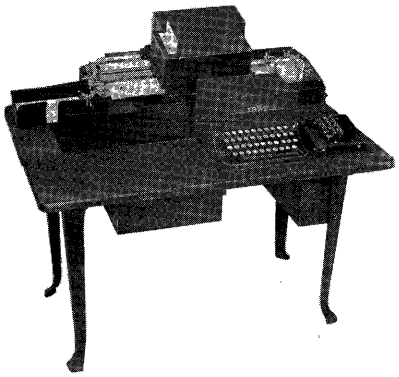
TUB FILE—A reservoir file of pre-punched cards. A Tub File for Billing is divided into two sections:

Heading Cards — One set for each customer; contain "repetitive" information appearing in the heading section of the invoice. These cards are usually arranged in customer sequence.

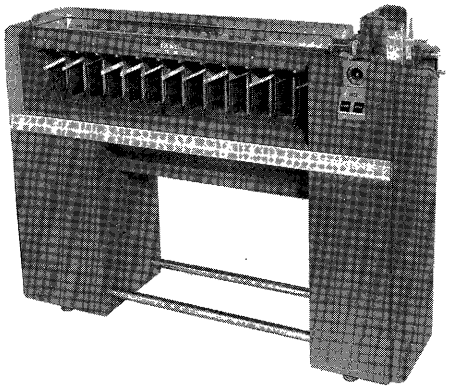
Commodity Cards—Contain "repetitive" information for each commodity or product appearing in the body of the invoice. These cards are usually arranged in commodity or product sequence, and may be further segregated according to size, quantity, packaging, etc.

Different card colors and corner cuts are used to distinguish among the cards which serve different purposes.

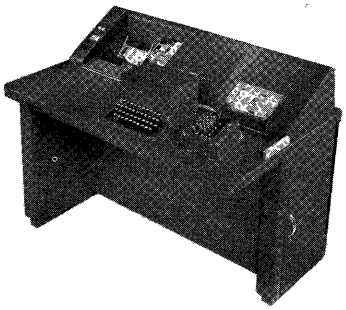
IBM ELECTRIC PUNCHED CARD ACCOUNTING MACHINES



CARD PUNCHING MACHINE
WITH DUPLICATING FEATURE

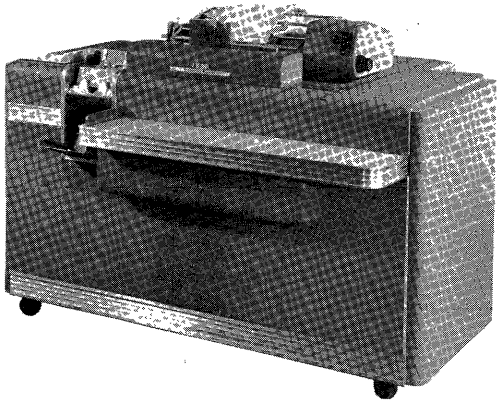


SORTER

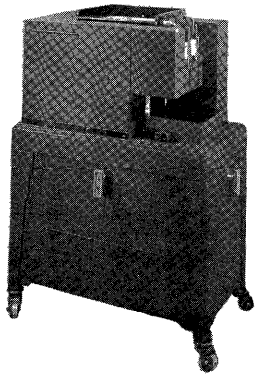


VERIFIER

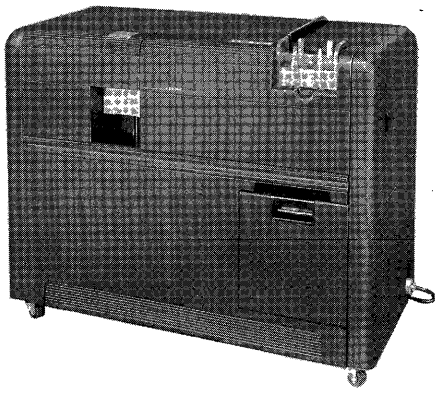
ELECTRIC DOCUMENT-
ORIGINATING MACHINE



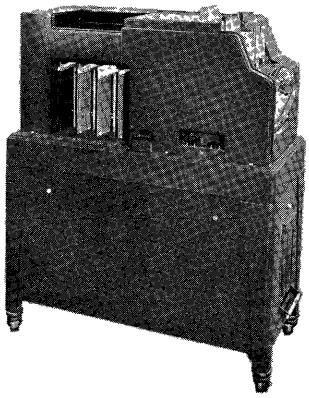
ACCOUNTING MACHINE



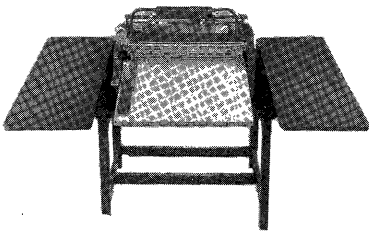
CARD INTERPRETER



CALCULATING PUNCH



COLLATOR



FACSIMILE POSTING MACHINE

IBM ACCOUNTING

SALES
APPLICATION

INTERNATIONAL BUSINESS MACHINES CORPORATION
NEW YORK, NEW YORK

Published by
Department of Education
International Business Machines Corporation
Endicott, New York

Printed in U.S.A.
Form 22—9271-2—3M—ME—10-47

IBM
ACCOUNTING

SALES

SALES Accounting is the recording of information of sales and shipments of merchandise to customers.

In many businesses, it is necessary to make an analysis of orders received; in others, goods can be shipped immediately. In the latter case, Order and Sales Analysis are combined and are usually referred to as Sales Accounting.

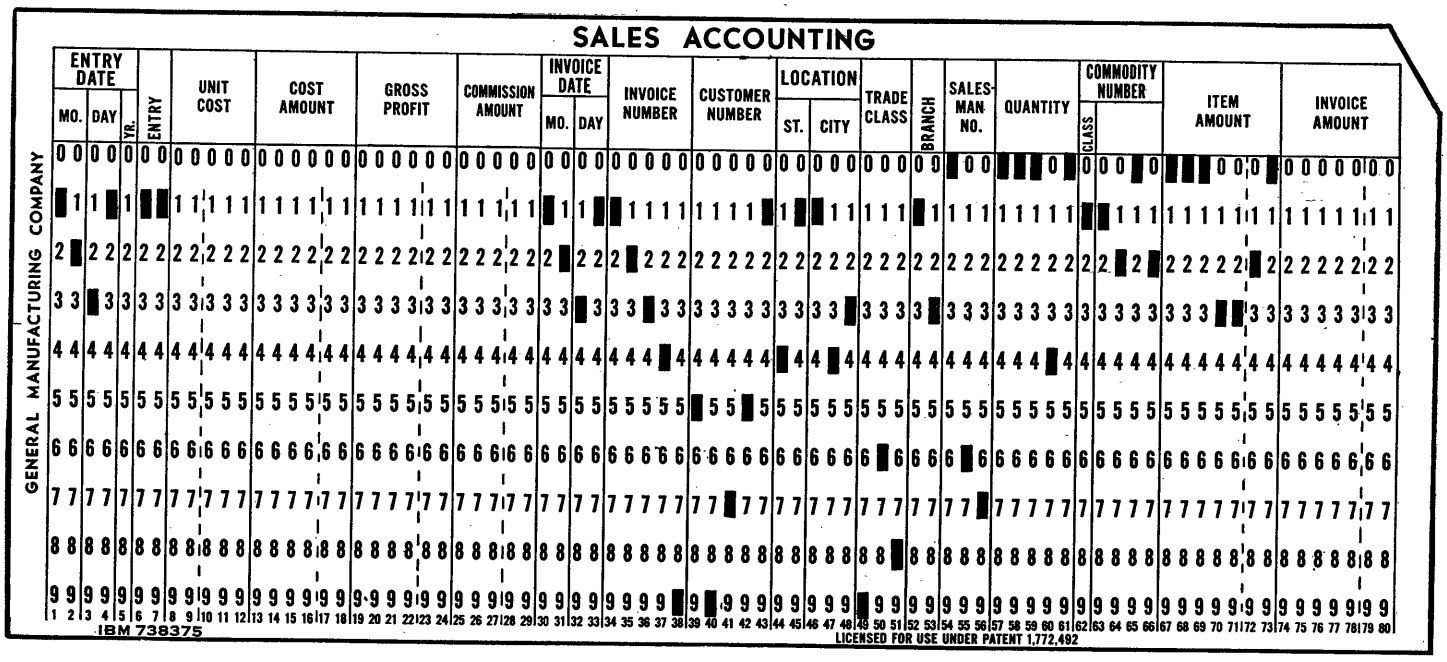
A sale may be made "over the counter," as in a retail store, or it may be an order which has to be filled according to a customer's specifications. When a sale is made for articles which are to be manufactured, it is usually customary to analyze the orders received. This provides management with information necessary to manufacture what is needed to fill each order. For example, in the garment industry, orders are taken before making the garments. This permits the manufacturer to summarize all orders and then to produce only the styles, colors, and sizes which will be shipped.

Regardless of whether a sale is made "over the counter," for shipment from stock, or for articles to be manufactured, the facts needed to account for the sale can be recorded on an IBM card.

For each sale, a "bill," "invoice," "order," or "sales check" is made out which describes the items and records the salesman, the customer, the price, the amount due, and the terms. This document initiates the accounting work connected with a sale.

The IBM card, which is the operating unit, is prepared from the information on this document and can be designed to meet the requirements of almost any business. Despite the differences which characterize every IBM Sales Accounting card, the essential elements to be recorded are fundamentally the same.

The sales data are arranged on the card in groups of columns—called fields—the order of these fields being determined by the sequence of the information on the "bill," "invoice," "order," or "sales check." Certain fields on the document which are repetitive can be automatically record-



GENERAL MANUFACTURING COMPANY

ENDICOTT, N. Y.

CUSTOMER'S ORDER No. 311 INVOICE DATE 12-31 INVOICE No. 12349

SOLD TO New Mexico Company
216 Wysor Building
Houston, Texas

SHIP TO Above

Make all checks payable to

GENERAL MANUFACTURING COMPANY
Endicott, N. Y.

SALESMAN Macy-67

SHIPPED VIA Truck Prepaid

TERMS 2% 10 Days Net 30

QUANTITY	COMMODITY No.	DESCRIPTION	PRICE	AMOUNT
		Casters		
40	11202	Sq. Shank Swivel	.83	33.20
75	13102	Flat Top Rigid	.84	63.00
5	17203	Ext. Shank with Brk.	1.62	8.10
2	32105	Bolt and Nut Shank	2.64	5.28
4	44104	Rnd. Spr. Ring Stem	3.51	14.04
40	62110	Bolt and Nut Shank	7.25	290.00
		Freight		.78
				414.40

GENERAL MANUFACTURING COMPANY

CUSTOMER NAME New Mexico Company

ADDRESS 216 Wysor Building

CITY Houston

STATE Texas

BRANCH

SALESMAN Macy

CUSTOMER NO.	STATE	CITY
59751	41	143
TRADE CLASS	**BRANCH**	**SALESMAN**
968	13	067

CUSTOMER NUMBER	LOCATION ST.	LOCATION CITY	TRADE CLASS	BR.	SALESMAN

CUSTOMER NO.	STATE	CITY	TR. CLASS	BR.	SALESMAN
59751	41	143	968	13	067

MASTER CODE CARD

IBM 738724

ed on the Sales card by the use of pre-punched Master Code Cards.

After an invoice has been rendered it is sometimes necessary to make adjustments for price changes and returned goods. A credit memorandum is issued to the customer for items of this type. A copy of the credit memorandum is the record from which IBM Sales Accounting Adjustment cards are punched.

The Sales Register is usually the first record prepared by the IBM Electric Accounting Machine from the IBM Sales Accounting Card. This is a list of items sold, by invoice number, with totals of the sales amount. This report is used for reference, to provide control totals to which subsequent sales reports must balance, and for current sales figures.

The IBM cards contain all necessary information on sales in the form of holes in the cards. The accumulated sales cards for any period can be arranged in any desired sequence by the IBM Sorting Machine, and from them sales reports are automatically prepared by the IBM Electric Accounting Machine.

While the nature of a business determines the importance of the elements of a sale, the majority of sales executives are interested in:

What was sold?
What was cost of sales?
Who was buying?
Who made the sale?
What was the profit?
Where was it sold?

With answers to these questions, it is possible for executives to develop sales policies, take steps necessary to make the most of favorable indications, and to counteract quickly any adverse conditions.

SHEET 2 OF 3

GENERAL MANUFACTURING COMPANY

SALES REGISTER

DATE December 31

ENTRY DATE MO.	ENTRY DATE DAY	ENTRY DATE Yr.	INVOICE DATE MO.	INVOICE DATE DAY	ENTRY	INVOICE NUMBER	CUSTOMER NUMBER	LOCATION ST.	LOCATION CITY	TRADE CLASS	BRANCH	SALESMAN	COMMODITY NUMBER CL.	COMMODITY NUMBER ITEM	QUANTITY FREIGHT	ITEM AMOUNT	INVOICE AMOUNT
12	31		12	31	11	12349	59751	41	143	968	13	67	1	1202	40	3320	
12	31		12	31	11	12349	59751	41	143	968	13	67	1	3102	75	6300	
12	31		12	31	11	12349	59751	41	143	968	13	67	1	7203	5	810	
12	31		12	31	11	12349	59751	41	143	968	13	67	3	2105	2	528	
12	31		12	31	11	12349	59751	41	143	968	13	67	4	4104	4	1404	
12	31		12	31	11	12349	59751	41	143	968	13	67	6	2110	40	29000	41440
12	31		12	31	11	12349	59751	41	143	968	13	67	7	0651		78	
															78*	41362*	41440*
12	31		12	31	11	12350	41314	30	231	280	22	22	1	4702	25	2700	
12	31		12	31	11	12350	41314	30	231	280	22	22	5	5706	50	32550	
12	31		12	31	11	12350	41314	30	231	280	22	22	4	6106	5	1910	37221
12	31		12	31	11	12350	41314	30	231	280	22	22	7	0651		61	
															61*	37160*	37221*
12	31		12	31	11	12351	11234	30	231	235	22	79	2	1103	5	885	
12	31		12	31	11	12351	11234	30	231	235	22	79	3	2103	50	13450	
12	31		12	31	11	12351	11234	30	231	235	22	79	5	4107	20	9960	
12	31		12	31	11	12351	11234	30	231	235	22	79	1	7203	15	2430	26786
12	31		12	31	11	12351	11234	30	231	235	22	79	7	0651		61	
															61*	26725*	26786*
12	31		12	31	11	12352	30523	4	127	403	16	76	1	6102	10	1530	
12	31		12	31	11	12352	30523	4	127	403	16	76	3	5105	5	1640	
12	31		12	31	11	12352	30523	4	127	403	16	76	5	3208	50	24250	
12	31		12	31	11	12352	30523	4	127	403	16	76	4	4104	15	5265	33123
12	31		12	31	11	12352	30523	4	127	403	16	76	7	0651		438	
															438*	32685*	33123*
12	31		12	31	11	12353	78050	33	1	238	7	69	5	3605	25	13225	
12	31		12	31	11	12353	78050	33	1	238	7	69	6	2110	35	25375	
12	31		12	31	11	12353	78050	33	1	238	7	69	2	3302	5	985	39669
12	31		12	31	11	12353	78050	33	1	238	7	69	7	0651		84	
															84*	39585*	39669*
12	31		12	31	11	12354	30541	4	127	279	16	76	1	4202	20	1760	
12	31		12	31	11	12354	30541	4	127	279	16	76	3	1703	50	13350	
12	31		12	31	11	12354	30541	4	127	279	16	76	6	5112	50	119600	135148
12	31		12	31	11	12354	30541	4	127	279	16	76	7	0651		438	
															438*	134710*	135148*

What was sold?

Studies of sales of different products according to color, style, size, and price range are commonly used in the retail merchandising field. The same principles can be advantageously employed by manufacturers whenever the same or related factors are involved in the distribution of their products.

The analysis of what was sold according to subclassifications, such as who made the sale, to whom it was sold, where it was sold, may give valuable cross-analyses that will point out the factors which must be corrected in order to obtain more effective selling.

The demand for each item governs the rate of manufacture, or the volume of stock to be maintained. Demand determines what method of packing shall be used. Demand regulates the retention or elimination of products or of entire lines.

Close study of the activity of various products according to the geographical locations of customers is a valuable type of market analysis. Whenever a wide variation in the sales volume of certain products exists in several territories, the report reveals the existence of a potential demand which some representatives have uncovered. If the selling points used in the territories with high sales volume are furnished to other representatives, additional business can be developed.

Any form of cross-analysis of facts concerning what was sold may be prepared from the IBM cards to reveal markets that have not been fully developed. Among the additional specific purposes which these reports serve are:

To regulate purchasing of raw materials, semi-finished parts, containers
To determine production schedules and personnel requirements
To control advertising expenditures
To know preference as to price, size, color, packaging
To credit finished goods inventory records
To check effectiveness of advertising
To determine customer preference
To determine sales trends
To serve as a basis for cost of sales

Cost of Sales

Daily, weekly or at other intervals, the IBM Electric Accounting Machine prepares a report that reveals the revenue, cost, and gross profit pertaining to the current sales of each commodity.

The Cost of Sales Statement reveals the relative profit of each product. Management may then proceed with the formulation of policies to convert unprofitable items to a profitable basis by studying means of reducing manufacturing costs, increasing selling prices, or discontinuing the manufacture of "loss" products.

By including quantities of each commodity on hand on this report, management is able to determine:

What to Manufacture?
How Much?
When?

GENERAL MANUFACTURING COMPANY

SHEET 2 OF 3 — COST OF SALES — DATE December 31

COMMODITY	UNIT COST	QUANTITY	SALES AMOUNT	COST AMOUNT	GROSS PROFIT
11202	664	763	63329	50663	12666
13102	673	1329	111636	89448	22188
14202	709	479	42152	33970	8182
14203	768	379	36384	29108	7276
14702	810	917	99036	74277	24759
15102	968	414	50094	40075	10019
16102	1225	493	75429	60397	15032
16103	1263	869	142516	109759	32757
17203	1300	519	84078	67470	16608
21103	1334	649	112893	86576	26317
21302	1369	527	87417	72146	15271
21502	1480	552	102120	81696	20424
23103	1508	354	69384	53383	16001
23104	1517	315	59535	47786	11749
23302	1517	280	55160	42486	12674
23303	1636	326	66504	53334	13170
23304	1653	852	182328	140836	41492
23702	1710	903	200466	154413	46053
24204	1842	457	109223	84179	25044
26104		416	101504		232

Who was buying?

Analyses of customers' purchases develop the fact that some customers do not purchase all types of merchandise. Directed sales effort based on such knowledge will increase business. Customers may also be only occasional buyers, as revealed by comparative reports. More intensive follow-up usually increases the regularity of buying by this class of purchasers.

Sales by classes of customer (or channels of distribution) is also an important part of sales analysis. Determination of the volume of business received from each of the classes may result in the development of the profitable outlets.

The purposes for which analyses of buyers are made may be summarized briefly as follows:

Know the individual concerns and trade groups that are buying

Know where to place sales emphasis

Determine contract sales policy

Meet competition

Bolster weak territories

Calculate profits by classes of customer

Determine sales trends by industry and customer

Curtail sales to unprofitable accounts

Determine what products customers are buying

Determine advertising policy in regard to display, newspaper advertising, exhibits, free deals.

SHEET 4 OF 6

GENERAL MANUFACTURING COMPANY

SALES BY CUSTOMER — COMPARATIVE

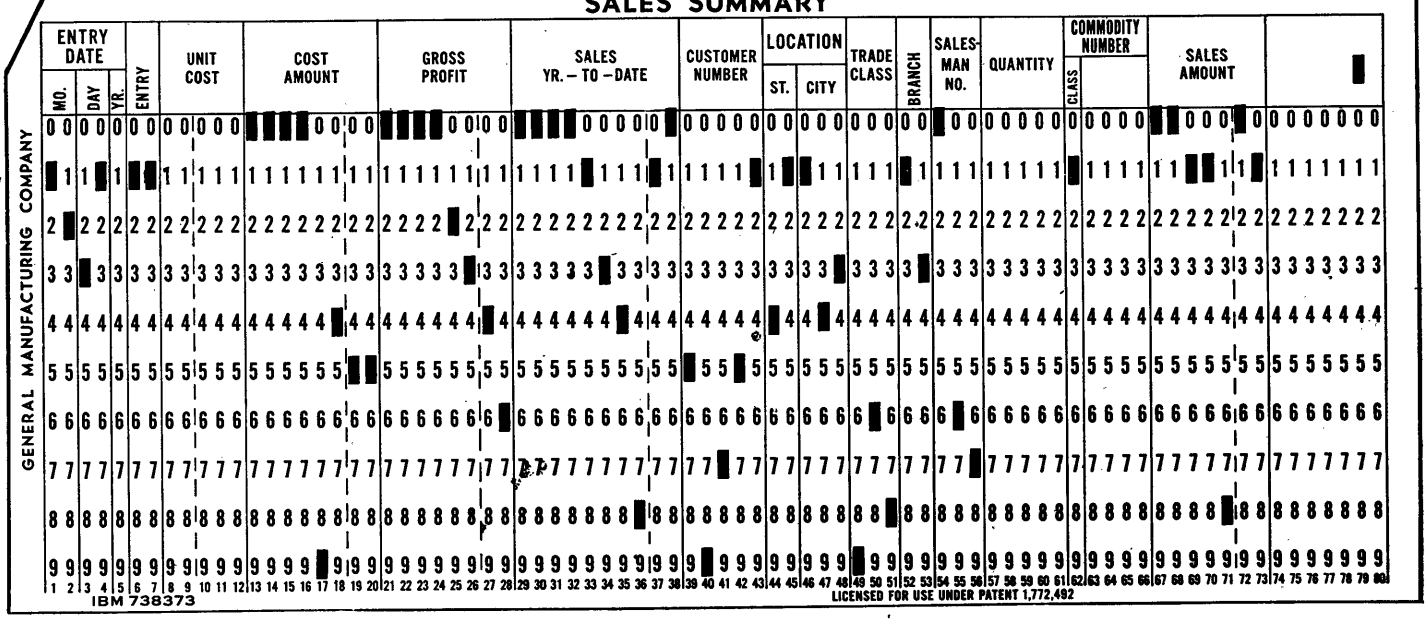
DATE December 31

CUSTOMER NAME	CUSTOMER No.	LOCATION STATE	LOCATION CITY	TRADE CLASS	BRANCH	SALESMAN	COMMODITY CLASS	SALES THIS MONTH	SALES YEAR TO DATE	SALES LAST YEAR
NEW MEXICO COMPANY	59751	41	143	968	13	67	1	11801	134810	125323
	59751	41	143	968	13	67	2	14845	14845	
	59751	41	143	968	13	67	3	15028	329031	243208
	59751	41	143	968	13	67	4	2808	184926	140700
	59751	41	143	968	13	67	5	48910	285932	222046
	59751	41	143	968	13	67	6	88470	88470	11404
								181862 *	1038014 *	742681 *
NEWTON PARK AND CO	61043	11	61	417	4	18	1	612	612	
	61043	11	61	417	4	18	2	11740	847952	608208
	61043	11	61	417	4	18	3	1166	147879	122692
	61043	11	61	417	4	18	4	45690	259953	198420
	61043	11	61	417	4	18	5	32850	32850	33103
	61043	11	61	417	4	18	6	242455	356543	140301
								334513 *	1645789 *	1102724 *

SALES SUMMARY

GENERAL MANUFACTURING COMPANY

ENTRY DATE: MO. DAY YR. | ENTRY | UNIT COST | COST AMOUNT | GROSS PROFIT | SALES YR. – TO – DATE | CUSTOMER NUMBER | LOCATION ST. CITY | TRADE CLASS | BRANCH | SALESMAN NO. | QUANTITY | COMMODITY NUMBER CLASS | SALES AMOUNT



IBM 738373

LICENSED FOR USE UNDER PATENT 1,772,492

Who made the sale?

Performance of salesmen may be profitably analyzed at frequent intervals for better management control of operations, i.e.,

To direct salesmen's efforts,
To determine territorial coverage,
To guide in the hiring, training, supervising, promoting, and releasing of men,
To regulate salary, draw, and commissions,
To check use of advertising and sales aids.

This type of analysis can also be prepared for branches, districts, and divisions.

These groups may be further analyzed by preparing reports showing the results of each salesman's activities according to other classifications, such as:

Product
Class of customer
Class of trade
Size of order
Discount terms
State and city
Product class
Customer
Package style
Industry classification

What was the profit?

Greater productivity of salesmen, better control of products and stocks of finished goods on hand, stimulation of customer purchases, and better territorial coverage are only desirable when they yield profits. Intensive sales efforts in some areas may result in diminishing returns, and therefore it is important to make periodic analyses of the profit on each type of activity.

Discounts allowed to large users on a flat percentage basis may cause a loss in low-profit lines. Therefore, it becomes necessary to make analyses which will enable the executive to control discounts allowed.

Analysis of travelling expenses to determine the average cost "per call" or "per order received" will give a valuable figure to apply against the revenues produced in provincial territories.

When sales and cost are punched in the card, it is possible to get vital figures for any single factor or combination of factors that affects profits, such as,

Profit by territory
Profit by salesman
Profit by branch
Profit by geographical area
Profit by product
Profit by industry
Profit by customer

SHEET 2 OF 2

GENERAL MANUFACTURING COMPANY

SALES BY SALESMAN

DATE December 31

SALESMAN'S NAME	SALESMAN NUMBER	SALES	RETURNS AND ALLOWANCES	NET SALES	COST OF SALES	GROSS PROFIT
MACY	67	762143	52575	709568	538185	171383
NELSON	69	1694332	37845	1656487	1258359	398128
NEVINS	71	662284		662284	503939	158345
NORDEN	74	436235		436235	333541	102694
POTTER	76	611201	18872	592329	455609	136720
REVERE	79	1039749	26117	1013632	779284	234348
TANNER	81	935731		935731	710669	225062
WILSON	85	160858		160858	123255	37603

With such figures the sales and general management can control sales policy, sales plans, research, engineering, advertising expenditures, distribution methods.

With such figures, management is informed as to where profits are coming from, who is making and losing money, what customers are buying low or no-profit merchandise. They also know where they are not making money, where to cut expenses, where to increase advertising and sales pressure. They will know what products are profit makers and those on which money is lost. They can stop advertising non-profit items or increase sales prices to assure profits.

Where was it sold?

To know geographical sales trends and experience, it is necessary to compare sales in geographical areas with business charts, quotas, advertising and sales expense.

This type of analysis also enables management

To sense public demand,

To determine advertising policy,

To determine quality of sales effort,

To allocate sales strength.

Inventory Control

Preparation of a periodic summary of shipments from each location simplifies the task of inventory control. With the cards sorted according to shipping locations, separate summaries can be prepared to record the movement of every commodity out of each finished goods warehouse and stockroom.

SHEET 9 OF 3

GENERAL MANUFACTURING COMPANY

SALES BY STATE

DATE December 31

STATE	TRADE CLASS	COMM CLASS	SALES AMOUNT	COST AMOUNT	GROSS PROFIT	SALES AMOUNT BY STATE	COST AMOUNT BY STATE	GROSS PROFIT BY STATE
41	170	1	17185	13361	3824			
41	170	3	279	215	64			
41	170	4	18315	14099	4216			
41	170	6	254715	194154	60561			
			290494 *	221829 *	68665 *			
41	416	2	4780	3684	1096			
41	416	3	10760	8288	2472			
41	416	4	11650	9079	2571			
41	416	5	46029	34444	11585			
41	416	6	2133	1708	425			
			75352 *	57203 *	18149 *			
41	968	1	11801	9455	2346			
41	968	2	14845	11516	3329			
41	968	3	15028	11597	3431			
41	968	4	2808	2250	558			
41	968	5	48910	37192	11718			
41	968	6	88470	67145	21325			
			181862 *	139155 *	42707 *	547708	418187	129521
47	147	1	22025	17671	4354			
47	147	2	21555	17705	3850			
47	147	3	21721	16724	4997			
47	147	4	9625	7220	2405			
47	147	6	439012	335675	103337			
			513938 *	394995 *	118943 *			
47	240	2	9604	7389	2215			
47	240	5	29295	22545	6750			
47	240	6	24717	19788	4929			
			63616 *	49722 *	13894 *	577554	444717	132837

Miscellaneous Statements

The completeness of the detailed transaction information appearing in the IBM Sales Accounting cards makes it possible for the Accounting Department to prepare other statements and records required by the business.

Salesmen's Commission Statements may be listed in complete detail so that errors and misunderstandings will be eliminated.

Royalty Statements may be compiled to substantiate each remittance to licensers.

Sales and Use Taxes collected may be itemized on special statements for each governmental agency. Such lists simplify the analysis of these accounts and correspondingly reduce the cost of their audit.

GENERAL MANUFACTURING COMPANY

COMMISSION STATEMENT

SALESMAN: M A C Y 67 DATE 12 31

INVOICE NO.	COMMODITY	SALES AMOUNT	RETURNS AND ALLOWANCES	COMMISSION AMOUNT
12176	14202	22.00		.99
12176	14702	81.00		3.65
12176	16102	68.85		3.10
12176	63706	223.50		3.35
12176	65110	529.65		7.94
12227	65112	1794.00		26.91
12227	33202	2.79		.08
12227	46107	183.15		7.33
12256	53209	25.25		.63
12256	62110	290.00		4.35
12256	65112	1794.00		26.91
12256	44104	35.10		1.40
12286	24204	47.80		.48
12286	55706	19.53		.49
12286	63306	21.33		.32
12286	32103	107.60		3.23
12286	44104	35.10		1.40
12313	14202	2.64		.12
12313	17203	6.48		.29
12313	16102	4.59		.21
12313	21502	27.75		.28
12313	23103	49.00		.49
12313	24204	71.70		.72
12313	51105	164.40		4.11
12313	51105	82.20		2.06
12313	53208	242.50		6.06
12313	63306	355.50		5.33
12313	65112	239.20		3.59
12313	33205	145.00		4.35
12313	44104	14.04		.56
12342	51106	180.40		4.51
12342	51106	4.51		.11
12342	53209	20.20		.51
12342	53209	50.50		1.26
12342	53605	185.15		4.63
12342	46107	81.40		3.26
12349	11202	33.20		1.49
12349	13102	63.00		2.84
12349	17203	8.10		.36
12349	62110	290.00		4.35
12349	32105	5.28		.16
12349	44104	14.04		.56
99590	35106		239.25	7.18 CR
99590	46106		28.65	1.46 CR
		7621.43	525.75*	126.13*

The president, sales manager, treasurer, comptroller and other executives use IBM Order and Sales Accounting Reports because they can:

Economically interpret sales made through various channels, thereby permitting timely and accurate sales policy decisions.

Determine the effectiveness of sales performance by salesmen, districts, division, branch offices.

Plan manufacturing schedules and thus maintain minimum inventory investment.

Readily obtain gross profit by customer, type of merchandise, and territory.

Develop compensation plans based on performance and sale of products at varying commission rates.

Develop bonus arrangements which permit quick and accurate payments for results produced.

Improve service to customers by keeping abreast of customer preferences as to price, size, color, packaging.

Secure better control over advertising expenditures.

Direct advertising more accurately by proper emphasis on publications, mediums and types of advertising, localities, trade groups, industries, brands.

Determine quality of sales effort.

Discover weaknesses and strength of sales organization and thus take proper action in training, supervising, promoting, and releasing personnel.

Allocate sales strength to better advantage by analyzing territory coverage.

Make decisions based on *facts*.

GLOSSARY

ANALYSIS, SALES—Analysis of sales for which delivery has been made or an invoice rendered; usually applies to sales of merchandise carried in stock.

ANALYSIS, ORDER—Analysis of orders received, before shipment has been made; usually applies to orders for goods which are manufactured after the order is received. Order Analysis reveals the demand for any and all products whether or not the supplier actually makes shipment.

ANALYSIS, MARKET—Study of potential demand for products, including the type of customer who will buy, the areas where sales can be made, etc.

BACK ORDER—That part of an order which cannot be shipped immediately and is set back for shipment at a later date.

COMMISSION—Compensation paid to a salesman for sales he has made. Commissions are based on a percentage of the value of the products sold, but a commission may also be paid at a flat rate, that is, a certain amount for each item sold.

COMMODITY — Any movable article that is bought and sold.

CONTROL—The total of amounts, set up from source documents, with which subsequent reports or operations must balance.

CUSTOMER CODE CARD—A master card containing all pertinent information regarding a customer, such as customer number, geographic location, trade class, etc. Automatic reproduction of this information into detail cards provides for automatic coding of the classification data.

CUSTOMER NUMBER——An account number assigned in order to identify each customer. These numbers are usually assigned from a list of customers already on the books, and are usually set up in alphabetic sequence.

DEMAND—The total quantity of goods or commodities which consumers are buying. Demand is created or increased by all types of sales efforts, such as advertising and salesmen's activities.

DIMINISHING RETURNS—The point in business economy at which the expense of doing additional business, whether it be selling or manufacturing, increases at a greater rate than the profit resulting from that additional business.

DRAW—Some salesmen operate entirely on a commission basis; in other words, they receive no direct salary. In these cases, their employer usually allows them to draw a certain amount of money each month. The amount they draw is deducted from commission they earn on sales. It is an arrangement which permits salesmen to meet their operating and living expenses during periods of slack sales, and particularly when a salesman is first beginning to sell.

MASTER CARDS—Cards set up in a permanent file, used periodically to transfer the punched data they contain to other cards or reports.

OVER THE COUNTER—In those businesses which sell products directly from store shelves to customers who come personally to buy, sales are referred to as "Over the Counter."

OUTLETS—This term is often used as synonymous with "market." It is also used to designate distribution channels, such as wholesale houses and retail stores through which commodities reach the ultimate consumer.

ROYALTY—Some businesses require or desire to use, in the manufacture of their product, certain features which are patented or copyrighted by another individual or firm. The manufacturer may obtain from the patent owner a license to use the patented feature, in return for which he is to pay the patent owner a certain amount for each unit manufactured. The amount paid under such an agreement is known as royalty.

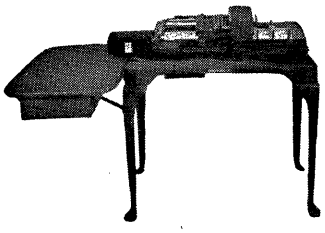
RAW MATERIALS—Unfinished goods from which all types of parts and commodities are made; examples are sheet metal, bar stock, unprocessed liquids and minerals, wool, cotton, etc.

SEMI-FINISHED PARTS—Parts which have been partially processed from raw materials, but on which certain operations are required before they will be finished or ready for use.

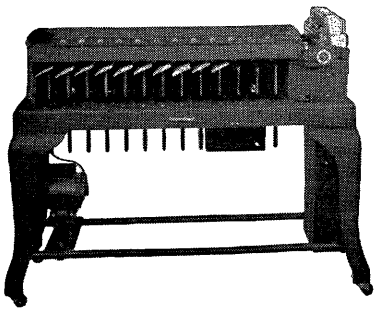
TRADE CLASS—A classification of customers or business firms according to the type of business in which they are engaged, such as retailer, jobber, wholesale dealer, commission agent, etc.

UNIT PRICE—The selling price for one unit of a commodity, such as one pound, one piece, or one gallon.

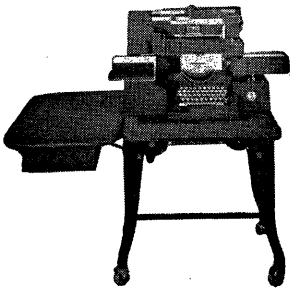
IBM ELECTRIC ACCOUNTING MACHINES



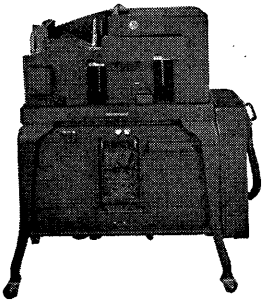
Card Punching Machine
with Duplicating Feature



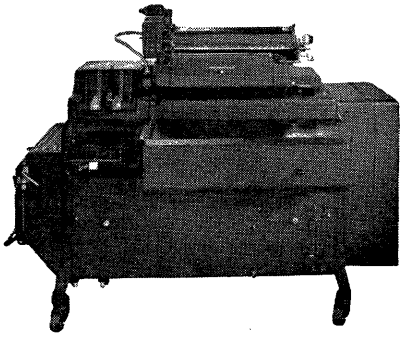
Card Sorting Machine



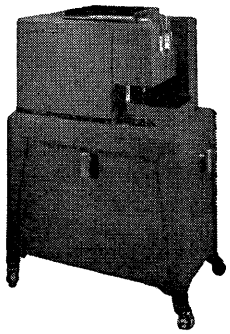
Card Punching Machine
with Printing and
Duplicating Features



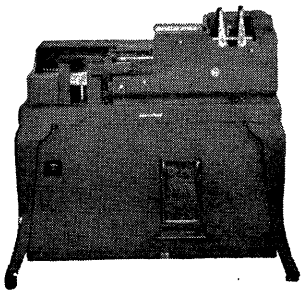
Card Reproducing Punch



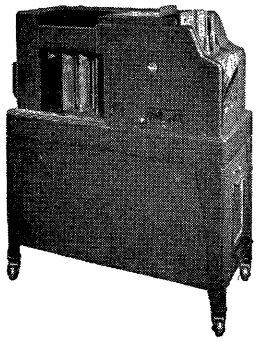
Accounting Machine



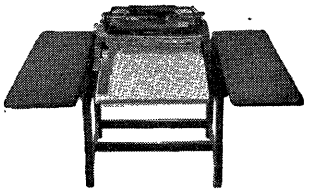
Card Interpreter



Multiplying and
Computing Punch



Collating Machine



Facsimile Posting Machine

IBM ACCOUNTING

ACCOUNTS RECEIVABLE
APPLICATION

INTERNATIONAL BUSINESS MACHINES CORPORATION
NEW YORK, NEW YORK

Published by
Department of Education
International Business Machines Corporation
Endicott, New York

Printed in U. S. A.
Form 22-9270-2

IBM
ACCOUNTING

ACCOUNTS RECEIVABLE

"ACCOUNTS RECEIVABLE" is the amount of money owed to a company by its customers for merchandise sold or services rendered. A company depends largely upon its Accounts Receivable for the money with which to pay its maturing obligations and to finance current operations.

The primary purpose of Accounts Receivable accounting is to maintain currently a record of indebtedness between the company and its customers, by recording the amounts owed, posting payments when made, and rendering itemized statements of amounts due.

Charges to customers' Accounts Receivable originate from sales invoices and debit memoranda.

When merchandise is sold or services are rendered, an "invoice" is furnished the customer, describing the merchandise or services, stating price and amount, and covering the terms of payment.

GENERAL MANUFACTURING COMPANY
ENDICOTT, N. Y.

CUSTOMER'S ORDER No. 311 INVOICE DATE 12-31 INVOICE No. 12349

SOLD TO New Mexico Company
216 Wysor Building
Houston, Texas

SHIP TO Above

Make all checks payable to
GENERAL MANUFACTURING COMPANY
Endicott, N. Y.

SALESMAN Macy-67

SHIPPED VIA Truck Prepaid

TERMS 2% 10 Days Net 30

QUANTITY	COMMODITY No.	DESCRIPTION	PRICE	AMOUNT
		Casters		
40	11202	Sq. Shank Swivel	.83	33.20
75	13102	Flat Top Rigid	.84	63.00
5	17203	Ext. Shank with Brk.	1.62	8.10
2	32105	Bolt and Nut Shank	2.64	5.28
4	44104	Rnd. Spr. Ring Stem	3.51	14.04
40	62110	Bolt and Nut Shank	7.25	290.00
		Freight		.78
				414.40

Credits to customers' accounts (other than payments received) arise from credit memoranda and journal vouchers.

Credit memoranda are issued for authorized allowances, adjustments, returns, short shipments, and similar entries which serve to reverse or adjust invoices rendered.

Journal vouchers are issued by the Accounting Department to adjust small differences, incorrectly allocated items, and similar miscellaneous entries.

The medium for recording these charges or credits in IBM Accounts Receivable accounting is the IBM card, which is the operating unit of the IBM Electric Accounting Machines.

In practice, charge cards are punched at the same time as the sales accounting cards (sometimes as an automatic by-product of the sales accounting or billing cards). Similarly, cards are punched for each entry originating from credit or debit memoranda and journal vouchers.

CREDIT MEMORANDUM

GENERAL MANUFACTURING COMPANY

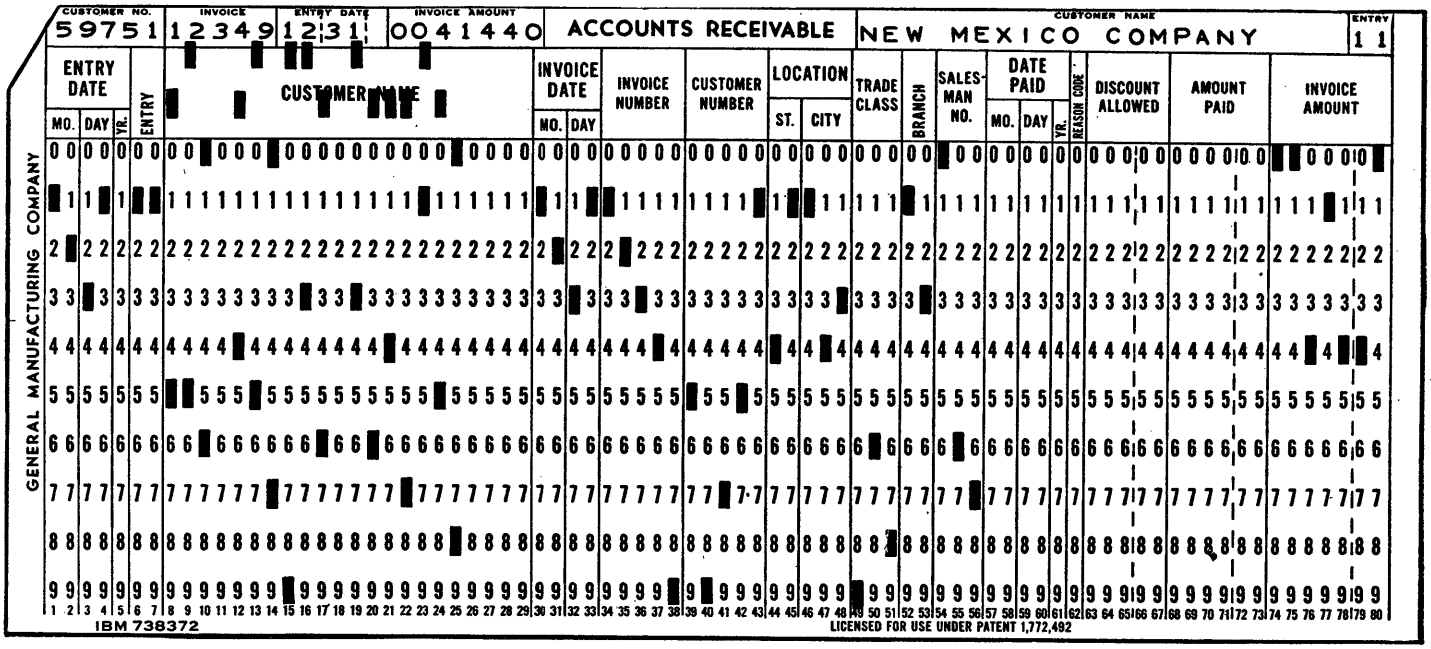
ENDICOTT, N. Y.

CUSTOMER'S ORDER No. 311 DATE 1-25 No. 99206

SOLD TO New Mexico Company
216 Wysor Building
Houston, Texas

SALESMAN Macy-67

QUANTITY	COMMODITY No.	DESCRIPTION	PRICE	AMOUNT
10	13102	Flat Top Rigid	.84	8.40
		Damaged in Shipment - Returned for Credit		
		Refer to Invoice #12349 - 12/31		



From these cards a permanent record of Accounts Receivable entries is prepared. This is referred to as a register. It serves as the basis for auditing charges and credits (other than payments received) to Accounts Receivable, and at the same time furnishes an automatic means of proving that the Accounts Receivable cards and the sales accounting or billing cards are in balance.

After preparation of the Accounts Receivable Register and establishment of daily accounts receivable controls, the cards are placed in a file known as the Accounts Receivable Ledger, in date sequence by customer account number, where they are available for reference, analysis, and ultimate withdrawal from the active file upon payment or credit.

Payments by customers may be accompanied by a remittance statement. If a satisfactory remittance statement is not furnished, it is customary to prepare a memorandum form to identify the remittance and relate it to the original card or cards in the active Accounts Receivable Ledger File.

This statement or memorandum furnishes the basis for applying credits to customers' accounts for payments made.

GENERAL MANUFACTURING COMPANY

SHEET 2 OF 2

ACCOUNTS RECEIVABLE REGISTER

DATE December 31

ENTRY DATE MO.	ENTRY DAY	ENTRY	CUSTOMER NAME	INVOICE DATE MO	INVOICE DAY	INVOICE No.	CUSTOMER No	LOCATION STATE	LOCATION CITY	TRADE CLASS	BR.	SALESMAN	AMOUNT
12	31	11	NEW MEXICO COMPANY	12	31	12349	59751	41	143	968	13	67	414 40
12	31	11	INDUSTRIAL CART CO	12	31	12350	41314	30	231	280	22	22	372 21
12	31	11	CHANEL WHOLESALE CO	12	31	12351	11234	30	231	235	22	79	26786
12	31	11	EMPIRE EQUIPMENT CO	12	31	12352	30523	4	127	403	16	76	331 23
12	31	11	VESTAL STEEL CO	12	31	12353	78050	33	1	238	7	69	396 69
12	31	11	GEN PORTABLE EQUIP CO	12	31	12354	30541	4	127	279	16	76	1351 48
12	31	11	STAR INDUSTRIES INC	12	31	12355	73557	40	77	686	25	44	116493
12	31	11	CHOLMAR FURNITURE CO	12	31	12356	14910	30	1	405	22	57	143432

The method of applying payments to the Accounts Receivable Ledger File will depend upon the form and the content of the periodic customer statements, usually classified according to two general types, namely, Open Item statements and Balance Forward statements:

Open Item—Under this plan the Accounts Receivable Ledger File contains only the open items, and continues to contain such items until they have been paid.

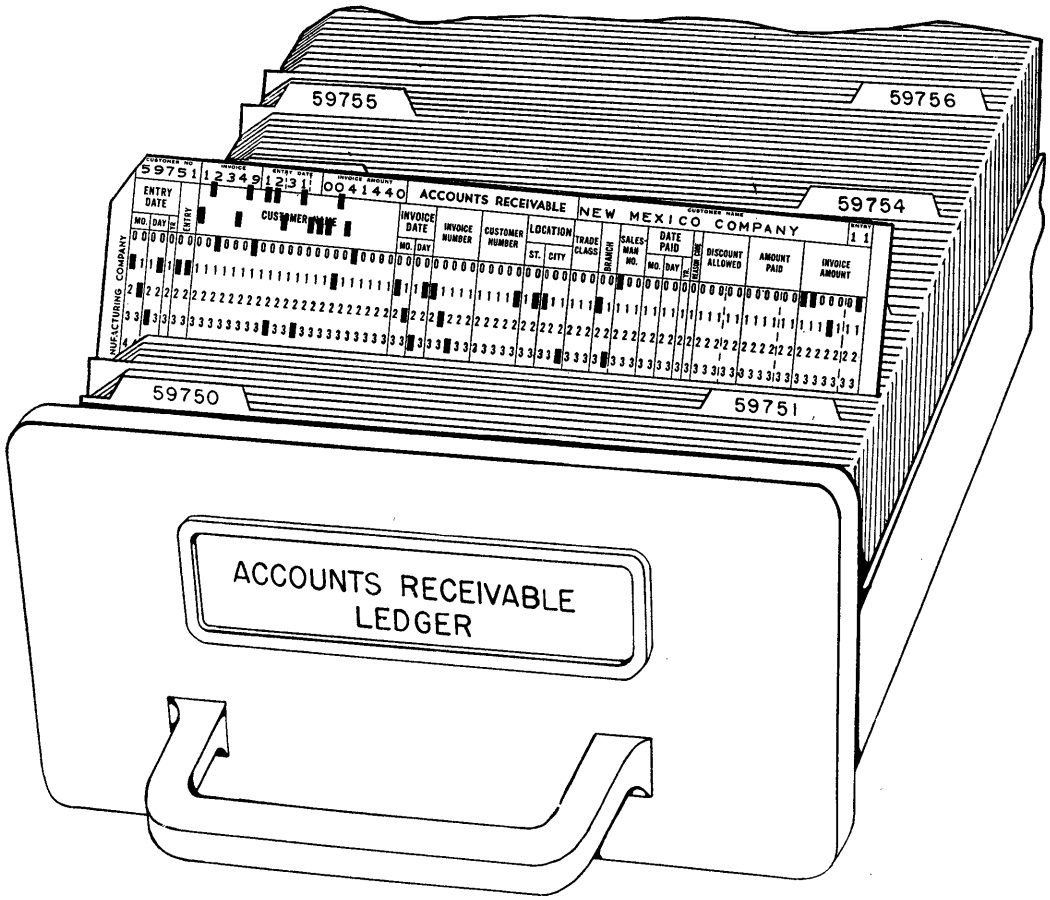
Balance Forward—Under this plan the Accounts Receivable Ledger File contains detail cards for all charges and credits for the current period, and a Balance Forward card for the total of all transactions prior to the current period.

The choice of the particular method used will depend upon the requirements of the individual business.

When the open item method is used, and a customer pays the exact amount owed, such payment is applied by removing from the Accounts Receivable Ledger File the charge cards that are paid in full. These cards are completed by punching the amount paid, discount, and date paid. They then become the cash credit cards.

If the payment does not match with the original charge, the credit is applied to the oldest open items, and a credit card is punched for the remaining amount which cannot be applied to any specific item.

When the Balance Forward method is used, payments are applied by punching a cash credit card for each payment and placing the card in the Accounts Receivable Ledger File as a credit entry.



SHEET 2 OF 2

GENERAL MANUFACTURING COMPANY

CASH RECEIPTS BOOK

DATE December 31

CUSTOMER NAME	CUSTOMER No.	BR.	SALESMAN	ENTRY	INVOICE No.	INVOICE DATE MO.	INVOICE DATE DAY	ACCOUNTS RECEIVABLE CREDIT	CASH DEBIT	DISCOUNT ALLOWED DEBIT
NEW MEXICO COMPANY	59751	13	67	11	11993	11	30	100000	100000	
NEWTON PARK AND CO	61043	4	18	11	11239	11	1	76131	76131	
N Y GAS AND ELEC CO	61221	22	46	11	12325	12	28	105503	103393	2110
VESTAL STEEL CO	78050	7	69	11	10452	10	8	14661	14661	
WINTERDALE RAILWAY	87652	16	76	11	9562	9	1	65040	65040	
								697507*	690421*	7086

Under either plan the cards covering these payments are first used to prepare the Cash Receipts Register; the totals obtained when preparing this register provide the means of proving that the Accounts Receivable cards and the total of cash receipts are in balance.

The many advantages which accrue from IBM Accounting for Accounts Receivable are due to the flexibility and mobility of the IBM Accounts Receivable Ledger File.

This IBM ledger file permits automatic listing of all unpaid items, called a trial balance. This trial balance can be automatically aged to show amounts owing for the current month, and amounts overdue for periods of 30, 60, and 90 days or more. This form of aged trial balance is complete and comprehensive; it is difficult to prepare by any other method.

CASH RECEIPTS MEMORANDUM

CUSTOMER NAME New Mexico Co.

No. 59751 DATE 12/31

IN PAYMENT OF INVOICE No. 11993

FULL PAYMENT ☐ PARTIAL PAYMENT ☑

CASH	1000 00
DISCOUNT	
OTHER ACCOUNTS	
ACC. No.	
ACC. No.	
INVOICE TOTAL	1,222.30
TOTAL CR.	1,000.00
BALANCE	222.30

SHEET 2 OF 2

GENERAL MANUFACTURING COMPANY

AGED TRIAL BALANCE

DATE December 31

CUSTOMER NAME	CUSTOMER No.	TOTAL	CURRENT	30 DAY	60 DAY	90 DAY
NEW MEXICO COMPANY	59751	204413	182183	22230		
NEW MILTON SUPPLY	60035	88694		88694		
NEWTON PARK AND CO	61043	106046	106046			
OWEGO TRIBUNE	61514	244710	74235	124559	45916	
J C PEARCE COMPANY	62159	66668	24302	42366		
ROCK ROYAL BRASS	63436	50849	50849			
SANBORN INDUSTRIAL CO	66273	82300	82300			
SEASHELL PETROLEUM	68284	52304	52304			
SOUTHERN SPEAC CO	69345	63076	63076			
SQUARE DEAL OIL COMPANY	71308	50619	50619			
STAR INDUSTRIES	73557	116493	116493			
STARLITE ELECTRIC CO	74185	96374	84311		12063	
SUPREME REALTY CO	74279	86025	81913		4112	
TIDEWATER CHEMICAL	74292	142274	142274			
TRI CITIES GLASS CO	78009	112055	112055			
VESTAL STEEL CO	78050	199314	33489		165825	
WATSON FOUNDRIES INC	79234	122527	25118		97409	
WHITE STEEL BENCH CO	86287	32398	32398			
WINTERDALE RAILWAY	87652	59895	59895			
WISELOMANN INC	88213	90336	90336			
		6729099	3798283	1690319	1022632	217865
		TOTAL	CURRENT	30 DAY	60 DAY	90 DAY

After the total amount of unpaid items on the trial balance has been checked and balanced to controls, these same IBM cards are used to prepare customer statements, in complete detail, speedily, and with uniformity of appearance.

The automatic preparation of customer statements from the same basic operating unit (the IBM card) is a unique feature of IBM Accounting for Accounts Receivable. Below are samples of Open Item and Balance Forward statements.

STATEMENT

GENERAL MANUFACTURING COMPANY

ENDICOTT, NEW YORK

IN ACCOUNT WITH

NEW MEXICO COMPANY
216 WYSOR BUILDING
HOUSTON TEXAS

CUSTOMER NUMBER	MO.	DAY	YR.
59751	12	31	

CODES
1 CASH
2 RETURN
3 ALLOWANCE

DATE MO.	DATE DAY	REFERENCE	CODE	CHARGES	CREDIT	BALANCE
11	30	11993		1222 30		
12	27	12313		1407 43		
12	31	12349		414 40		
12	31	11993	1		1000 00	
						2044 13*

Open Item Statement

STATEMENT

GENERAL MANUFACTURING COMPANY

ENDICOTT, NEW YORK

IN ACCOUNT WITH

HULLMAN STEEL CO
10 JENNISON AVENUE
PITTSBURGH PA

CUSTOMER NUMBER	MO	DAY	YR.
38321	12	31	

CODES
1 CASH
2 RETURN
3 ALLOWANCE

DATE MO.	DATE DAY	REFERENCE	CODE	CHARGES	CREDIT	BALANCE
11	30	BALANCE		12873 4		
12	29	12337		489 91		
12	30	12344		392 16		
						21694 1*

Balance Forward Statement

The IBM card provides the means for recording all transactions affecting each customer's account. The inherent flexibility of the IBM Accounting method enables the IBM card to:

- List an Accounts Receivable entry in the daily register.
- Establish control figures.
- Print a line on the monthly customer statement.
- Prepare an aged trial balance.
- Record the payment when remittance is received.
- Furnish the credit entry when an item has been cancelled or adjusted.
- Furnish a cash anticipation report for cash budget.
- Prepare historical record of the activity of customer's account.
- Supply special analyses necessary for policy formation and credit follow-up.

The unique principle of IBM Accounting, which makes possible the preparation of these reports and securing all this information from one recording, results in the following advantages:

Permits complete statement preparation at an early date, resulting in more prompt collections.

Permits earlier closing of books and gives up-to-the-minute facts for action by management.

Gives credit manager, treasurer, sales manager and other interested executives an accurate and complete aged trial balance by customer.

Furnishes prompt analyses of outstanding amounts which enable the treasurer to anticipate future collections and cash position of the company.

Assures clear, legible, uniformly printed reports.

Results in a simple straight-line procedure.

Makes for economy of operation.

Users of IBM Accounting Machines like the many advantages of IBM Accounts Receivable. In particular,

The treasurer likes it because:

Statements are mailed early and collections are speeded up.

Aged trial balance furnishes basis for more accurately estimating reserves for bad debts.

Analyses of outstanding accounts provide specific facts from which cash receipts can be more definitely anticipated.

The credit manager likes it because:

Aged trial balance permits better and closer follow-up of past due accounts.

Extra copies of reports and statements acquaint the sales manager, branch manager, and other interested executives with the collection situation, and bring about better cooperation on their part.

The controller likes it because:

It furnishes a direct straight-line plan which is simple to operate, supervise and control.

It results in neat uniform reports and statements.

It is economical and flexible.

The sales manager likes it because:

The neatly printed and uniform customer statements are a good advertisement for the company.

It furnishes a complete and concise picture of each customer's paying habits.

It provides for analysis of delinquent accounts by branch, salesman, industry, and geographical area, for better direction of salesmen's activities.

Customer statements are complete, accurate, and detailed, thereby reducing customer complaints to a minimum, and increasing good will.

GLOSSARY

ACCOUNT NUMBER—In order to avoid lengthy word descriptions of the many accounts required to record business transactions, numbers are usually assigned to identify the accounts. These are known as Account Numbers. It is customary to set up account numbers in such a manner as to establish major and sub-classifications so that accounting entries may be distributed to general or detail accounts. Major account classifications correspond to General Ledger Accounts, and sub-account classifications correspond to Subsidiary Ledger Accounts.

In accounts receivable accounting, an account number is assigned to each customer. These account numbers are usually established from a list of the customers already on the books, and are generally set up in alphabetic sequence. In some instances, however, they may be grouped according to geographical areas as well.

ALLOWANCES — Concessions or reductions against an original charge, brought about by varying conditions and reasons, and agreed to between the seller and the purchaser.

BAD DEBTS—Items which are of long standing and have not been paid, and which eventually turn out to be uncollectible, are cleared from the Accounts Receivable Ledger and charged to an account called Bad Debts.

CASH—A term used to designate money. In it are included currency, bank drafts, checks, express and postal money orders.

CASH DISCOUNT — A sum deducted from the invoice amount and allowed by the seller, because of prompt payment within the time limits specified on the invoice.

CLOSED TRANSACTION FILE—A file of cards representing fully paid items. After the daily Cash Receipts Register is prepared the cards are sorted to separate the fully paid items from partial payment and unauthorized deduction cards; the latter are filed back in the Accounts Receivable Ledger File, and the cards for fully paid items are placed in a closed transaction file.

For reference purposes, the closed transaction file would be used for closed items, and the current Accounts Receivable Ledger File for open items. The two files together represent the customer's entire account. Also, cards in the closed transaction file are available for preparation of periodic historical record analysis for each customer.

CREDIT—In accounts receivable accounting this is a term applied to decreasing the indebtedness in a customer's account.

DEBIT—In accounts receivable accounting this is a term applied to increasing the indebtedness in a customer's account.

DEPOSIT—When funds are taken or sent to a bank for credit to the company's account, the funds are designated as a deposit.

DEPOSIT SLIP—A small ticket or slip of paper arranged so that the depositor may indicate items making up the deposit.

LEDGER—In the Accounts Receivable Ledger File the accounts are arranged in customer number sequence, which is also usually an alphabetic arrangement. When the accounts become too numerous for one person to maintain, it becomes necessary to divide them into two or more sections. Each section in this arrangement of accounts is known as a sub-ledger. The number of sub-ledgers will depend upon the number of customer accounts maintained, and their activity.

PEAK LOAD—That point in the work of a day, week, month or other period, when the heaviest volume of work is received.

PROVING—The procedure followed in order to establish the correctness of totals of items received. This procedure usually consists of listing the items involved and comparing their total with the total or proof figure submitted or established.

RECIPROCITY—The practice of placing business with other companies in relation to the amount of business received from, or sold to, those companies. Reciprocity may work either way; one company may solicit business from another because it has purchased a certain amount of that company's products, or a firm may desire to purchase from various vendors in proportion to the volume of its sales to those vendors. Use of reciprocity in sales is not considered good business practice, because it prevents having the advantages of open market buying.

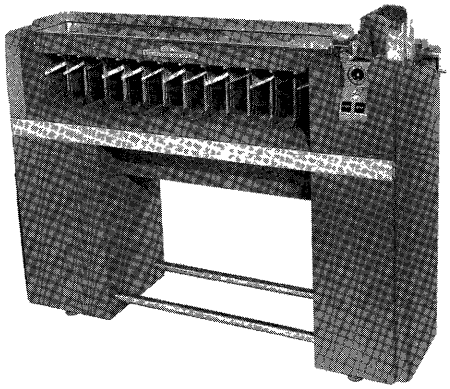
RETURNS—Items of merchandise that have been returned for one reason or another, and for which a credit is given for their corresponding value or original charge amount.

SHORT SHIPMENT—A term referring to the fact that the quantity shipped on an order was less than the quantity for which an invoice was rendered. A short shipment is usually adjusted by the issuance of a credit memorandum for the value of the items that were not shipped.

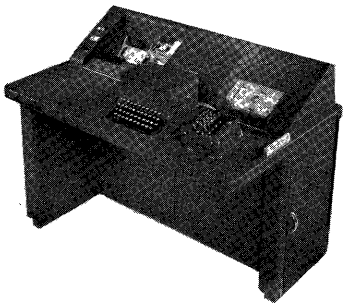
TRIAL BALANCE—In Accounts Receivable, a listing of the unpaid amounts represented by the cards in the Accounts Receivable Ledger File. It is prepared to balance the total of the cards against the control total.

IBM ELECTRIC PUNCHED CARD ACCOUNTING MACHINES

CARD PUNCHING MACHINE
WITH DUPLICATING FEATURE

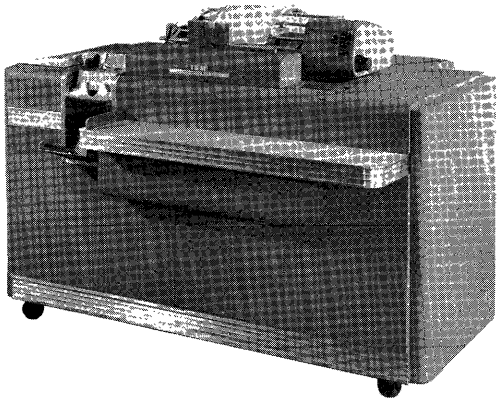


SORTER



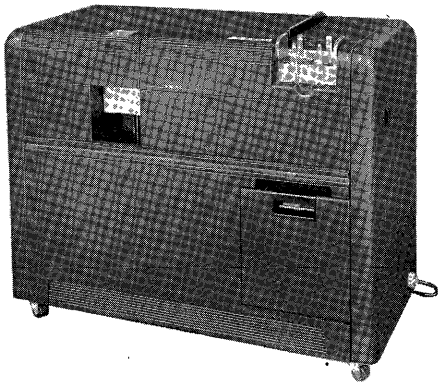
VERIFIER

ELECTRIC DOCUMENT-
ORIGINATING MACHINE

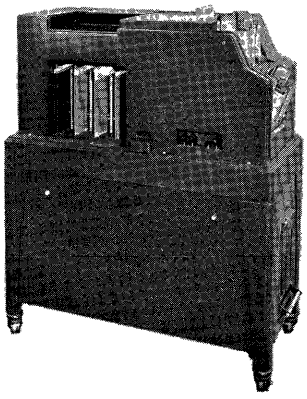


ACCOUNTING MACHINE

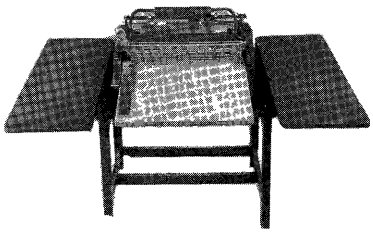
CARD INTERPRETER



CALCULATING PUNCH



COLLATOR



FACSIMILE POSTING MACHINE

IBM ACCOUNTING

MANUFACTURING CONTROL
APPLICATION

INTERNATIONAL BUSINESS MACHINES CORPORATION
NEW YORK, NEW YORK

Published by
Department of Education
International Business Machines Corporation
Endicott, New York

Printed in U. S. A.
Form 22-4969-2—2M—ME—6-48

IBM ACCOUNTING

MANUFACTURING CONTROL

MANUFACTURING is the activity of changing basic raw materials—such as steel, copper, or wood —into more useful and more valuable forms—such as automobiles, clocks, or office machines.

Manufacturing Control is the coordination of the flow of materials, the efforts of labor, and the use of buildings, tools, and equipment.

The administration of Manufacturing Control includes the performance of the following functions:

Selecting the products to be made.

Analyzing the manufacturing program to find what things are necessary for its accomplishment.

Comparing these requirements with what is now available to decide what additional items, if any, must be obtained.

Authorizing buying or making the items not in stock.

Establishing the order of the operations required to produce those things which are made in the plant, and the time at which these operations must be performed.

Determining whether existing labor, tools, and equipment are sufficient to fulfill the needs of the program or indicating what adjustments are necessary.

Checking the progress of the work by establishing the controls necessary to insure that the desired results will be obtained.

The application of the IBM Accounting method to the field of Manufacturing Control has done much to increase the speed and accuracy of performing these functions.

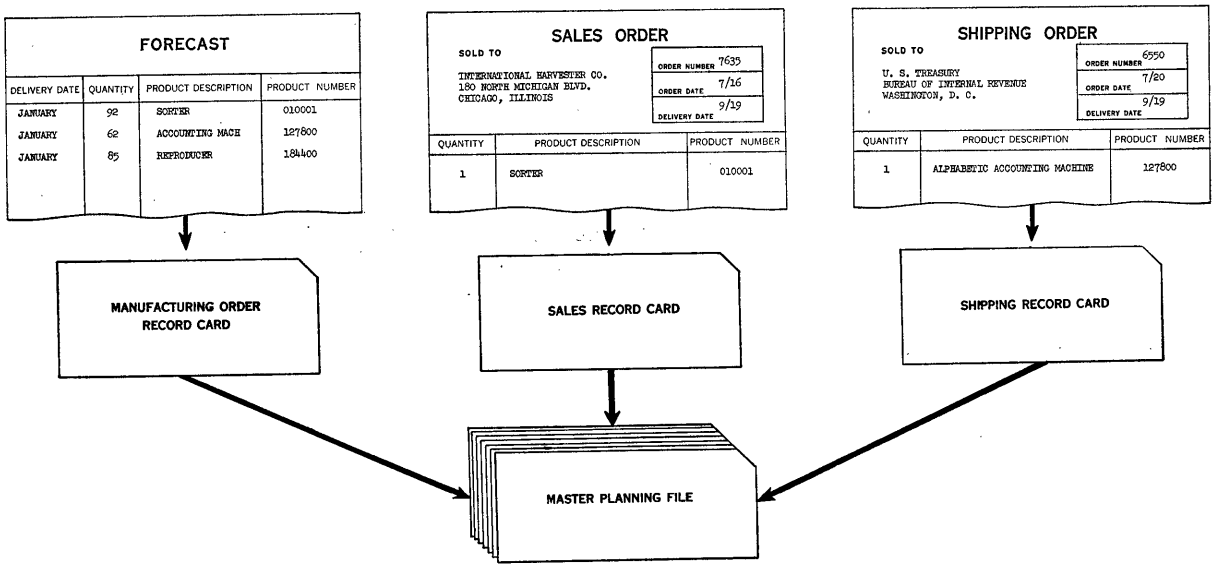
PRODUCTION FORECASTING

Forecasting is estimating the probable future demands for the products to be manufactured. This function consists of:

Anticipating changes in general business activity.
Deciding how these changes will affect the demand for the products.
Checking the accuracy of the forecast by analysis of sales orders actually received.

Forecasting is necessary because the procurement and processing of materials takes time. In many plants it is too late to begin the purchasing of materials when the sales order is received.

Basic Facts Are Recorded by IBM Cards



The IBM Accounting Machine Prepares a Comparative Report

MASTER PLANNING REPORT — DATE Sept. 20

PRODUCT	SOLD LAST YEAR	SOLD FOR DELIVERY IN EACH OF PAST 5 MONTHS					SALES ORDERS NOT YET SHIPPED	PRODUCTION THIS MONTH		MANUFACTURING ORDERS		
		1	2	3	4	5		Scheduled	Shipped	Still to be Built	Not Assigned to Sales Orders	Balance 5 Months Hence
016 PUNCH	533	44	42	46	41	45	83	44	32	160	77	58 CR
031 PUNCH	1060	90	92	88	93	89	184	92	73	360	176	92 CR
052 VERIFIER	341	29	27	31	28	30	55	31	23	80	25	65 CR
054 VERIFIER	358	31	33	31	32	30	60	32	21	120	60	37 CR
075 SORTER	46	4	3	4	4	3	8	3	2	16	8	2 CR
077 COLLATOR	783	65	63	67	62	66	125	65	48	240	115	83 CR
080 SORTER	1192	100	102	98	103	99	210	102	80	400	190	102 CR
405 ACTG MACH	933	78	76	78	77	77	150	78	56	280	130	106 CR
513 REPRODUCER	983	82	80	78	79	83	160	79	60	320	160	82 CR
552 INTERPRETER	471	40	42	38	41	39	83	39	25	160	77	40 CR

Adjust manufacturing orders so that all sales orders are balanced by them and that the balance at the end of the forecast period will be nearly even unless unusual demands are indicated by monthly trends.

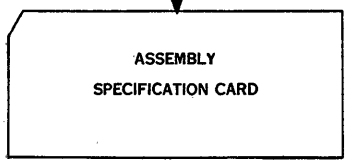
PLANNING ASSEMBLY REQUIREMENTS

Manufactured products usually take the form of an assembled item, that is, one which consists of two or more separate pieces joined in some manner. Because each of these pieces (called component parts) must be made or purchased individually, the completed product schedule must be expressed in terms of the quantities of each part needed. This process is called assembly planning.

A specification sheet is prepared by the engineering department showing how the product is to be built (assembled).

SPECIFICATION SHEET

PRODUCT NAME	PART NAME	PRODUCT NO.	PART NO.	QUANTITY PER PRODUCT
SORTER	SUPPORT SCREW	010001	119097	3
SORTER	GEAR STUD	010001	120615	2
SORTER	LOCKWASHER	010001	132120	1
SORTER	BASE CASTING	010001	147745	1
SORTER	LEFT LEG	010001	173067	1

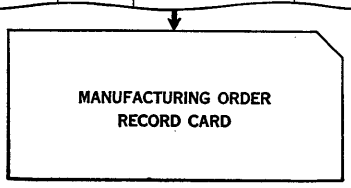


Assembly specification cards are key punched and verified for each part used to build the assembly. A descriptive heading card completes the set.

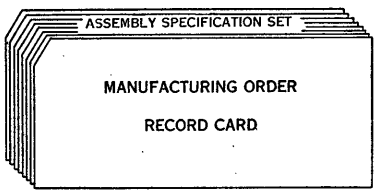
An IBM card records the manufacturing orders placed as the result of forecasting.

FORECAST

DELIVERY DATE	QUANTITY	PRODUCT DESCRIPTION	PRODUCT NUMBER
JANUARY	92	SORTER	010001
JANUARY	62	ACCOUNTING MACH.	127800
JANUARY	85	REPRODUCER	184400



These cards are used to select the corresponding assembly specification set and are used as heading cards.



The IBM Accounting Machine writes a list of the parts used, called a "Bill of Materials," for each manufacturing order.

BILL OF MATERIAL

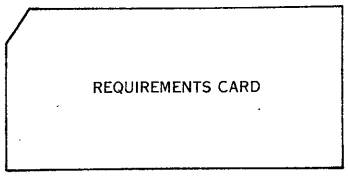
PRODUCT No.	DATE ISSUED	ORDER No.	QUANTITY
010001	9 19	1015	92

SORTER FINAL

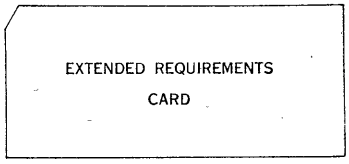
PRODUCT DESCRIPTION	PART NUMBER	QUANTITY PER PRODUCT
SUPPORT SCRW	119097	3
GEAR STUD	120615	2
LOCK WASHER	132120	1
BASE CASTING	147745	1
LEFT LEG	173067	1

This forms a delivery order, routing the required items from stock to assembly line.

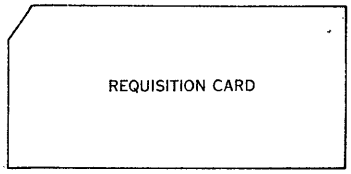
Copies of these cards are made by reproducing to requirements cards, gang punching the lot number and quantity to be manufactured.



Total requirements (quantity to be manufactured × pieces per assembly) are extended by the IBM Multiplying and Computing Punch.

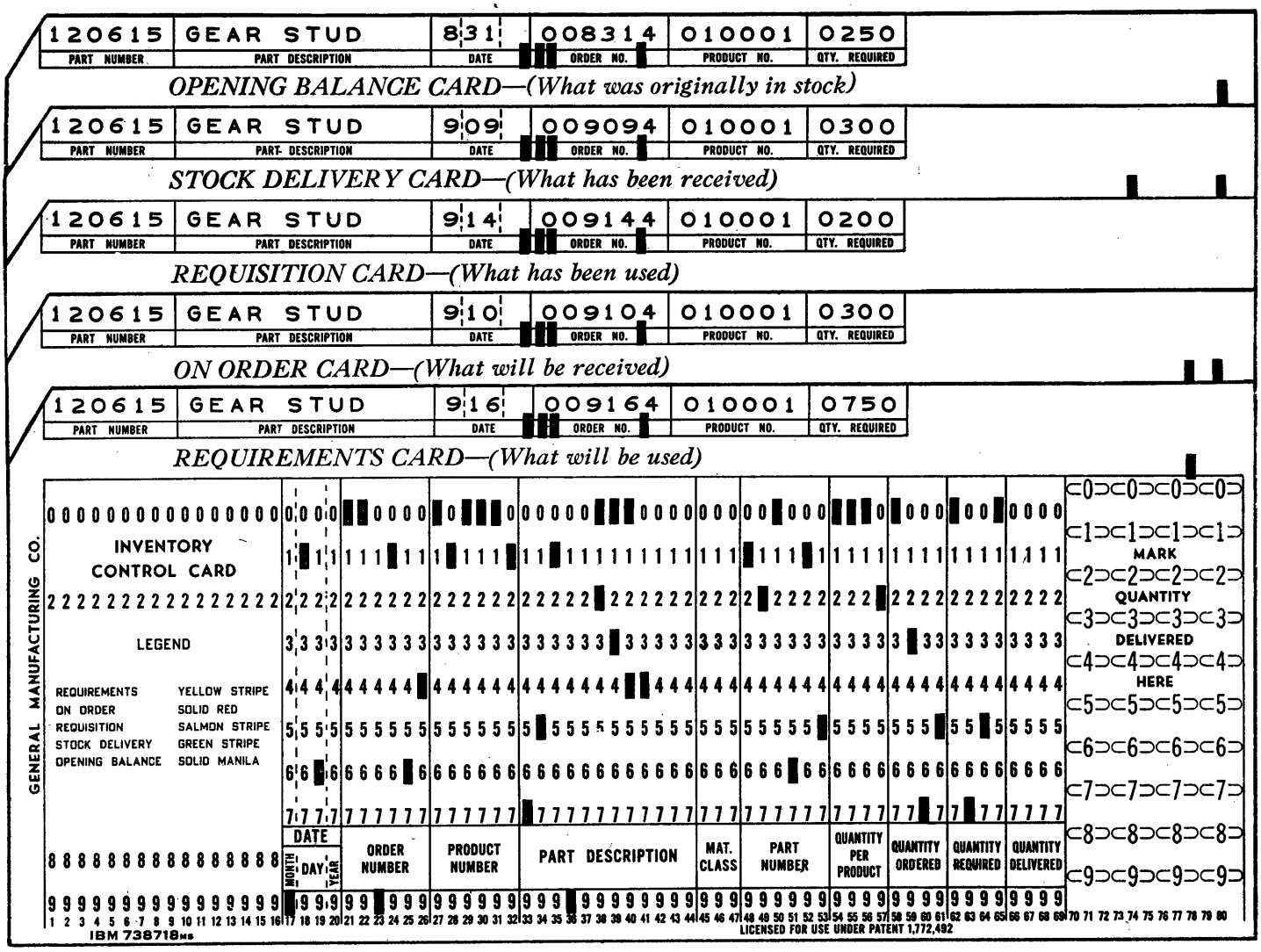


To withdraw items from stock a requisition card is necessary. These cards are prepared in advance by reproducing from the requirements cards.



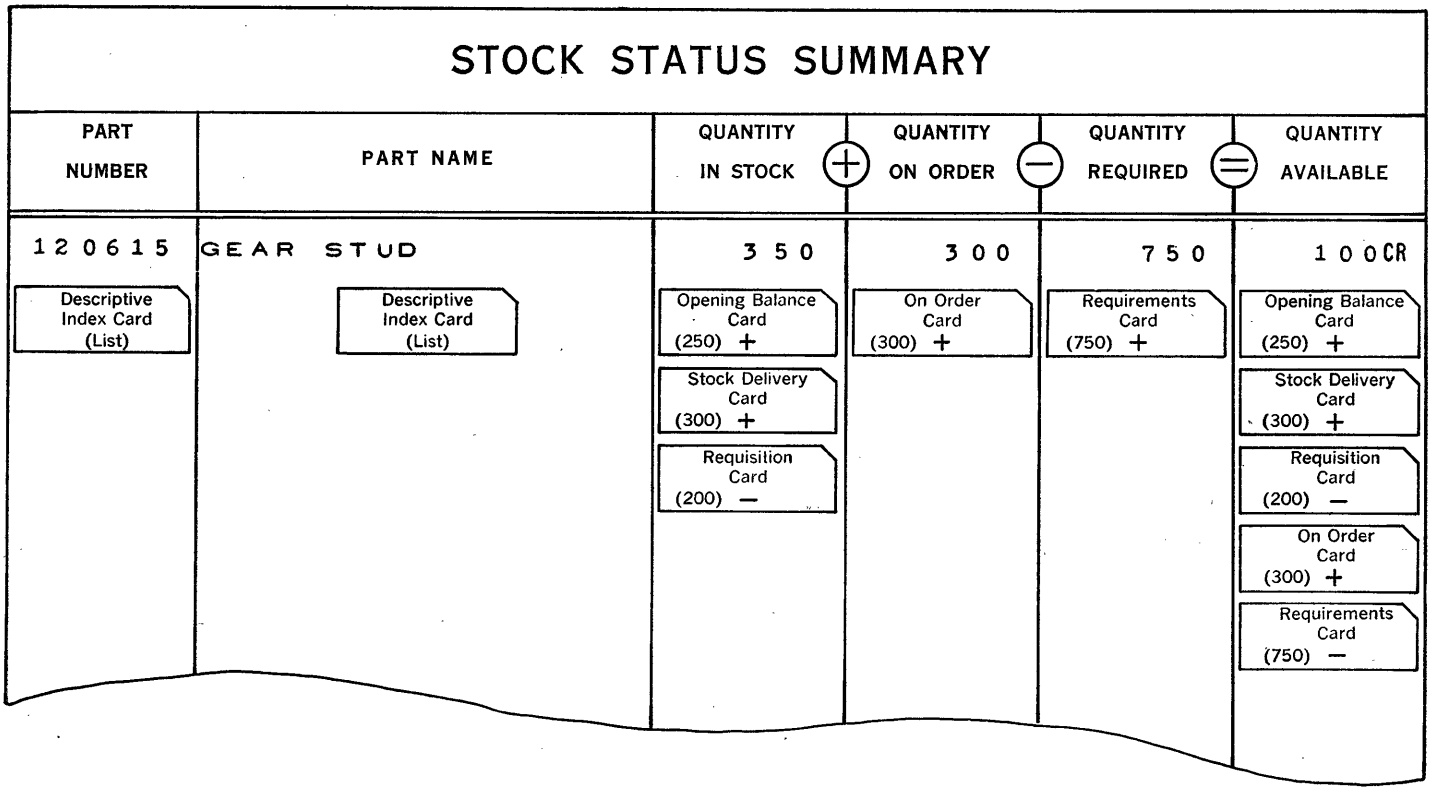
AUTOMATIC INVENTORY ANALYSIS

Inventory analysis is the process of associating requirements, current inventory, and previously placed manufacturing or purchase orders for individual parts with the object of determining if any additional items must be made or bought to complete the manufacturing program. All inventory movement is recorded by IBM cards.



Perpetual Inventory File

The IBM Accounting Machine Produces a Comparative Report



If the available balance on the Stock Status Summary shows that sufficient parts are not available (CR Balance), purchase orders are issued for these parts if they are to be purchased from an outside source, or factory orders are issued if the parts are to be made in the plant.

OPERATIONS SCHEDULING

Operations Scheduling is planning the work to be done, the department in which the work will be done, the machines to be used, and the time at which it must begin.

The routing sheet (sequence and kind of operations which must be performed to make the part) is prepared but once for each part number.

TRANSFER OPERATION RECORD

DATE 2/2 ROUTED BY H.B.T.

PART NUMBER 120615

PART NAME GEAR STUD

OPERATION DESCRIPTION	OPER. No.	DEPT No.	TOOL No. OR MATERIAL No.	MACH GROUP	HOURS OR WEIGHT PER 100 PIECES
RAW STORES	1	500	211000		1.5
H. S. TURN	5	50	876942	98	.6
MILL SLOT	10	10		4	.2
H. S. TURN O. D.	15	50		98	.3
BURR O. D. SLO	20	40		102	.2
GRIND O. D.	25	70		117	.3
GRIND T. D.					.1
INSPECT					.6
STOCK					

MASTER OPERATION CARD

A master operation card is key punched and verified for each operation. The material delivery operation also specifies the type and quantity of material needed. A descriptive heading card completes the set.

Manufacturing order cards are created for each lot of parts to be made.

MANUFACTURING ORDER RECORD CARD

These cards are used to select the corresponding master operation set and are used as heading cards.

The IBM Reproducing Punch automatically prepares a set of schedule cards for each lot of parts.

SCHEDULE CARD

The IBM Multiplying Punch automatically calculates the time needed to perform each operation and subtracts this time from the finish date, thus establishing a date for work to begin.

DATED SCHEDULE CARD

The IBM Accounting Machine writes the shop order authorizing the performance of the work and giving the processing instructions.

OPERATION RECORD

PART No.	ORDER No.	QUANTITY	DATE ISSUED
120615	11074	100	9 19

GEAR STUD

DESCRIPTION	OPERATION No.	DEPT. No.	TOOL OR MATERIAL No.	MACH. GROUP	START DATE WEEK	START DATE DAY
RAW STORES	1	500	211000		41	4
H S TURN	5	50	876942	98	42	2
MILL SLOT	10	10		4	43	0

The IBM Reproducing Punch prepares in advance of the work to be done:

MATERIAL REQUIREMENTS CARD

1. To Inventory Control File automatically reserving this material for a particular job or manufacturing order.

MATERIAL REQUISITION CARD

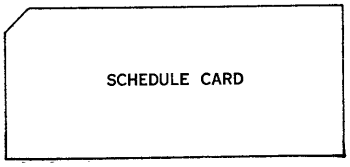
2. To be used as an authority to withdraw the required quantity of raw materials from stores; to reduce the quantity of material on hand; to establish cost of material used.

LABOR CARD

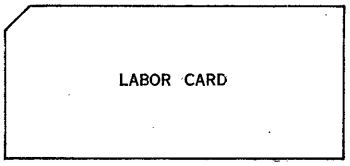
3. To assign work to the employee; to give credit for work performed; to establish time taken; to reduce work ahead; to establish cost of production.

MACHINE TOOL LOADING

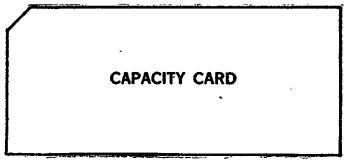
Many operations needed to produce the component parts of the product are performed with the aid of power driven mechanical devices called machine tools (milling machines, drill and punch presses, etc.). Since these machine tools are expensive it is desirable to make sure that they are used as much as possible. It is equally important that no more work be assigned to them than they are able to produce. The amount of work, measured in time ahead, of each of these machine tools is called the load.



Schedule cards set up the load by types or groups of machine tools.

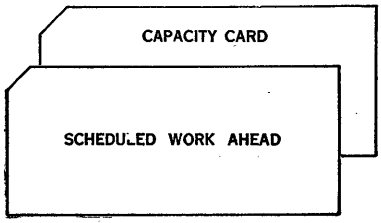


Completed Labor Cards record the work which has been performed.



Capacity cards, punched from property records, show the number and capacity of each machine group.

The IBM Collator automatically matches the labor and schedule cards, removing the latter from the "load" file, so that those which remain indicate the work still to be performed by each machine tool group. The capacity cards are merged in the load file by machine tool group.



The IBM Accounting Machine Prepares Comparative Reports

MACHINE LOAD SUMMARY

DEPT. No.	GROUP No.	NUMBER OF MACH.	LOAD WEEK	CAPACITY HOURS	LOAD HOURS	VARIANCE HOURS
10	4	14	39	3840	3830	10
			40	3840	3730	110
			41	3840	3810	30
			42	3840	3755	85
			43	3840	4050	210CR
			44	3840	3815	25
40	102	13	39	3840	3662	178
			40	3840	3649	191
			41	3840	3780	60
			42	3840	3971	131CR

MACHINE LOAD ANALYSIS

DEPT. NO.	GROUP NO.	NUMBER OF MACHS.	LOAD WEEK	CAPACITY HOURS	PART NUMBER	ORDER NUMBER	LOAD HOURS	VARIANCE HOURS
10	4	14	43	3840				
			43		120615	11074	2	
			43		123457	11354	144	
			43		123459	12054	180	
			43		123500	12064	280	
			43		123601	12074	180	
			43		123652	12084	700	
			43		123666	12094	1200	
			43		123701	12104	630	
			43		123702	12114	30	
			43		123704	12124	75	
			43		123705	12134	120	
			43		123801	12144	350	
			43		123802	12154	100	
			43		123840	12164	59	
				3840			4050	210CR
40	102	13	42	3840				
			42		120618	8014	1350	
			42		120819	8024	1980	
			42		121019	8034	510	

The Machine Load Summary shows work ahead for each machine group, and the Machine Load Analysis gives the same information detailed by Part Number. From these reports, the schedule of operations can be adjusted to obtain maximum use of available equipment and avoid peak overloads.

Materials

The control of materials is a vital phase of manufacturing control. For a complete discussion of this application, refer to the booklet "Inventory and Material Accounting."

ADVANTAGES OF THE APPLICATION OF IBM ACCOUNTING TO THE PROBLEMS OF MANUFACTURING CONTROL

Accumulation of excessive stocks of material, through over-ordering for planned production, is reduced.

A stock status summary report of all active raw material items and parts can be submitted to the management daily, weekly or monthly as desired.

Up-to-date information concerning machine tool loads helps to establish sound equipment policies.

The whole cycle of manufacturing control planning operations can be reduced to a matter of days; the comparable manual method invariably requires several weeks.

IBM Accounting eliminates the necessity of manually transcribing basic information from original documents to finished reports.

IBM Accounting saves time in the factory by eliminating the manual preparation of such original documents as labor cards, requisition cards and stock delivery cards.

The recordkeeping operations essential to manufacturing control are coordinated with those necessary for general factory accounting.

Uniformity of source documents is obtained by substituting IBM cards for existing forms.

Special analyses and reports, which by manual methods would be too costly or too late, are easily prepared. Examples of such reports are:

Purchase Order Writing.
Commitment Follow-up.
Spoilage, Inspection, Re-work.
Receiving Documents.
Shipping Documents.

The IBM card, a unit record, simplifies revision of specifications to incorporate changes in engineering or manufacturing processes.

Vital information essential to the control of manufacturing is made available more rapidly and accurately.

GLOSSARY

ASSEMBLY—Part or all of a product which has been constructed from separate parts. A final assembly may be made up of many sub-assemblies, each of which in turn has been made up of many component parts.

ASSEMBLY SPECIFICATION SHEET—A list showing for a given product the different parts or assemblies needed to make it, an identification number for each of these parts, and the quantity of each part required to build one unit of the product.

AVAILABLE—A term used to denote the quantity of a product or material actually in stock, plus the quantity on order from vendors or manufacturing departments, less the quantity reserved for future use on specific orders.

BALANCE CARD—A card on which is recorded the balance in stock at a certain time; these cards are usually prepared automatically at the end of a period, by summary-punching the tabulation of old balance plus receipts minus stock issues.

BILL OF MATERIALS—A list of the various materials and parts required to complete a manufacturing order for a given quantity of a specified product.

FORECAST—An estimate of the probable future demands for the products to be manufactured made by analyzing sales orders and past shipments, and general business activity which will affect the product in question.

MACHINE CAPACITY—The amount of work which a specific machine can perform in a given period of time, taking into account time required for servicing and set-up, holidays, etc.

MACHINE LOAD—The amount of work, in terms of hours, which has been assigned to a given machine or group of machines.

MANUFACTURING ORDER—An order or authorization to manufacturing departments to make a certain number of parts or products.

MASTER OPERATION CARD—A card containing a complete description of one operation in the process of producing a part. It includes information such as the sequence in which this operation is to be done, the department where it is to be done, machine tools to be used, and time required. From it is reproduced the schedule card, which, with schedule cards for other operations, is used to write the Operation Record.

ON ORDER CARD—A record of a quantity of a certain part or product which is on order from vendors or from a manufacturing department.

OPERATION RECORD (ROUTING SHEET)—A list describing each of the steps necessary for producing one component part of a product, and the sequence in which those operations should be performed.

OPERATIONS SCHEDULING—Planning the work to be done, the department in which the work will be done, the machines to be used, and the time at which it must begin.

PERPETUAL INVENTORY—A file of IBM cards, one section for each item stocked, which at any time indicates the quantity of that item on hand. It is made up of cards representing an opening balance, units which have been added to stock, and units removed from stock. It may also include cards showing units on order but not yet received, and units reserved for use on specific orders.

PROCESSING—Performing the steps in manufacturing required to turn a raw material into a finished part.

RECEIPTS CARD—A card in the perpetual inventory file which represents a quantity of one stock item which has been received in the stock room.

REQUIREMENTS—As used in Manufacturing Control, the quantity of one part needed to complete a manufacturing order for a given product, obtained by multiplying the quantity of the final product by the number of pieces of the part needed for each unit of the product.

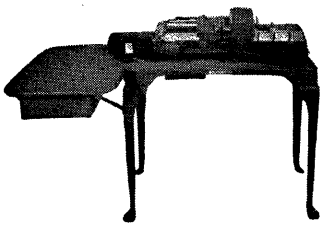
REQUIREMENTS CARD—A card in the perpetual inventory file representing the quantity of a part which has been reserved for use in a certain manufacturing order.

REQUISITION CARD—A card in the perpetual inventory file representing a quantity of a stock item which has been delivered to a manufacturing department. The requisition card replaces the corresponding requirements card when items are actually removed from stock. In IBM Manufacturing Control, the requisition card is prewritten, by reproducing, from the requirements card at the time the manufacturing order is scheduled.

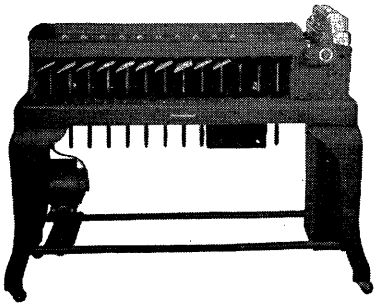
ROUTING SHEET—See Operation Record.

SCHEDULE CARDS—The cards, reproduced from the master schedule cards, used to write the Operation Record. Each card contains a complete description of one step in the manufacturing process and writes one line on the Operation Record.

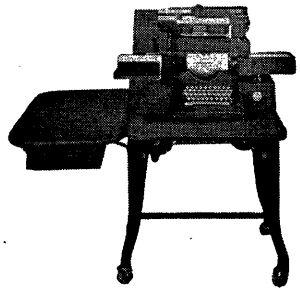
IBM ELECTRIC ACCOUNTING MACHINES



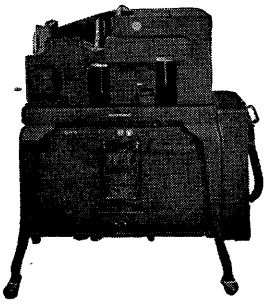
Card Punching Machine
with Duplicating Feature



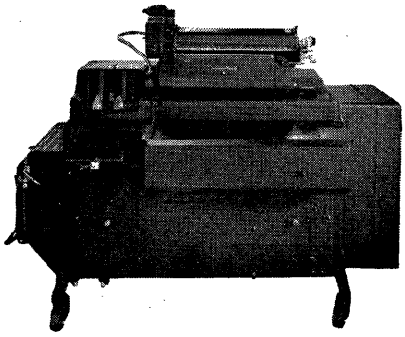
Card Sorting Machine



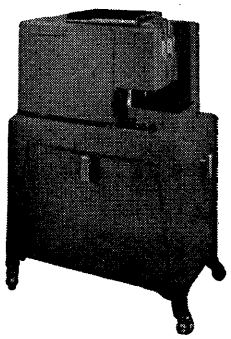
Card Punching Machine
with Printing and
Duplicating Features



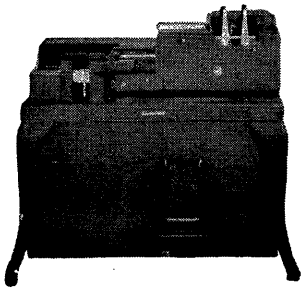
Card Reproducing Punch



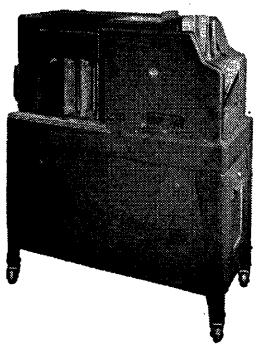
Accounting Machine



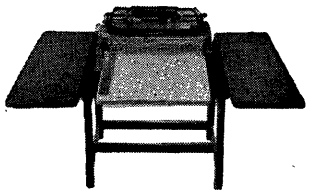
Card Interpreter



Multiplying and
Computing Punch

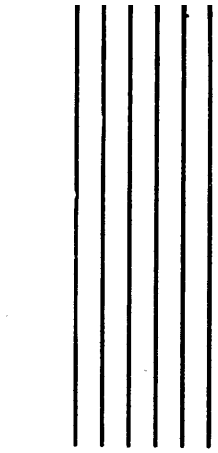


Collating Machine

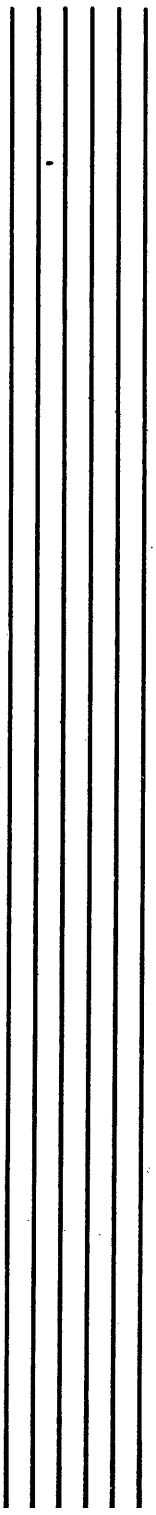


Facsimile Posting Machine

Form No. 22-4969-2—ME3201—9-48



IBM ACCOUNTING



PLANT AND EQUIPMENT ACCOUNTING

APPLICATION

INTERNATIONAL BUSINESS MACHINES CORPORATION
NEW YORK, NEW YORK

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Form 22-3076-0

IBM

ACCOUNTING

PLANT AND EQUIPMENT ACCOUNTING

EVERY business has a plant in which to operate and equipment with which to produce its goods or services. The property and equipment acquired and maintained for conducting a business are known as capital facilities or fixed assets. Buildings, machinery, furniture and fixtures, tools, patterns, drawings, and trucks, which a company owns are examples of capital facilities. Accounting for these fixed assets, and the expense due to loss in their value through age and use, is the function of capital facilities or Plant and Equipment Accounting.

A complete list of the objectives of Plant and Equipment Accounting will include:

Control of investments in Plant and Equipment.

Individual detailed history record of all items of property and equipment.

Computation of depreciation charged, for accounting purposes.

Determination of current property and equipment values at regular intervals.

Preparation of plant and equipment inventories by location.

Distribution of depreciation charges to plant, departments or accounts as factors affecting cost of production.

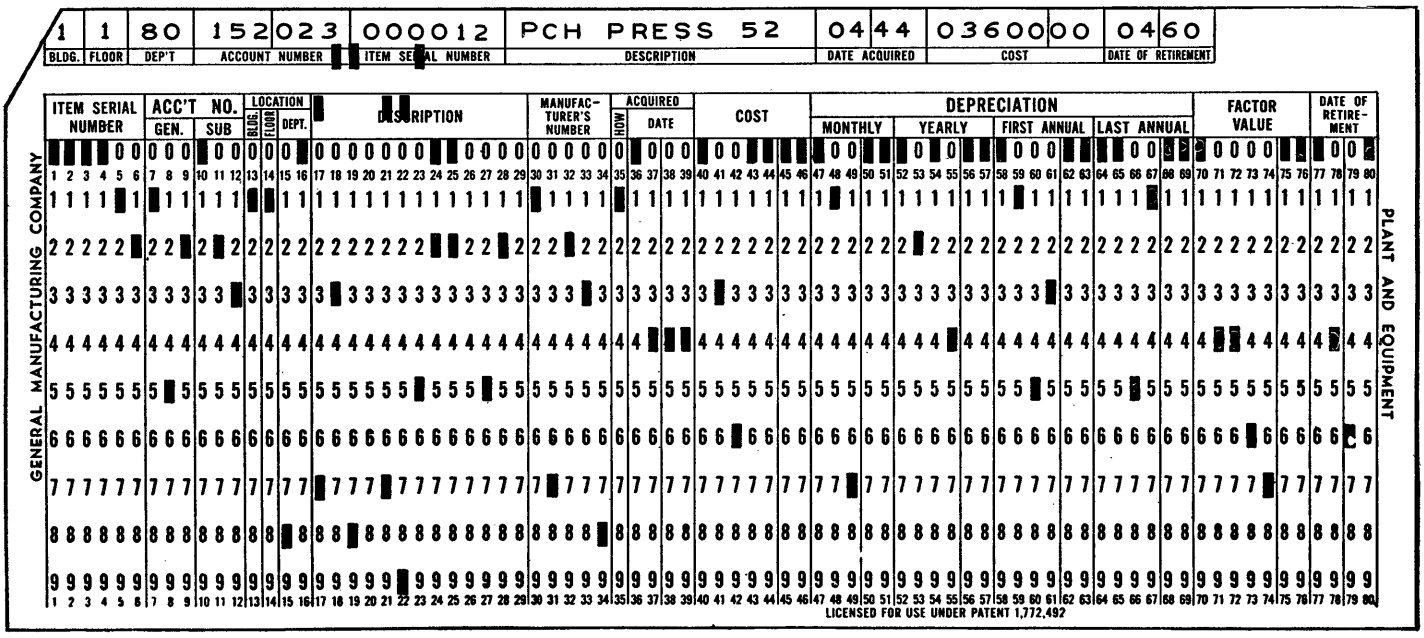
Control over retirement of fully depreciated items.

Provision for writing off fixed assets which are sold, traded, or scrapped when continued operation becomes uneconomical.

Determination of amount of depreciation allowable as deduction from income in computing income taxes.

Establishment of value for property insurance purposes.

Audit records.



Accurate and timely property accounting records are required in order that management may account for the original investment, fix responsibility for fixed assets, and establish a basis for recovering cost.

Capital facilities are usually obtained through purchase or manufacture. For each Capital Facility unit, however acquired, a complete, detailed record is required for accounting and statistical analyses, as well as for the engineering and production departments.

When an acquisition is first authorized, a History Ledger card carrying all pertinent information is set up in the Accounting Department among the "in process" items. On this History Ledger card are posted subsequent charges of cost, transportation and installation; the estimated salvage value, years of life, and depreciation

SERIAL NUMBER 000012 ACCOUNT NUMBER 152 - 023 BUILDING 1 FLOOR 1 DEPARTMENT 80 KIND 1

DESCRIPTION Punch Press, Model 52

MANUFACTURER'S SERIAL NUMBER 17238 MANUFACTURER'S NAME National Acme Manufacturing Company, Cleveland, Ohio

PLANT AND EQUIPMENT HISTORY LEDGER CARD

		Safety Attach.				
HOW ACQUIRED	1	2				
DATE ACQUIRED	4 - 44	1 - 45				
COST—						
ORIGINAL	$3405.00	$88.25				
TRANSPORTATION	120.00					
INSTALLATION						
LABOR	32.00	4.00				
MATERIAL	15.00	.75				
OVERHEAD	28.00	3.00				
OTHER						
TOTAL	3600.00	96.00				
ESTIMATED SALVAGE VALUE	336.00					
DEPRECIABLE AMOUNT	3264.00	96.00				
MONTHLY DEPRECIATION	17.00	.52				
YEARLY DEPRECIATION	204.00	6.24				
FIRST ANNUAL CHARGE	153.00					
LAST ANNUAL CHARGE	51.00	2.40				
FACTOR VALUE	4467.00	127.20				
VOUCHER NUMBER	29874	37141				
PURCHASE ORDER NUMBER	5327	11893				

TRANSFERS

DATE	TO ACC'T	LOCATION	REF. No.

ESTIMATED LIFE 192 MONTHS

16 YEARS

ESTIMATED DATE OF RETIREMENT 4 - 60

MOTORS

No.	DESCRIPTION
1231	10hp AC 220V 3 phase 60 cycle

Front of History Ledger Card

charges are also posted after being calculated. The total original cost (i.e., cost plus transportation and installation charges, excluding all discounts and allowances) of fixed assets is an investment of capital.

The History Ledger card is removed to the property accounting file when the asset is acquired, and becomes the source document for the IBM card. Each Ledger card is posted periodically as changes and charges which affect the asset are made. The file becomes a perpetual inventory of all plant property and equipment.

The descriptive and accounting data from the History Ledger card are recorded by means of holes in the IBM card, which is the operating unit of the IBM Accounting machines. When the cards have been completed, they may be used to produce any required or desired report.

MFG. No.	DESCRIPTION	DATE	LOCATION BLDG.	LOCATION FLOOR	LOCATION DPT	ACC'T. No. GEN	ACC'T. No. SUB	ITEM SERIAL No.	YEARLY DEPRECIATION	COST	FACTOR VALUE	DATE OF RETIREMENT
17238	PCH PRESS 52	4 4 4	1	1	80	152	023	000012	204 00	3600 00	4467 00	4 60
	SAFETY ATTACH	1 4 5	1	1	80	152	023	000012	6 24	96 00	126 00	4 60

EST. LIFE	REMARKS	DATE	LOCATION BLDG.	LOCATION FLOOR	LOCATION DPT	ACC'T No GEN	ACC'T No SUB	ITEM SERIAL No	YEARLY DEPRECIATION	MAINTENANCE CHARGES MATERIAL	LABOR	OVERHEAD	TOTAL
192 mos.		12 4 4	1	1	80	152	023	000012	153 00				
		12 4 4	1	1	80	152	023	000012		2 50	1 00	75	4 25
180 mos.		12 4 5	1	1	80	152	023	000012	210 24				
		12 4 5	1	1	80	152	023	000012		1 75	1 20	90	3 85

Back of History Ledger Card

GENERAL MANUFACTURING COMPANY

ACQUISITION AND RETIREMENT REGISTER

DATE April 1944

MANUFACTURERS SERIAL NUMBER	DESCRIPTION	DATE	LOCATION BLDG.	LOCATION FLOOR	LOCATION DEPT.	ACC'T No GEN.	ACC'T No SUB	ITEM SERIAL NUMBER	DEPRECIATION	COST	FACTOR VALUE	DATE OF RETIREMENT
17238	PCH PRESS 52	4 4 4	1	1	80	152	023	000012	204 00	3600 00	4467 00	4 60
00509	SPEC CAM MACH	4 4 4	1	34	5	152	512	000020	235 44	1648 08	2648 65	4 51
05898	BOOKCASE	4 4 4	1	2	15	152	013	000241	8 00	64 00	98 00	4 52
00092	PCH PRESS 6V0	4 4 4	1	1	80	152	023	000969	800 00	9875 00	13275 00	4 56
00546	BRYANT INT GR	4 4 4	1	37	5	152	116	007056	522 00	4176 00	6394 50	4 52
00724	AUTO SCREW	4 4 4	1	35	6	152	150	018232	89 64	896 40	1277 37	4 54
62071	BS HOR MILLER	4 4 4	1	3	10	152	003	029216	264 00	4224 00	5346 00	4 60
00027	VERT MILLER	4 4 4	1	3	10	152	003	029871	241 80	2176 20	3203 85	4 53
05194	EXEC DESK	4 4 4	1	2	15	152	010	061349	8 50	85 00	121 13	4 54
18946	SCHAUER HEAD	4 4 4	1	32	7	152	102	061712	774 64	4997 84	8290 06	4 50
00590	TYPEWRITER	4 4 4	1	2	15	152	013	072685	28 20	225 60	345 45	4 52
00123	PRAT WHIT JIG	4 4 4	1	37	6	152	063	287584	413 04	3717 36	5472 78	4 53

GENERAL MANUFACTURING COMPANY

INVENTORY VERIFICATION

DATE Dec. 31, 1944

LOCATION BLDG	LOCATION FLOOR	LOCATION DEPT	ACC'T No GEN	ACC'T No SUB	DESCRIPTION	ITEM SERIAL NUMBER	DEPRECIATION	COST
1	1	80	152	023	PCH PRESS 52	000012	204 00	3600 00
1	1	80	152	023	PCH PRESS 6V0	000969	800 00	9875 00
1	1	80	152	023	102 BL PRESS	013830	204 00	3200 00
1	1	80	152	023	36 VO PCH PR	016920	550 00	5800 00
1	1	80	152	126	MULTI SLIDE	028221	264 00	4224 00
1	1	80	152	127	3 NIAG PCH PR	028410	750 00	7604 00
1	1	80	152	331	TOLEDO BLK PR	029648	227 50	2400 00
1	1	80	152	334	4 VO PCH PR	053300	350 00	3800 00
1	1	80	152	334	4 VO PCH PR	082437	400 00	4106 00
1	2	15	152	010	DESK	000238	6 25	62 50
1	2	15	152	010	EXEC DESK	061349	8 50	85 00
1	2	15	152	010	DESK	070401	6 00	60 00
1	2	15	152	013	BOOKCASE	000241	8 00	64 00
1	2	15	152	013	TYPEWRITER	072685	28 20	255 60
1	2	15	152	014	TABLE	083846	7 25	72 50

As new assets are acquired and made ready for use, an Acquisition Register showing all the details of the transactions is prepared from the IBM cards. In the same manner, a Retirement Register is made of units sold, scrapped or traded.

Periodically, it is necessary to verify the physical location and condition of each capital facility. The IBM cards are listed, indicating each asset by location, to produce an Inventory Verification Report. Such a report is used to check the asset's physical presence, so that responsibility for capital items can be placed on a departmental basis and so that a review can be made of the asset's condition as of any date.

Investments in capital facilities may be considered as prepaid expenses. Several factors—the total cost, the cost of replacement, and the estimated years of life of each fixed asset—are known. From them the cost of depreciation to be allocated during each month and year of the facility's life can be computed.

Depreciation, which has been called the "exhaustion of capacity for service," is the measure of the gradual decrease in the value of these assets caused by (1) age and use, (2) inadequacy, or unsuitability due to changes in policy or process, and (3) obsolescence or loss in utility due to newer, more economical developments.

The most common method of computing the amount of depreciation to be taken each period is called the "straight-line" method. Under this method, the total depreciable amount (i.e., total cost less salvage value) is divided into equal parts, one for each year of the estimated life of the asset. One part is charged off annually. In some cases, the monthly depreciation is computed

GENERAL MANUFACTURING COMPANY

DEPRECIATION ALLOCATION

DATE Dec. 31, 1944

DATE	LOCATION BLDG.	LOCATION FLOOR	LOCATION DEPT	ACC'T No. GEN.	ACC'T No. SUB.	ITEM SERIAL NUMBER	DEPRECIATION	TOTAL
12 44	1	2	15	152	010	000238	6 25	
12 44	1	3	40	152	010	000362	19 60	
12 44	1	2	15	152	010	061349	8 50	
12 44	1	2	15	152	010	070401	6 00	
								40 35 *
12 44	1	2	15	152	013	000241	8 00	
12 44	1	2	15	152	013	072685	28 20	
								36 20 *
12 44	2	1	38	152	014	083846	7 25	
								7 25 *
12 44	1	1	80	152	023	000012	153 00	
12 44	2	3	17	152	023	000431	615 20	

for the purpose of distributing depreciation expense on a monthly basis, as a part of overhead expense of production.

By use of the IBM cards, the amount of depreciation to be distributed during each accounting period is determined by showing the depreciation charge for each capital facility on a Depreciation Allocation Report.

The difference between the amount of investment and the amount of depreciation is the remaining or book value. Since assets are purchased at different times and depreciate at different rates, the direct computation of remaining values as of any current date would involve a separate computation for each individual unit. In order to eliminate these individual computations, the original cost of each item is adjusted as of a common date to a theoretical value called "Factor Value." This basic date is set arbitrarily and has no significance other than to make possible the calculation of net depreciated values for a group of assets at a single operation.

In order to establish values by location for insurance purposes, a report showing remaining values is prepared. Such a report is called a Valuation. Should loss occur through fire, tornado, flood or other disaster, a valuation on the date of the loss would be required. A valuation report is also necessary when, because of conditions existing within a company, its depreciation charges do not agree with those allowable for insurance and tax purposes. This report, substantiated by original vouchers, is submitted as evidence of correct accounting practice.

GENERAL MANUFACTURING COMPANY

VALUATION REPORT

DATE Dec. 31, 1945

LOCATION			ACC'T. No.		ITEM SERIAL NUMBER	DEPRECIATION	COST	FACTOR VALUE
BLDG	FLOOR	DEPT	GEN	SUB				
1	1	80	152	023	000012	204 00	3600 00	4467 00
1	1	80	152	023	000969	800 00	9875 00	13275 00
1	1	80	152	023	013830	204 00	3200 00	2792 00
1	1	80	152	023	016920	550 00	5800 00	6700 00
1	1	80	152	126	028221	264 00	4224 00	3696 00
1	1	80	152	127	028410	750 00	7604 00	8104 00
1	1	80	152	331	029648	227 50	2400 00	2627 50
1	1	80	152	334	053300	350 00	3800 00	3975 00
1	1	80	152	334	082437	400 00	4106 00	3760 00
						3749 50 *	44609 00 *	49342 50 *
						X 6		- 22 497 00
						22,497 00		26 845 50
								Remaining Value

The basic elements in Plant and Equipment Accounting may be summarized as follows:

Capital Facilities or Fixed Assets are continuing units—that is, each must be included repeatedly, for several years, on the books of the company.

In any plant, the fixed assets are numerous, and the purposes of capital facilities accounting require that records be kept in considerable detail.

The values of most assets usually change at a constant rate over several periods, their identifying and descriptive specifications remaining unchanged.

These elements determine the type of reports needed, which IBM Accounting produces economically, quickly, and automatically. In addition to these results, which are expected of any accounting method, many other statistics and analyses are instantly available. The ability of IBM Accounting to reclassify the IBM cards automatically in any desired sequence or selective grouping, provides these advantages in addition to the usual accounting results.

Important analyses are those prepared to meet the following circumstances:

Changes in depreciation rates. Fluctuations in productive activity and obsolescence due to newer developments or changes in product specifications may require an increase or decrease in rate of depreciation. Before changes are made, the effect of such changes must be known. The facility with which IBM Accounting can produce complete analyses is a real advantage. From these analyses, correct decisions may be made by informed management.

Comparison of actual useful life against estimated or expected life of assets. Analyses of this type are used effectively to prevent losses due to inadequate depreciation charges, to establish depreciation rates for new acquisitions, and to provide quality control for guidance in future procurement.

Supporting data for audit and depreciation claims. It is not always possible to determine in advance what supporting data may be required to facilitate audits and to substantiate depreciation claims for tax and insurance purposes. Pertinent data recorded in IBM cards provide unit operating records from which supporting summary or detail records are instantly available when needed.

The accountant, treasurer, controller and auditor use IBM Plant and Equipment Accounting because it meets all of the requirements normally expected of an accounting method, and also because it provides numerous additional analyses and reports, instantly available when needed. These positive results are assured:

Detailed history of all property and equipment is available.

Plant and equipment inventories are available when needed.

Accurate depreciation charges for accounting purposes are made.

Control over distribution of depreciation charges to proper accounts is assured.

Fully depreciated items are retired on proper dates.

Assets sold, traded, scrapped, or abandoned are promptly written off.

Current depreciated or remaining value of property and equipment is determined accurately at regular intervals.

Allowable deductions from income taxes are computed.

Valuations for insurance purposes are available when needed.

Supporting data are supplied to substantiate depreciation claims for tax and insurance purposes.

Adequate audit records are available.

GLOSSARY

AUDIT—An examination of the accounting records of a company, to check their accuracy.

ACCRUED DEPRECIATION—Total of depreciation charges up to the present date.

BOOK VALUE—The value at which any asset appears on the books of a company, whether that value is cost, cost less depreciation, or appraised value.

CAPITAL FACILITY (See fixed asset)—Asset of a permanent nature owned by a company, that will be of service for a long time, used in the operation of a business, to produce revenue.

DEPRECIATION CHARGE—Measurement of the decrease in the value of a unit resulting from its age and use, obsolescence or inadequacy for an accounting period.

FACTOR VALUE—Current value of a fixed asset computed from a basic date, arbitrarily chosen as the common purchase date of all capital facilities in a plant.

FIRST ANNUAL DEPRECIATION—If a unit is acquired during the year this is the charge for the depreciation of that unit from the date of its purchase until the end of the current accounting period.

FIXED ASSET (See capital facility)—Something owned by a company intended for long-time use, not acquired for resale, whose investment will be recovered through future operations of the business.

INADEQUACY—Unsuitability due to changes in policy or process.

JOB ORDER—A written authorization to perform a specified task. Charges for labor (from job tickets) and material (from material requisitions) may be noted on this form.

JOB TICKET—Original record of labor performed.

LAST ANNUAL DEPRECIATION—If a fixed asset is retired during the year, this is the depreciation charge from the date of the last accounting entry to the date of retirement.

MAINTENANCE CHARGES—Cost necessary to keep plant and equipment in good operating condition.

MATERIAL REQUISITION—A request for specified material from one location to another.

OBSOLESCENCE—Loss in value and commercial utility resulting from newer, more economical manufacturing developments.

OVERHEAD OR BURDEN—Costs of manufacturing that cannot be directly charged to the product produced.

PERPETUAL INVENTORY—Current record of all items received and retired or disposed of.

PREPAID EXPENSE—Expense that has been paid, the benefits from which will be received by the company in the future.

REMAINING VALUE—Current value of a fixed asset on the books of a company determined by subtracting its Accrued Depreciation charges from the Total Original Cost of the unit.

RETIRED—When an asset is removed from use it is said to be retired.

SALVAGE VALUE—Value realized from sale of retired assets.

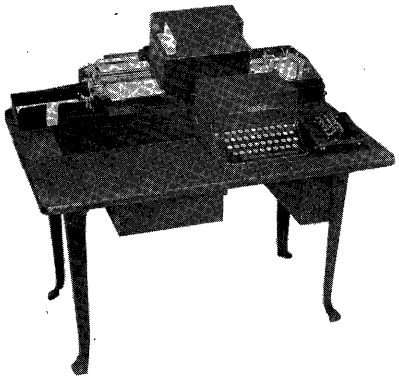
VENDOR'S INVOICE—A bill from the company that sold goods or services to the purchasing company.

VOUCHER—A business form that shows all the details of a transaction and authorizes its entry into accounting records.

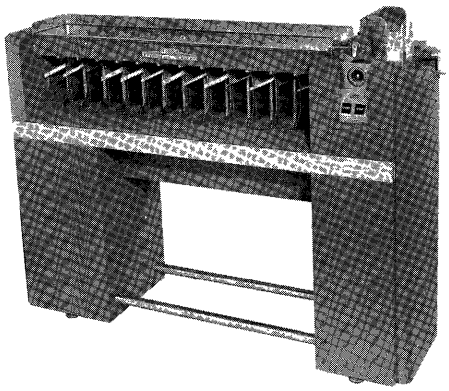
WORK ORDER—A written authorization to produce a fixed asset in a company's own plant.

WRITTEN OFF—When an asset is fully depreciated and disposed of, it is said to be written off the books of the company.

IBM ELECTRIC PUNCHED CARD ACCOUNTING MACHINES



Card Punching Machine
with Duplicating Feature



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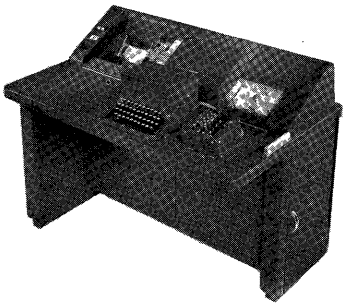
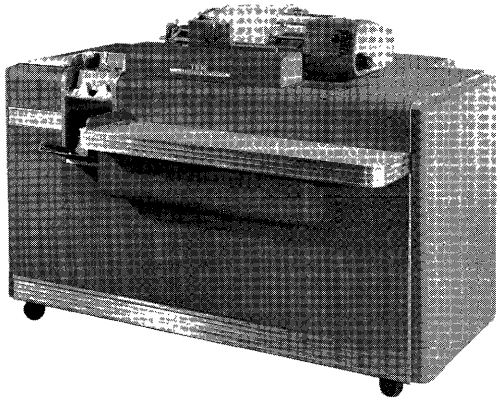


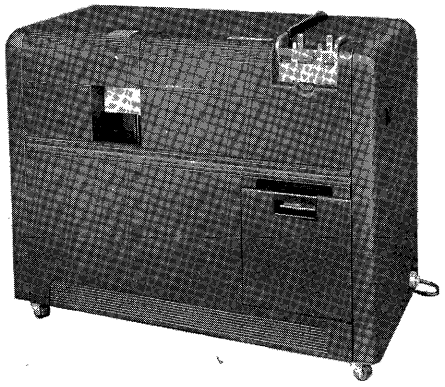
Verifier

Electric Document-
Originating Machine

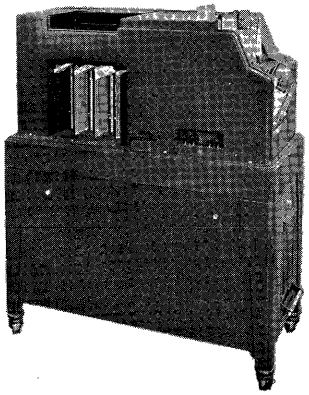


Accounting Machine

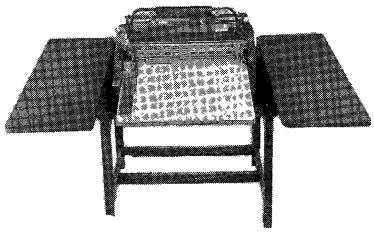
Card Interpreter



Calculating Punch



Collator



Facsimile Posting Machine

IBM ACCOUNTING

FINANCIAL CONTROL AND STATEMENTS

APPLICATION

INTERNATIONAL BUSINESS MACHINES CORPORATION
New York, New York

Published by
Department of Education
International Business Machines Corporation
Endicott, New York

Form 22-4968-1

IBM
ACCOUNTING

FINANCIAL CONTROL AND STATEMENTS

EACH IBM application—Sales, Billing, Accounts Receivable, Accounts Payable, Payroll and Labor Accounting, Material Accounting, and Manufacturing Control—represents a different phase of a complete accounting system. Each of these phases has a relation to the over-all accounting system.

The executive officers of a company are interested in the comprehensive financial control and management of the business, rather than in the details of Sales, Accounts Receivable, Accounts Payable, etc. It is through summarization of the details of these separate phases of accounting that top management secures figure-facts which enable it to check the results of its policies and change those policies when advisable. Therefore, management demands that its accounting system produce figure-facts in the form of financial and operating statements to tell it where its policies have brought the business and in which direction it is going.

Figure-facts are the tools of management. The management of a business can exercise effective financial control only by having current, accurate, and complete information.

It is an axiom of good financial control that both the general accounting structure and the operating records of the business should be designed so that all of the reports, statements and data required by management may be produced quickly and accurately. This essential information is produced automatically and as a by-product of the accounting and record-keeping of the business wherever IBM Accounting is used.

The accounting system of a business should produce a great part of the information required for management. It is the record-keeping of the business as a whole. It is a form of arithmetic dealing with additions to, and subtractions from, the assets, liabilities, ownership, income, and expenses of the business. *General Accounting furnishes a summarization of all values relating to the business.*

The general accounting of a business stems from the many individual transactions such as sales and purchases. It is built upon the complete details of these transactions, but the plus and minus arithmetic of general accounting is often limited to totals of like transactions. General accounting is intended, primarily, to enable the management to know and to evaluate:

The present position of the business

The effect and trend of existing policies and practices

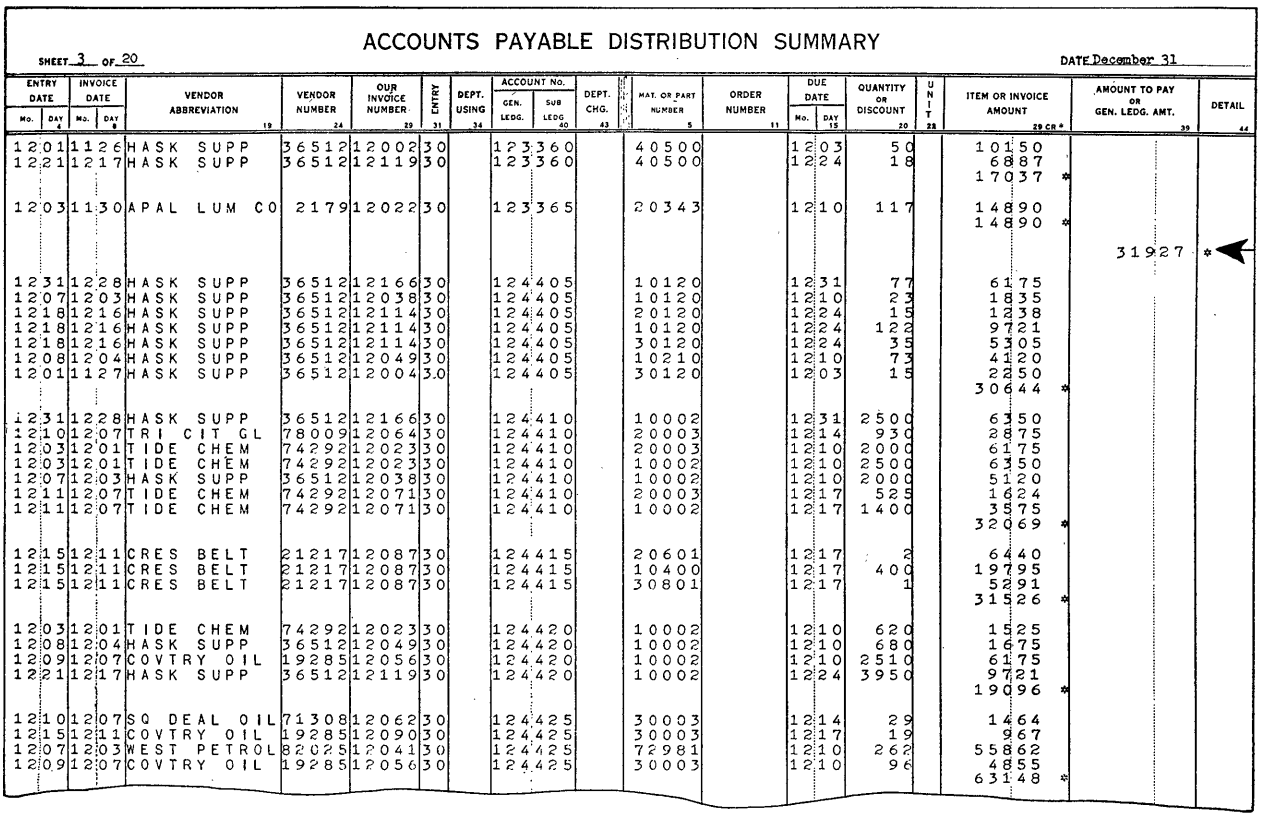
The opportunities and the need for improvement

The executives of any business depend first upon two basic general accounting statements, which are prepared periodically or as often as required:

The Balance Sheet, which shows the position of the business at any given time and which, in its simplest form, can be expressed by the following equation: ASSETS $50,000 = LIABILITIES $10,000 + OWNERSHIP $40,000.

The Statement of Profit or Loss, which shows the results of activities over a period of time, and which likewise can be expressed by a simple equation: INCOME $200,000 —EXPENSE $180,000 = PROFIT $20,000.

While the foregoing equations show the *content* of the Balance Sheet and the Statement of Profit or Loss, they are, of course, insufficient for management because they tell nothing of the *nature* of the assets, liabilities, income and expenses. To provide for the preparation of these statements (and numerous others which are essential to sound operation) in a usable form, the management must decide upon appropriate descriptions for the various kinds of assets (property), liabilities (obligations) income and expenses. The "general accounts" are established to furnish this description and classification. They are in all cases merely convenient titles for the different kinds of assets, liabilities, income, and expenses. For instance, "Cash," "Notes Receivable," "Accounts Receivable," "Merchandise Inventory," "Furni-



ACCOUNTS PAYABLE DISTRIBUTION SUMMARY

SHEET 3 OF 20 — DATE December 31

ENTRY DATE Mo.	ENTRY DATE Day	INVOICE DATE Mo.	INVOICE DATE Day	VENDOR ABBREVIATION	VENDOR NUMBER	OUR INVOICE NUMBER	ENTRY	DEPT. USING	ACCOUNT No. GEN. LEDG.	ACCOUNT No. SUB LEDG.	DEPT. CHG.	MAT. OR PART NUMBER	ORDER NUMBER	DUE DATE Mo.	DUE DATE Day	QUANTITY OR DISCOUNT	UNIT	ITEM OR INVOICE AMOUNT	AMOUNT TO PAY OR GEN. LEDG. AMT.	DETAIL
12	01	11	26	HASK SUPP	36512	12002	30		123360			40500		12	03	50		10150		
12	21	12	17	HASK SUPP	36512	12119	30		123360			40500		12	24	18		6887		
																		17037 *		
12	03	11	30	APAL LUM CO	2179	12022	30		123365			20343		12	10	117		14890		
																		14890 *		
																			31927 *	◀
12	31	12	28	HASK SUPP	36512	12166	30		124405			10120		12	31	77		6175		
12	07	12	03	HASK SUPP	36512	12038	30		124405			10120		12	10	23		1835		
12	18	12	16	HASK SUPP	36512	12114	30		124405			20120		12	24	15		1238		
12	18	12	16	HASK SUPP	36512	12114	30		124405			10120		12	24	122		9721		
12	18	12	16	HASK SUPP	36512	12114	30		124405			30120		12	24	35		5305		
12	08	12	04	HASK SUPP	36512	12049	30		124405			10210		12	10	73		4120		
12	01	11	27	HASK SUPP	36512	12004	30		124405			30120		12	03	15		2250		
																		30644 *		
12	31	12	28	HASK SUPP	36512	12166	30		124410			10002		12	31	2500		6350		
12	10	12	07	TRI CIT GL	78009	12064	30		124410			20003		12	14	930		2875		
12	03	12	01	TIDE CHEM	74292	12023	30		124410			20003		12	10	2000		6175		
12	03	12	01	TIDE CHEM	74292	12023	30		124410			10002		12	10	2500		6350		
12	07	12	03	HASK SUPP	36512	12038	30		124410			10002		12	10	2000		5120		
12	11	12	07	TIDE CHEM	74292	12071	30		124410			20003		12	17	525		1624		
12	11	12	07	TIDE CHEM	74292	12071	30		124410			10002		12	17	1400		3575		
																		32069 *		
12	15	12	11	CRES BELT	21217	12087	30		124415			20601		12	17	2		6440		
12	15	12	11	CRES BELT	21217	12087	30		124415			10400		12	17	400		19795		
12	15	12	11	CRES BELT	21217	12087	30		124415			30801		12	17	1		5291		
																		31526 *		
12	03	12	01	TIDE CHEM	74292	12023	30		124420			10002		12	10	620		1525		
12	08	12	04	HASK SUPP	36512	12049	30		124420			10002		12	10	680		1675		
12	09	12	07	COVTRY OIL	19285	12056	30		124420			10002		12	10	2510		6175		
12	21	12	17	HASK SUPP	36512	12119	30		124420			10002		12	24	3950		9721		
																		19096 *		
12	10	12	07	SO DEAL OIL	71308	12062	30		124425			30003		12	14	29		1464		
12	15	12	11	COVTRY OIL	19285	12090	30		124425			30003		12	17	19		967		
12	07	12	03	WEST PETROL	82025	12041	30		124425			72981		12	10	262		55862		
12	09	12	07	COVTRY OIL	19285	12056	30		124425			30003		12	10	96		4855		
																		63148 *		

The effect on the general accounts is:

to increase Accounts Payable $319.27 (credit)
to increase Merchandise Inventory Account No. 123-360 by $170.37 (debit)
to increase Merchandise Inventory Account No. 123-365 by $148.90 (debit)

ture and Fixtures," "Office Supplies" are all common titles for certain kinds of assets. "Notes Payable" and "Accounts Payable" are common titles for liabilities of a certain type.

The definition and establishment of general accounts starts as soon as the business acquires its first property. New accounts are established whenever new activity makes them necessary.

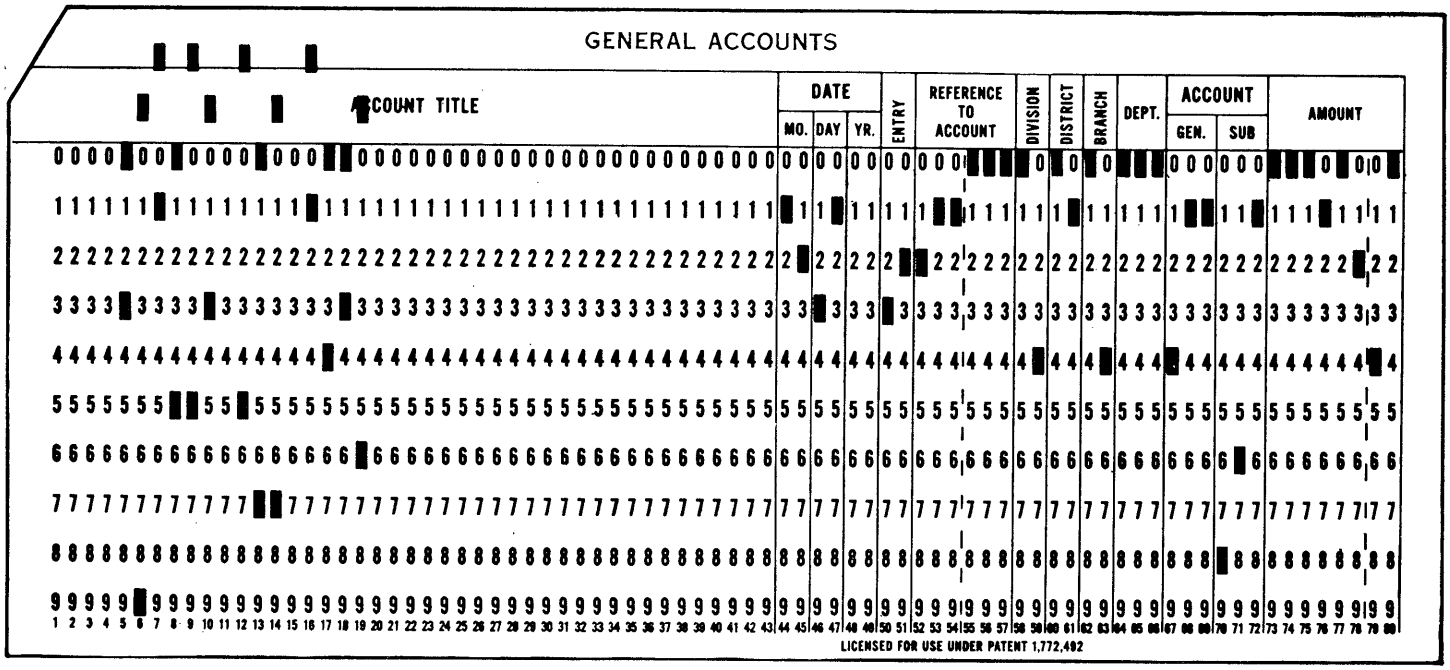
Each individual business transaction causes some increase or decrease in the general accounts, but since even small firms perform hundreds of transactions each day, it is not desirable to include every single transaction in the general accounts.

Most of the transactions fall into one of several classifications, and can be grouped with all other transactions of the same type, for which the totals only are entered in the general accounts. The medium for grouping similar transactions and totaling them for entry to the general accounts is the journal or register.

Common sources of increases and decreases in the general accounts are:

Accounts Payable Distribution Summary
Sales Distribution Summary
Labor Distribution Summary
Material Distribution Summary
Cash Receipts Journal
Cash Disbursements Journal

The foregoing increase of $319.27 in Accounts Payable is an excellent illustration of the precise control that is also a characteristic of the general accounts. An individual account, known as a subsidiary account, is maintained for each vendor. Each of these accounts shows the vendor's name and address, and the date and amount of each purchase from him. The sum of balances in these individual vendor's accounts will be in agreement with the amount of the general account if the work has been done correctly. This need for agreement is a valuable control feature.



SALES DISTRIBUTION SUMMARY

December

BRANCH	GROSS SALES	RETURNS	NET SALES	COST OF GOODS SOLD
1	8462.35		8462.35	6650.69
2	30936.99	656.00	30280.99	23817.29
7	13857.13		13857.13	10579.52
10	11164.20	119.00	11045.20	8707.92
13	14573.62	436.50	14137.12	10915.11
16	7115.44		7115.44	5592.82
19	6381.97		6381.97	4887.72
22	14346.34	453.50	13892.84	10612.75
23	267.62		267.62	206.88
25	9315.23	31.90	9283.33	6962.97
28	12871.07	112.50	12758.57	10685.44
31	2321.61	94.50	2227.11	1750.65
34	4883.14		4883.14	3783.98

The effect on the general accounts for Branch 2 is:

to increase Accounts Receivable (from Net Sales column) $30,280.99 (debit)
to increase Sales $30,936.99 (credit)
to increase Returns $656.00 (debit)
to increase Cost of Goods Sold $23,817.29 (debit)
to decrease Finished Goods by $23,817.29 (credit)

INDIRECT LABOR

CLASSIFIED BY ACCOUNTS AND DEPARTMENTS

December 31

ACCOUNT No.	ACCOUNT NAME	DEPT.	HOURS	AMOUNT
202	INSPECTION			
202		43	880	6720
			880	6720 *
211	SUPERVISION			
211		1	640	8800
211		2	640	8896
211		3	640	10240
211		4	640	9920
211		12	640	9120
211		14	640	10560
211		16	640	9760
211		23	640	9280
211		26	640	9120
211		28	640	8800
211		40	320	5440
211		41	320	4800
211		43	320	4160
211		45	240	3720
			7600	112616 *

The effect on the general accounts is:
to increase Inspection expense account $67.20 (debit)
the corresponding increase to Payroll is taken from the Payroll register which includes this amount of $67.20

INDIRECT MATERIAL CHARGES

EXPENSE ACCOUNTS

December 31 19

DEPT. 32	EXPENSE ACCOUNT NUMBER 39	MATERIAL CLASS 43	STOCK NUMBER 5	ACCOUNT TOTAL 13 CR	DEPARTMENT TOTAL 23
1	809380	420	10002	375	
				375 *	
1	809384	465	21032	1290	
				1290 *	
					1665
2	709381	460	13165	546CR	
2	709381	460	13165	546	
2	709381	460	29191	1648CR	
2	709381	460	29191	1648	
2	709381	460	13165	546CR	
2	709381	460	29191	1648CR	
				2194CR	
2	809382	415	20601	6440	
2	809382	465	30006	5174	
				11614 *	

The effect on the general accounts is:
to increase Expense Account 809380, Dept. 1, $3.75 (debit)
the corresponding decrease of $3.75 to Material Inventory is included in the total value of all materials issued

CASH RECEIPT BOOK

DATE December 31

CUSTOMER NAME	CUSTOMER No	VOUCHER No	INVOICE DATE MO	INVOICE DATE DAY	CREDIT ACCOUNTS RECEIVABLE	CASH	DISCOUNT	OTHER ACCOUNTS AMOUNT	OTHER ACCOUNTS ACCOUNT
CASTLE HARDWARE CO	08062	11506	11	08	49217	49217			
CENTRAL UNION SUPPLY	08257	12300	12	23	36903	36165	738		
CHANEL WHOLESALE	11234	12324	12	28	50000	49000	1000		
COVENTRY OIL	19285	12292	12	23	95097	92244	2853		
HASKEL IND SUPP CO	36512	12318	12	28	41533	40702	831		
KELVINAIRE CORP	45035	11686	11	23	38166	38166			
MAIZE REFINING CO	58091	12285	12	22	25256	24498	758		
NEW MEXICO COMPANY	59751	11993	11	30	100000	100000			
NEWTON PARK AND CO	61043	11239	11	01	76131	76131			
N Y GAS AND ELEC CO	61221	12325	12	28	105503	103393	2110		
VESTAL STEEL CO	78050	10452	10	08	14661	14661			
WINTERDALE RAILWAY	87652	09562	9	01	65040	65040			
					697507*	689217*	8290*		

The effect on the general accounts is:
to increase Cash $6,892.17 (debit)
to increase Discount Expense $82.90 (debit)
to decrease Accounts Receivable 6,975.07 (credit)

CASH DISBURSEMENTS

DATE December 31

VENDOR ABBREVIATION 32	CHECK No. VENDOR NO. 38	CHECK No. DATE MO.	CHECK No. DATE DAY	DEBIT ACC. PAYABLE 8	CREDIT DISCOUNT 16	CREDIT CASH 26
ACE INS CO	1181	12	31	57735		57735
BARR MACH	3076	12	31	301527	15077	286450
EL TRUST CO	29521	12	31	5125		5125
KARTAGE INC	44860	12	31	21875		21875
LEHIGH COAL	48678	12	31	69178	1384	67794
MAIZE REF	58091	12	31	11823		11823
N MILT SUPP	60035	12	31	21415		21415
N Y GAS EL	61221	12	31	67595		67595
STATE N Y	74213	12	31	179286		179286
W COR TEL	81469	12	31	23729		23729
WICKWIRE BR	86341	12	31	36043		36043
WISELO INC	88213	12	31	19518		19518
PETTY CASH	90000	12	31	147654		147654
W B ARCHER	90004	12	31	7425		7425
BOSTON	93001	12	31	29000		29000
CHICAGO	93004	12	31	14232		14232
CLEVELAND	93007	12	31	14469		14469
HOUSTON	93013	12	31	25952		25952
LOS ANGELES	93016	12	31	14051		14051
NEW ORLEANS	93019	12	31	16870		16870
NEW YORK	93022	12	31	26720		26720
PHILA	93025	12	31	14190		14190
SAN FRAN	93031	12	31	17864		17864
				1143276 *	16461 *	1126815 *

The effect on the general accounts is:
to decrease Accounts Payable $11,432.76 (debit)
to increase Discount Earned $164.61 (credit)
to decrease Cash $11,268.15 (credit)

JOURNAL VOUCHER

DATE Dec. 31 MONTH OF ACCOUNT Dec. VOUCHER No. 1386

	ACCOUNT GEN.	ACCOUNT SUB.	DEPT.	DEBIT	CREDIT
Depreciation - Bldgs + Equipt.	913			2774 25	
Reserve for Depreciation Bldgs. + Equipt.	153				2774 25

The effect on the general accounts is:
to increase Depreciation $2,774.25 (debit)
to increase Reserve for Depreciation $2,774.25 (credit)

In addition to these Sales, Cash Receipts and other journals of a similar kind, there is one other source of increases and decreases to the general accounts. It is the Journal Voucher.

The transactions of a business move swiftly. It is imperative that the effect of all transactions upon the general accounts be recorded promptly at the close of the accounting period, and that the Balance Sheet, the Statement of Profit or Loss, and other related statements be available as early as possible.

IBM cards are punched (and verified) from the totals on the source records described above.

When IBM cards are used for the details of Purchases and Payables, Billing and Sales, Payroll and Payroll Distribution, Material Records and Material Distribution, Collections, Disbursements, etc., all of the cards needed for general accounting will be produced automatically in the summary punch when the distribution journals are prepared. Under such circumstances, it will be necessary to key-punch only those increases and decreases to general accounts which are made through Journal Vouchers.

At the close of the accounting period all cards, including balance forward cards from the preceding period, are sorted by general account number and a Trial Balance listing is prepared showing the new balance of each account. New balance forward cards are automatically punched during this operation for use in the next period.

TRIAL BALANCE AND WORK SHEET

Month Ending Dec. 31 19

ACCOUNT		TRIAL BALANCE		REVENUE AND EXPENSES		BALANCE SHEET	
No.	NAME	DEBIT	CREDIT	DEBIT	CREDIT	DEBIT	CREDIT
111	CASH	137648 94	177455 90				398096
113	ACCOUNTS RECEIVABLE	136592 81	139468 33				28752
114	RES FOR BAD DEBTS		1345 93				1345 93
121	FINISHED GOODS	105882 66	106283 98				401 32
122	WORK IN PROCESS	107011 02	104752 42			2258 60	
123	RAW MATERIALS	49429 94	55645 84				6215 90
124	MFG SUPPLIES	3843 44	2665 74			1177 70	
125	OFFICE SUPPLIES	1673 09	380 11			1292 98	
143	RES FOR DEPR BLDGS		604 00				604 00
152	BLDGS AND EQUIP	3015 27				3015 27	
153	RES DEPR PL EQUIP		2774 25				2774 25
171	UNEXPIRED INS		716 84				716 84
211	ACCOUNTS PAYABLE	179526 52	126061 63			53464 89	
311	SALES		138496 71		138496 71		
312	RETURNS AND ALLOW	1903 90		1903 90			
321	COST OF GOODS SOLD	106283 98	1130 24	105153 74			
411	SELLING	15248 81		15248 81			
412	DELIVERY	423 40		423 40			
421	EXPERIMENTAL	645 81		645 81			
422	BAD DEBTS	1345 93		1345 93			
431	ADMINISTRATION	6953 63		6953 63			
512	CASH DISC TAKEN		2070 62		2070 62		
522	CASH DISC ALLOWD	1819 39		1819 39			
523	BLDG INV DEPR	604 00		604 00			
911	FACTORY PAYROLL	331413 7	331413 7				
912	MATERIALS	58311 58	58311 58				
913	GENERAL	16851 05	16851 05				
		968156 54	968156 54		6468 72	6468 72	

The trial balance shown is an informal combination of Balance Sheet and Statement of Profit and Loss. By subtraction of totals for income and expense (in accordance with the simple equation for profit or loss) the amount of profit or loss to date can be determined immediately.

After the Trial Balance has been checked, the balance sheet is prepared in its finished form. It is common practice to include figures relating to some prior date, for comparison and detection of major changes. The Balance Sheet is one of the primary tools of management.

GENERAL MANUFACTURING COMPANY

BALANCE SHEET

December, 31 19

ACCT. No.	ACCOUNT NAME	CURRENT BALANCE	JANUARY 1 BALANCE	NET CHANGE (UNFAVORABLE CHANGE → CR)
	ASSETS			
	CASH AND RECEIVABLES			
111	CASH	11287460	81905 76	30968 84
112	NOTES RECEIVABLE	398976	368976	30000
113	ACCOUNTS RECEIVABLE	6701126	6464480	236646
114	RESERVE FOR BAD DEBTS	77125 CR	26975 CR	50150 CR
116	IMPREST FUNDS	585000	585000	
		18895437*	15582057*	3313380*
	INVENTORIES			
121	FINISHED GOODS	13048743	16019518	2970775 CR
122	WORK IN PROCESS	5139228	4607952	531276
123	RAW MATERIALS	13222037	12563935	658102
124	MFG SUPPLIES	2705906	2610732	95174
125	OFFICE SUPPLIES	243413	114382	129031
		34316327*	35916519*	1557192*CR
	INVESTMENTS			
141	INVESTMENT LAND	4076680	4076680	
142	INVESTMENT BUILDINGS	2496082	2496082	
143	RESR DEPR BUILDINGS	1366344 CR	1241544 CR	124800 CR
		5206418*	5331218*	124800*CR
	PROPERTY PLANT AND EQPT			
151	PLANT LAND	6875832	6875832	
152	PLANT BLDGS AND EQPT	80658488	72016298	8642190
153	RES DEP PLT BLDG EQPT	30369380 CR	27531561 CR	2837819 CR
		57164940*	51360569*	5804371*
	INTANGIBLE ASSETS			
161	PATENTS	1022780	1022780	
162	ORGANIZATION EXPENSE	426000	426000	
163	RES AMORT INTANG ASST	596624 CR	326840 CR	269784 CR
		852156*	1121940*	269784*CR
	DEFERRED CHARGES			
171	UNEXPIRED INSURANCE	556054	570613	14559 CR
174	FREIGHT CLEARING			
	117034332	556054*	570613*	14559*CR
	LIABILITIES			
	CURRENT LIABILITIES			
211	ACCOUNTS PAYABLE	2394600 CR	3560319 CR	1165719
212	WAGES COMM ACCRUED	305960 CR	476500 CR	170540
213	INCOME TAXES ACCRUED	111152 CR	27214 CR	83938 CR
215	SOC SEC TAXES ACCRUED	538712 CR	673706 CR	134994
216	WITHHOLDING TAX	332180 CR	423500 CR	91320
217	ACCR PAYROLL DEDNS	131987 CR	124750 CR	7237 CR
		3814591*CR	5285989*CR	1471398*
	CAPITAL STOCK			
241	CAPITAL STOCK	65000000 CR	65000000 CR	
		65000000*CR	65000000*CR	*
	SURPLUS			
251	SURPLUS	52119741 CR	43496927 CR	8622814 CR
252	DIVIDENDS DECLARED	3900000	3900000	
	117034332	48219741*CR	39596927*CR	8622814*CR

The Statement of Profit or Loss is then prepared in its finished form. Here also, figures for the preceding year are usually included for purposes of comparison. The burdensome job of arithmetic is performed automatically by the IBM Electric Accounting Machine. The Profit and Loss statement provides the basis for intelligent action by management.

If the management forecasts or budgets the income and expenses of the business, a Statement of Profit or Loss is prepared showing amounts budgeted for the month and year to date, with variances over or under budget. To do this, it is necessary only to include cards punched for budgeted amounts.

Similar but specialized statements of profit or loss may be prepared for each division, district, branch or other operating subdivision of the business. This localizes superior or poor results so that action may be taken by management.

GENERAL MANUFACTURING COMPANY

PROFIT AND LOSS SUMMARY

December 19

ACCT. No. GENERAL	ACCOUNT NAME	THIS YEAR MONTH	THIS YEAR YEAR-TO-DATE	LAST YEAR YEAR-TO-DATE	VARIANCE YEAR-TO-DATE (CR DENOTES INCREASE OVER LAST YEAR-TO-DATE)
	REVENUE				
	SALES				
311	SALES	175127 70	1978049 16	1254355 00	723694 16 CR
312	SALES RETURNS	1114 14	22583 29	12785 25	9798 04 CR
313	SALES ALLOWANCES	401 83	5460 74	4891 60	569 14 CR
314	FREIGHT ON SHIPMENTS	44 38	691 91	461 24	230 67 CR
		173567 35*	1949313 22*	1236216 91*	
	COST OF SALES				
321	COST OF GOODS SOLD	133215 48	1500274 54	964217 85	536056 69 CR
		133215 48*	1500274 54*	964217 85*	
		40351 87	449038 68	271999 06	
	EXPENSE				
	SALES EXPENSE				
411	SELLING EXPENSE	17429 18	184667 36	198352 10	13684 74
412	DELIVERY AND STORAGE	332 07	5048 02	4036 12	1011 90 CR
413	ADVERTISING		20000 00	21983 60	1983 60
		17761 25*	209715 38*	224371 82*	
	GENERAL EXPENSE				
421	GENERAL EXPENSE	683 27	7142 76	7263 81	121 05
422	EXPERIMENTAL		598 58	426 28	172 30 CR
423	BAD DEBTS	872 50	1047 00	9950 93	5190 7 CR
424	AMORTIZATION PATENTS		1720 62	1863 02	142 40
425	AMORT OF ORG EXP	224 82	977 22	867 01	110 21 CR
		1780 59*	20909 18*	20371 05*	
	ADMINISTRATIVE EXPENSE				
431	ADMINISTRATION	7542 51	84792 39	89031 29	4238 90
432	TAXES STATE	2202 86	16777 86	15873 86	904 00 CR
		9745 37*	101570 25*	104905 15*	
		11064 66	116843 87	77648 96	
	OTHER INCOME AND EXPENSE				
	OTHER INCOME				
511	RENTALS	850 00	10200 00	16311 10	6111 10
512	DISCOUNT TAKEN	2126 13	20848 67	21367 91	519 24
		2976 13*	31048 67*	37679 01*	
	OTHER CHARGES				
521	PROV FED TAXES	300 00	3600 00	3800 00	3220 00 CR
522	DISCOUNT ALLOWED	2305 18	40816 40	41186 40	370 00
523	BUILDING EXPENSE	104 00	1248 00	1361 00	113 00
		2709 18*	45664 40*	42927 40*	
		11331 61	102228 14	72400 57	

PROFIT AND LOSS SUMMARY

BRANCH 2 Month Ending Dec. 31 19

ACCOUNT No. MAIN	ACCOUNT No. SUB	ACCOUNT NAME	AMOUNT	ACCOUNT TOTALS	NET
		REVENUE			
		SALES			
311		SALES	30936 99		
312		RETURNS ALLOWANCES	656 00		
				30280 99	
320		COST OF SALES			
321		COST OF GOODS SOLD	23817 29		
				23817 29	6463 70
		EXPENSE			
		SALES			
411		SELLING			
411	51	FRT AND EXP	63 75		
411	72	MISCELLANEOUS	13 00		
411	73	POSTAGE	28 30		
411	78	RENT	1000 00		
411	96	SALARIES OPER	824 58		
411	129	TRAVELING	220 30		
412		DELIVERY			
				2149 93	
		GENERAL			
422		BAD DEBTS	796 45		
				796 45	3517 32

GENERAL MANUFACTURING COMPANY

GENERAL ACCOUNTING REGISTER

December 19

ACCOUNT No. GENERAL	ACCOUNT No. SUB.	OPENING BALANCE	CURRENT MONTH REFERENCE VOUCHER REPORT	CURRENT MONTH REFERENCE ACCOUNT No.	CURRENT MONTH DR. OR CR.	CLOSING BALANCE
111		13403334				
111				511	85000	
111				113	16668571	
111				211	18869445 CR	
					2115874 *CR	11287460
112		398976				
					*	398976
113		6220591				
113				311	17550615	
113				312	1492559 CR	
113					16899089 CR	
113				313	401883 CR	
113	651			174	18451	
					480535 *	6701126
114		10125				
114				423	87250 CR	
					87250 *CR	77125 CR
116		585000				
					*	585000
121		15895049				
121				321	1145515	
121				122	10475242	
121				321	13436063 CR	
					2846306 *CR	13048743
122		3313814				
122				913	3163604	
122				912	5905507	
122				911	3231545	
122	1			121	2195956 CR	
122	3			121	3351708 CR	
122	2			121	4927578 CR	
					1825414 *	5139228

Finally, after all essential general accounting statements have been prepared, a listing is made for each general account. This listing is a permanent historical record. It is essential for proper audit and discharge of responsibility. It shows the title of the account, the opening balance, every increase or decrease affecting the account (with complete reference to source documents), and the closing balance. Frequently, detailed listings are prepared on a definite schedule throughout the month. In these cases summary cards are produced automatically and are used at the end of the month to permit maximum speed in the preparation of reports.

These are the essential statements which are prepared automatically from the IBM cards:

A trial balance of the general accounts.

A comparative balance sheet.

A statement of profit or loss for the current period and year-to-date showing comparison with corresponding figures of the preceding year and variances over or under.

If budgets are used, a statement of profit or loss for the current period and year-to-date, with budget comparison, and variances over and under budget.

Specialized statements of profit or loss for divisions, districts, branches, or other operating subdivisions.

The general accounts.

The same IBM cards can and should produce listings which will simplify audit by internal or professional accountants. This involves only resorting and listing the cards in any desired sequence.

IBM General Accounting provides the following advantages:

Automatic selection and association of old balances with increases and decreases of the current period.

Automatic computation of new balances.

Automatic selection and association of figures for the current period and year-to-date with corresponding figures of the preceding year.

Automatic selection and association of budget figures with actual amounts.

Automatic computation of variances.

Elimination of burdensome manual effort in the preparation and checking of essential statements, and the typing, footing and proof-reading of these same statements.

Positive assurance that all statements are in balance.

Maximum speed in the preparation of all statements.

Automatic analysis of any given account, as required, in a detail not feasible under other methods because of time and expense.

Important as they are, the general accounting statements nevertheless constitute only a part of the information required for effective financial control by management.

Additional information essential to management must be produced from the operating records of the business. When IBM methods are used for Purchases and Accounts Payable, Billing and Accounts Receivable, Personnel Records, Payroll and Payroll Distribution, etc., the same IBM cards furnish the information required for General Accounting automatically and as a by-product.

From IBM cards used for Purchases and Accounts Payable, information for management is prepared in the form of:

Statements of expense, analyzed and compared with corresponding figures of the preceding year, by office, by department, by detailed account items.

Statements of cash requirements.

Reports showing discounts not earned because of poor cash position or other reasons.

Reciprocity figures which can be related to sales activities.

From IBM cards used for Orders, Billing and Accounts Receivable, information for management is prepared in the form of:

Statements of revenue, analyzed and compared with corresponding figures of preceding year by division, by product, by location, by salesman, etc.

Statements of sales denied, because of out-of-stock condition.

Statements reflecting the "age" and probable real value of accounts receivable.

Reciprocity figures which can be related to purchase activities.

From IBM cards used for Personnel Records and Payroll, information for management is prepared in the form of:

Reports of employee interests.

Safety and accident prevention reports.

Salary, wage, and overtime reports.

Manpower utilization tables.

Reports of attendance and absenteeism.

Reports relating to plant protection policies and violations.

From IBM cards used for Inventories of materials, parts, supplies and finished goods, information for management is prepared in the form of:

Figures relating to inventory "turn-over."

Reports of inventory compared with requirements.

Statements of obsolete and slow-moving items.

Reports of defective, rejected, scrapped and lost items.

Statements of maintenance expense.

These statements and reports are typical, but by no means inclusive, of all of the statements which are necessary for effective financial control by management. Many similar and equally valuable statements are prepared as by-products of IBM operating records for Production Accounting, Cost Accounting, Property Accounting, Tax Accounting and other phases of business activity.

IBM Accounting is vital to effective operation of a business. The Board of Directors, the President, and other executives use IBM Accounting because it provides:

Dependable accuracy in all statements.

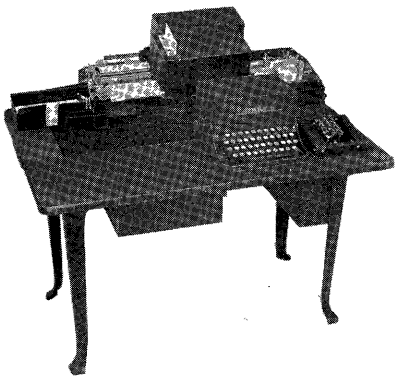
The ability to select, summarize, and present currently, information which will anticipate the needs and demands of executives and boards of directors.

The saving of valuable time. Preparation of the essential statements, by the IBM method, has saved from one to twenty days as compared with previous methods. This means that *action* can be taken just that much earlier.

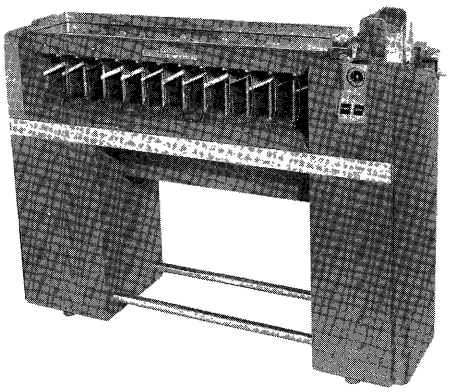
Economical preparation of figure-facts and statements to be used for financial control by management at all levels including the directors, officers, division heads, department heads, and section heads. Such statements make each executive his own taskmaster; with them, his participation in management is more active and effective.

Statements prepared as often as desired, with minimum fluctuation in work loads.

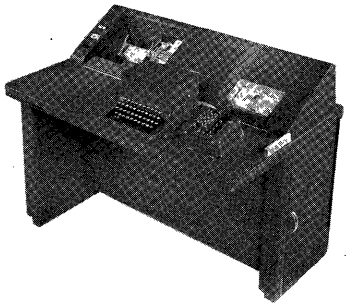
IBM ELECTRIC PUNCHED CARD ACCOUNTING MACHINES



Card Punching Machine
with Duplicating Feature

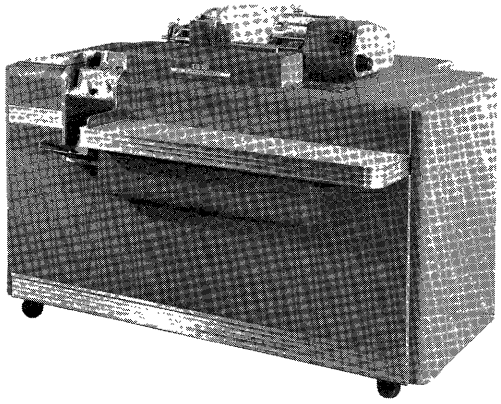


Sorter

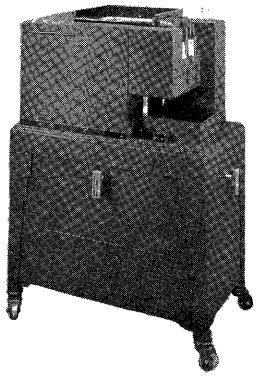


Verifier

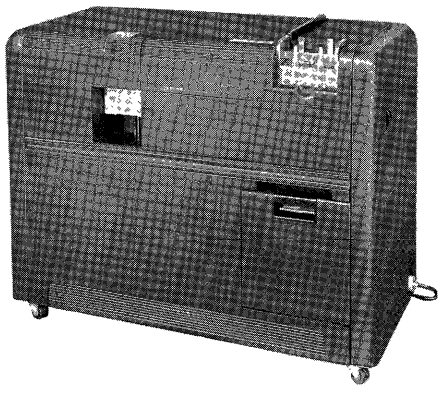
Electric Document-
Originating Machine



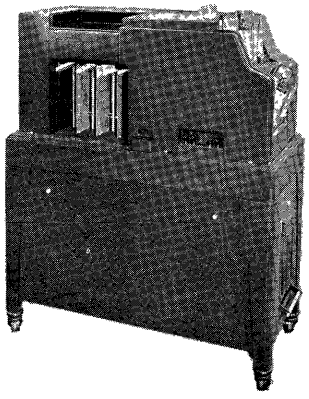
Accounting Machine



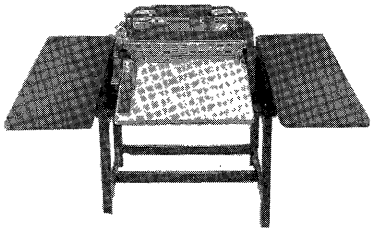
Card Interpreter



Calculating Punch



Collator



Facsimile Posting Machine

IBM ACCOUNTING MANAGEMENT

PROCEDURES AND FLOW CHARTS

INTERNATIONAL BUSINESS MACHINES CORPORATION
590 MADISON AVENUE, NEW YORK 22, NEW YORK

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SUPERVISION PROCEDURES AND FLOW CHARTS

WHEN the entire scope of IBM Accounting is considered, three fields of activity become apparent: (1) operations, (2) installations, and (3) applications.

1. The first field of activity revolves around the manipulation and use of the individual IBM Electric Punched Card Accounting Machines and IBM Cards. Here lie the problems of handling cards, setting up the machine, wiring of control panels, and depressing the keys. The individual whose interest is directed toward these detailed operations is the machine operator.
2. The second field of activity lies with the *installation.* Several machine operations are combined and coordinated so that given accounting results may be produced. To obtain such results efficiently it is necessary to coordinate not only operations but also personnel, procedures, supplies and equipment. These are the duties of the supervisor.
3. Third field of activity is concerned with the accounting function and results which the installation is able to produce. This is the area of *applications.* The greatest interest in this field is usually held by managerial or administrative officials.

This section is devoted to the second of these fields of activity, which is the supervision of an IBM Accounting Machine installation.

PROCEDURE DEVELOPMENT

SINCE the purpose and function of a machine accounting installation is to transform source document information into final reports and documents, it is evident that the first consideration of the supervisor is the *procedure* to be used to effect the transition—the job steps which are necessary to change raw factual information into finished reports. Any number of procedures can be designed to accomplish a given job. However, only one of them will be the most efficient procedure that can be used. Whether a procedure for a new application or all applications in

a new IBM installation is to be developed, the supervisor must attack the problem logically and methodically.

1. Determine the ultimate objectives. It is essential that the supervisor have a clear understanding of the use to which the report will be put and how the report should look. He must confer with all parties concerned and:
   a. Determine *what* results are required.
   b. Determine the *form* in which the results will be presented.
   c. Determine *who* is to receive and use the results.
   d. Understand the *use* to which the results will be put.
   e. Determine *when* the results are to be presented.
2. Study the source documents. It is necessary to determine whether all information essential for the report is present in the source documents. Source documents are usually already in existence and do not have to be designed at the time the procedure is developed. Many others, especially those from outside sources, cannot be redesigned though a change may be desirable. In any event, the following points should be considered when studying the source documents.
   a. Is all necessary information available?
   b. Will documents be available when they are needed?
   c. Is coding or decoding necessary?
   d. Is the document sufficiently legible?
   e. Is redesign desirable or necessary?
3. Construct the procedure. When developing a procedure for an accounting application to be performed on IBM Machines, the basic accounting steps should be kept clearly in mind. The procedure involves:

a. Punching the cards.
b. Arranging or classifying the cards.
c. Special processing steps.
d. Preparing the finished report or document.

The basic rules governing the accounting functions to be performed must still be applied. We must not lose sight of the fact that mechanization of the accounting job does not in any way limit or effect the necessity of applying good accounting practices to the accounting job. The machines are merely units which perform the basic operations required in all accounting procedures. These operations are reading, writing, arithmetic, arranging, sorting and filing. These operations should be applied to the proper machine when constructing the procedure. It is not always practical to apply the machine most ideally suited from a purely mechanical standpoint, because of insufficient volume, the nature of the job, special precautions and variations from the standard methods, or other similar conditions. In working out procedures with mechanization in the picture, the practical aspects should always be kept in mind. Machines have been built to perform the more simple and repetitive types of accounting jobs so that personnel may be utilized more effectively in the less repetitive and more variable aspects of the procedure where analysis and good judgment is necessary. The procedure should be developed as follows:

a. Determine the job steps necessary to bridge the gap between the source documents and the final report or document.
b. Analyze the job steps and determine which can be performed mechanically.
c. Determine which machines and clerical operations will be applied to the various steps.

FLOW CHARTS

ONCE the procedure is conceived and developed, it is important to put it on paper so that it may be examined, revised, or explained. Since a procedure is a series of related job steps which must be taken in a given sequence to complete the finished reports, these job steps can be indicated on a flow chart so as to give a picture of the entire procedure. This picture serves to show the job steps involved, the sequence of these job steps, and to point out the main elements of the procedure. It is always an aid to constructive thinking to make a picture which will enable you to grasp quickly the main factors involved and their relation to each other. The act of making the flow chart will crystalize your thoughts so that you have a clear understanding of the procedure. One of the best methods of teaching is the use of pictures and illustrations. The flow chart is the picture we may use to illustrate graphically the procedure to supervisors or operators. The mere making of a pretty picture is neither a valid purpose nor an excuse for spending time and money on a chart. The reason for construction of a chart is to bring out forcibly and visibly certain leading facts which assist in clarifying thinking and enable you to convey clearly to others certain facts and impressions. The leading facts should stand out clearly and should be simple, obvious and easily grasped by anyone. In order to realize these objectives, certain points should be emphasized:

1. It is important to remember that any work which can be performed can be charted.
2. The flow chart should show in a clear simple picture the flow of work into the department, and the flow of work within the department.

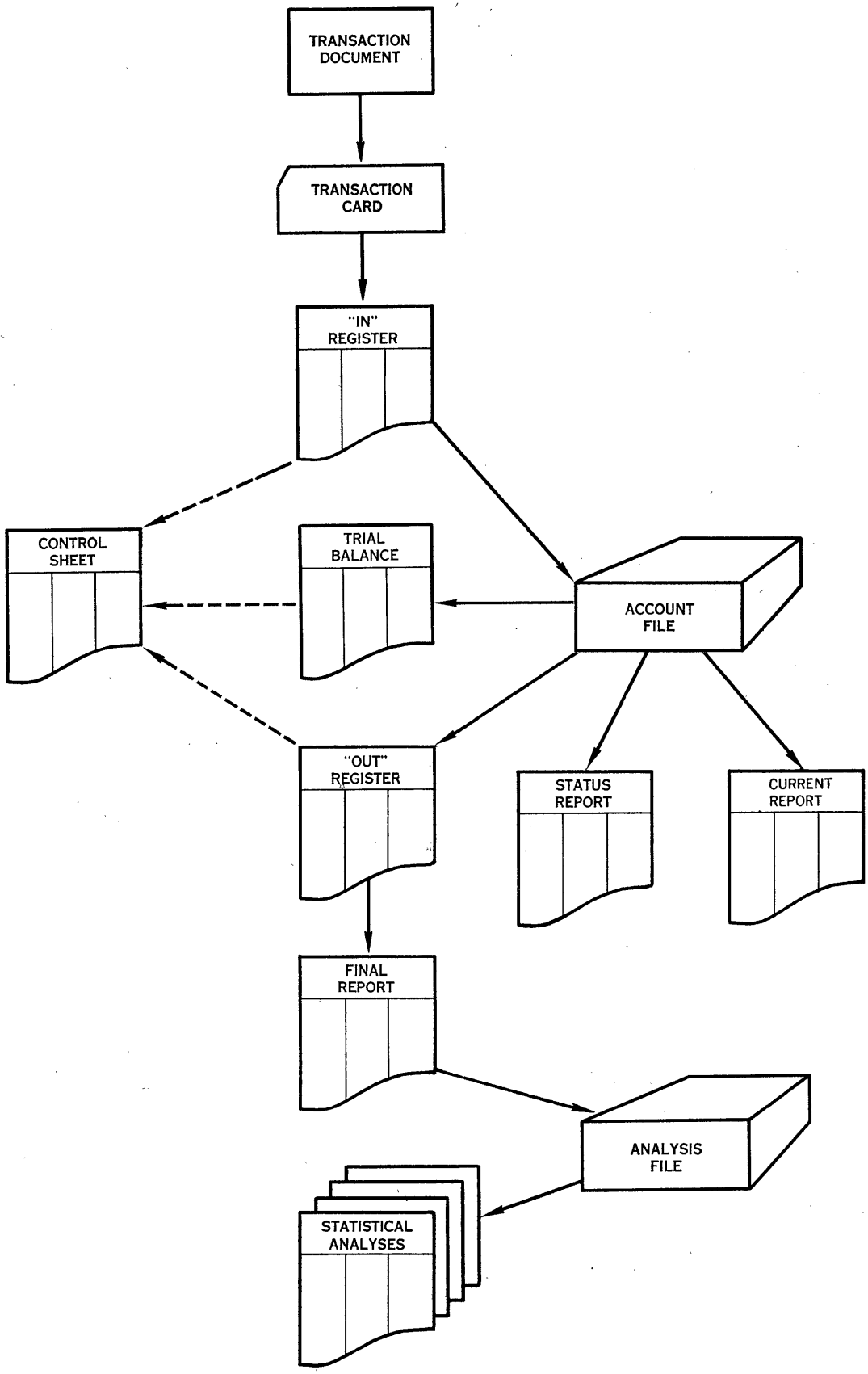


FIGURE 1. GENERAL FLOW CHART

3. The wording on the flow chart should be as brief and clear as possible.
4. The type of work performed at each job step must be clearly evident.
5. The chart must not be so cluttered up with details that the overall picture is lost.
6. If the procedure is too long or complicated to be pictured on one chart, break it down into logical sub-procedures and draw several flow charts depicting different phases of the work. The relationship between the several phases of the work should be clearly explained, possibly in a master flow chart showing the more important steps in the procedure.
7. Indicate by keyed numbers or letters where more detailed information concerning each job step may be found.

Flow charts are generally of two types:

1. The General Flow Chart is a pictorial representation of the *general* method by which source document information is converted to final reports and documents. These types of flow charts serve to give a picture of the accounting job which the procedure accomplishes. It emphasizes the source documents, the cards and card files used in the machine accounting procedure, and the final reports and documents. Such a flow chart is illustrated in Figure 1. These flow charts have value in depicting the over-all procedure to management or to the person or persons receiving final reports. The source of the information is readily seen; the major elements of the accounting procedure are evident; and the various reports relating to the job are shown.

2. The Operational Flow Chart is a pictorial representation of the *specific* job steps necessary to arrive at the end product. These types of flow charts point out the machine or clerical operation in their proper sequence and the movement of cards or documents from one operation to another. Since operational flow charts contain more detailed information than do the applicational flow charts, they naturally must be lengthy and involved. Frequently the operational flow chart will depict a portion of the entire accounting procedure. The operational flow chart is used by the supervisor of the IBM Accounting Machine installation as a nucleus around which he builds his plans, schedules, controls, and operations in order to carry the procedure through to the final results. It is, therefore, desirable that the several elements which are common to all accounting machine procedures be symbolized and standardized so that these common elements may be quickly drawn and recognized.

If many types of procedures are examined, there are bound to be certain job steps and processes which are found in all these procedures. In an IBM Machine installation there are *machine* operations and there are *clerical* operations; there are *cards* moving from job to job and there are *documents* moving from step to step. Most operations are performed *within* the machine installations, but some may be performed in *outside* departments.

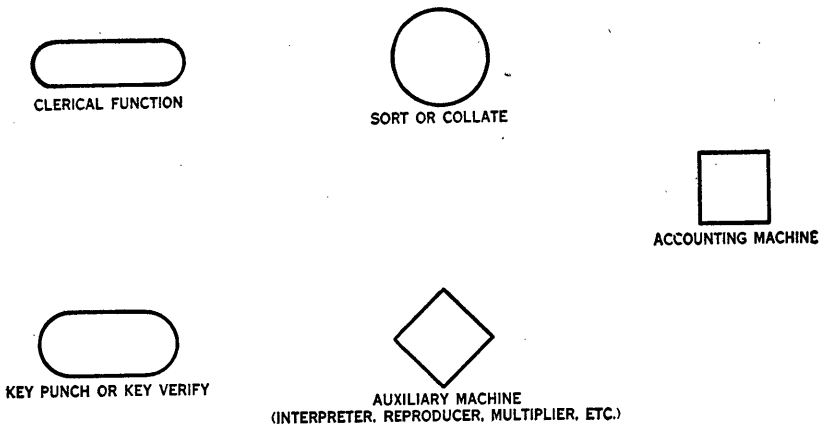


FIGURE 2. FLOW CHART OPERATIONAL SYMBOLS

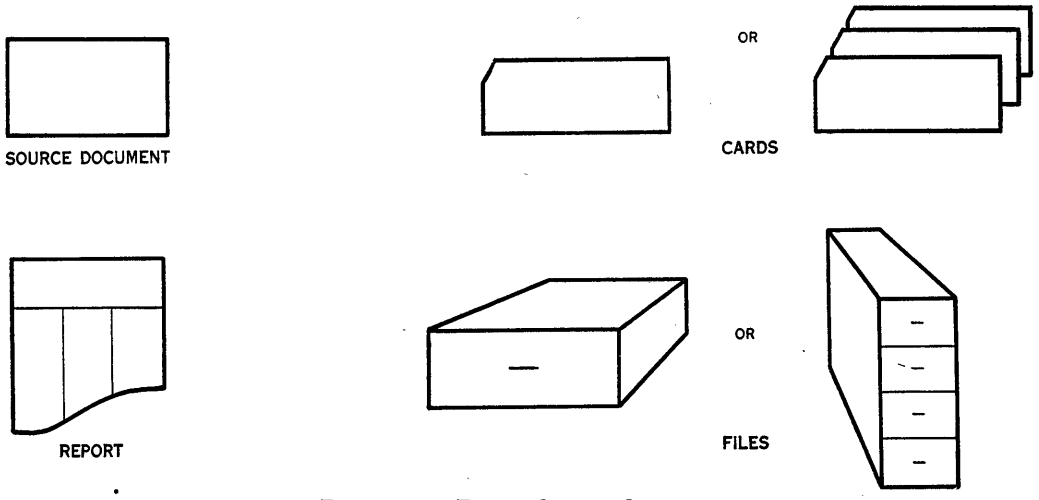


FIGURE 3. FLOW CHART SYMBOLS

In order to symbolize the various machine and clerical operations on flow charts, the symbols illustrated in Figure 2 have been assigned to the respective operations.

Beside or within each symbol can be a word or two which indicate the type of job the machine is performing.

Symbols that can be used to represent source documents, final reports, cards, and card files are illustrated in Figure 3.

Cards moving from one job step to another job step may be represented by a solid arrow. Documents moving through the procedure may be represented by dotted arrows.

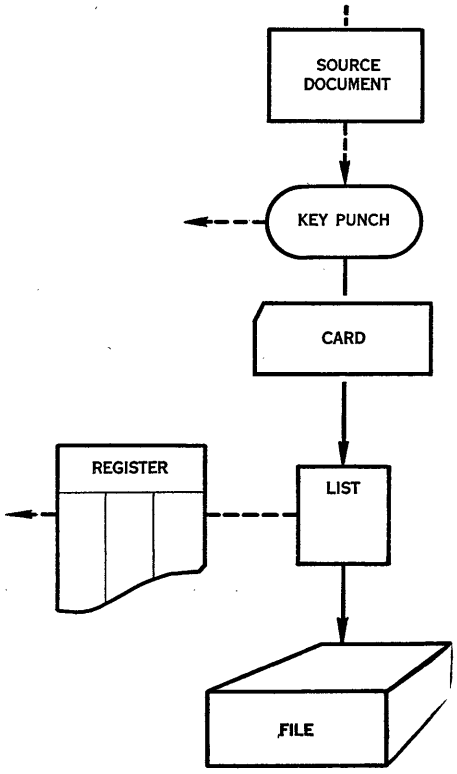


FIGURE 4. FLOW CHART DEVELOPMENT

It will be noted in Figure 4 that the card symbol and the report symbol have no arrows leading to them, but the arrows appear to go *behind* them. This is advisable to prevent confusion which may result if these particular symbols should be interpreted as job steps rather than identification symbols. The card symbol and the report and document symbols are not job steps and should have no arrows leading into them.

When a job step or operation is performed outside the IBM Machine Accounting Department, these job steps should be made to stand out distinctly on the flow chart by drawing them in red, and any element of the flow chart which is related to outside activities should be drawn in red. If the use of color is not practical, then the outside function should be clearly designated as such.

Special symbols may be devised and used for job processes and for special documents which are unique to a given procedure. It is important, however, that any special symbol which is not standard should be clearly indicated so that there will be no likelihood of misinterpretation.

Using these standardized symbols and principles, let us develop the applicational flow chart shown in Figure 1 into an operational flow chart. The first procedure will depict the operations necessary for punching the cards, preparing the IN register, and inserting the cards into the current working file (Figure 5).

In examining the operational flow chart in Figure 5, it is noted that the main line procedure is down the center of the page. Subsidiary or parallel jobs are drawn to the side. Cards drawn out of one procedure to be used in another procedure are indicated, but additional information on the second procedure is reserved for the flow chart for that procedure. The material with which the procedure starts—whether it be documents or cards—should be at the top of the page, and the final results—whether

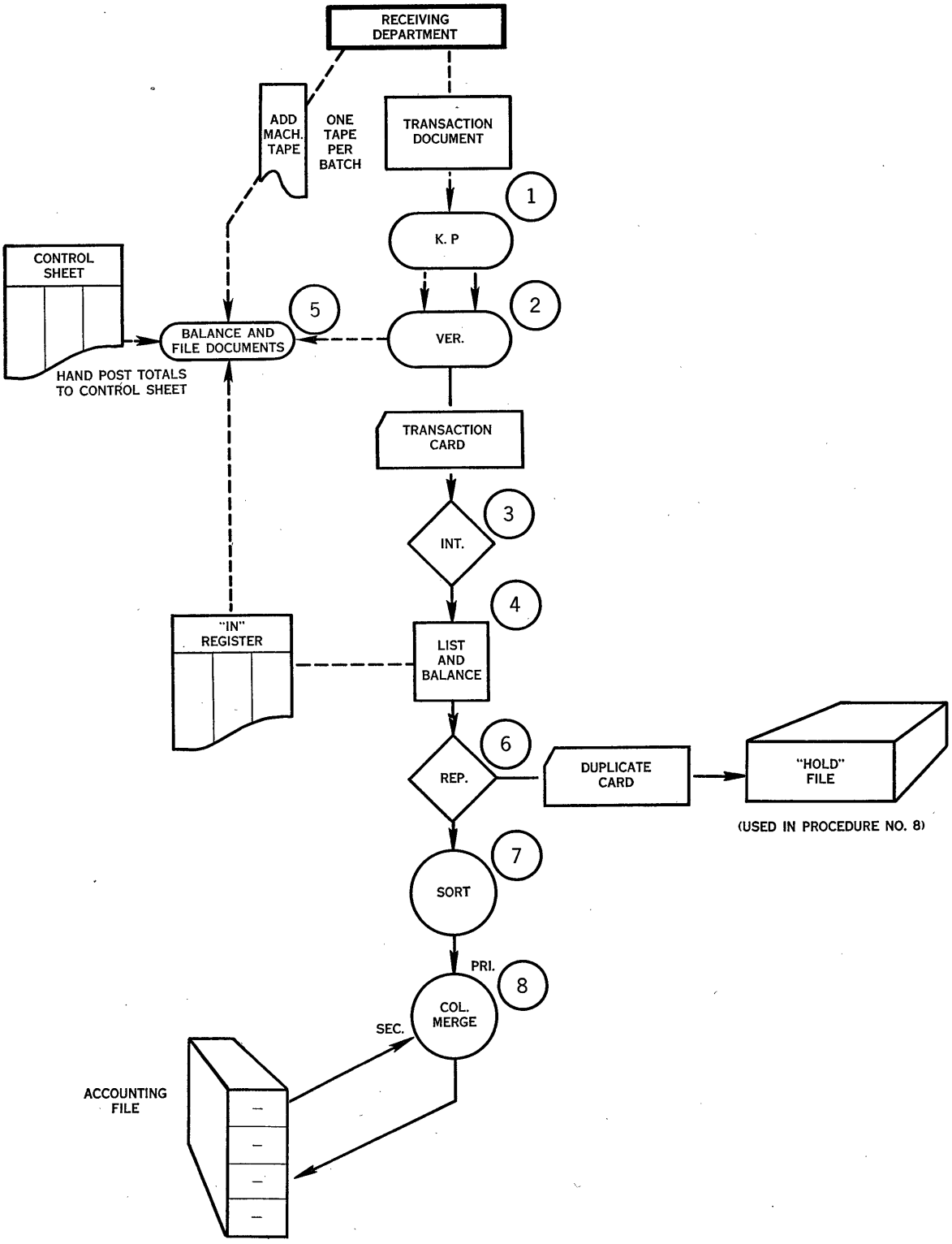


FIGURE 5. OPERATIONAL FLOW CHART

they be reports or cards—should be at the bottom of the sheet. The flow chart will then show the main line job steps which link the source documents to the final report.

In order to facilitate the drawing of these various standardized symbols, a template has been designed and is available for use in constructing flow charts (Figure 6).

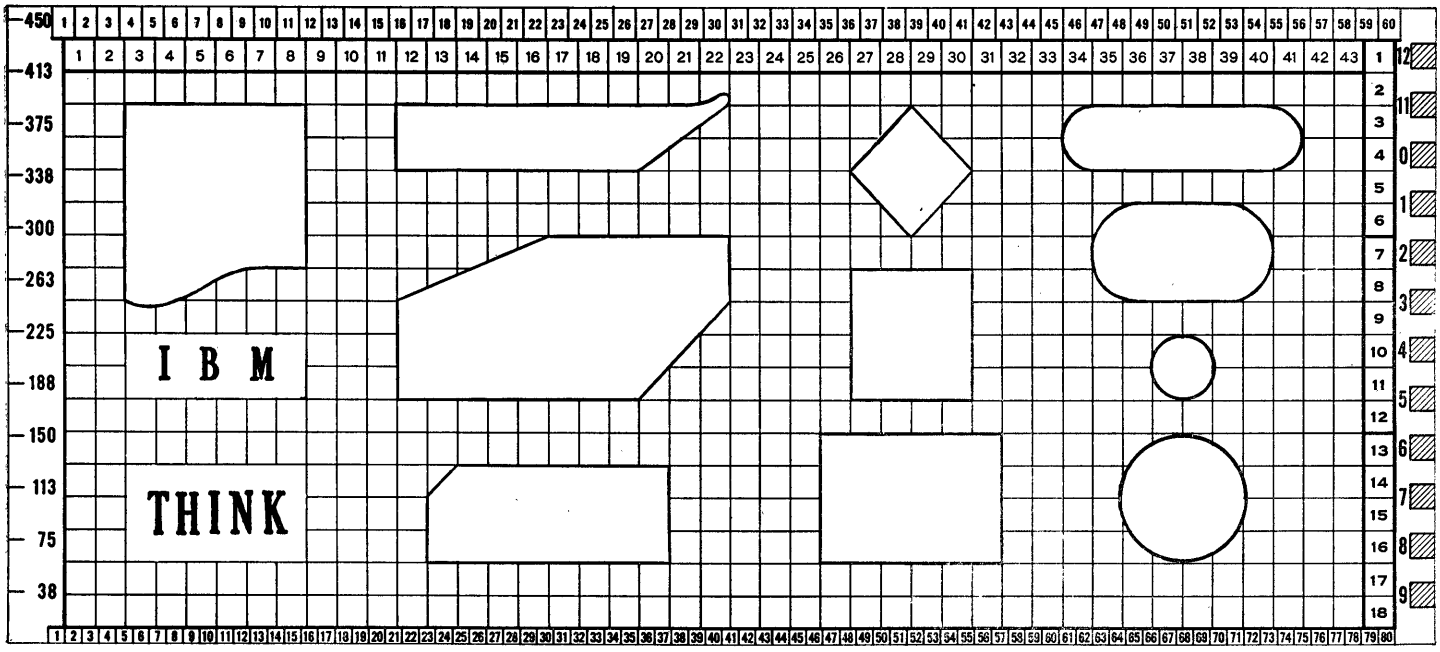


FIGURE 6. FLOW CHART TEMPLATE

This template, in addition to the symbol cut-outs, contains scales and spacing guides for various uses in an IBM installation. On the left edge is a scale for determining the approximate number of cards in a deck. The scale on the right edge shows the punching positions on an

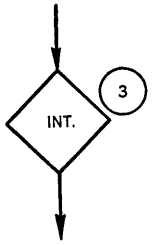
IBM card. The top shows the Alphabetic Interpreter type-bar spacing scale. At the bottom are shown columns 1-80 on an IBM card. The cross-line grid on the template gives the printing positions of an Alphabetical Accounting Machine—six lines to the inch and the standard type bar spacing for 43 type bars.

It is noticed that two cut-outs are necessary to complete the drawing for a file. The upper cut-out supplies two additional edges to the file and the third additional edge is simply drawn in with any straight edge. This file may be used to depict either a single drawer file or a vertical file of several drawers depending upon the position drawn and fill-in lines inserted.

It is evident that any of the symbols may be reversed for variety or symmetrical considerations by turning the template over.

There remains on the template a small circle cut-out which has not yet been explained. This is for a most important use on flow charts as a key to more *detailed* information or instructions. The detailed information on the flow chart must necessarily be kept at a minimum so as not to clutter up or confuse the entire picture. But, there will be details connected with the specific job steps of the procedure which must be explained. To refer to these more specific details, key numbers are placed on the flow chart beside the pertinent operation to indicate where this detailed information concerning the job is found. There may be a separate page for each job step, and on this page will be found all the operating details connected with the job step or machine operation.

The small circle is placed adjacent to each job step and a key number inserted for reference to detailed operating instructions.



IBM ACCOUNTING MANAGEMENT

KEY PUNCHING AND VERIFYING

INTERNATIONAL BUSINESS MACHINES CORPORATION
590 MADISON AVENUE, NEW YORK 22, NEW YORK

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IBM ACCOUNTING MANAGEMENT

KEY PUNCHING AND VERIFYING

MODERN BUSINESS OPERATIONS involve the use of many kinds of source records or original documents bearing voluminous data. The transcription of such data into the form of punched holes in IBM cards is the first step in an IBM Accounting procedure. This can be done by an operator on high-speed equipment, can be performed automatically from other cards already in existence, or can be done by mark sensing—that is, holes are punched automatically into the card by a machine which senses pencil marks electronically.

Once the initial data have been recorded as holes in the cards, IBM machines automatically read these holes and perform a wide variety of operations to prepare finished reports.

The high degree of accuracy maintained throughout IBM Accounting procedures is dependent upon accuracy in the initial punching of data into the cards. As basically important steps in the over-all accounting procedure, key punching and verifying operations deserve careful study and close analysis. This booklet offers general suggestions for the efficient supervision of key punching and verifying operations and includes specific recommendations for the improvement of accuracy.

KEY PUNCHING

WHILE this section is limited to a discussion of key punching, efficient supervision and planning for card punching includes the use of more automatic methods wherever possible. The first job of the supervisor in relation to key punching, therefore, is to decide whether the information is to be key punched at all, or whether one of the more automatic methods could be used. This means the investigation of each new job to determine how the data can best be punched, in consideration of all the possibilities:

1. Key punch.
2. Duplicate part of the data from a master card and key punch the rest.
3. Automatically reproduce the data from a set of cards already punched with the same data (although perhaps in different order).

4. Gang punch automatically information common to a group of cards from a master card sorted ahead of them in a file.
5. Have the data pencil-marked on the card, for automatic transcription into punched holes by the mark-sensing feature of the Reproducing Punch or Document-Originating Machine.
6. Punch automatically a summary card with the totals and indicative data accumulated for a report prepared on the Accounting Machine.
7. Set up a prepunched file for information which is used repetitively, such as that used in billing. Gang punch a supply of cards for each item, so that each time it is to be recorded, its prepunched card can be pulled from the file.
8. Use the results of a calculation punched in a card by the Multiplier or Calculating Punch.
9. Use an emitter (on the Reproducer, Document-Originating Machine or Calculating Punch) to punch information such as ENTRY DATE which is common to a group of cards being processed.

Two, three, or more of these basic methods can be combined for any one job, depending on its specifications. The selection of the method by which a job should be done requires a knowledge of all these methods and of how they may best be used. Each new job (or an old one being studied) should be analyzed to determine whether any of the information to be punched already exists in punched form so that it can be copied automatically, or whether some items might better be punched by mark-sensing or some other method.

For all these methods except key punching (and duplicating), however, machine operation does not differ greatly from that used for other automatic functions. In the case of key punching, many different factors affect efficiency and accuracy of work. All of them should be given careful consideration:

Design of source documents and cards
Legibility of source documents
Number of columns to be punched (or duplicated) and proportion of alphabetic to numerical columns.
Skill and experience of operator
Type of equipment used
Type of instruction
Volume of transactions
Flow of work
Duties other than key punching (auditing, coding or checking)
Working conditions

Each of these factors should be given careful consideration by the supervisor, in evaluating work being done, in planning new procedures or improving procedures already in effect.

Design of Source Documents and Cards

An important factor in speed and accuracy of key punching is the design of the source documents and of the card form. Because the card moves automatically through the key punch as each column is punched, the operator must read the data from the document in the same sequence in which they are to be punched. The best design of both document and card, therefore, will provide for exactly the same arrangement of the items on both. Usually the card is designed to conform to the arrangement of an existing source document.

If the card and source document are not arranged alike, it is often desirable and economical to attach an apron or use a rubber stamp on the document (Figure 1). The information to be punched can then be manually transcribed to the apron so that the key punch operator may read it in the right sequence. This procedure is especially desirable when coding or other necessary information is added to the document before it is punched.

The ideal source document for key punching shows all information to be punched in one card on one line, so that it may be read from left to right. It is for this reason that transcription forms or alignment sheets are designed for use in many jobs for which the source information arises within the company. These transcription sheets are ruled into grids, with 80 (or fewer) squares horizontally in which the data to be recorded in one card are recorded, and 25 or 50 lines vertically to receive the data for that many cards. Such sheets may be used to good advantage when the information must be collected from many sources before it is punched, when there are coding or editing functions to be performed, or when the source document is so poorly designed or illegible that the key punch operation would be inefficient without special forms.

The design of the card with respect to duplicated, punched, and skipped fields further affects card punching speed and efficiency. Best operation is achieved when duplicated information appears at the left of the card, and when all fields to be key punched are grouped together so that the punching need not be interrupted by skipping.

Alphabetic information affects speed and accuracy of key punching when it is interspersed with numerical data in the same card. Speed is lessened when the operator has to change from the numerical keyboard to the alphabetic keyboard for a certain field, and then back to the numerical keyboard. Here again, careful design of the source document and

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TERMS	F.O.B.	CUST. ORD. NO	OUR ORD. NO	INVOICE NO.
2 10 NET 30	ERIE	6542	11137	24027

QUANTITY	ITEM No.	DESCRIPTION	AMOUNT
18	20400	SOFT BRASS ROD	32 97
35	10300	BRASS ROD	28 60
3950	20023	BRASS CASTING	97 21
			158 78 *

INVOICE DATE	VENDOR No.	OUR INVOICE	RECEIVED	APPROVED BY:
12/21	1179	12120		UMC

ENTRY	ORDER No.	DUE DATE	DEPT. USING	INSPECTED
30		12/31		

PURCHASING AGENT

ACCOUNT GEN.	NUMBER SUB.	DEPT. CHARGED	MATERIAL	QUANTITY	UNIT	AMOUNT
123	360		20400	18		32 97
123	350		10300	35		28.60
124	420		20023	3950		97.21

APPROVED BY: M Heller
ACCOUNTING

INVOICE AMOUNT	158.78
DISCOUNT	3.18
NET	155.60

FIGURE 1. USE OF STANDARDIZED APRON FORM TO FACILITATE KEY PUNCHING

card form will reduce to a minimum the necessity for shifting from one keyboard to another.

Legibility of Source Documents

The degree of legibility of the source data is one of the more important factors which affect production in key punching. For this reason, original copies—rather than the sixth or twelfth carbon copy—should be routed to the key punch operation whenever possible. A source document which contains manually written data should be designed so that enough space is allowed for large, legible characters to be hand written, especially when this writing is to be done by someone other than a clerk.

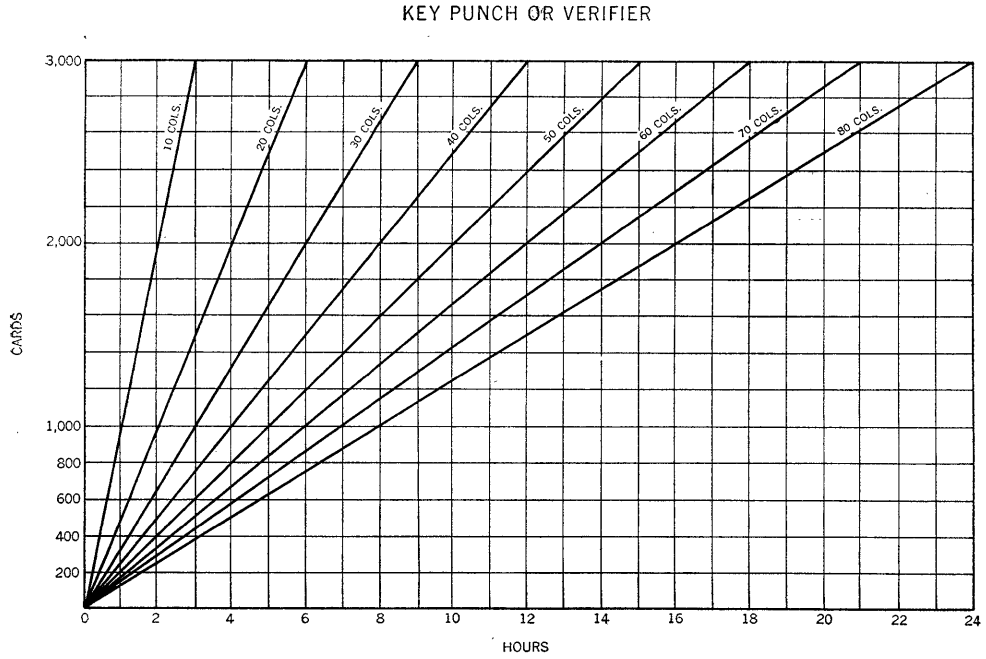

FIGURE 2. CHART FOR DETERMINING KEY PUNCHING TIME

(BASED ON PRODUCTION RATE OF 10,000 COLUMNS PER HOUR)

Number of Columns Punched

The number of cards punched per hour is directly dependent on the number of columns to be punched per card. To evaluate production of key punch operators, it is customary to express production in terms of columns punched per hour, or key depressions per hour. This is obtained by multiplying the number of cards punched per hour by the average number of columns punched in each card. Charts similar to Figure 2 are frequently used to schedule key punching jobs.

Whenever it is possible, information common to groups of cards will be punched automatically by using the duplicating feature of the machine. Duplication not only saves actual punching time, but also increases the accuracy of the job and simplifies verification.

Skill and Experience of Operators

In evaluating the work of key punch operators, it is important to consider their training and experience. For new operators, the number of cards punched per hour or the number of errors being made are not so important as how much *improvement* is being made from week to week. This trend is the best indication of the type of production that can be expected in the development of each operator. Only after the

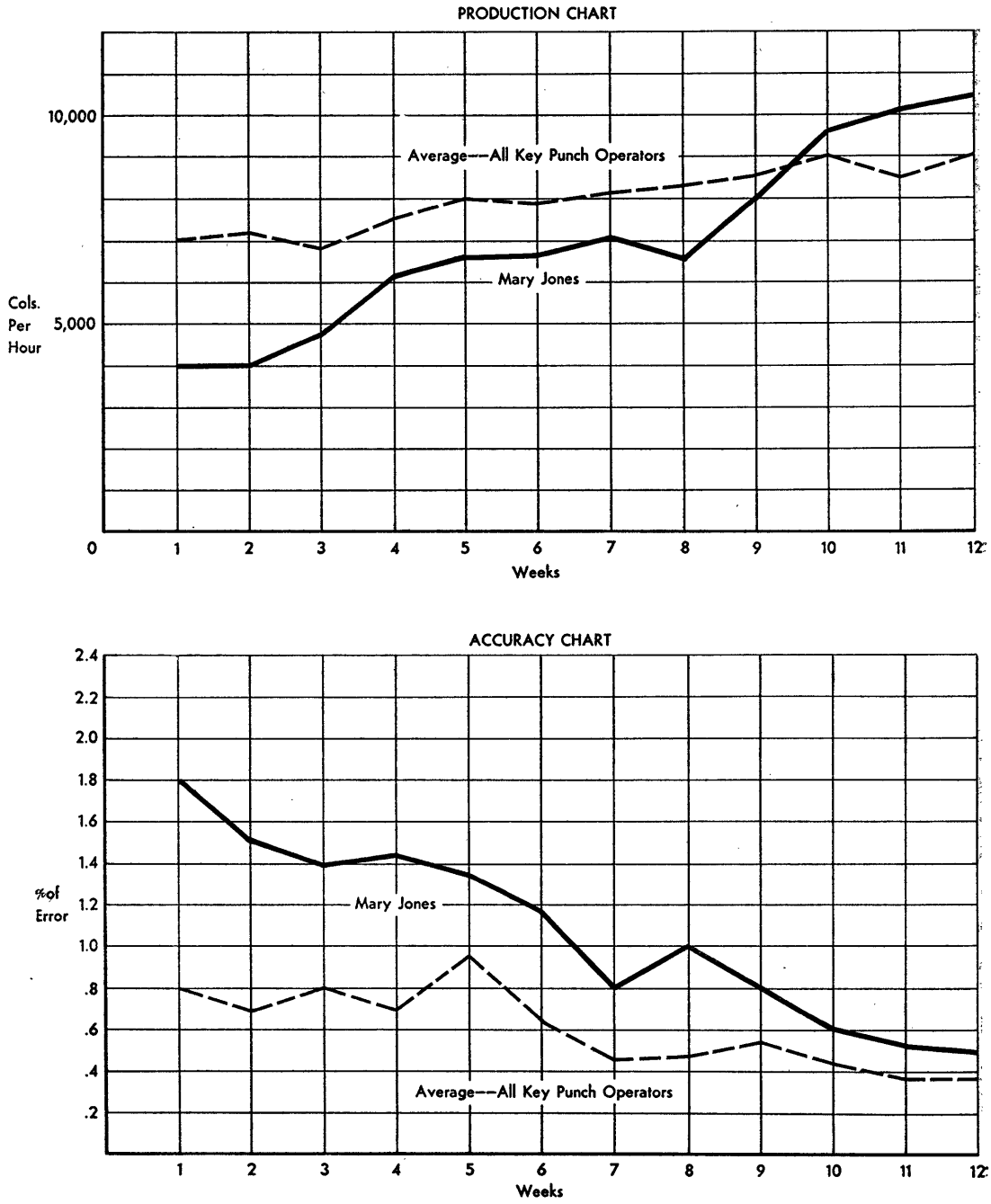

FIGURE 3. CHARTS OF KEY PUNCH PRODUCTION AND ACCURACY

operator has reached a level rate of production should her proficiency be given an absolute evaluation.

It is advisable to keep a record of the production and percentage of errors for each operator, and a comparison with the group average, such as shown in Figure 3. This production record is essential informa-

tion for the supervisor as he makes plans for scheduling work through the key punching section. The prevailing percentage of error will have an important bearing upon the kind and amount of verification which will be built into the procedures.

Type of Equipment Used

New machines are constantly being developed which incorporate more effective mechanisms for the reduction of the fatigue which, to a greater or lesser degree, is associated with all recording operations. The advantages of the newer machines should be carefully studied by the supervisor with the object of continually improving equipment and performance. The special features of each should be used to simplify the key punching job and increase production. For example, if the Type 031 Alphabetic Duplicating Punch is being used, the operator should use the auxiliary numerical keyboard—rather than the numerical keys on the alphabetic keyboard—for numerical data.

Operating routines change for some types of equipment, and should be studied to be sure that they are changed along with a change from one machine to another. For example, when a small amount of information is being punched into each card, greater production can sometimes be obtained with a manually fed machine. With this type of key punch (Type 011) the right hand is used to insert cards in the machine, while with the machines with automatic card feeding, the right hand rests constantly on the keyboard.

Type of Instructions Given Operators

There is much that the supervisor can do to raise the production and reduce the errors of key punch operators. It is extremely important that he give complete, clear, understandable instructions. It is preferable that the oral directions be summarized in written form.

If directions are given verbally, and in a rather hurried manner, as is so often the case, the speed and accuracy with which the work is done will be low. The operator may not have understood at the time, or may forget certain details of the directions; he may ask others (who probably do not know) or may have to go back to the supervisor for a second set of instructions; or he may perform the whole job wrong, so that it has to be done over. These conditions can be completely eliminated by carefully writing all instructions necessary for performing all jobs. It is even more important that one-time jobs or infrequent jobs have written instructions, because the operators will have little or no experience to

DATE _____ PAGE _____

CARD PUNCHING OR VERIFYING MACHINE INSTRUCTIONS

JOB NAME Accounts Receivable Procedure JOB NUMBER 701

TYPE OF CARD PUNCHING OR VERIFYING MACHINE TO BE USED 026

SKIP BAR TO BE USED _____

TAB INSERTS TO BE USED
(ALPHABETIC PRINTING PUNCH) #6 Cols. 57 and 62

DUE	DAY	TIME
DAILY ✓	—	11 A.M.
WEEKLY		
SEMI-MONTHLY		
MONTHLY		

SOURCE RECORDS RECEIVED FROM Cashier

MASTER DUPLICATING CARD INSTRUCTIONS See below - use A/R open item file card.

SOURCE DOCUMENTS AND CARDS USED Remittance Advice, A/R Card # 738372

MACHINE TIME INFORMATION

AVERAGE NUMBER OF CARDS FOR JOB _____ TIME REQUIRED TO PERFORM JOB _____ TIME PER 1000 CARDS _____

CARD PUNCHING OR VERIFYING INSTRUCTIONS

FIELD NAME	CARD COLUMNS	PUNCHING OR VERIFYING INSTRUCTIONS
FULL PAYMENTS.		
(Use card pulled	from Open	Item File.)
Date of Credit	57-61	
Discount Allowed	63-67	
Amount Paid (Cash)	68-73	
PARTIAL PAYMENTS		
(Use open item file	card as a	Duplicating Master)
Duplicate entire card	except	"Invoice Amt"
Reason code	62	Punch "J" ("X" and "1")
Invoice Amount	74-80	Add "Amt. Paid" + "Disc. Amt."
Amount Paid	68-73	
Discount Allowed	63-67	
Date Paid	57-61	

NUMBER OF COLUMNS PUNCHED ~~OR VERIFIED~~ FULL PAYMENTS - 17, PART. PAYMENTS 24

MISCELLANEOUS INSTRUCTIONS _____

DISPOSITION OF CARDS AND SOURCE DOCUMENTS Cards to 405 with Advices for balancing

FIGURE 4. JOB STEP INSTRUCTION SHEET FOR KEY PUNCHING

use as a guide for these jobs. *All* jobs should have written instructions for the operator, and become part of the operators' manual of procedure (Figure 4).

Volume of Transactions

It might be expected that key punch operators would produce more per hour when they are working on jobs of large volume, in which there

is no change in set-up of the machine or in the documents and cards. It is true that production increases as the operators become more familiar with the job, as in any standardized operation. The element of fatigue may, however, offset the greater production resulting from familiarity with the job. The two factors may even exactly balance each other, so that the same rate of production is obtained by an operator, regardless of the volume of the job. The effect of the size of the job on production, then, is dependent entirely upon the operator. Operators who like routine work will have a higher rate of production when the size of the job increases. Those who desire change and novelty will become fatigued quickly on such jobs. This element of fatigue in relation to the size of a job should be given consideration in the planning of work, so that it may be reduced to a minimum.

Flow of Work

The most efficient production cannot be reached when the operator is being interrupted continually to perform special jobs, when a job is shifted from one operator to another, or when work is done piece-meal as documents become available. When more than one operator is required for a job, there should be an equitable distribution of work to the several operators, commensurate with their productive capacities. Furthermore, each operator should have a backlog of documents—not so large as to create a pile of idle material, nor so small that the operator's work will be interrupted, This requires careful planning and scheduling on the part of the supervisor.

The flow of work should be such that the operators do not have to leave their place of work. If the operators transfer work from one station to another, they should be located so that they do not have to leave their desks to do so. Otherwise, they will be doing a double job —key punching and messenger service.

Duties Other than Key Punching

Key punch operators are frequently called upon to do other kinds of jobs, such as coding, auditing, selecting, comparing and checking, while they are key punching. Key punch production is inevitably lowered in such a case, and these factors should be taken into consideration in evaluating the production. It is sometimes a better plan to have persons other than the key punch operator doing the auditing, checking, coding, and messenger work. However, for morale purposes, it may be more desirable to introduce the varied duties.

Working Conditions and Morale

The conditions under which key punch operators perform their duties, and the morale of operators, are the most intangible factors to be dealt with by the supervisor. Because they are intangible and immeasurable, morale factors are too frequently overlooked. It is now generally recognized by the best supervisors that efforts exerted to improve morale of operators can go further than those in any other single area to increase production and improve the general working relations of all personnel in the department.

The operator works best when the work is enjoyed. Although few jobs are completely enjoyable, there is much that can be done to keep the job from being completely disliked.

A room of the proper temperature, humidity, and ventilation is usually a first consideration for comfort. The key punch operator, more than the operators of any other IBM machines, requires good illumination of the source documents for maximum efficiency. A minimum 25 candle-power illumination is considered necessary for such work. The machine is usually located near the window, preferably with a northern exposure, and positioned so that daylight will be to the operator's left.

Disturbing noises and sounds should be kept at a minimum. It is not the continuous sounds of fans running, machines operating, or keys striking that are so disturbing, but the noises that are not continuous, such as the ringing of telephones, opening and shutting of doors, or other unusual disturbances which increase fatigue. Even more distracting are movements of things and people which take place in the area of vision of the operator and divert the attention from work. Other machine operations, or any other activity involving motion, should be removed from in front of the key punch operator. When several key punch operators are in the same room, they should be placed one behind the other in order to minimize distractions.

Rest periods should be provided at proper intervals. Studies have indicated that long periods of work, such as from morning until noon, should be broken by a rest period about mid-morning and a second rest period at about the three-quarter point. For example, if the hours are from 8:00 to 12:00 noon, there should be a rest period at 10:00 and another at 11:00. If only one rest period is allowed, it should be about two-thirds of the way through the work period.

Every possible effort should be made to reduce fatigue for the key punch operator. Proper instruction in the use of the touch system of key punch operation during an adequate period of training, proper working posture, knowledge of motion economy principles, and adequate and up-to-date machinery all contribute to reduction of fatigue.

IBM ACCOUNTING

MANAGEMENT

MACHINE LOADS AND SCHEDULING

INTERNATIONAL BUSINESS MACHINES CORPORATION
590 MADISON AVENUE, NEW YORK 22, NEW YORK

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International Business Machines Corporation
Endicott, New York

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MACHINE LOADS AND SCHEDULING

OBJECTIVES

THE question of efficiency—the effective use of men, materials, space and time—is basic in commercial, economic, and industrial activity. Constantly the supervisor should look for those methods which for a given expenditure of money or effort accomplish more work, give greater accuracy, and take less time. Effective use of time will determine to a large extent the efficiency of an accounting machine installation. Operations must be scheduled if maximum efficiency is to be obtained.

Scheduling is the process of fitting job processes into a logical time table. No first-class railroad would consider operating without definite train scheduling. The machine accounting department must also route its work over paths likewise limited in carrying capacity. The procedure and flow chart shows *what* paths the work must follow. The schedule must show *when* the operations will take place. It is necessary to plan ahead, particularly when several or many procedures are to be processed, in order to avoid conflicts. This forethought and planning insure the delivery of the completed reports to executives on time. Accounting and statistical reports which are late lose their value to management.

Scheduling may be performed effectively, provided that the time necessary to perform each job step can be predicted. When the majority of the job steps are mechanized, running time may be accurately determined, and scheduling becomes more effective. The supervisor must decide upon the degree of precision he wishes to use in his scheduling or the extent to which control will be effective in maintaining the schedule. Should he attempt to schedule operations to the nearest hour, tenth of an hour, half-day or day? To make this decision he must consider the volume of work, degree of effort and control he is willing to exercise, efficiency of operators, and extent of variable factors present which will affect the schedule. Generally, the hour is selected as a practical unit of time.

To arrive at the schedule for a given procedure, the following data must be obtained:

a. The time the source material is available and can be delivered (*Due-in* time).
b. The time which is required for each machine and clerical operation in the procedure.
c. The time the job must be completed (*Due-out* time).

MACHINE AND CLERICAL LOADS

ONCE the *Due-in* and/or *Due-out* times are determined, the supervisor must compute the time required for each job step or operation. The most difficult job steps to schedule are the clerical ones where the speed and efficiency of the operation depend upon human variables which cannot be accurately predicted. The most satisfactory basis for determining clerical speeds is reference to statistical analyses and efficiency records pertaining to the standard type of clerical functions performed in the department. Without these data, the scheduled clerical time becomes an indefinite estimate.

Key punching and verifying operations are somewhat more measurable and predictable because the operation is standard and comparatively simple. The speed of operators can be easily determined and used for scheduling purposes. The total punching time can be determined from the number of cards to be punched, the number of columns in each card, and the speed of the operator. The efficiency of key punching depends upon many factors. The number of cards which can be punched per hour is determined primarily by the number of columns to be punched in each card. The speed and accuracy of punching are dependent also upon the form and legibility of source documents, working conditions, and continuity of flow of work.

Operations on the other machines are still more measurable, and since each machine runs at a definite and constant speed, the time necessary to run a given number of cards is easily found by dividing the number of cards by speed in cards per hour. A certain percentage of efficiency must be applied to machine operations to account for card handling time, machine set-up time, operator efficiency, and other variables.

$$\text{Scheduled time (hrs.)} = \frac{\text{number of cards}}{\text{cards per hour} \times \text{operation efficiency}}$$

To facilitate scheduling for the supervisor, this formula has been applied to each machine operation, and plotted in chart form in Figures 2 through 9. An efficiency of 100 per cent was used for these charts.

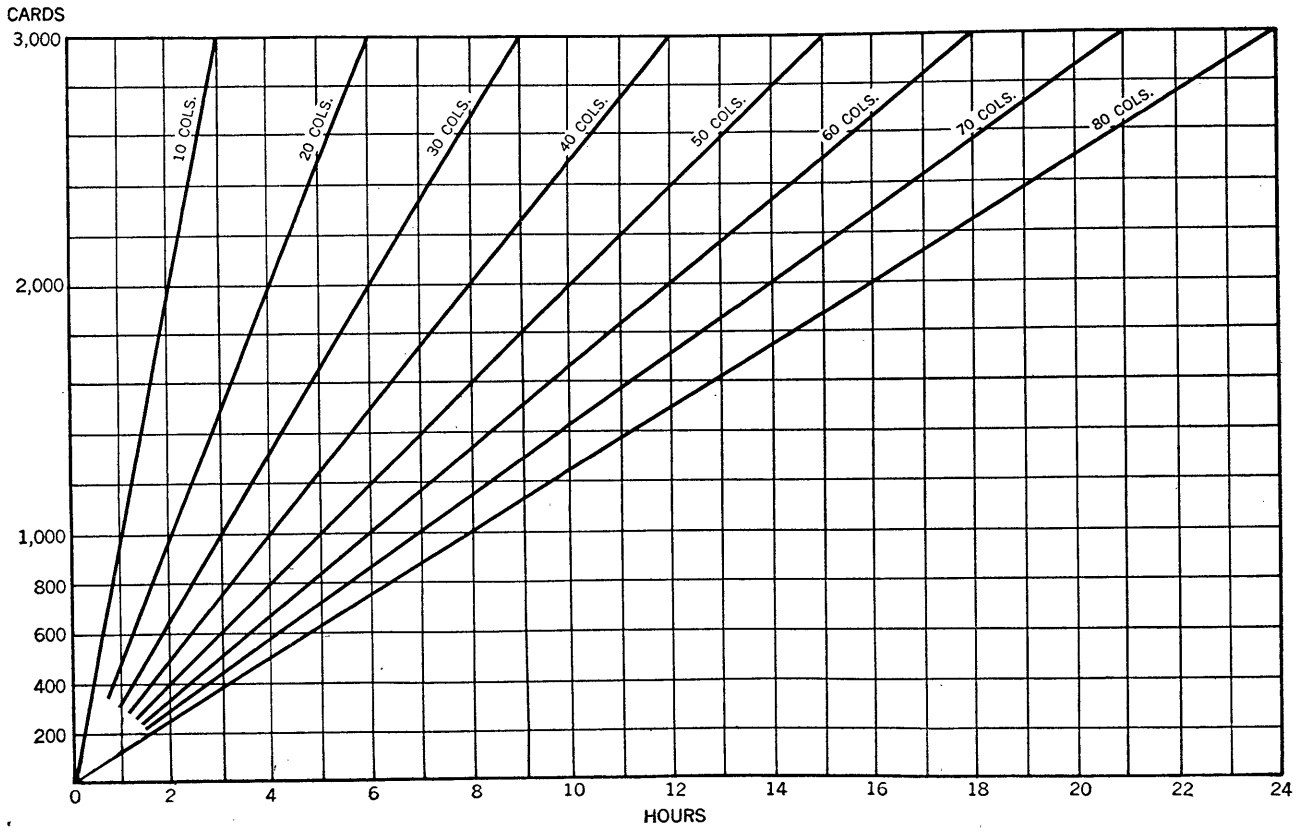


FIGURE 1. KEY PUNCH OR VERIFIER

(THIS CHART IS BASED ON PUNCHING AT THE RATE OF 10,000 COLUMNS PER HOUR).

The charts on this and the succeeding nine pages offer a convenient method of arriving at the number of hours required for an operator to process a given number of cards on various IBM accounting machines. To use the charts, locate the card volume on the vertical scale, then follow a horizontal line to the right to the line which represents the type of job being performed. From this point, follow straight down to the scale at the bottom to find the number of hours required.

When these charts are applied to particular scheduling jobs, they must be revised to correspond to the degree of operation efficiency of the installation as determined by past experience. They may be used in their present form for estimating processing time for new procedures or for approximate scheduling.

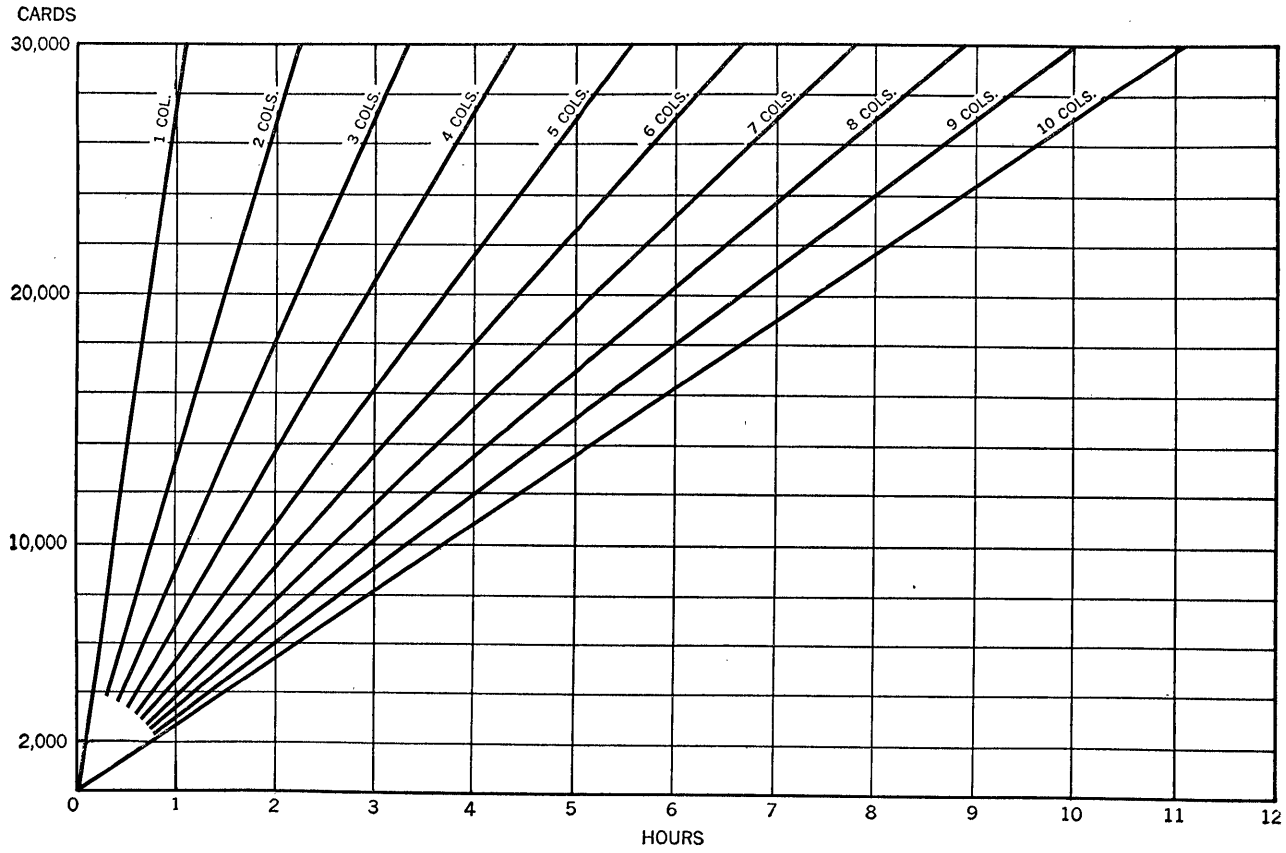


FIGURE 2. SORTER, TYPE 080

(450 CARDS PER MINUTE)

Because all cards must pass through the Sorter once for each column of the field being sorted, a separate curve is provided for each number of sorts from 1 to 10. For alphabetical sorting, of course, the number of sorts is doubled.

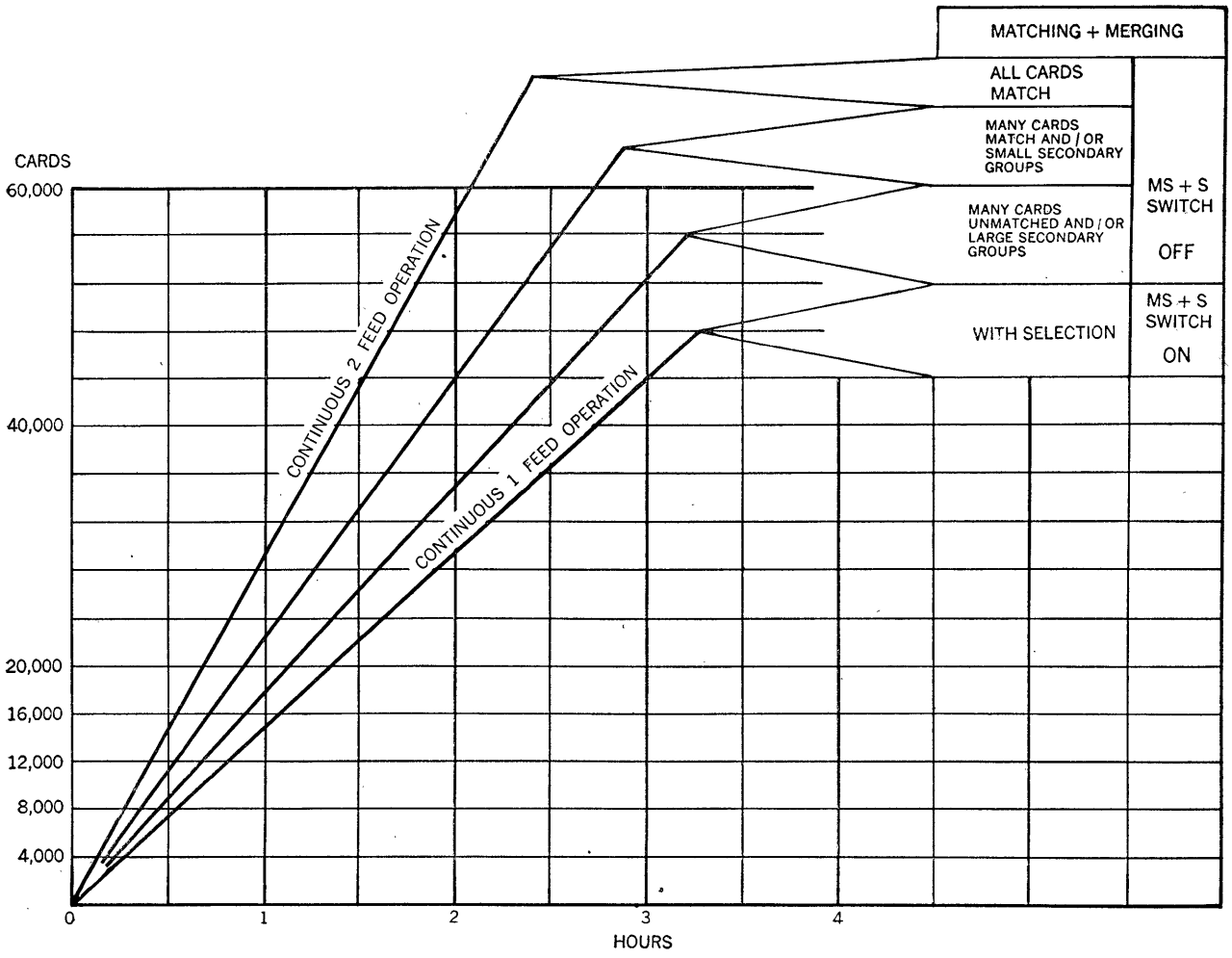


FIGURE 3. COLLATOR, TYPE 077

(240-480 CARDS PER MINUTE)

Since the Collator operation is from two card feeds, the number of cards which pass through the machine per hour will vary with the type of job. For jobs which require only one feed, the lower curve should be used. For jobs utilizing continuous operation of both feeds, the upper curve should be used. In merging or matching operations, the feeds operate separately at some times and together at other times, and the machine speed in total cards per hour will depend upon the MS&S switch setting and the nature of the cards. The curve to be used for scheduling any job should be the one most nearly descriptive of the actual job. In all cases, the total number of cards (primaries plus secondaries) should be used.

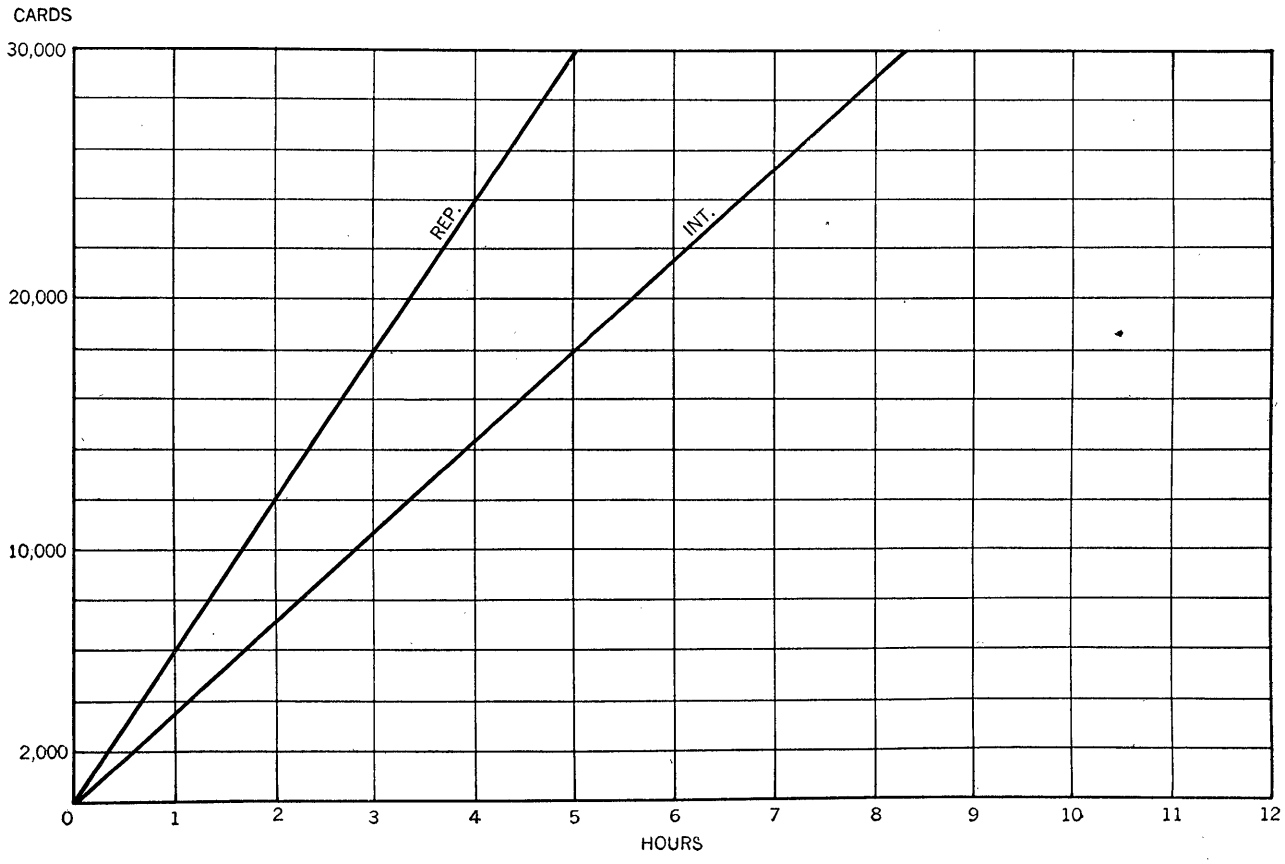


FIGURE 4. REPRODUCER, TYPE 513

(100 CARDS PER MINUTE)

AND INTERPRETER, TYPE 552

(60 CARDS PER MINUTE)

This chart includes the curves for two machines. For reproducing, the number of cards should be the number of cards punched, or passing through the punch feed.

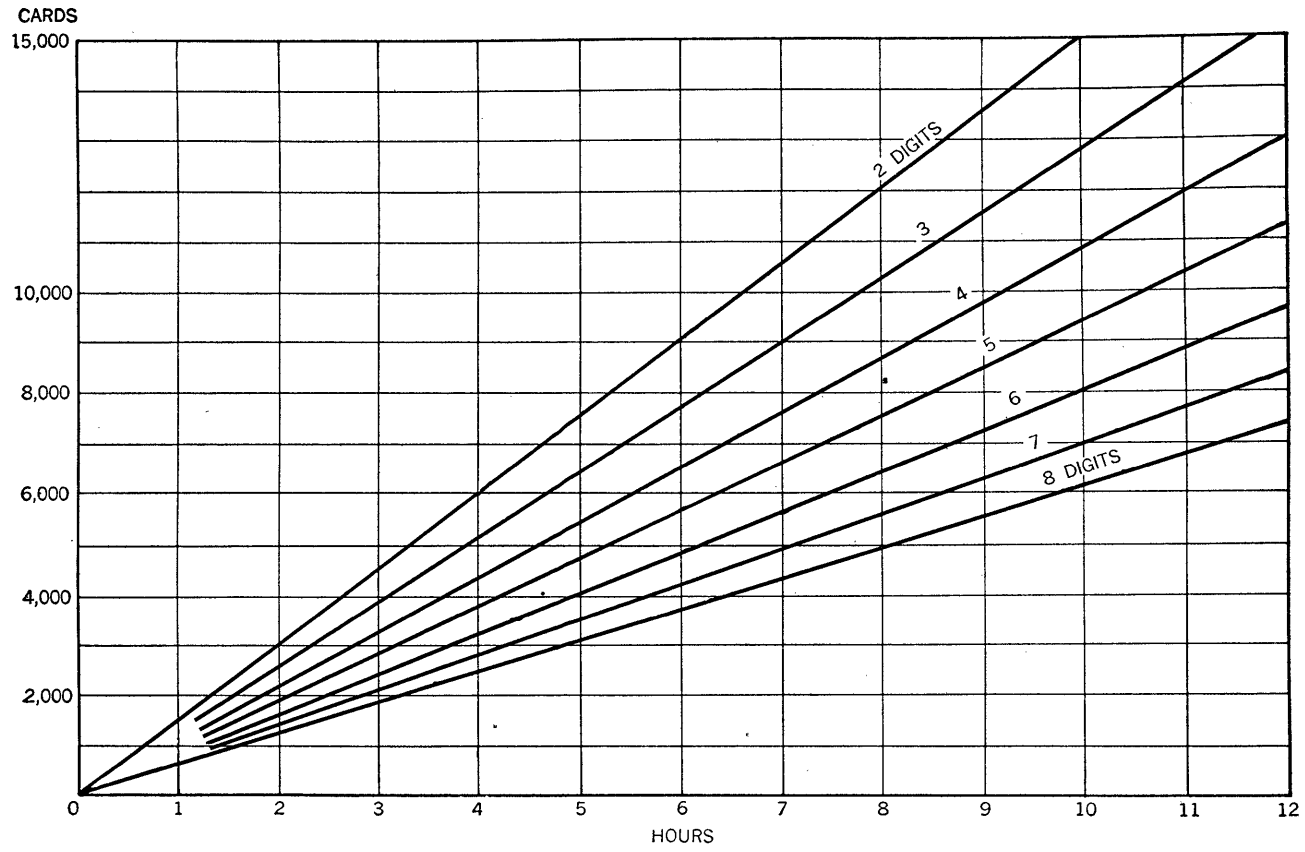


FIGURE 5. STANDARD MULTIPLIER, TYPE 601

Separate curves are shown for various sizes of multipliers. Choose the curve corresponding to the average number of digits in the multipliers.

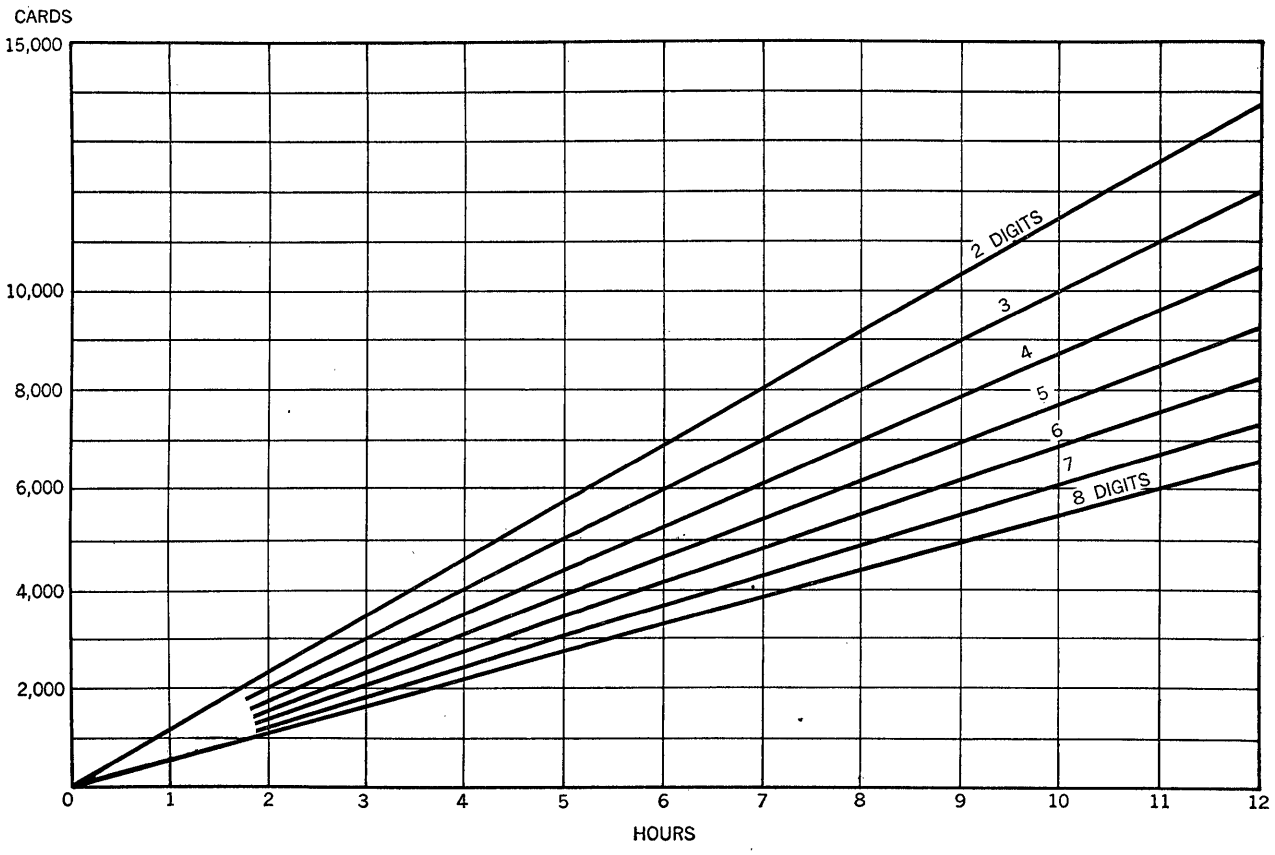


FIGURE 6. CROSSFOOTING MULTIPLIER, TYPE 601

Use the curve corresponding to the average number of digits in the multipliers. If crossfooting operations only are being performed without multiplying, use the two-digit curve.

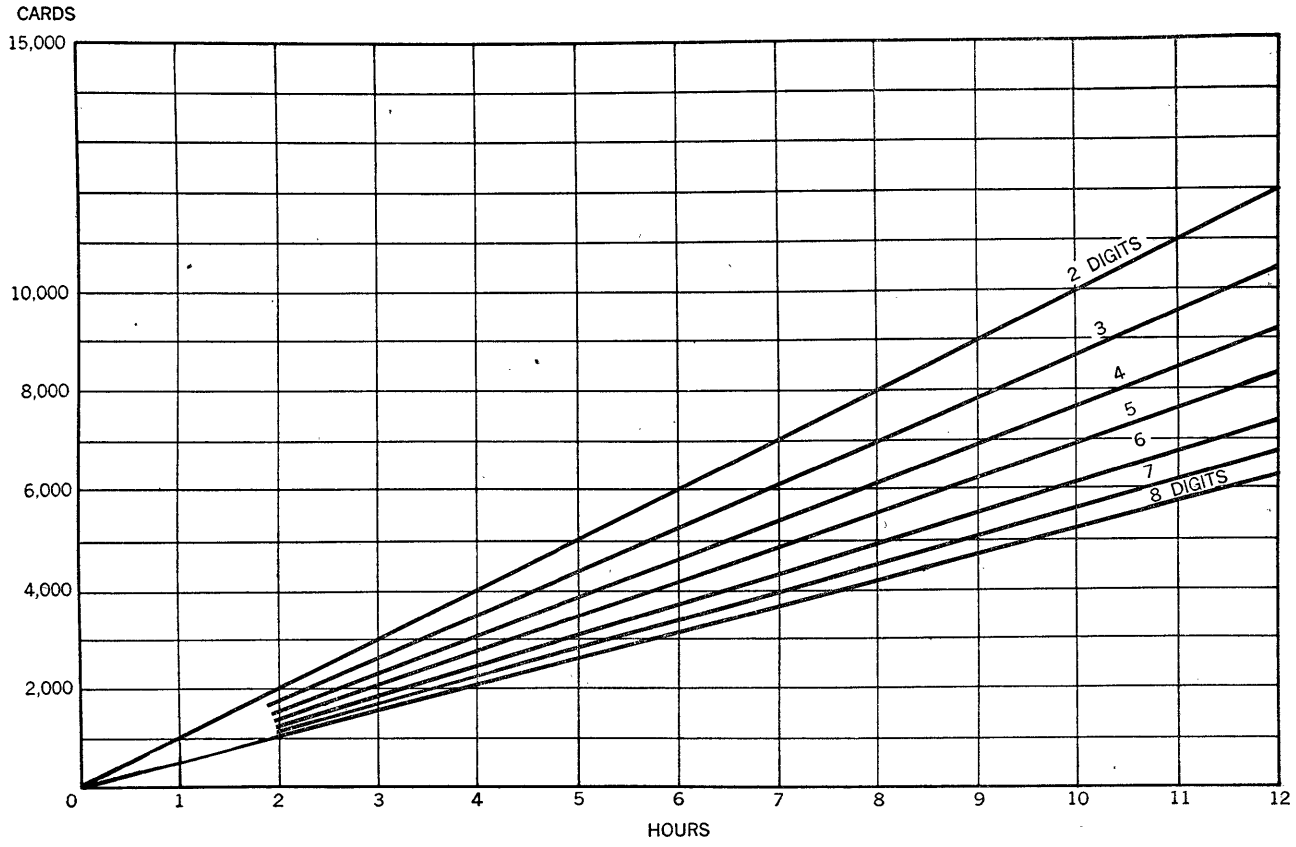


FIGURE 7. ADDITIONAL CROSSFOOT MULTIPLIER, TYPE 601

Use the curve corresponding to the average number of digits in the multipliers. For straight crossfooting jobs without multiplying, use the two-digit curve.

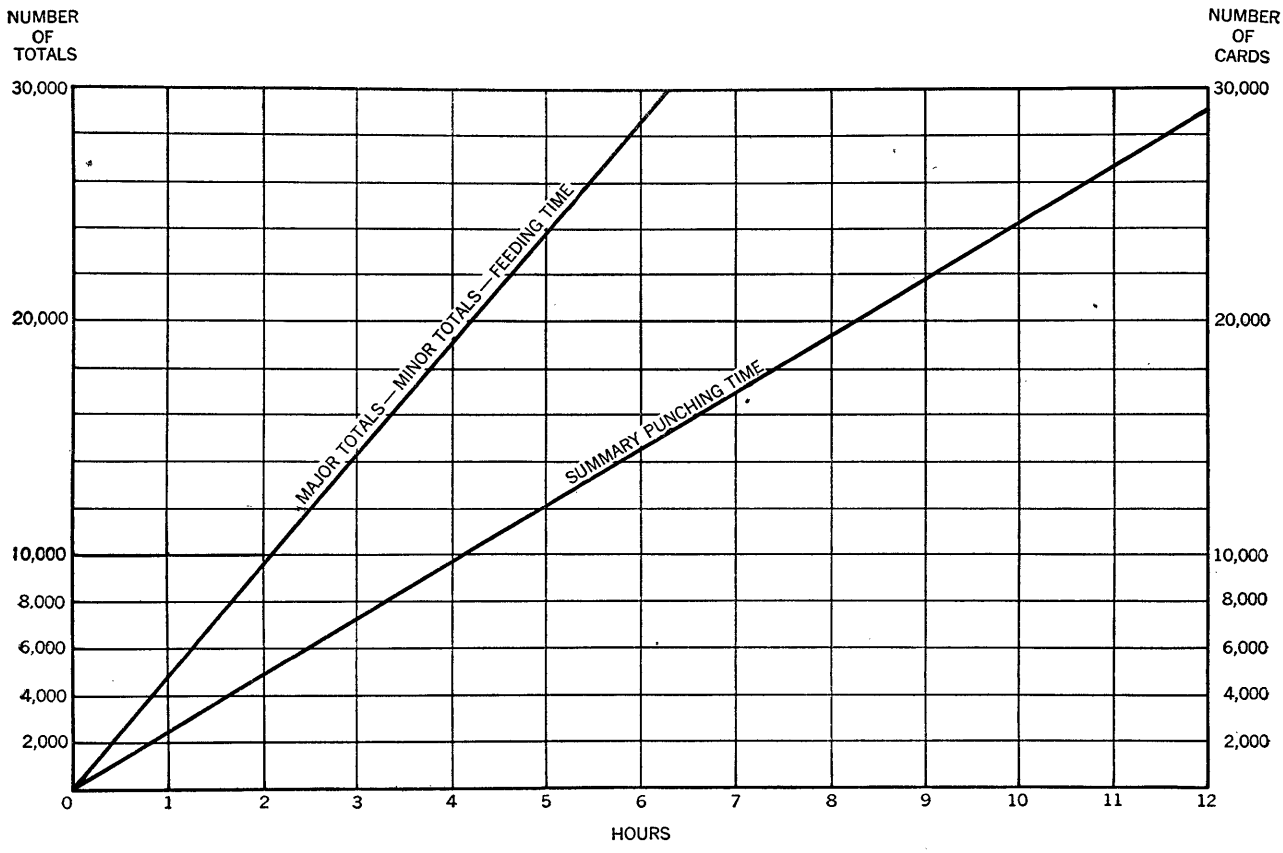


FIGURE 8. ACCOUNTING MACHINE, TYPE 405

(80 CARDS PER MINUTE FOR LISTING OPERATIONS)

Two curves are shown. Feeding time refers to the time required for the cards to pass through the machine and gives the approximate machine running time. For more accurate determinations, however, time must be added for total print cycles. The same curve used for feeding time may be used also for determining the time for either minor or major total print cycles, by referring to the scale for number of totals on the left of the chart. A second curve shows summary punching time. Total time for the job is the sum of all the various elements of the job.

Total time = Feeding time + Time to print minor totals.

+ Time to print major totals + Time for punching summary cards.

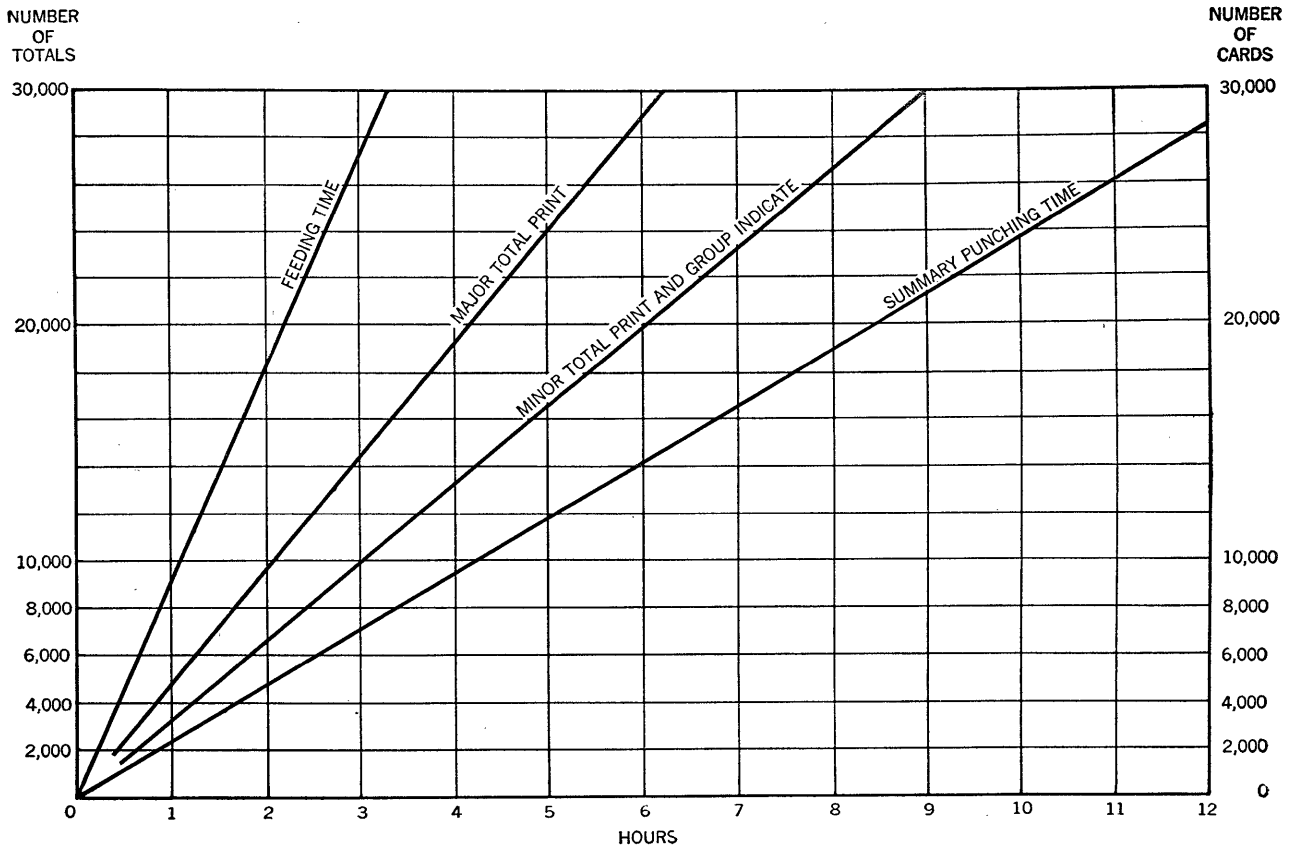


FIGURE 9. ACCOUNTING MACHINE, TYPE 405

(150 CARDS PER MINUTE FOR NON-LISTING OPERATIONS)

For the faster non-listing speeds, four curves are necessary: one for feeding time, one for major total printing time, one for minor total print and group indicating time, and a fourth curve for summary punching time. The curve to be used depends upon the type of operation. Number of cards is read from the scale at the right, and number of totals from the scale at the left. The total running time is the sum of the time required for the separate elements of the operation. No provision is made for determining time for carriage operations or conversion cycles for net balance operations. The latter can be determined by using the non-list feeding time curves, with the number of negative totals expected.

SCHEDULING

JUST as a procedure may be visualized best when it is presented in a flow chart, so can a schedule be visualized to greatest advantage if it is plotted on a chart. There are many methods for charting schedules, and the illustrations which follow represent only a few.

Once the scheduling unit of time is decided upon, a chart may be drawn with squares to represent these units of time, and machine operations may be plotted in the unit squares to indicate the time of each operation to be performed.

Generally there are two methods of plotting operation schedules: (1) by procedure and (2) by machine.

1. *Procedure Scheduling*

   To plot the schedule of a given procedure, the job steps shown on the operational flow chart are indicated in the proper time square either by use of machine abbreviations or, if job steps are given key numbers on the procedure, such numbers may be indicated on the schedule.

To illustrate, a simple schedule of a single procedure might be drawn as shown in Figure 10.

JOB OR PROCEDURE	NUMBER OF CARDS	MONDAY								TUESDAY		
		1	2	3	4	5	6	7	8	1	2	
Procedure No 1	3000	KP	KP	KP	Ver	Ver	Ver	S	S	L	L	
		(START)										(FINISH)

Abbreviations: K. P. — Key Punch Ver. — Verify S — Sort L — List

FIGURE 10. PROCEDURE SCHEDULE CHART

This schedule may be bettered by allowing job steps to overlap in some cases, so that two operations may proceed simultaneously. The schedule would then appear as shown in Figure 11.

JOB OR PROCEDURE	NUMBER OF CARDS	MONDAY 1	2	3	4	5	6	7	8	TUESDAY 1	2	
Procedure No1	3000	KP	KP Ver	KP Ver	Ver	S	S L	L				
(START)								(FINISH)				

FIGURE 11. PROCEDURE SCHEDULE CHART

The advantage of a graphic schedule lies in plotting many jobs on the same chart to form a master procedure schedule as shown in Figure 12.

MASTER PROCEDURE SCHEDULE

FOR WEEK STARTING April 1

JOB OR PROCEDURE	NUMBER OF CARDS	MONDAY 1	2	3	4	5	6	7	TUESDAY 1	2	3	4	5	6	7	WEDNESDAY 1	2	3	4	5	6	7	THURSDAY 1	2	3	4	5	6	7	FRIDAY 1	2	3	4	5	6	7
Procedure 1A	300	KP	KP Ver	KP Ver	Ver	S	S L	L																												
Procedure 1B	15,000	Rep	Rep Int.	Rep Int.	Int.	Int.	NL	NL																												
Procedure 1C	10,000	S	S	L	L	L																														
Procedure 2	10,000	KP	→	→	→	→	→	→	→																											
Procedure 3	8,000		Cl.	S	Rep	Rep	Int	Int	Int	L	L	L																									
Procedure 4A	30,000	NL	→	→	→	→	Cl	Cl																												
Procedure 4B	20,000	S	→	→	→	→	Rep	→	→																											
Procedure 5	800	Cl.	L	Cl.																																
Abbreviations:																																				
KP - Key Punch Ver - Verify																																				
S - Sort L - List																																				
NL - Non List Rep - Reproduce																																				
Int - Interpret Cl - Clerical																																				

FIGURE 12

A master procedure schedule may be drawn to correspond to a particular accounting period or for a week of operations. The operational procedures are listed one below the other with the number of cards involved in each procedure. This chart is useful in the scheduling of many operations. The chief advantage of such a schedule lies in the fact that for each hour of the week, all operations going on at that time are evident. Also, the running sequence of each procedure is shown. This chart makes a convenient work sheet for creating the schedule and shows where special jobs may be sandwiched into the routine.

The main disadvantage of such a procedure schedule lies in the scattering of machines over the chart. For the purpose of charting the running time of each machine, the "by machine" schedule is more suitable. Information for the machine schedule may be taken from the procedure schedule and provides a different classification of the same information.

2. *Machine Schedules*

The procedure schedule charts may be adapted for machine schedule charts by plotting the running time for each machine as shown in Figure 13.

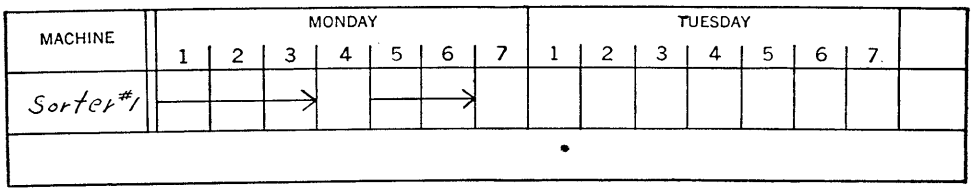


FIGURE 13. MACHINE SCHEDULE CHART

A sample master machine schedule to show running time of all machines on one chart is shown in Figure 14. If desirable, the appropriate procedures may be entered in the time squares as on the procedure schedules for complete cross indexing.

MASTER MACHINE SCHEDULE

FOR WEEK STARTING *April 1*

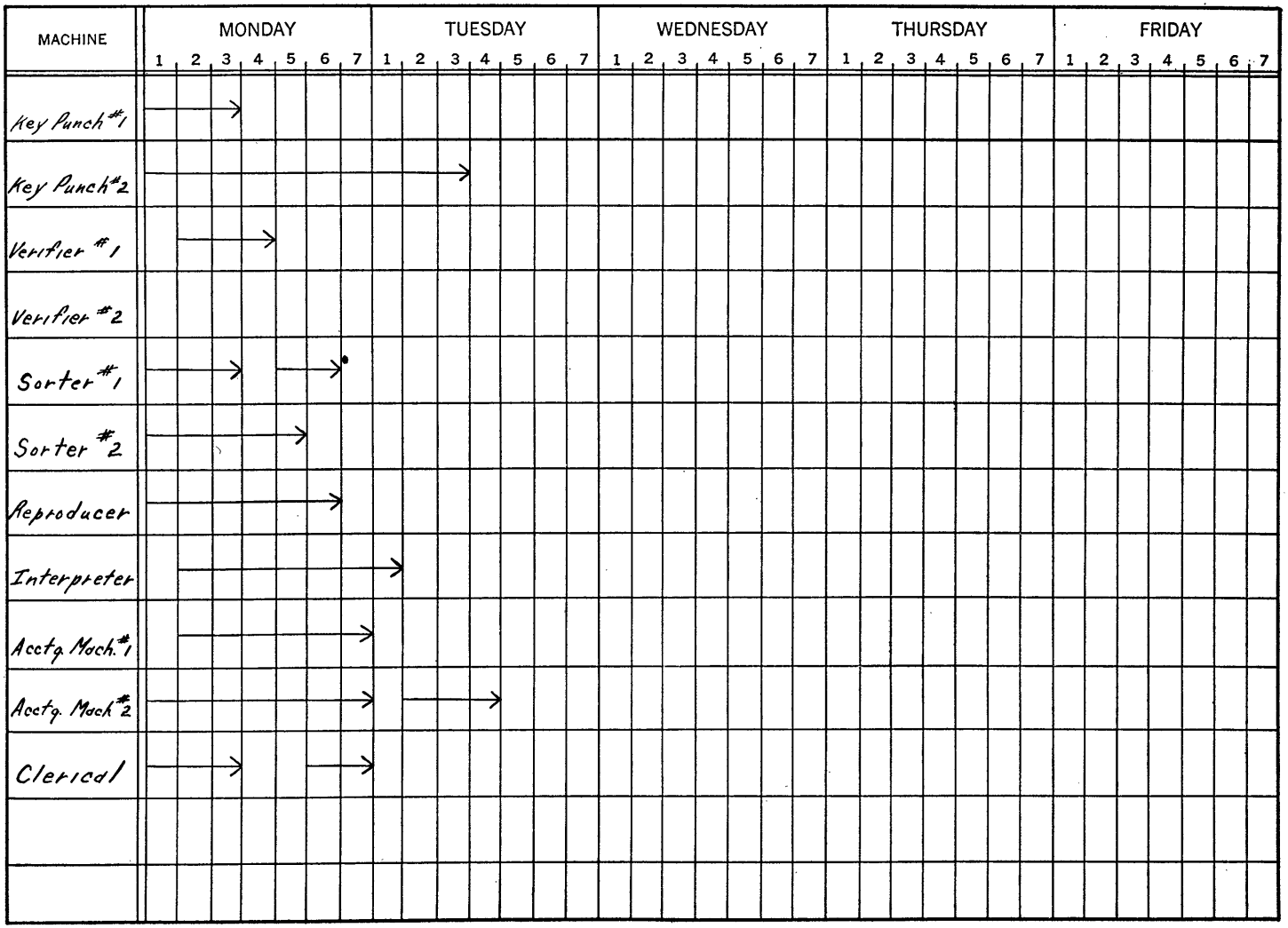


FIGURE 14

USE OF SCHEDULES

FREQUENTLY after the procedure is designed and the schedule plotted, the procedures appear to be impractical because of machine conflicts or peak loads requiring overtime work. In fact, the consideration of scheduling should underlie the supervisor's thinking as he designs the procedure, so that elements of impracticality do not enter. It is frequently necessary, therefore, to revise the procedure in order to obtain better schedules.

The following "pointers" indicate methods which may be used to alter a procedure to give better schedules:

1. Use several machines for a single job step if they are available.
2. Work two job steps simultaneously by such methods as:
   a. Block sorting.
   b. Gang punch, reproduce, mark-sense punch, and summary punch simultaneously in one run.
   c. Reproduce all cards and introduce the second deck into another portion of the procedure so that two identical decks are processed simultaneously.
3. To reduce card volumes resulting from accumulated detail cards, summarize periodically and use summary cards. This will obviate peak loads.
4. Change sorting sequence in procedure to utilize previous major classification for new minor classification.
5. Use pre-sorting.
6. Interpret cards at another point in procedure.
7. Perform collating jobs on Sorter.

8. Substitute or supplement certain types of multiplying jobs on the Multiplier with digiting on the Accounting Machine or by the gang punch extension method.
9. Establish cut-off dates.
10. Perform work in batches of the proper size.
11. Keep a backlog of work to insure continuity of flow.
12. Use special machine devices.
13. Combine information on several reports into one report.
14. Standardize report forms to simplify procedures.

It must be pointed out that the scheduling methods described in this section are for planning purposes so that the supervisor may plan for operations before they happen. Nevertheless, the schedules used for planning have value to the supervisor after they have served their purpose as a medium of planning, and after the operations planned have been completed.

A budget, whether of time or money, has little meaning unless actual performance is measured against it; it is necessary to determine how well the scheduling has been performed. The first few times a procedure is carried through, a close check must be kept of all actual running times so that schedules may be revised on the basis of new efficiency figures. The actual performance may be plotted on the schedule chart, and provision for such records may be made in the design of the schedule chart (Figure 15).

The performance chart may be used as a convenient and accurate source of information for statistical analysis of machine running time, machine efficiency, equipment requirements, personnel requirements, processing time and other valuable information for the supervisor and management.

After it has been analyzed, the schedule and performance chart becomes an historical record of all operations.

MASTER MACHINE SCHEDULE AND PERFORMANCE RECORD

FOR WEEK STARTING *April 1*

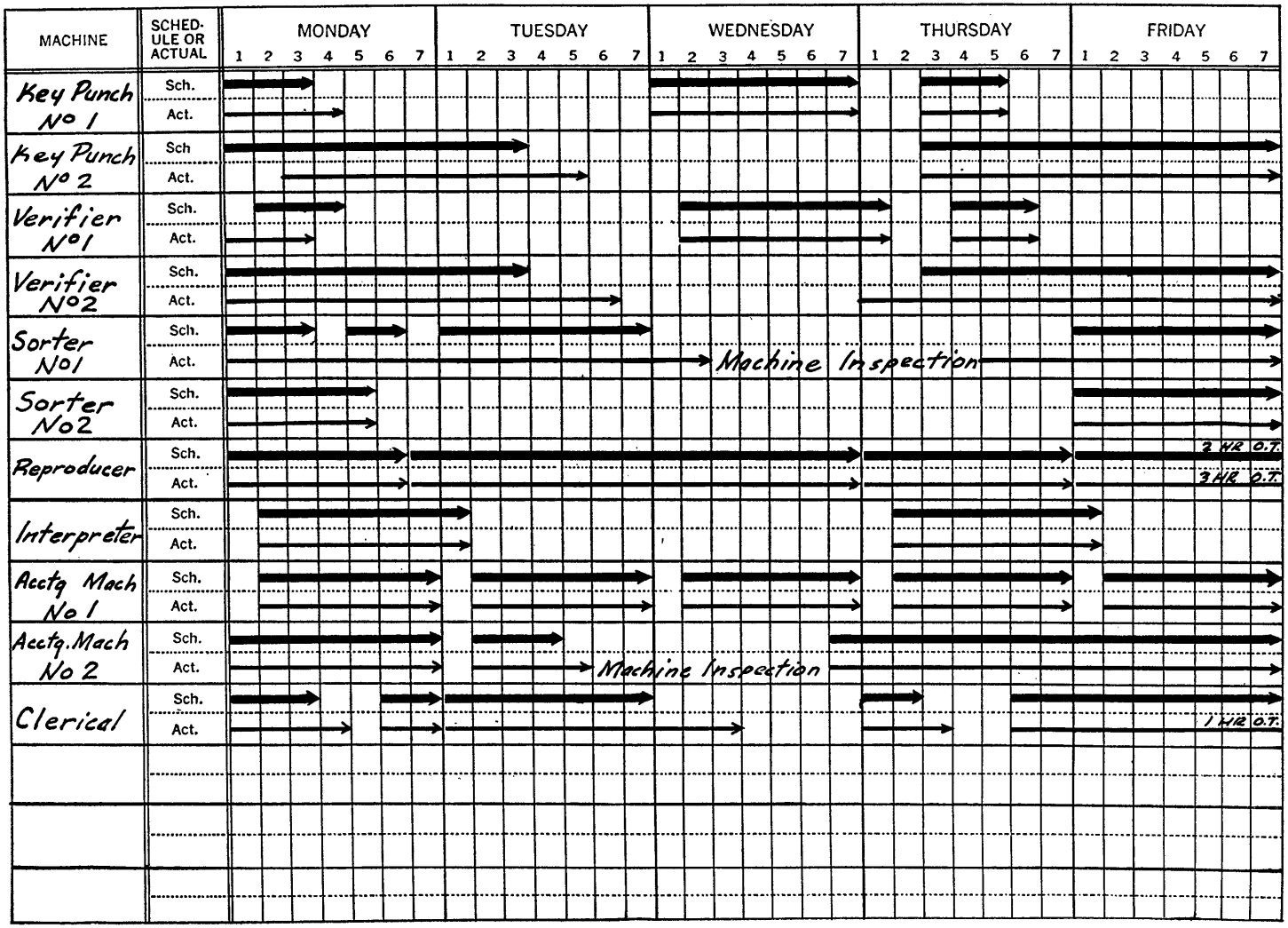


FIGURE 15

IBM ACCOUNTING

MANAGEMENT

MANUALS OF PROCEDURE

INTERNATIONAL BUSINESS MACHINES CORPORATION
590 MADISON AVENUE, NEW YORK 22, NEW YORK

Published by
Department of Education
International Business Machines Corporation
Endicott, New York

Printed in U. S. A.
Form 52-3707-2

MANUALS OF PROCEDURE

FACTS left unrecorded often cease to be facts. Just as folklore, passing from generation to generation by word of mouth, may accumulate fantasy and lose accuracy, so the everyday facts, procedures and organizational details of modern business may be distorted unless they are set down for the record. Recorded facts are lasting, dependable tools.

In modern administrative practice, manuals of procedure are the principal means for the recording of facts. The term manual, as used in connection with office procedures, refers to the written record or handbook of those procedures. The purpose is threefold: to make instructions definite, to provide an authoritative reference in answer to questions pertaining to procedure, and to improve administrative control. The manuals are prepared, not for the benefit of management, but for the benefit of the employees and the assistance of management.

Every organization and every department will include different types of information in a manual of procedure, depending upon the nature of the work being done. One department may have comparatively simple procedures, but its volume of work may be a major problem; its manual would contain work loads and scheduling information. Another department may have a small volume of work but complex procedures; in this case a manual emphasizing procedures would be most useful. Still another department may perform jobs which are simple in procedure and light in work load, but material supplies may be a major problem; here a manual containing procurement, storage and supply information would be most valuable. In all cases, the manual of procedure represents the "core" of the job to be done in the department—the nucleus around which all plans and operations are to be built. Its information reflects the purpose for which the department exists and the essence of the work done.

Any discussion of manuals of procedure can only suggest how to build a manual and what to include in it. Since the type of work which is performed in IBM Accounting departments is essentially the same for most installations, a pattern manual of procedure can be developed to meet the requirements of most supervisors.

FOUR BASIC premises should be taken into consideration in the development of a manual:

1. For a manual of procedure to be used, it must be useful.
2. The information included must be consistent with the interest of the persons using the manual.
3. The manual must be so prepared and arranged that changes can be readily made to keep it current.
4. Pictures, charts and exhibits should be substituted for words wherever possible.

Experience shows that manuals of procedure are used by three groups of individuals:

1. EXECUTIVES of the organization and VISITORS from outside the organization have an over-all interest in the purpose and work of the department. They are interested in the accounting and record-keeping *results* produced by the machine department.
2. The SUPERVISOR, whose duty is to produce the results, is interested in the *job steps* necessary to complete the work.
3. The OPERATORS, whose duty is to operate machines and handle clerical functions, need to know specifically *how* to do each element of the job.

It is impossible to compile a single manual which will be of greatest service to all three classes of people. The executive would not be directly concerned with operating instructions furnished the operator; any such machine and clerical information would be more confusing than helpful to him. The supervisor has department-wide responsibilities which are not the direct concern of either the operators or the executive. The operator has detailed responsibilities for machine operation and clerical functions which should not be the continued concern of the supervisor once he sets up the job and issues instructions. The most satisfactory service is rendered by the use of three manuals—one for each of these groups.

The preparation of three manuals has an added advantage of establishing method in the work and thinking of the person preparing the manual. Any job is performed most effectively when attacked methodically. The job of the machine department is to produce certain results. The following steps must be taken in planning procedures, and can be best accomplished in the course of developing a manual of procedure:

Determine the ultimate objectives.
Determine the facts with which to start.

Devise methods of procedure so that the objectives can be reached from the starting point.

Study each part of the procedures to determine how each step will be accomplished.

If the manual of procedure is to be developed on this basis, then it should consist of these three sections:

A GENERAL MANUAL showing ultimate objectives, source information, and the general procedure of accomplishing the jobs. This information is usually desired by executives and visitors.

A SUPERVISOR'S MANUAL which shows all the job steps of the procedure and perhaps other information pertaining to machines, personnel and procedures. This becomes the basis of the supervisor's work.

An OPERATOR'S MANUAL which gives the operator all the details of each job step needed to perform the work.

This division into three manuals may not be the ideal physical arrangement, nor will the suggested content of each manual necessarily meet the requirements of all situations. It is felt, however, that the development of the manual by starting with the general and working toward the specific is the best sequence to follow.

If the manual is to be kept current it must be arranged physically in such a way that changes can be made with a minimum of effort. The only manual which requires articulate form and appearance is the General Manual. This information, being general, requires few changes, and a given set of information remains current for a longer period of time. The Supervisor's Manual changes more frequently and requires few reproductions so that even a pencil or ink recording is generally satisfactory and can be changed easily. The Operator's Manual may require reproduction for distribution to the various operators. For this purpose, typed copies, ditto, or mimeograph reproductions are most commonly used.

For ease in changing and flexibility all manuals should be loose-leaf. Notebooks which accommodate the standard 8½″ x 11″ paper are generally satisfactory.

All the material should be well illustrated. Words alone often have little meaning, even to the person who takes the time to read them. Whenever and wherever possible, replace or supplement worded instructions and descriptions with charts, graphs, drawings, pictures, exhibits, samples, diagrams, or other illustrations.

THE GENERAL MANUAL

A GENERAL MANUAL (Figure 1) is frequently presented to the executive by the IBM salesman when the IBM machines are initially installed. These manuals usually show exhibits of documents, reports and perhaps cards. They may contain simple flow charts which show the general outline of the job.

In preparing a General Manual, the supervisor's first step is to discuss with management the various requirements of his job. From conversations with his superiors he should determine:

1. What reports are desired?
2. What form should the reports take?
3. Do they contain valuable information?
4. Is all the information being used?
5. Are the reports too detailed?
6. Is decoding necessary or desirable?
7. When should the reports be presented?

The second step is to determine all source information available. The supervisor confers with supervisors of other departments and perhaps with management to ascertain the availability of certain necessary source information to be punched into cards.

He inquires:

1. Do the source documents contain the desired information?
2. Will the documents be available when they are needed?
3. Is coding or decoding necessary?
4. Are the documents sufficiently legible?
5. Is redesign desirable or necessary?

Once these reports and documents have been listed and samples of each collected, the general manual is practically complete. The only remaining part of the general manual is the development of general flow charts. These are drawn to emphasize the documents, cards, files and reports—the materials which move through the procedure.

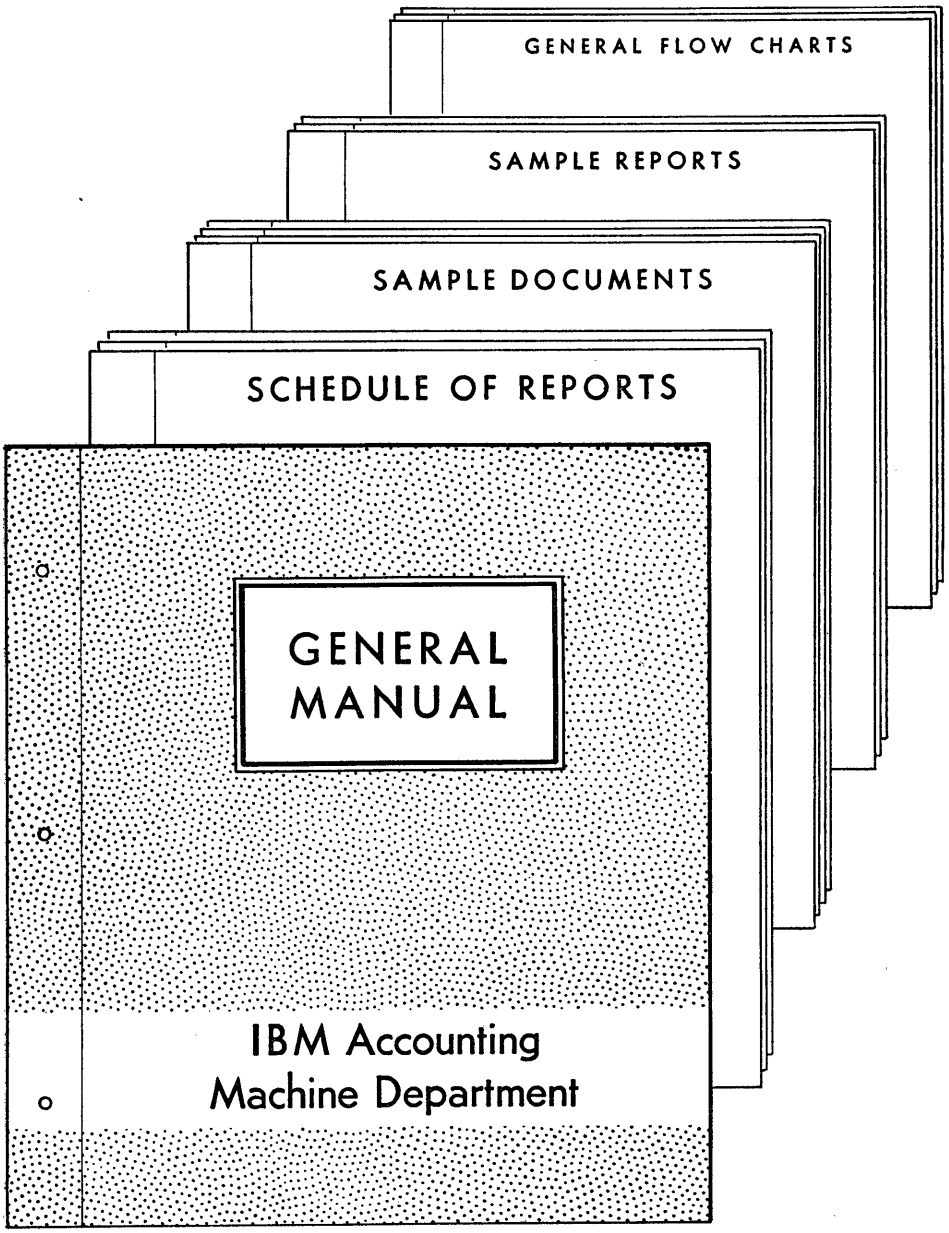


FIGURE 1. SUGGESTED CONTENTS OF THE GENERAL MANUAL

IBM ACCOUNTING MANUAL | SECTION: GENERAL SECTION | APPLICATION:

SUBJECT: SCHEDULE OF REPORTS | DATE:

	EXHIBIT	DUE IN	FROM	DUE OUT	TO
BILLING					
*Customer Orders	A	DAILY 10 AM	Order Dept.	DAILY 4:30 PM	Order Dept.
Shipping Orders	B			DAILY 4:30 PM	Shipping Dept.
Invoice	C			DAILY 1:00 PM	Customers
Register	D			DAILY 3:00 PM	Supervisor
ACCOUNTS RECEIVABLE					
*Remittance Advice	E	DAILY 2 PM	Cashier	DAILY 10 AM	Cashier
Cash Receipts	F			DAILY 2 PM	Chief Acct.
Aged Trial Balance	G			MONTHLY 1ST	
Statements	H			MONTHLY 5TH	Mail Room
SALES ANALYSIS					
Cost of Sales	I			MONTHLY 10 TH	Sales Mgr.
Sales by Customer	J			MONTHLY 15 TH	Sales Mgr.
Commission Statement	K			MONTHLY 17 TH	Sales Mgr.
Sales by State	L			MONTHLY 20 TH	Sales Mgr.
Sales by Salesman	M			MONTHLY 25 TH	Sales Mgr.

*Source Document

FIGURE 2

Figure 2 illustrates a list of documents and reports, together with certain schedule information combined to make a Schedule of Reports. The various reports and documents may be grouped according to the accounting application, as shown in Figure 2, or they can be grouped by type of report, or according to the due-out sequence. An exhibit letter is shown beside each report as a reference to the actual samples of reports and documents which follow in the manual.

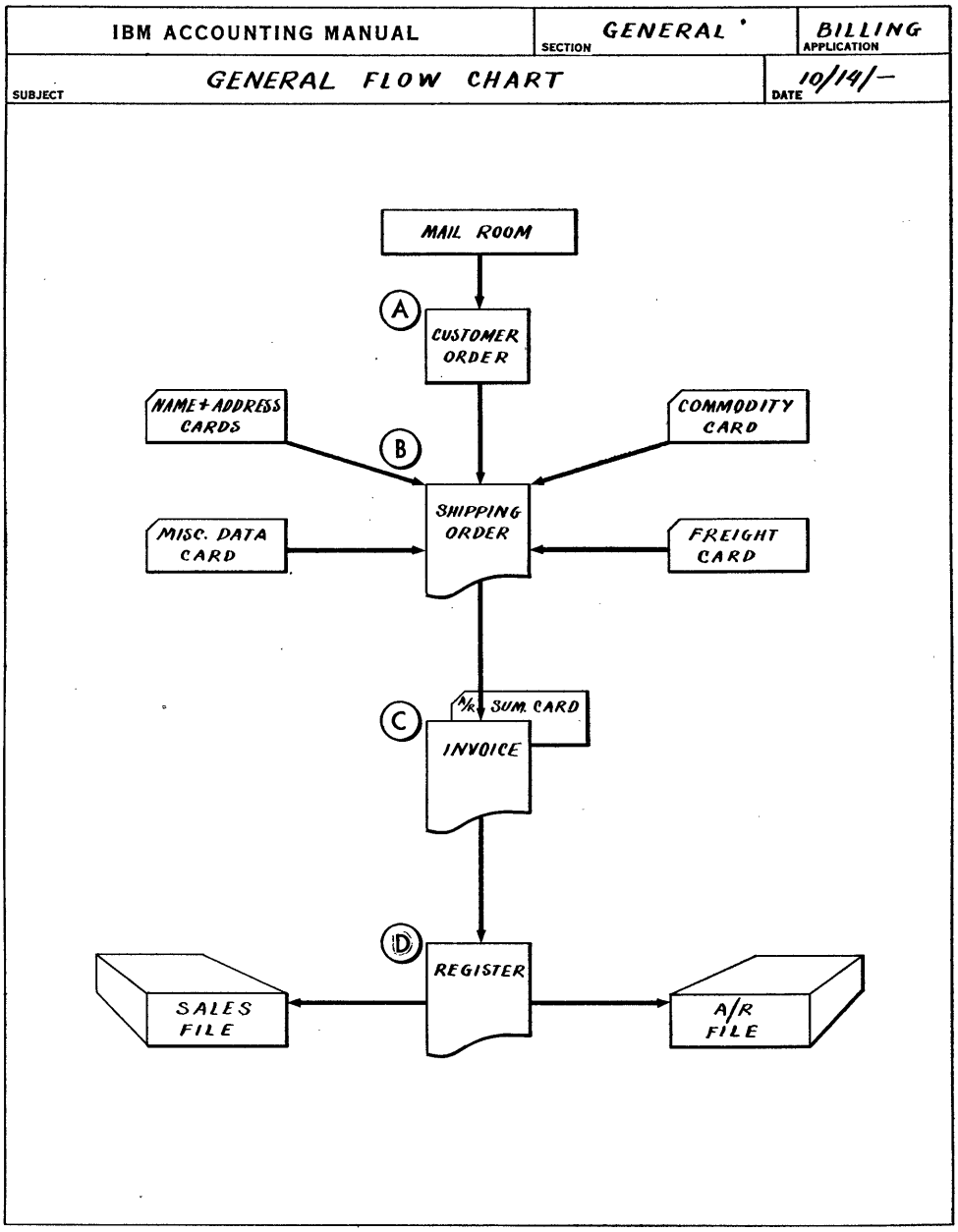


FIGURE 3

Figure 3 illustrates the symbol type of general flow chart. Symbols are utilized to depict the materials which move through the procedure—documents, cards and files, and reports. The lines and arrows represent processing steps or functions being performed to produce the results shown.

THE SUPERVISOR'S MANUAL

THE SUPERVISOR'S MANUAL (Figure 4) consists mainly of procedure data, supplemented by data on machines and personnel. When the supervisor develops procedures which best accomplish the desired results, he thinks in terms of unit functions or job steps required to bridge the gap between source documents and final reports. In assigning symbols to these job steps and connecting them with arrows to show the sequence of operations and the relations which exist between these operations, he develops graphic operational flow charts. These are designed primarily for his own use and are a basis for all of the plans, controls, and evaluations of the department's operations.

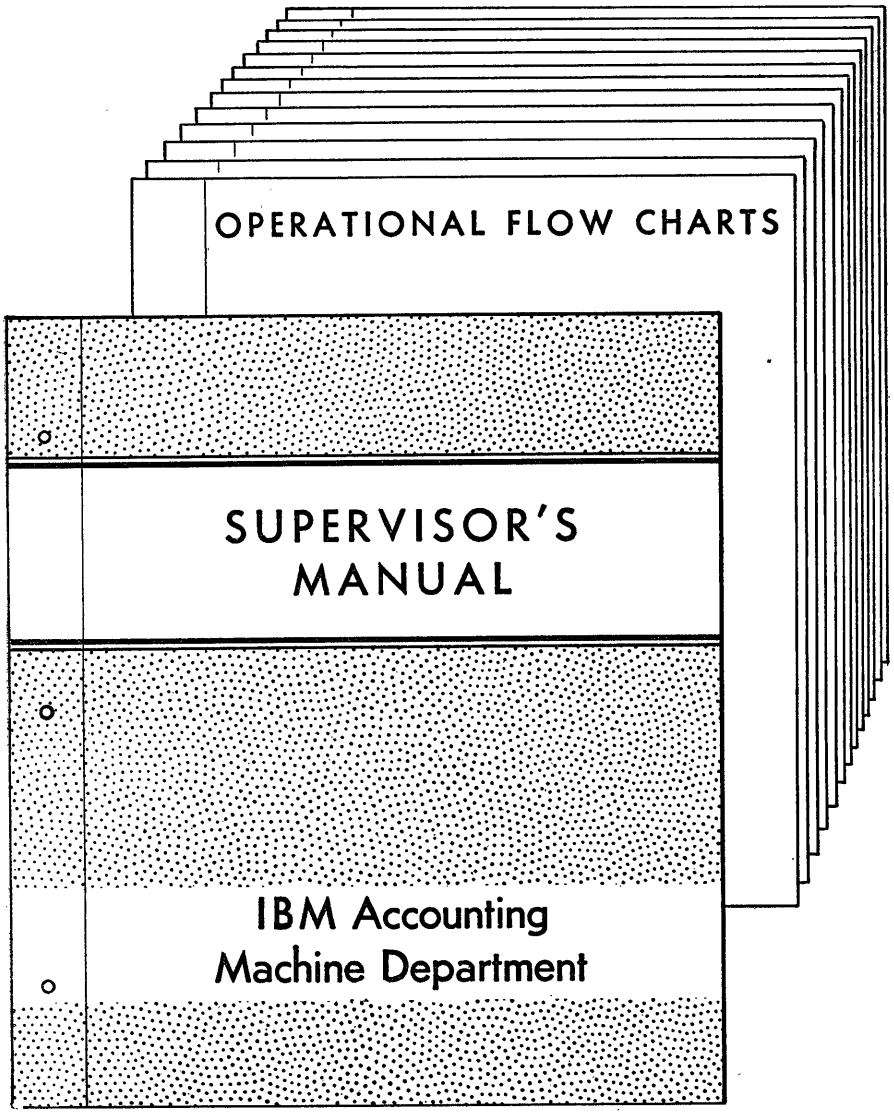


FIGURE 4. THE SUPERVISOR'S MANUAL

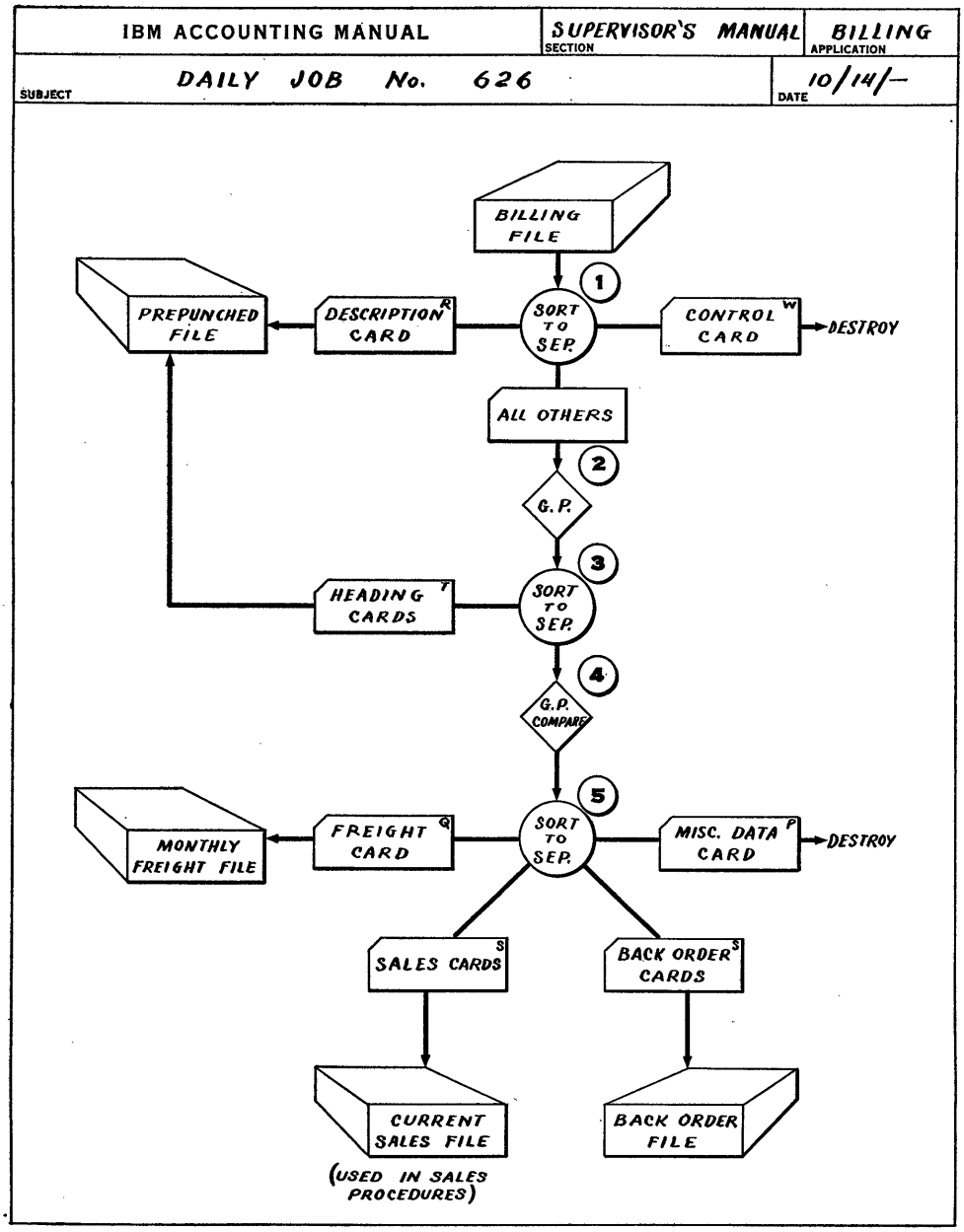


FIGURE 5. OPERATIONAL FLOW CHART

Figure 5 illustrates the symbolic operation flow chart designed to show graphically the job steps in the procedure. In this case, symbols are used primarily to represent job steps or unit functions to be performed, and the arrows represent the materials moving through the procedure from one job step to another. To avoid ambiguity in the meaning of the several connecting lines, they are frequently identified with

a card symbol or report symbol. The job functions are numbered in their normal sequence of operation. These job-step numbers are useful in preparing schedules and route slips.

The operational flow chart is a working tool, comparable to an architect's blueprints, plans or specifications. The basis on which the supervisor builds his plan of operation, schedules, controls and use of personnel, it is also a means for preparing detailed instructions for the operators.

In preparing these operational flow charts the supervisor frequently learns for the first time the exact nature of his procedures, instead of having to depend upon a mental and perhaps vague concept of what his operators are doing. He thus gains control of his department by knowing exactly what he wants done, without depending upon the collective knowledge of all his personnel.

Although operational flow charts constitute the main part of the supervisor's manual, many supervisors find it convenient to include certain other information and pertinent data. Personnel data, machine and control panel data, codes and X-lists, schedules and records of supplies are all part of the paper work of the supervisor and may conveniently be made part of the supervisor's manual.

THE OPERATOR'S MANUAL

IN PREPARING the General Manual, the supervisor determines and records a summary picture of the reports he is expected to produce. As he prepares the Supervisor's Manual, he determines and records every job step in the procedure by which these results are accomplished. Having completed this, he is in a position to determine and write the detailed information, pertaining to each job step, which becomes the Operator's Manual (Figure 6).

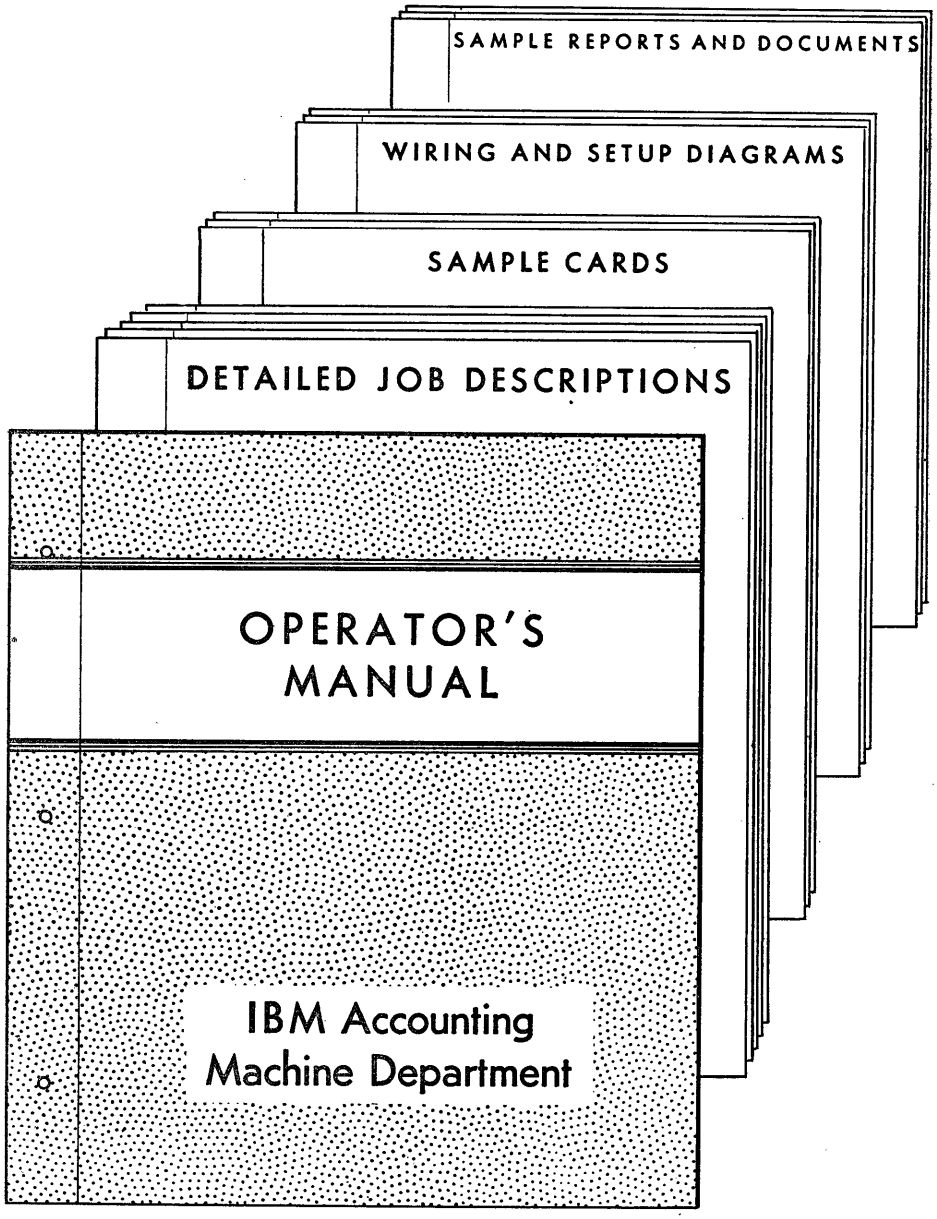


FIGURE 6. SUGGESTED CONTENTS FOR THE OPERATOR'S MANUAL

After constructing the operational flow charts for his various jobs, the supervisor can develop detailed and well-organized instructions in a logical and methodical manner. Such instructions will be used by the machine operators of the department and *must* be logical and clear. Operators are justified in expecting complete and explicit instructions so that they will know what is expected of them and will be able to perform the job properly. These specific instructions constitute the operator's manual of procedure.

The degree of detail contained in the operator's manual will depend upon the experience of the employees, their knowledge of the job, multiplicity of jobs performed, personnel turnover and other factors. In a large, functional-type organization, each operator may specialize on one machine and will use that machine on several jobs per day as the various jobs are routed through him.

For this type of operation, it is generally more suitable to have a separate sheet or card for each job step. On this sheet is found all information necessary to do the work at each step of the job. The operator can read such an instruction sheet to determine the details of setting the machine, wiring the control panel, schedule of work, volume of cards involved, source of cards or documents, disposition of cards or reports, and any other detailed information pertaining to the work. If such instructions are not written and given to the operator, that person will either return to the supervisor for more complete instructions, or in many cases do the work incorrectly.

It is important that instruction sheets or cards be so numbered or identified that they may be related to the entire procedure. These are generally numbered according to the job-step sequence number found on the operational flow chart. A job-step number assigned to the operator's instruction sheet will correspond to the job-step number written beside each job step on the flow chart previously prepared.

Instruction sheets of this type vary considerably in form. Figure 7 illustrates one type of job sheet, a printed form filled out for a specific job. One form is used for each type of machine and provides spaces for all possible information needed by the operator. The advantage of such a form lies in the fact that an instruction sheet serves as a check list on which the supervisor can provide the greatest amount of information for the operator with the least amount of writing.

A disadvantage is the excessive unused paper space, because all the spaces will not be pertinent to a given job. An alternative form of this type is one which provides for a minimum of information, such as job name, job-step number, name of cards used (and perhaps average vol-

DATE_____ PAGE 2 of 5

MULTIPLYING AND COMPUTING PUNCH INSTRUCTIONS

JOB NAME CROSSFOOT DAILY SALES JOB NUMBER 604

CARDS USED SALES - ACCOUNTING

DUE	DAY	TIME
DAILY		10 AM
WEEKLY		
SEMI-MONTHLY		
MONTHLY		

SEE [X] WIRING DIAGRAM
OR
[ ] FIXED CONTROL PANEL_____ NUMBER_____

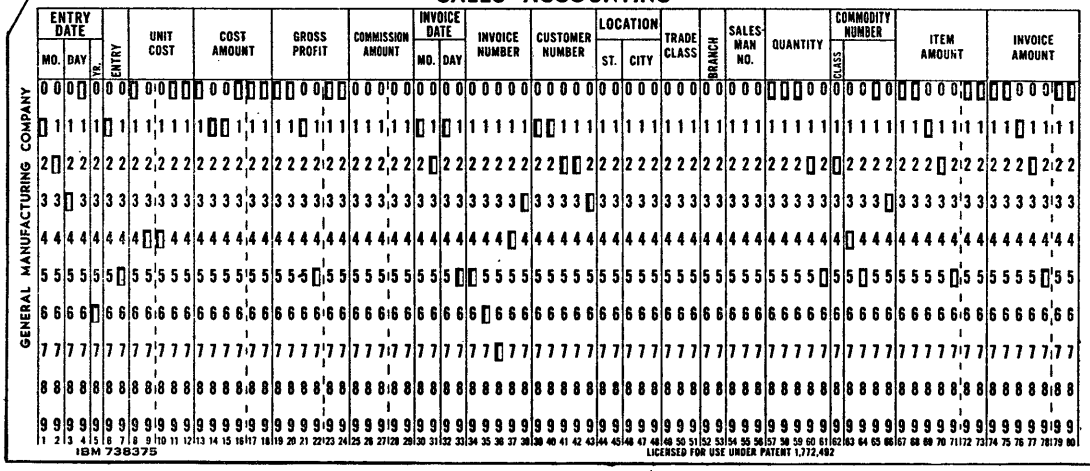
MACHINE TIME INFORMATION

AVERAGE NUMBER OF CARDS FOR JOB 5000 TIME REQUIRED TO PERFORM JOB 4 TIME PER 1000 CARDS_____

SALES ACCOUNTING

GENERAL MANUFACTURING COMPANY

ENTRY DATE (MO. DAY YR.) | ENTRY | UNIT COST | COST AMOUNT | GROSS PROFIT | COMMISSION AMOUNT | INVOICE DATE (MO. DAY) | INVOICE NUMBER | CUSTOMER NUMBER | LOCATION (ST. CITY) | TRADE CLASS | BRANCH | SALES-MAN NO. | QUANTITY | COMMODITY NUMBER (CLASS) | ITEM AMOUNT | INVOICE AMOUNT



IBM 738375 LICENSED FOR USE UNDER PATENT 1,772,492

SORTING OR GROUPING PRIOR TO MULTIPLYING

	CARD FIELD	CARD COLUMN
1ST SORT		
2ND SORT		

TYPE OF MULTIPLYING OPERATION: INDIVIDUAL [X] GROUP [ ]

SET X BRUSH_____ ON COL._____ FOR GROUP MULTIPLYING

USE X BAR LABELED GROSS PROFIT

WIRING INSTRUCTIONS

	READ					PUNCH	
			COMPONENTS				
FIELD	MULTIPLIER	MULTIPLICAND	RIGHT ADD OR SUBT.	LEFT ADD ONLY	SUMMARY COUNTER (ADD'L. CR. FOOT)	PRODUCTS COUNTER	SUMMARY COUNTER
NAME			COST AMT.	ITEM AMT.		GR. PROFIT	
COLUMNS			13-18	67-73		19-24	
EXAMPLE			110.00	125.00		15.00	

POSITIONS TO THE RIGHT OF PRODUCTS COUNTER TO BE DROPPED ⟶

WIRE INDIVIDUAL [ ] OR GROUP [ ]

WIRE ½ PICK-UP_____ POSITION FROM RIGHT OF ½ ENTRY ROW.

EXTENSION CHECKING INSTRUCTIONS SEE NEXT JOB SHEET

DISPOSITION OF CARDS Acctg. Machine for proof run.

FIGURE 7. JOB-STEP INSTRUCTION SHEET

ume of cards) and leaves the greater portion of the form blank for writing in the details of operating instructions for the particular job step.

Forms of the above types frequently carry with them exhibits of cards and reports as well as wiring diagrams, setup diagrams, operating data sheets, or other material pertaining to the job step. When this material becomes bulky and difficult to retain intact, operation envelopes are sometimes used to contain all material needed for the job step. Variations of this method are found in the use of file folders (one file folder for each job step), binders, and cards.

It is evident that such methods as these use the job step as the unit of operational control. They are most suitable in a large machine accounting department where the volume of cards per job is large and each job step is scheduled and analyzed. They may be used in the smaller department also, if the procedures are comparatively simple and card volume large. For smaller departments where the card volume is usually small, or where procedures are more complex, the job step is too small a unit of work for effective operational control. For these departments, the procedure or job write-up can be used to best advantage. In this case the procedure becomes the unit of work, and the operating instructions cover the entire procedure.

Figure 8 illustrates a type of job sheet which covers several job steps and provides the necessary details of the entire procedure, or a large portion of a given procedure. Just as on the operational sheets previously described, the procedure write-up must include name and number of the job, source of material, disposition of results and instructions for the job.

Job instructions in this form are a flow chart in narrative form, with the same sequence and logical development as exhibited by the charts. Again, certain exhibits such as cards, forms, reports, diagrams and test cards, will either be referred to or included with the instruction sheets. In the latter case, envelopes or file folders would again be used, and each envelope would represent a larger unit of work such as an entire procedure entailing many job steps. The responsibility for carrying out such work generally rests with a supervisor or chief operator. For this type of operation, the operational flow chart may well be included with the detailed instructions for more complete understanding of the procedure by the operators.

Job Name Preparing Sales Accounting Cards Job No. 626

MATERIAL RECEIVED FROM

Documents None

Cards Billing Cards from Job 625

DISPOSITION OF

Cards Sales cards to Sales File. Heading cards to Tub file. Miscellaneous Data, Description and Control cards destroy. Back Order cards to Back Order file.

Reports or Documents None

SPECIAL INSTRUCTIONS

Oper. No.	Mach.	Fin.	Description	Materials
1	080		Sort cards on Col. 80 to pull out Miscellaneous Description and Control cards. All commutator switches except switches No. 6 and No. 8 should be pushed to center. Cards falling pocket 8 are Control cards. Destroy. Cards falling pocket 6 are Miscellaneous Description cards. Return to Tub file. Remaining cards (reject pocket) to Operation 2.	
2	513		Gang punch Branch, Customer Number, Salesman Number, Invoice Date and Invoice Number into all Commodity cards. NOTE: Branch and Customer Number are punched from the Heading cards. Salesman Number, Invoice Number, Invoice Date, are punched from the Miscellaneous Data card. Set PX Brush 1 on Col. 5. Set PX Brush 6 on Col. 73.	Board #626-02-513
3	080		Sort cards on "X" in Col. 5. 1. Cards falling in "X" pocket are heading cards. Return to Tub files for further use. 2. Cards in reject pocket continue to Operation 4.	

FIGURE 8. PROCEDURE WRITE-UP.

ADVANTAGES

ANY machine accounting department which prepares and uses manuals of procedure will gain the following advantages:

1. During the preparation stages of a manual, overlapping functions, duplications of work, uncoordinated relationship between departments, inconsistencies in operations, and waste of time, effort and money are recognized and eliminated as the procedures in the manual are developed.

2. A basis is provided for refinement of existing procedures and development of new ones.

3. New procedures and refinement of methods can best be carried out by reducing the procedures to writing.

4. The manual of procedure is an excellent medium to use in training new employees.

5. Manuals define responsibility and reduce errors by telling each individual to whom and for what he is responsible.

6. The use of manuals of procedure makes results uniform. Unless the manuals are accessible for the employees' use, much of their value is lost.

7. The manual of procedure facilitates the other important duties of the supervisor and gives him a basis for scheduling, exercising controls, measurement of production, and for evaluating machine and personnel performance.

IBM ACCOUNTING MANAGEMENT

WORK CONTROL

INTERNATIONAL BUSINESS MACHINES CORPORATION
590 MADISON AVENUE, NEW YORK 22, NEW YORK

WORK CONTROL

AN ESSENTIAL ELEMENT of good supervision is the follow-up of planned operations to see that they are executed in the proper manner. Elaborate procedures and schedules which have been planned have no value until the operations are actually performed in accordance with those plans. The actual performance of the work can be indicated on a schedule chart in such a manner that the comparison between the scheduled operations and the performance record is obvious (Figure 1).

As work moves out of the planning stage into processing operations, the supervisor must follow up his plans with a system of work control. He must be able to determine at any time the status of work in process, so that he may know the effectiveness with which his plans are being carried out. Furthermore, he must have available recorded facts pertaining to all work which has actually been done in his department. These facts he uses to analyze current operations and as a basis for more intelligent future planning.

To maintain effective control of operations, the supervisor must:

1. See that each batch of work is properly identified to avoid loss or misplacement.

2. Be assured (through a system of procedure control) that each job is expeditiously kept on the right track until it is finished.

3. Obtain factual data on operations actually performed in order to analyze machine, personnel, and job performance.

By maintaining such controls over his work the supervisor has full knowledge of the operations being performed in his department and is not at the mercy of his machines or operators in determining the effectiveness of work for which he is responsible. The necessity for controls becomes increasingly important with larger installations and more complex procedures.

MASTER MACHINE SCHEDULE AND PERFORMANCE RECORD

FOR WEEK STARTING *April 1*

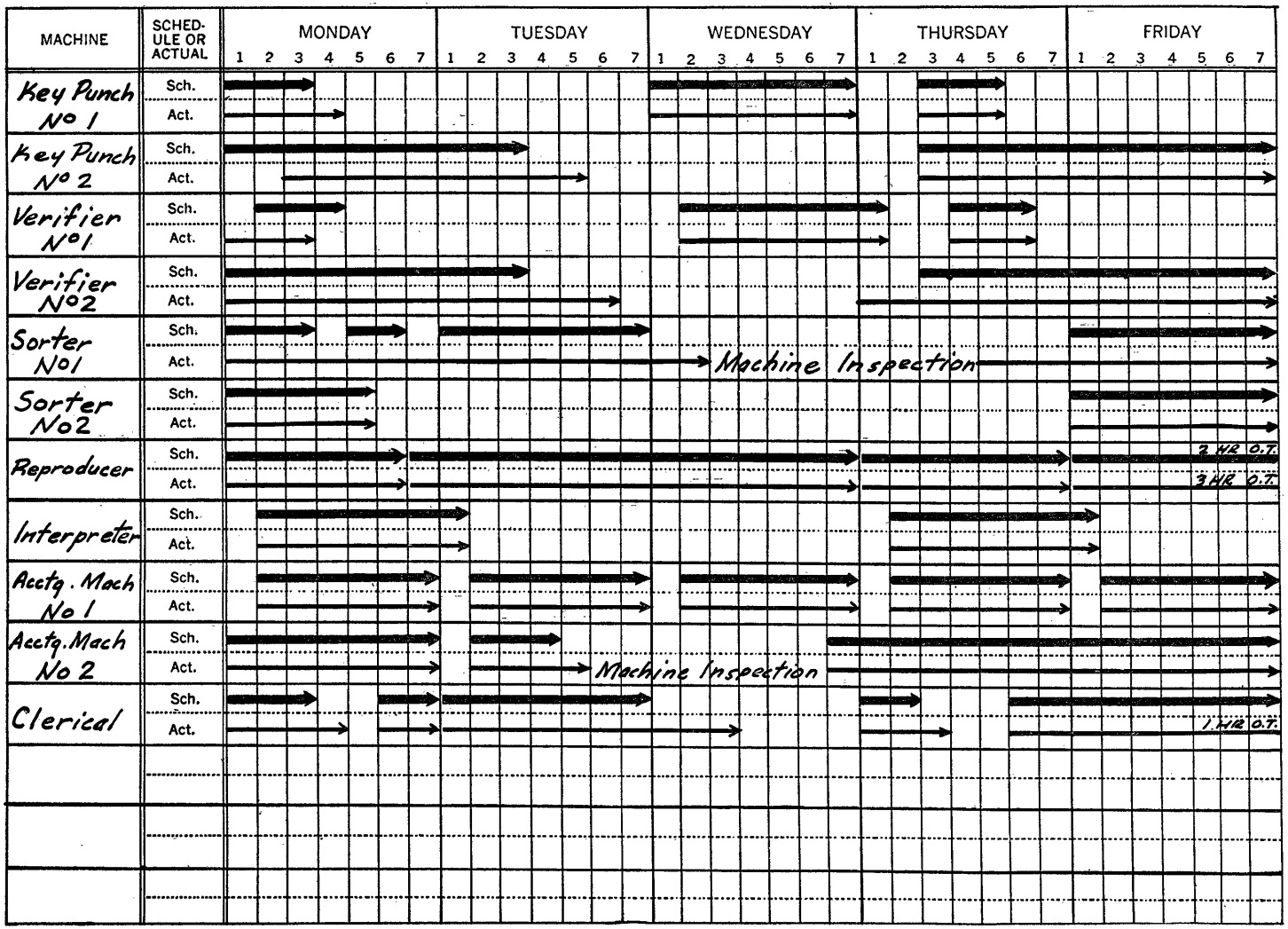


FIGURE 1. MASTER MACHINE SCHEDULE AND PERFORMANCE RECORD

Identification

THE PURPOSE of identification of work in process is to insure that each set of cards is maintained as an integral unit and that the cards remain in proper relation to each other. The operator should always know exactly what cards he has to work with. Identification reduces the likelihood of mixing cards from different decks or of misplacing or losing cards. Such identification of work makes it possible for the supervisor to inspect his department and determine the progress on any given job.

One useful expedient for identifying a deck of cards is to write the title of the work and the number of boxes across the edges of the cards as they are stacked in a box or file. A soft pencil should be used to avoid mutilating the edges of the cards. This form of identification may be used within the job step and is particularly useful in identifying a given sequence of the deck, as well as its title. When the sequence of a deck changes, the identification is naturally destroyed. This limits the usefulness of this method of identification, because in many cases the sequence is not retained throughout the procedure.

Decks of cards being processed may be in various forms. Small groups of cards may have no container at all; they may be held intact by a rubber band or a large metallic clip. Larger groups of cards may be kept in file drawers which are moved about the department as the cards are processed. Punched cards are frequently retained in their original cartons when files are not available or when the job is of a temporary nature.

It is evident that the practice of marking the identification directly on the boxes or file drawers will serve to title the work or number the boxes. These boxes will be used again and again, however, and repeated markings of the same boxes soon render them illegible. It is for this reason that the use of work identification cards is advisable. These cards are simply inserted in the front of each file or box containing work in process. They should be of a distinctive color, different from that of all other cards used in the department, so that the identification may be readily spotted. Such identification cards should be conveniently located

for access by the operators. It is advantageous to use a card which is the same size as an IBM card, so that it may be placed on top of a small deck of cards to form a neat and compact deck.

The first box of every batch of work should contain an identification card giving the job or title of the batch of cards and the number of boxes. Each of the other boxes should contain a similar identification card showing the number of the box within the batch, such as Box 3 of 7, indicating the third box of a group of seven boxes. This constitutes the minimum of information to be put on identification cards (Figure 2.)

Any amount of additional information may be included on these cards. Pertinent data such as scheduled time, actual time required, "due out" time, number of cards involved, machines to be used, operators, etc., may be placed on cards to be used for routing slips or job tickets as well as for identification purposes.

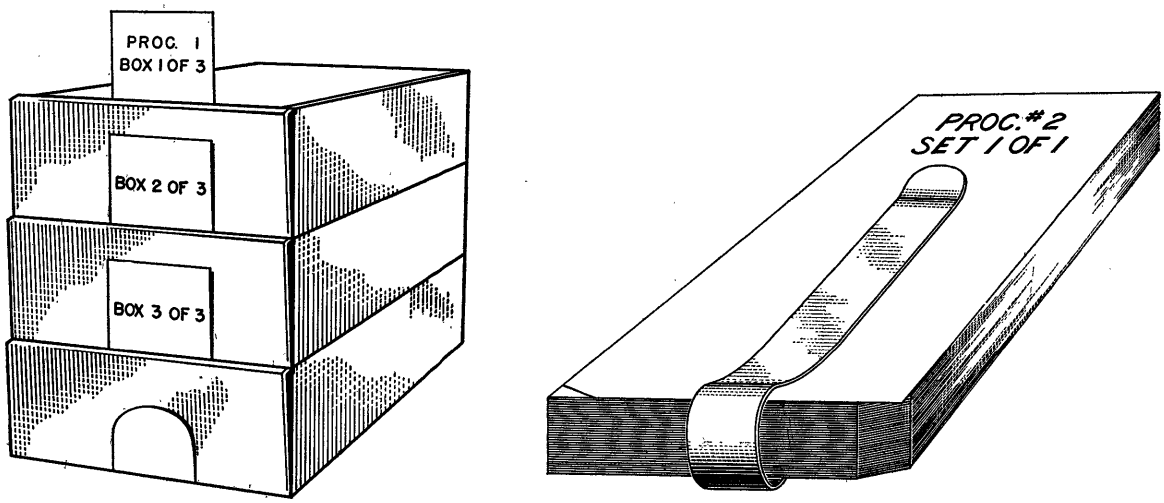
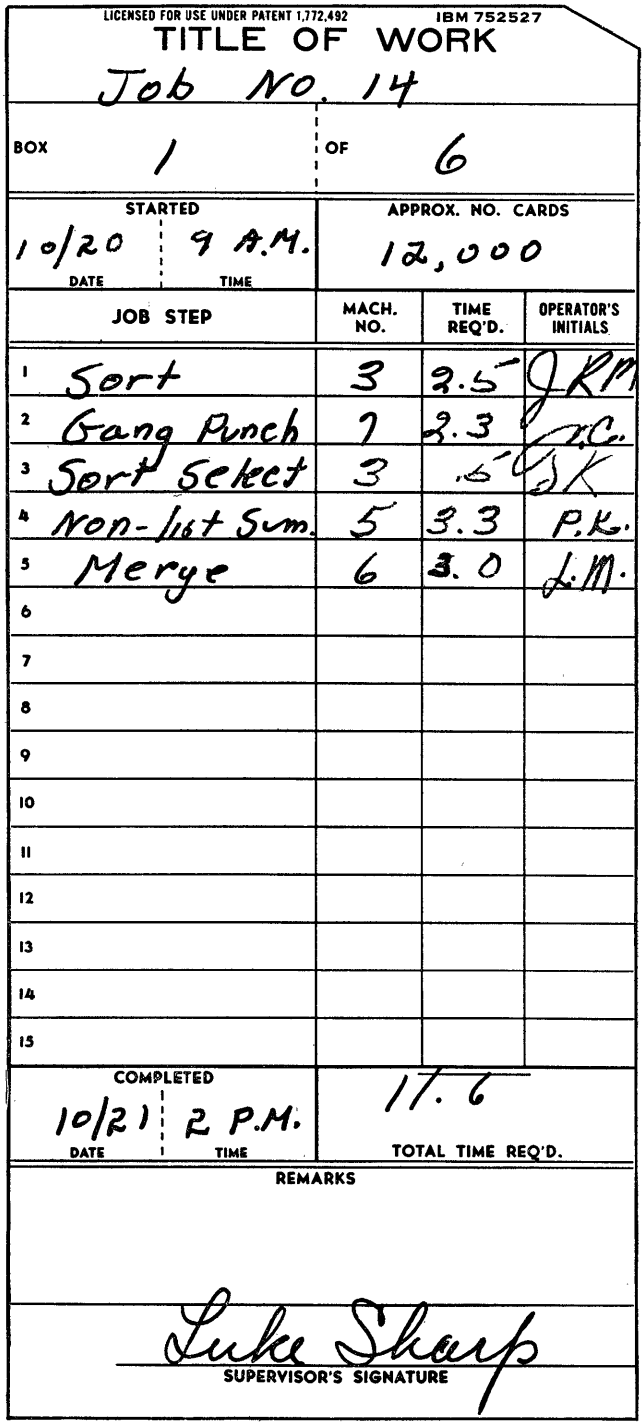


FIGURE 2. CARDS WELL-IDENTIFIED

Procedure Control

OPERATIONAL CONTROL over work being processed requires that the supervisor keep close check on the progress of work to be certain that the job being performed is in accordance with the procedure flow chart. He may stay with the work himself or delegate this responsibility to a supervisor or operator. In any case this person must be thoroughly familiar with the entire procedure and exercise personal supervision over the job.

A more automatic method of control is the use of Route Slips or Job Tickets which are filled out by the supervisor and which show the sequence of all job steps necessary to accomplish the job. This form stays with the cards as they move from machine to machine and serves as a guide to the operators in transmitting the work to the next job step. The operators, of course, would have their detailed operation instructions pertaining to the job, and these instructions may be keyed in to job steps on the route slip by name of operation or by number of the job step. The form may further serve as a medium to record information pertaining to actual work performed, for analysis purposes. As the job is performed, the operators would fill in information such as machine used, time required, or any other desired information, and this information would be certified by the operator's initials, indicating that the job step has been performed according to instructions. This gives the supervisor the necessary information concerning the operations of the procedure so that he may intelligently appraise the efficiency of the job. A sample of such a form is illustrated in Figure 3.



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TITLE OF WORK

Job No. 14

BOX 1 OF 6

STARTED		APPROX. NO. CARDS
10/20 DATE	9 A.M. TIME	12,000

	JOB STEP	MACH. NO.	TIME REQ'D.	OPERATOR'S INITIALS
1	Sort	3	2.5	JRM
2	Gang Punch	7	2.3	J.C.
3	Sort Select	3	.5	SK
4	Non-list Sum.	5	3.3	P.K.
5	Merge	6	3.0	L.M.
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

COMPLETED		
10/21 DATE	2 P.M. TIME	11.6 TOTAL TIME REQ'D.

REMARKS

Luke Sharp
SUPERVISOR'S SIGNATURE

FIGURE 3. ROUTE SLIP OR JOB TICKET

Analysis Data

IF OPERATIONS and procedures are never analyzed critically, they may never be improved upon. Too many procedures are followed year after year for the simple reason that they produce results. The purpose of analysis is to determine *better* methods of producing results.

Before any analysis is possible, sufficient data must be accumulated concerning the various operations so that conclusions will be based upon *facts,* and any changes which may be made will be sound.

Since the job of a supervisor is to use effectively machines, personnel, and time, and to so coordinate these factors through good procedures and schedules that his job is efficient, it is obvious that to analyze the procedures he must have data pertaining to the actual use of machines, of personnel, and of time.

MACHINE NO. 405-2 | DATE Oct. 25

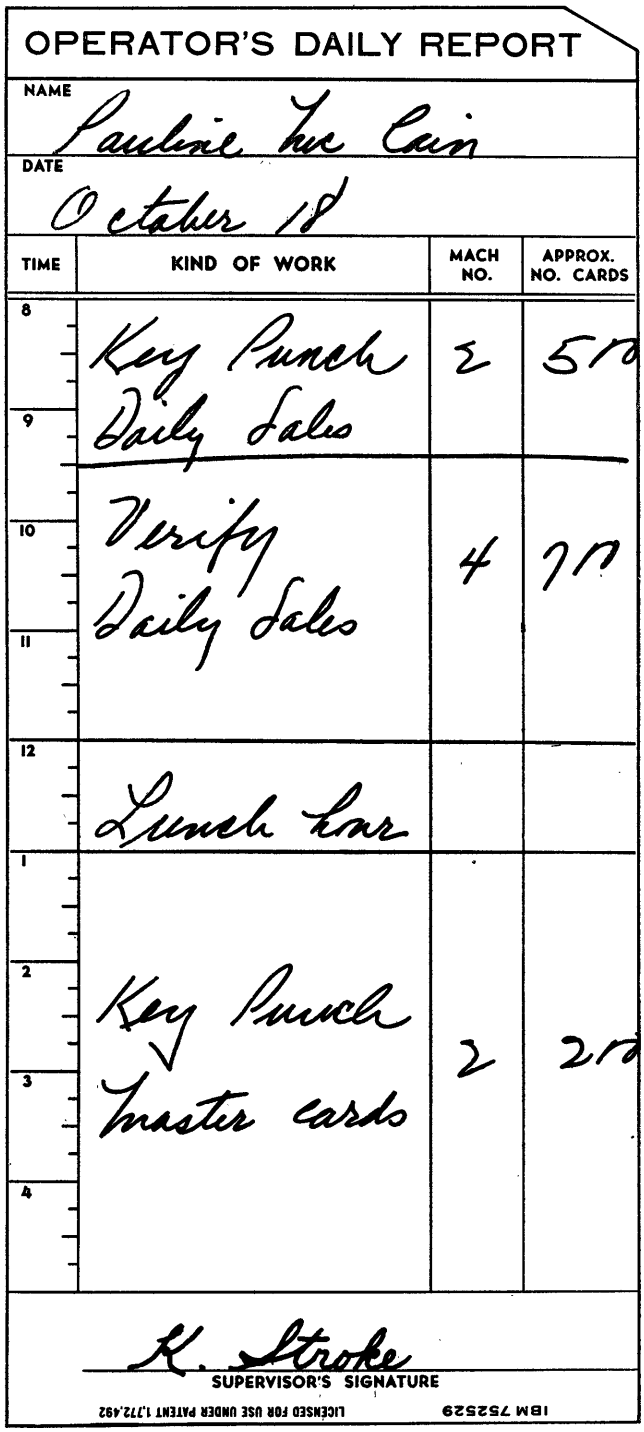
DAILY MACHINE OPERATION RECORD

NAME OF OPERATION	APPROX. NO. OF CARDS	TIME REQUIRED	OPERATOR'S INITIALS	REMARKS
Payroll Register	7,000	2.1	J.M.	
AGED TRIAL BAL.	18.000	3.0	O.P.	
Sales by State	15,000	2.5	J.M.	
		7.6 TOTAL TIME		

IBM 752528

FIGURE 4. DAILY MACHINE OPERATION RECORD

These data may be taken from the completed Route Slip (Figure 3) and summarized by machine or by operator for the desired analysis. Or these same data may be classified by machine in the form of a daily Machine Operation Record (Figure 4.) In this case the form is kept with each machine and each operator enters the record of operations performed on that machine throughout the day.



OPERATOR'S DAILY REPORT

NAME Pauline Lee Cain

DATE October 18

TIME	KIND OF WORK	MACH NO.	APPROX. NO. CARDS
8	Key Punch Daily Sales	2	500
9			
10	Verify Daily Sales	4	700
11			
12	Lunch hour		
1	Key Punch ✓ Master cards	2	200
2			
3			
4			

K. Stroke
SUPERVISOR'S SIGNATURE

LICENSED FOR USE UNDER PATENT 1,772,492 IBM 752529

FIGURE 5. OPERATOR'S DAILY REPORT

A common method of receiving operational data is through the medium of the Operator's Daily Report (Figure 5). This report would be submitted by each operator each day as a report of the day's work. This sample form illustrates the use of a graphic time scale representing the hours of the day. The operator would divide the various jobs performed through the day into their respective time units by horizontal lines drawn at the proper "time" position. This same idea may also be adapted to the Daily Machine Report.

Finally, mention should be made of the unit record method, using punched cards, which may be adaptable to a large installation. In this case a record is made of each operation performed on each machine by each operator (Figure 6). This form illustrates the use of "time started" and "time finished" entries to facilitate the computation of elapsed time. Coding and punching the information makes it possible to analyze and summarize the operation records by automatic machine methods.

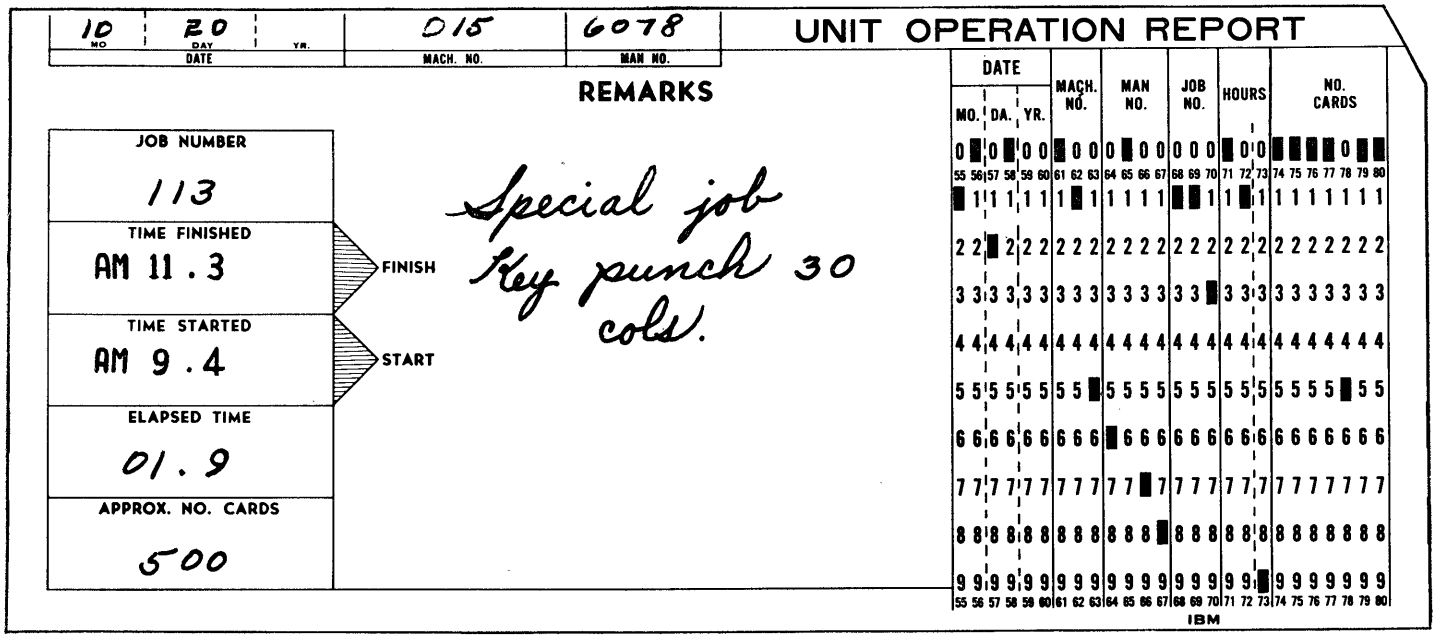


FIGURE 6. UNIT OPERATION REPORT

MACHINE EFFICIENCY

FOR WEEK STARTING May 15

MACHINE	ACTUAL TIME (HRS)	AVAILABLE TIME (HRS)	UTILIZATION EFF. (%)	SCHEDULED TIME (HRS)	PERFORMANCE (%)	REMARKS
Key Punch #1	34	40	85	32	94	
Key Punch #2	30	40	75	32	107	
Sorter	35	40	88	35	100	
Reproducer	20	40	50	18	90	Machine Inspection (8 hours)
Acctg. Machine	36	40	90	30	83	Re-run on Proc #3 (2 hours)
TOTALS	155	200	78%	147	95%	

FIGURE 7. MACHINE EFFICIENCY REPORT

USE OF OPERATING DATA

FACTUAL INFORMATION relative to actual operations has value when it is used to analyze the efficiency of operations. When these operational data are accumulated and summarized, valuable information becomes available concerning the installation as a whole. For instance, when the operating records are summarized for each machine used, machine use efficiency and performance can be computed:

$$\text{Machine use efficiency} = \frac{\text{Actual running time performing useful work}}{\text{Available running time}}$$

$$\text{Performance} = \frac{\text{Scheduled or standard time required}}{\text{Actual operating time required}}$$

Figure 7 illustrates a report showing machine efficiencies.

When operating information is classified by job, and summarized, the job efficiencies for the procedures in use may be computed.

$$\text{Job performance} = \frac{\text{Scheduled or standard time}}{\text{Actual operating time required}}$$

Figure 8 illustrates a report showing job or procedure performance.

The greatest value of such reports lies in the use of summarized data to locate elements of the operation which have abnormal efficiencies or unusual variations from standards. These would then be analyzed in more detail to determine the cause of such variations, by making use of the Operators' Daily Reports, Machine Daily Operation records, or Job Tickets, if they are already in use, or by initiating the use of such forms for collecting data for some specific analysis.

JOB PERFORMANCE

FOR WEEK STARTING July 15

PROCEDURE	ACTUAL TIME (HRS)	SCHEDULED TIME (HRS)	JOB PERFORMANCE (%)	REMARKS
Proc # 1-A	18	15	83	Final report re-run (3-hrs.)
Proc # 1-B	10	10	100	
Proc # 2	35	33	94	
Proc # 3	43	38	89	
Proc # 4	15	15	100	
Proc # 5-A	30	31	103	
Proc # 5-B	4	5	125	
TOTALS	155	147	95%	

FIGURE 8. JOB PERFORMANCE REPORT

When forms have been in use continuously for collecting operating data, the supervisor must make sure that operators do not become careless and perfunctory in filling them out. The data should always be as representative of the actual operations as possible.

Like all records which are gathered for analysis purposes, it is necessary that these records be complete enough to provide an adequate picture of actual operations, but not so numerous as to be cumbersome or without use.

The supervisor must bear in mind at all times the psychological reaction that reports or records may have upon personnel, and forms such as the Operator's Daily Report must be used with caution.

Records are necessary to maintain control of complex operations and their effective use determines the degree of control which a supervisor or manager can exercise over his organization. The following principle must be kept in mind:

Gather all the information you need to maintain adequate control, but do not accumulate more data than you can effectively use. Usable facts are the raw material of good judgment.

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IBM ACCOUNTING MANAGEMENT

EVALUATION AND IMPROVEMENT

INTERNATIONAL BUSINESS MACHINES CORPORATION
590 MADISON AVENUE, NEW YORK 22, NEW YORK

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IBM ACCOUNTING MANAGEMENT

EVALUATION AND IMPROVEMENT

IN AN IBM ACCOUNTING department the supervisor's job involves coordination of machines and people in order to produce specified results. This coordination is achieved largely through good supervisory planning, which requires experience and foresight. Experience must be so recorded and organized that it can be utilized for effective planning and operation. This recording, organizing, and use of past experience in relation to a given activity is a process of *evaluation.* It is essential to good planning and execution of plans.

IMPROVEMENT THROUGH EVALUATION

EVALUATION makes possible the improvement with which every IBM Accounting department supervisor should constantly be concerned. The supervisor's objectives are to work within the department to improve *reports, procedures, machine usage* and *operation.* To do this, he must also go outside his department to improve *teamwork* with other departments.

Improvement of Reports

Periodically, the entire set of reports being produced by the IBM Accounting department should be reviewed on these points:

Does a need exist for each report?

Do the reports show the necessary detail consistent with their use?

Is provision made for decoding, if necessary?

Is the form of the report satisfactory to those who must use it?

Supervisors are frequently in a position to suggest additions or modifications which will increase the value of the reports to management. Because figure-facts have most meaning in relation to other figures and facts, reports usually have greater value when comparative figures are placed together on the report. Quotas, standards, and budget figures can be introduced with a small amount of extra effort. For comparisons in time, previously punched cards may be introduced so that "same month last year," "last month," and "year-to-date" figures are shown to indicate trends in the various activities of the organization.

While reports are being prepared, it is frequently possible to have the machine perform additional functions which require no extra time, but which may add value to the report. Comparison may be made automatically to give a net difference or variance from standards. By the addition of a separate calculating process with the Calculating Punch, variances expressed as percentages may be printed on the report. Item counts frequently are useful to management, and consideration should be given to the possibility of setting the machine to count cards, classes of cards, number of totals, number of a particular type of transaction, number of specific types of cards, or almost anything which might be counted, and to print these counts on the report.

In addition to the review of the reports themselves, a careful study should be made of the times when reports are due. Reporting time may be changed in order to alleviate a bad peak-load situation. Priority

considerations affect schedules and machine loads, and management should appreciate general operating conditions, so that the supervisor and representatives of management may work out their mutual problems frankly and cooperatively.

Improvement of Procedures

From periodic reviews of the end results produced by the IBM Accounting department, certain changes will be made in these results so that they may satisfy the changing requirements of management. The fact that the accounting requirements of management do change is largely the reason why a flexible system such as IBM Accounting becomes necessary in a progressive organization where improvements are constantly being made.

The supervisor will find that as changes are made in other departments and activities of the organization, source data may change, or the methods of obtaining source data may be revised. Changes in policies and practices within the organization must become known through the contacts which the supervisor makes with management and with other supervisors. He must be aware, however, that any change in final results or in source documents usually requires changing the procedures also.

It is essential, then, that procedural changes be made within the IBM Accounting department whenever external changes call for new internal adaptations. Sometimes, when the need for particular information or a report no longer exists, the operations continue because of the inherent inertia which exists in all activities. A review of the procedures, after examining the current nature of source documents and final report requirements, will probably disclose that some operations are no longer necessary.

The operational flow chart has great value to the supervisor as he reviews his procedures critically. Changes can be quickly inserted and alternative methods proposed. Such changes, of course, are subject to a detailed study of the relative advantages to be gained by the alternative methods.

As changes in volume of transactions and cards become known, methods and procedures will be altered. A procedure which is adequate for a certain volume of work may be completely inadequate for an increased volume. The general nature of the transactions may also affect the procedure. As transactions become more standardized or of a predictable nature, they lend themselves to mechanized processing

more readily. A given type of transaction may become so variable that mechanization may be discontinued in favor of a manual process. It may be decided that the greatest economy can be obtained by separating the transactions or cards into two sets — standard and variable — and running two parallel procedures, which will accomplish the same results but use different methods.

The number of control functions in a procedure may be increased as the number of operational errors increases; or, as errors decrease, the number of controls may be reduced to a degree consistent with good accounting practice.

Improvement of Machine Usage

One of the first objectives of the supervisor is to obtain maximum utilization of the equipment with which he is charged and whose maintenance requires expenditure. Cost is measured either as a service charge, as in the case of IBM machines; as depreciation cost, as in the case of capital assets such as chairs and desks; or as maintenance cost on material bought but not yet used, such as ribbons, cards, or forms. In each case, the supervisor attempts to evaluate this cost by comparing it with the value being derived or the use to which the equipment is put. Maximum value is derived from IBM machines only when they are used for productive work which has value to the organization. For this reason, it has become customary in the better departments to evaluate machine usage by comparing the actual use of machines with the available time. A machine used only 4 hours in an 8-hour working day is productive only 50% of the available time. It may be that the four hours' usage accomplishes a given job more economically than any other method would, but it must be recognized that room for improvement still exists, and the supervisor should search for additional work which would raise the value of the machine still further.

Improvement in machine usage may also be made by doing a more effective scheduling job, so that stand-by time is reduced, machine conflicts are avoided, and peak loads are eliminated. The best operating condition exists when the machines are used approximately the same length of time each day. A fluctuating machine load usually reduces the utilization and operation efficiency, and should be avoided if possible.

The alert supervisor will take measures to assure the best performance of his mechanical equipment by proper maintenance and care. Proper maintenance is provided by the IBM Customer Engineer. The assistance of the supervisor is necessary, however, in working out in-

spection schedules, maintaining close control over machine performance, and in securing the cooperation of machine operators so that they will exercise the necessary care in the use of the equipment. A small amount of preventive maintenance on the part of the operator will go a long way toward keeping machines in top condition. Periodic cleaning and dusting of machines, oiling exposed metallic surfaces to prevent rust, and the covering of machines when they are not in use are protective measures taken by all well-trained operators.

Improvement of Operation

When productive tools are placed in the hands of people so that they can do a job better and faster, there is a tendency to forget the job the *person* is doing and direct our attention to the job the *machine* is doing. Although the machine removes many of the most detailed, repetitive, and routine aspects of his work, the operator still retains important duties which the machine cannot do. He must still perform the functions of control, analysis, judgment, decision and evaluation. These remain the most important aspects of a given operation. Furthermore, as tools are brought into use for greater productivity, the *thinking* function of the persons using the tools increases in importance. If the operation of the IBM Accounting Machine is observed closely, it will be noted that, during the time necessary to complete an operation, the operator will be performing functions over and above those of the machine. Time is consumed as cards are moved to the machine. Cards are checked to make sure of their identity, joggled, and placed in the machine. Proper forms are selected and positioned in the machine. As the work progresses, certain interruptions arise for checking, minor adjustments, asking questions and receiving instructions. These are variable factors which are present to some degree in all operations, and the extent to which they apply to a given operation is measured by the operation efficiency, which is the ratio between the running time of the machine and the total time for the job. This will vary, depending upon the nature of the job and the training and experience of the operator.

Machine loads are calculated and schedules are projected on the basis of a prevailing standard operation efficiency which the supervisor knows from past performance records. The objective in all improvement is to raise this standard gradually and continually. Operation standards can be raised only by doing a better personnel job, particularly in the selection and placement of operators and in their continuous training on the job. This places the responsibility for improving

the people in a department squarely in the hands of the supervisor. He should conduct a continuous training program for his operators; he should see that adequate manuals of procedure are always available; he should keep morale high by promoting better working conditions, improving his administrative relationships, being fair and impartial, and being a real leader of people. These are the methods of raising operating standards in an IBM Accounting department.

Improvement of Management-Supervisor Teamwork

An understanding relationship between management and the supervisor is the basis for teamwork in sound planning and efficient operation. This teamwork should extend not only up and down the line of authority but laterally, as well, to include the supervisors of other departments.

As the supervisor works outside of his department he comes into contact with supervisors in other departments. In this activity he attempts to coordinate the work of his department to that of other departments in the organization. This coordination becomes necessary when source documents move into and out of the department, or when reports are sent to another department for additional clerical work or processing.

The most satisfactory condition, as far as the IBM Accounting department is concerned, is to carry out the complete procedure, from source document to final report, within the department. This will minimize the number of points in a procedure where inter-departmental coordination and control must be maintained, and serves to fix responsibility for effective work within a single department. Whatever the situation, however, it is imperative that, for every point in the procedure where work crosses departmental boundaries, the supervisor establish the necessary controls with the departments in question. These points of interdepartmental contact require close supervision and complete understanding by supervisors and operators.

In his work with other departments, the supervisor determines as closely as possible the volume of work he may expect and at what times such work becomes available. He needs this information to establish his "due-in" times and machine loads, which become the basis for scheduling operations within his department. Frequently, having once established a "due-out" time for finished reports, the supervisor must consider the processing time in the department to arrive at the "due-in" time for the source documents. In this case the department trans-

mitting these documents should conform to the necessary schedule or else consult management for a revision of the due-date or a change in procedure so that the desired schedule may be met.

Understanding among the supervisor of the IBM Accounting department, management and supervisors in other departments is essential. It is particularly important that the supervisor maintain this understanding in regard to the schedule of reports, adequacy of reports, "due-in" times and "due-out" times. It is the basis for all that he does within his department.

RECORDING OPERATING DATA

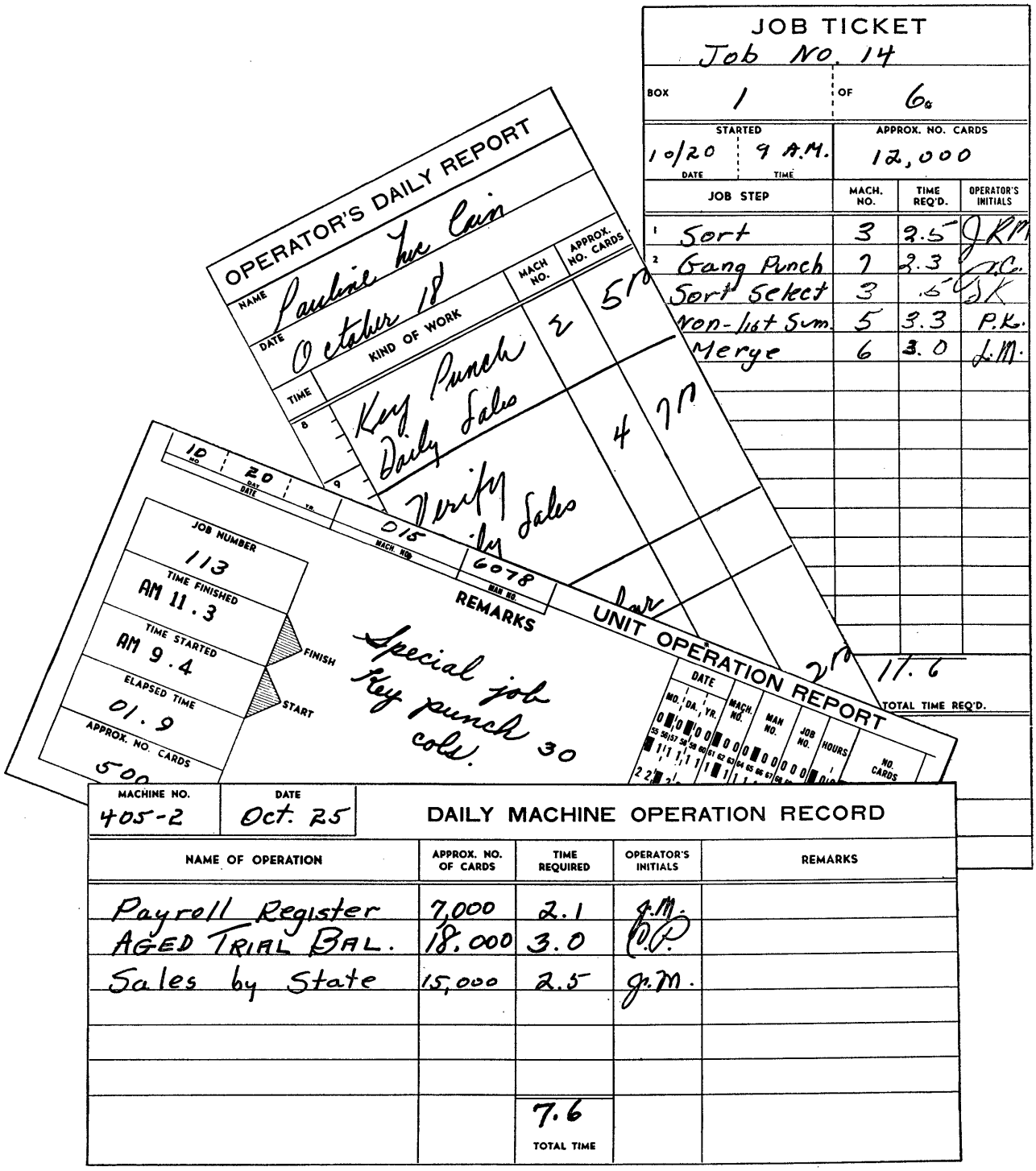
IF THE SUPERVISOR desires to make any kind of evaluation, he must first obtain certain factual data about the operations performed in his department, and must see that such data are recorded at the time of the operation. Operating data may be obtained from job tickets, machine operation records, operator reports, and operation tickets. The forms in Figure 1 are typical of the most common types of operation reports in present use. The essential and minimum information to be recorded on any of these forms is:

Job name or number
Operator name or number
Machine name or number
Actual time of performing operation

With these facts, many evaluations become possible. First, however, the recorded facts must be classified and summarized. The average supervisor will perform this record-keeping job manually, but in many of the larger installations, IBM cards are used effectively. Figure 2 illustrates sample summarizations of such basic operating data.

Just as a business organization keeps an accounting department to give management the facts they need for sound planning, so the supervisor keeps simple records of his departmental activities for sound supervisory planning. The kind of analysis to be made will largely determine the form to be used in getting the data. For instance, if a study of machine time is to be made, a machine operation record for each machine would furnish the data. In the average department, it should take only a few minutes each day to compile these facts from the source data.

There are many other aspects of operations about which the supervisor will want to keep records. These include key punch production, percentage of errors or number of errors per month, operation efficiency, card volume, number of transactions and cost of operation (salaries, machine service charges, supplies and miscellaneous expenses).



JOB TICKET

Job No. 14

BOX 1 OF 6

STARTED DATE	STARTED TIME	APPROX. NO. CARDS
10/20	9 A.M.	12,000

	JOB STEP	MACH. NO.	TIME REQ'D.	OPERATOR'S INITIALS
1	Sort	3	2.5	J.K.M.
2	Gang Punch	1	2.3	A.C.
	Sort Select	3	.6	J.K.
	Non-list Sum.	5	3.3	P.K.
	Merge	6	3.0	L.M.
	TOTAL TIME REQ'D.		11.6	

OPERATOR'S DAILY REPORT

NAME Pauline Lee Cain

DATE October 18

TIME	KIND OF WORK	MACH NO.	APPROX. NO. CARDS
8	Key Punch	2	5M
	Daily Sales		
9	Verify Daily Sales	4	7M

UNIT OPERATION REPORT

MO.	DA.	YR.	MACH. NO.	MAN NO.	JOB NO.	HOURS	NO. CARDS
10	20		015		6078		

JOB NUMBER 113

TIME FINISHED AM 11.3

TIME STARTED AM 9.4

ELAPSED TIME 01.9

APPROX. NO. CARDS 500

REMARKS

Special job
Key punch 30
cols.

DAILY MACHINE OPERATION RECORD

MACHINE NO. 405-2

DATE Oct. 25

NAME OF OPERATION	APPROX. NO. OF CARDS	TIME REQUIRED	OPERATOR'S INITIALS	REMARKS
Payroll Register	7,000	2.1	J.M.	
AGED TRIAL BAL.	18,000	3.0	D.P.	
Sales by State	15,000	2.5	J.M.	
		7.6 TOTAL TIME		

FIGURE 1. OPERATION REPORTS

MACHINE USAGE AND PERFORMANCE

FOR WEEK STARTING May 15

MACHINE	ACTUAL TIME (HRS)	AVAILABLE TIME (HRS)	UTILIZATION EFF. (%)	SCHEDULED TIME (HRS)	PERFORMANCE % OF STD.	REMARKS
Key Punch #1	34	40	85	32	94	
Key Punch #2	30	40	75	32	107	
Sorter	35	40	88	35	100	
Reproducer	20	40	50	18	90	Machine Inspection (8 hours)
Acctg. Machine	36	40	90	30	83	Re-run on Proc #3 (2 hours)
TOTALS	155	200	78%	147	95%	

JOB PERFORMANCE

FOR WEEK STARTING July 15

PROCEDURE	ACTUAL TIME (HRS)	SCHEDULED TIME (HRS)	PERFORMANCE % OF STD.	REMARKS
Proc # 1-A	18	15	83	Final report re-run (3-hrs.)
Proc # 1-B	10	10	100	
Proc # 2	35	33	94	
Proc # 3	43	38	89	
Proc # 4	15	15	100	
Proc # 5-A	30	31	103	
Proc # 5-B	4	5	125	
TOTALS	155	147	95%	

FIGURE 2. SUMMARIES OF OPERATING DATA

OPERATING DATA SUMMARY
KEY PUNCH PRODUCTION
FOR WEEK ENDING April 5

DATE	NUMBER OF DOCUMENTS RECEIVED	NUMBER OF CARDS		NUMBER OF ERRORS	% OF ERRORS
		KEYPUNCHED	SPOILED		
April 1	1380	3500	65	20	.57
April 2	1465	3850	83	25	.65
April 3	1205	3223	40	15	.47
April 4	1310	3485	45	13	.37
April 5	1325	3415	55	10	.30
WEEKLY TOTALS →	6685	17473	288	83	(2.36)
DAILY AVERAGES →	1340	3500	58	17	.47

OPERATING DATA SUMMARY
MACHINE AND OPERATOR PRODUCTION
FOR MONTH ENDING April 30

MACHINE TIME				NO. OF CARDS PROCESSED	NO. OF DOCUMENTS PRODUCED	OPERATOR TIME			
MACH.	ACTUAL USE	UNAVAIL-ABLE	IDLE			NAME	REG	O'TIME	TOTAL
405	180	4	24	720M	120M	John Blaine	208	4	212
080	175	3	30	875M	—	Mary Smith	200	-	200
513	150	0	58	750M	—	Joe Rogers	208	-	208
602	195	1	13	292M	—				
031A	150	0	58	41M	—				
031B	185	2	23	50M	—				
TOTALS →	1035	10	206	2728M		TOTALS →	616	4	620

OPERATING DATA SUMMARY
COST OF OPERATIONS

MONTH	TOTAL SALARIES	MACHINE SERVICE CHARGE	SUPPLIES	OVERHEAD	TOTAL
Jan.	850	570	150	75	1643
Feb.	850	570	174	75	1667
Mar.	875	570	130	75	1651
April	885	570	120	75	1655
May	885	570	125	75	1655
June	885	570	135	75	1660
TOTALS →	5230	3420	834	450	9931

FIGURE 3. OPERATING DATA SUMMARY FORMS

Figure 3 illustrates forms upon which is recorded information of the type needed for useful evaluation. This factual information may be entered daily, weekly, or monthly depending upon the frequency with which studies of departmental activities are made.

In evaluating such information, comparisons with fixed standards or with facts give a basis for judging the efficiency of the job being done

in the IBM department. Number of cards handled, compared to amount of work done, is one important comparison which can be expressed as cards processed per man-hour of work. Other useful comparisons are: number of documents processed per dollar cost, number of cards processed per available machine hour, number of documents handled per employee, percentage of cards spoiled by key punch operators, machine usage at peak load periods, operator overtime hours compared with machine idle time, cards processed per dollar cost, cost per final document produced, and many others.

The elements of factual information must be carefully selected and combined according to the nature of the problems being encountered. Such information must be evaluated so that decision can be made and changes incorporated which will lead to definite improvement in the department. The following list illustrates certain significant comparisons which can be used in most IBM Accounting departments:

Cards handled per machine operator	$\frac{\textit{Number cards processed}}{\textit{Number of machine operators}}$
Cards key-punched per operator	$\frac{\textit{Number cards key-punched}}{\textit{Number of key punch operators}}$
Cards handled per man hour	$\frac{\textit{Number of cards processsed}}{\textit{Total man hours}}$
Cards handled per machine hour	$\frac{\textit{Number of cards processsed}}{\textit{Total actual machine hours}}$
Cards processed per dollar cost	$\frac{\textit{Number of cards processsed}}{\textit{Total cost}}$
Cost per machine hour usage	$\frac{\textit{Total cost}}{\textit{Total actual machine time}}$
Cost per document processed	$\frac{\textit{Total cost}}{\textit{Number of documents processed}}$
Cost per report or document produced	$\frac{\textit{Total cost}}{\textit{Number of reports produced}}$
Cost per 10,000 cards processed	$\frac{\textit{Total cost x 10,000}}{\textit{Number cards processed}}$

These formulas show total figures for the department. The best studies can be made, however, when information is prorated by job to show the time or cost of each job. For instance, cost may be prorated on the basis of machine usage applied to each job. In this case, the cost of a given job, number 1, is determined as follows:

$$\text{Cost for Job 1} = \text{Total cost} \times \frac{\textit{Actual machine time on Job 1}}{\textit{Total actual machine time}}$$

For a more complete cost analysis of each job, it would be necessary to determine the actual cost for each kind of expense pertaining to each job, by associating with each job the operator salary, machine service charge, and actual cost of supplies used, together with a possible burden charge prorated to each job on the basis of operator or machine time.

In the same way, costs and other figures can be developed for each type of machine or for each operator, provided the basic operating data can be obtained in the desired classification by operator or by type of machine.

METHODS OF EVALUATION

PROBABLY the information easiest to obtain is the actual operating time of the machines. A machine operation record placed on each machine on which operators record each job and the time required furnishes the information necessary to analyze machine usage. Such analysis may be for each machine unit, for each type of machine, or for all the machine units in the department. Suppose, for example, that at the end of each day the total hourly wage is determined for each type of machine, and that this daily usage is plotted on a chart for one month. The resulting chart is shown in Figure 4. The dotted horizontal line drawn at 8 hours indicates that one accounting machine is available for use in each 8-hour working day. If two such machines were in the department, this line would be drawn at the 16-hour mark to indicate 16 machine hours are available each day for accounting machine operations.

The solid line represents the actual use of the accounting machine on the various working days throughout the month. It is evident that this chart depicts an average machine use of about 30% during the first half of the month, a usage that fluctuates considerably from day to day, and a peak load in the last half of the month requiring overtime work. This chart would indicate at least three possible improvements: eliminating overtime, using idle time more productively, and improving scheduling.

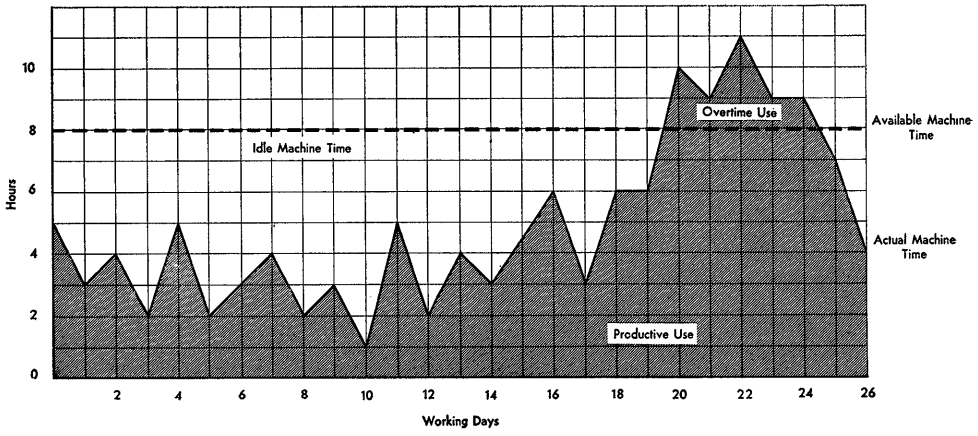


FIGURE 4. MACHINE USE CHART—ACCOUNTING MACHINE

Eliminate Overtime

The overtime near the end of the month should be eliminated if at all possible. This may be done in several ways. It is frequently possible, especially with certain types of analytical reports, to alter the "due-out" time. This type of change, of course, usually requires the understanding and cooperation of those who receive the reports. Another method is to change the "due-in" time for the source documents, or stagger the "due-in" schedule so that some of the processing can take place earlier in the month. This type of change usually requires the cooperation of other supervisors and management. When neither the "due-in" or "due-out" times can be changed, it is still possible at times to reduce the peak load by changing the procedures in such a way that machine time earlier in the month can be used to prepare cards for the peak period. For instance, if the peak load is caused by a monthly sales analysis prepared from a large volume of accumulated detail cards, it can be eliminated by punching summary cards at the middle of the month, and combining them with the detail cards for the last half of the month to run reports.

Use Idle Time Productively

The second type of improvement indicated by this chart is to use more of the idle machine time for productive purposes. As indicated above, some of this idle time may be used in resolving the peak load periods. The main way of using this idle time, however, is to provide more information on the existing reports, prepare more reports of an analytic nature, or to add more record-keeping activities to the machines when it is economical to do so.

To improve existing reports, it is only necessary to remember the factors which make a report informative and useful. Reports are used to measure results and they should contain comparison figures so that actual expenditures, or amounts, or hours, may be compared against budget figures, quotas, and standards; or amounts this month can be compared with amounts last month, amounts same month last year, or year-to-date figures. Most of such information is already available in files, and can be brought together with current cards to produce reports which show trends. Advantage should be taken of many other ways of producing better reports: adding name or description cards for decoding purposes, printing variances from standards or quotas, printing item counts or group counts, and even changing the design of the form. Many of these would use more of the available machine time.

The preparation of additional reports from the same punched cards always represents a good use of otherwise idle machine time. It must be remembered that classification on any field in the card will produce a report which will have interest or value to someone in the organization. When such possibilities are combined to give major and minor classifications, the types of new reports with possible value become almost unlimited.

Use of idle machine time for new record-keeping activities requires a greater degree of planning and study, for, in this case, it is necessary also to design new cards and report forms, build new procedures, train additional personnel, and revise the schedule. But the economies that can be effected by mechanizing additional parts of the record-keeping activities of an organization may well repay the cost and trouble of making the change. When idle machine time is available for such additional work, the cost may be negligible compared to the results.

Improve Scheduling

The chart in Figure 4 indicates still another possibility for improvement. The fluctuating load from day to day should, if possible, be smoothed out to give a more nearly constant work load. Such fluctuations usually result from poor schedules or a total lack of scheduling. By advance planning, different jobs can be alternated or staggered to use the machine for approximately the same number of hours each day. This would be a more desirable operating situation, with a minimum of machine conflicts. Scheduling is a requisite for this condition.

By putting into effect changes similar to those mentioned above, the monthly machine use chart might look more like Figure 5.

For more detailed analysis of the usage of each type of machine, the time devoted to each job or application can be indicated to show what constitutes the relative bulk of the work and the time of month when it occurs (Figure 6). Furthermore, the portion of the non-productive time alloted to machine maintenance, inspection, and repair can be shown.

For a still more detailed study of operations, the supervisor should make a comparison between his plans or scheduled operating time and the actual operating time as reported by the operators (Figure 7). This chart has great value to the supervisor. It shows how realistic his schedules are, indicates unusual departures between the scheduled time and operating time, and points up inefficient operations whether due to

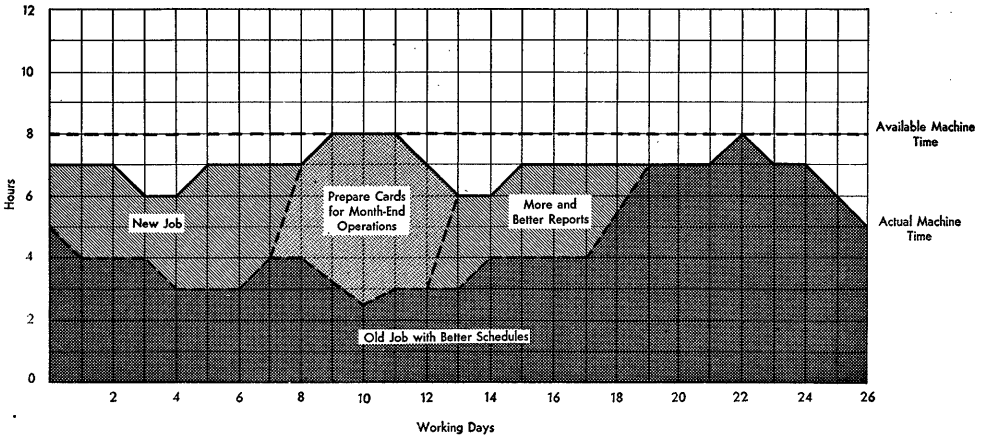


FIGURE 5. MACHINE USE CHART—ACCOUNTING MACHINE WITH INCREASED UTILIZATION

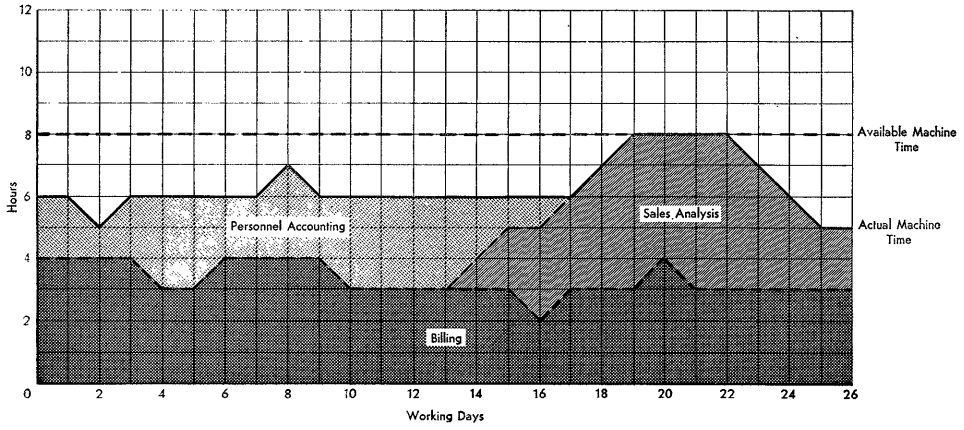


FIGURE 6. MACHINE USE CHART—ACCOUNTING MACHINE, SHOWING JOB ANALYSIS

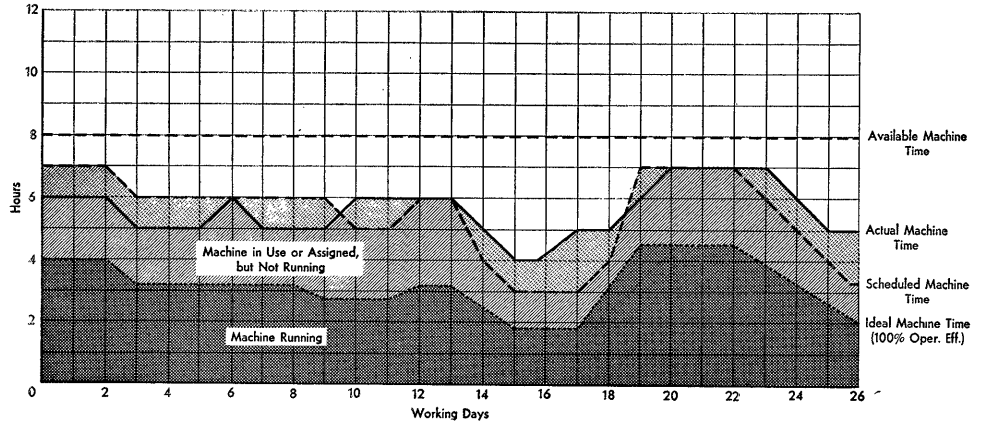


FIGURE 7. MONTHLY MACHINE USE—ACCOUNTING MACHINE, SHOWING OPERATING ANALYSIS

operator, machine, or poor scheduling. The lower line represents the ideal maximum machine time if the work of the operator were eliminated. The difference between this hypothetical time and the actual operating time represents time spent as stand-by time, checking time, set-up and wiring time, or any other non-running time.

The comparison between the actual time and scheduled time indicates how the machine operation efficiency must be revised upward or downward in future machine load and scheduling activities.

Charts of this type for specific studies are rarely prepared regularly, but are used periodically as the need occurs.

THE USE OF EVALUATIONS

IT IS EVIDENT that the possible number of comparisons and evaluation studies that can be made is unlimited. As each additional kind of fact is recorded, a whole array of new comparisons become possible. Since it is impossible to exhaust all of these, it is important that the comparisons to be made be selected carefully in relation to the most urgent and immediate problems. On the other hand, a single efficiency figure or comparison will seldom be sufficient to study adequately the operations of the department. For instance, it is not enough to know that the accounting machine is used 85% of the time. It is possible that much of this usage is being absorbed by re-running reports. An operation efficiency figure would disclose such a condition. Consequently, several significant comparisons should be made, and these should change from time to time as new problems present themselves.

Such comparisons will not solve problems. It is only through knowledge of such facts and figures that sound decisions can be made, changes instituted, and problems solved. The only purpose of evaluations is to give the supervisor a basis for making sound and economical improvements. Thus, the supervisor should be able to determine how effective his decisions have been. In other words, the supervisor needs to evaluate the use he has made of evaluation figures. It is by this means that he can answer such questions as:

> Is the cost per document diminishing from month to month or is it on the increase?
>
> Is productive capacity being utilized to an increasing extent?
>
> At what increased volume will additional equipment become necessary?
>
> Is the training program enabling operators to handle more cards per hour than they could last year?
>
> Does the greater number of transactions require that the procedure be changed to keep costs from becoming excessive?

All of these questions are related to trends. The only way such questions can be answered intelligently is to have current evaluation figures and historical records or charts of past performance. In this way, planning is effective for a long-range period, and preparations for future conditions are possible by means of forecasts made from trend curves on long-range improvement charts. Figure 8 illustrates a graph of machine usage plotted over a period of several years. The

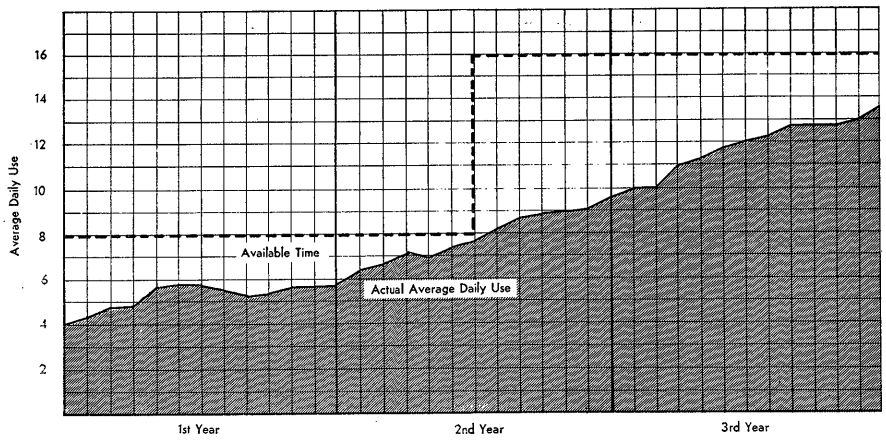


FIGURE 8. LONG-RANGE USE CHART—ACCOUNTING MACHINES

gradually rising line shows that, during the first year of operation, use increased from about 50% to 80%. This may have been due to jobs added in order to improve utilization, or to an increase in business transactions giving a rising volume of cards from month to month. If a larger work volume is responsible, it serves to indicate that around the early part of the second year, an additional machine should be ordered so that when the rising volume of work exceeds the capacity of one machine, the second machine will be installed. Or, perhaps, it may be more desirable to order the additional machine to be installed at the beginning of the third year, and make arrrangements to use the IBM Service Bureau for the intervening six months to take care of the excess work load.

The installation of the new machine doubles the daily available accounting machine time from 8 to 16 machine hours per day. It would also be advisable to search for additional record-keeping work that can be applied to the new machine to use some of the initial available time given by the additional equipment.

In the final analysis, the purpose of all improvement in a department is to raise the value of the results being produced as compared to the cost of the job. This can be done in either of two ways:

1. Increase the value of results by improving existing reports and producing more reports which have value.
2. Reduce the cost by improving methods of operation and raising efficiency.

The supervisor who is interested in raising the value of his department to the organization thinks in terms of the greatest value for a given cost rather than the least cost for a given value. The first is a program of enlargement; the second is a program of contraction.

CHECK LIST

NO EVALUATION is complete until the entire range of activity of the supervisor is reviewed and continually improved, because improvement in all of the details discussed thus far is dependent upon the capabilities of the supervisor in planning, executing, and evaluating the work over which he has control. He should be continually aware of the possibility for improvement in his net results, manuals of procedure, machine loads and scheduling, controls, evaluation methods and personnel work. For this reason, the following outline is given as a check list so that the entire scope of supervisory activity may be reviewed for consideration of possible areas of improvement in his job.

Reports: Is management receiving from the IBM Accounting department the reports it needs?

1. Do the reports contain valuable information?
2. Is the information being used?
3. Are the reports too detailed?
4. Is there provision for decoding?
5. Can the form of the report be improved?
6. Are quotas, standards, and budgets included in the reports for comparative purposes?
7. Are "same month last year," "last month," and "year to date" figures included for trend purposes?
8. Are variances given for analysis purposes?
9. Are automatic item counts being used to advantage?

General Manual of Procedure: Does the supervisor of the IBM Accounting department know what is expected of him?

1. Has he a list of all reports he is expected to produce, together with scheduled time for submitting these reports?
2. Does he know the relation of his department to other departments in regard to procedures and organization?
3. Does he have a definite schedule of availability of source documents from other departments?
4. Is there a general manual of procedure for the department which contains:
   a. Schedule of reports?
   b. Exhibit of reports and source documents?
   c. General or applicational flow charts?

Has the supervisor built adequate Operating Manuals of Procedure?

1. Has he prepared operation flow charts showing every job step or function within every procedure?
2. Is each function clearly presented to the operators with diagrams, sample cards, sample reports and documents, test cards, or other supporting exhibits?
3. Is the manual of procedure kept up to date through continual revision and adaptation to meet changing requirements and improved operations?
4. Does the manual always reflect methods which are really being followed, or is it just a historical record of what was once being done?
5. Does the supervisor use the manual to analyze his job and methods so that he may make improvements?

Machine Loads: Does the supervisor determine carefully the machine and clerical work loads?

1. Does he keep records of the time required to perform certain clerical functions which are part of his department's work?
2. Does he keep production records of each key punch and verifier operator which show:
   a. Speed in columns per hour?
   b. Accuracy in percentage of errors?
3. Does he take advantage of mechanization in determining processing time from known machine speeds and work loads?
   a. The main variable involved is the operation efficiency. This should be known for each type of machine job, and attempts should be made to raise it.

Scheduling: Does the supervisor schedule all of his expected work?

1. Can he establish definite "due-in" and "due-out" times for each job?
2. Is the processing time sufficient to control adequately his operations and produce results which are accurate?
3. Is a priority for his various jobs established?
4. Does he record his schedules in such a way that he can analyze the schedule and properly adjust it as changing requirements arise?
5. Does he cooperate with other supervisors in coordinating his schedules?

Controls: Does the supervisor have adequate control of his operations?

1. Are all source documents accounted for, while they are in custody of his department, by some visible form of document control sheet?
2. Do the procedures contain sufficient accounting controls and checks to insure accuracy of results? Specifically, do they provide for:
   a. Detecting and isolating possible errors?
   b. Recreating any transaction without the aid of memory?
   c. Establishing audit trails through control sheets, registers, and reference data?
3. How is the supervisor assured that his plans are being performed as he wishes them to be?
   a. Does he have all work in process identified?
   b. How does he direct the work through the correct series of job steps?
   c. Does he gather operating data from the operators as the work is actually performed?

Evaluation: Does the supervisor continually evaluate his work by seeking to raise the value of his results compared to a given cost?

1. Does he frequently confer with management to determine ways of making the reports more valuable?
2. Does he raise his efficiency of operation by the use of proper layout, accessories, operator test cards, and good housekeeping?
3. Does he keep records of machine usage efficiency, operation efficiency, and improvement?
4. Does he keep equipment in good working order by:
   a. Using machine test cards?
   b. Cooperating with the IBM Customer Engineers?
   c. Setting up inspection schedules?
   d. Instructing operators to clean, cover and use machines properly?

Leadership: Is the supervisor a leader of people?

1. Does he conduct an effective interview?
2. Does he know personally every member of his department?
3. Does he provide a continual training program for all his people?
4. Does he utilize supervisory ability of his people in delegating certain supervisory functions such as:
   a. Research?
   b. Planning?
   c. Personnel?
   d. Control?
   e. Operations?
5. Does he show that he appreciates the value of good morale by:
   a. Gaining respect as a leader?
   b. Providing good working conditions?
   c. Being a fair and impartial supervisor?
   d. Satisfying the basic social desires of his personnel?
6. Is he given a sufficient amount of freedom to do his job the best way he sees fit within the limits of company policy?

IBM ACCOUNTING MANAGEMENT

THE DESIGN OF IBM CARDS

INTERNATIONAL BUSINESS MACHINES CORPORATION
590 MADISON AVENUE, NEW YORK 22, NEW YORK

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International Business Machines Corporation
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Form 22-5526-0

THE DESIGN OF IBM CARDS

THE APPLICATION of IBM Accounting, and especially the design of the IBM cards around which the principle has been developed, afford a wide range for the use of ingenuity. The various accounting and statistical records which are compiled by means of the IBM Accounting principle reach into practically every phase of modern business and governmental activity. The cards themselves reflect this wide variety of business applications, and rarely are two identical card forms used by different companies, regardless of the similarity of their jobs.

In order to be able to design the most effective card for a particular procedure, it is essential:

To have a complete knowledge and understanding of the accounting and managerial reports to be made from the card and the use that is to be made of each.

To understand that the card is a tool in the hands of operators and clerks who will produce the desired reports.

To have a thorough knowledge of the procedure and machines through which the card is to be processed.

To know the rules and principles of good card design.

Although there are many basic principles governing the designing of card forms, it must always be remembered that common sense and practical experience will contribute much to the selection of the one best way to do the work.

DETERMINATION OF CARD DATA

THE FIRST step in card design is to determine the data which will be needed from the card in order to meet the requirements of the contemplated procedure. In order to accomplish this, all of the following factors must be considered, in the order presented.

Report Requirements

Of all the factors affecting card design the most important are the requirements of the finished reports that are to be prepared. These reports should be kept in mind constantly so that all necessary information may be included in the card and arranged to facilitate their final preparation. The factors so determined may be considered as the desired or ideal card requirements. Certain modifications may then be required to conform with any of the limiting conditions discussed later.

Availability of Data

The factors next in importance are determined by the sources of the original information. These must be studied to see whether all the desired data are available on the original documents to be used in punching. If not, or if too much labor is required to get them on these documents, it will be necessary to revise the list of card data, or substitute other data which will accomplish a similar purpose. A study of the source records will also determine whether a dual card can be used advantageously to replace these records. It will further show whether certain available data can be conveniently included in the card and a new use devised which was not originally planned, or which may be needed in the future. At this point, also, a study of reference punching should be made so that the card may be identified with the original record from which it is punched, if this is necessary. Dual cards will need no reference punching since they are also the original records.

Summarizing Card Data

After the above studies have been completed, the final results should be prepared in list form. This list will serve in assigning the proper number of columns to each field.

CARD DESIGN AID

TYPE OF CARD: CARD NAME: SOURCE DOCUMENT:

INFORMATION AVAILABLE AND REQUIRED FOR REPORTS	COLUMNS IN OTHER CARDS	SEQUENCE ON SOURCE DOCUMENTS	METHOD OF PUNCHING	R - REFERENCE C - CLASSIFICATION Q - QUANTITATIVE	CARD FIELD SIZE		INTERPRETATION		
					TRIAL	FINAL	FIELD	SIZE	ORDER
DE-1-0124-1				TOTALS→					

FIGURE 1. A WORKSHEET FOR CARD DESIGN

PRELIMINARY WORK FOR CARD DESIGN

A WORK sheet similar to the Card Design Aid illustrated in Figure 1 should be used to list the information which must be placed on the card and to record the results or decisions made in the preliminary work of designing cards.

Information Available and Required for Reports

This list of information is made by studying the reports and documents. Information which is to appear on the reports (except calculated and summarized data) must be punched in the card. The sequence of this listing is of minor importance at this point.

Columns in Other Cards

One of the most important factors to be decided in assigning card fields to the information is the alignment principle. A given item of information in the new card should be placed in the same columns previously assigned to it in other cards.

An IBM card designed to be used in various IBM accounting machine operations with other types of cards (such as a customer name card used with accounts receivable cards to list a Statement of Account, a daily time ticket used with labor distribution cards to obtain zero balance, or a labor distribution card with material distribution cards for cost analysis) must be aligned with these cards in the common control fields, and any other common types of information in the several cards should be placed in corresponding columns. This assures that fields for sorting and controlling will be placed in the same columns on all cards to be used together. Control panel wiring is facilitated when quantitative fields are placed in the same columns on all cards used together.

Figure 2 is a convenient layout form for planning several cards so that the alignment principle can be followed. After the major outlines of the card design have been planned, a separate form should be used for designing each card form in detail.

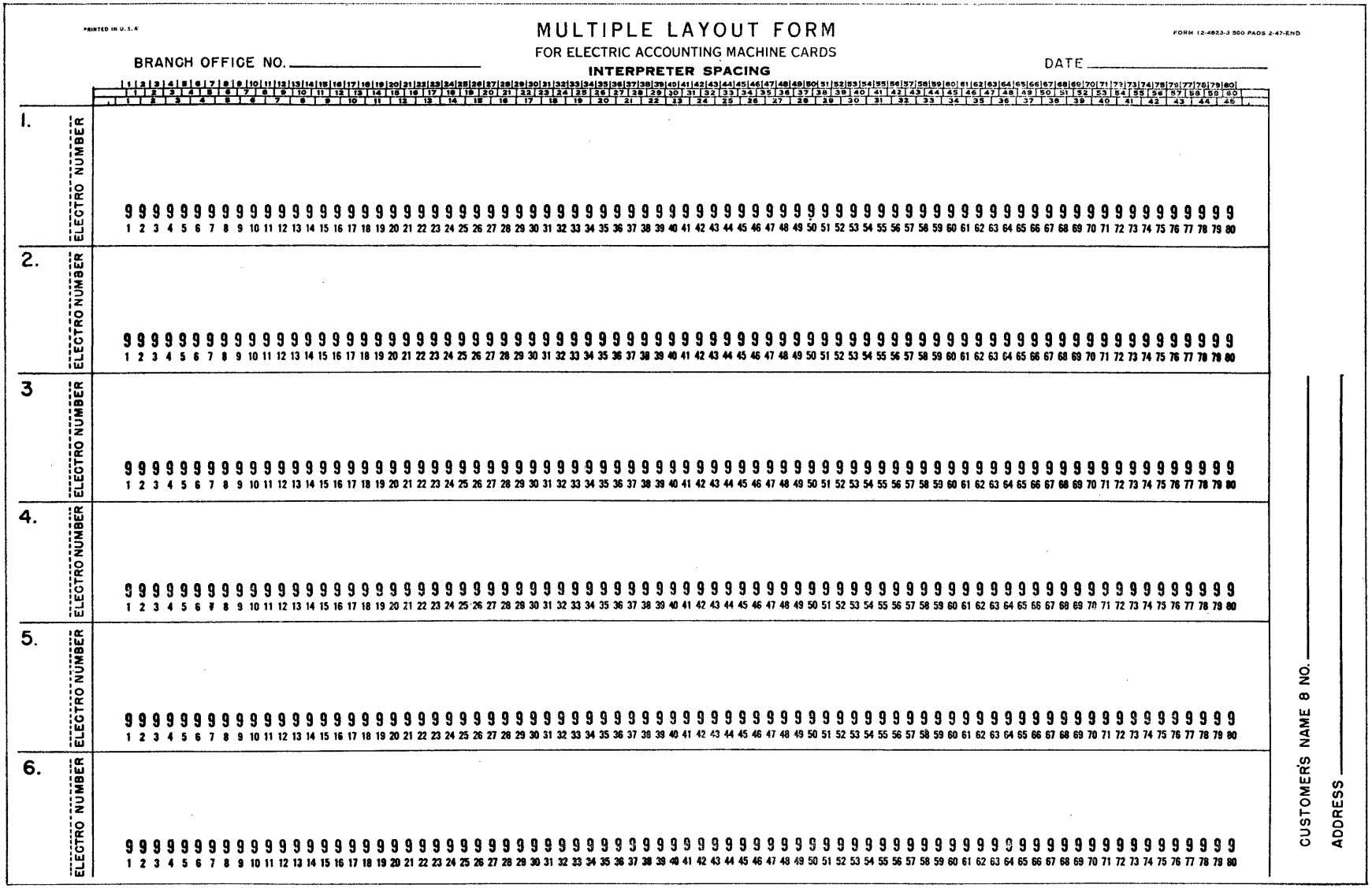

FIGURE 2. MULTIPLE CARD LAYOUT FORM

Sequence on Source Documents

The fields of the card to be manually written or key punched should be arranged so that information can be read from left to right or from top to bottom on the original document. The key punch operator's task is greatly speeded if the information to be punched into the card is in the same order in which it appears on the source document.

Method of Punching

Assign to each field the method by which it will be punched, i.e., key punched, duplicated, summary punched, gang punched, or multiplied. All like punching operations should be grouped together to simplify wiring, and to eliminate interspersed skipping on the key punch.

Types of Information

All information will be one of these three types:

Reference—to identify the original source (date, invoice number, batch number).

Classification—to cross index and classify the transaction to produce the desired summaries (state, department, part number).

Quantitative—To be added, subtracted, multiplied or divided (quantity on hand, unit price, sales amount).

After each item of information is so classified, consideration may be given to the following arrangement: reference information should be placed to the left of the card; classification information should be placed in the center of the card; quantitative information should be placed to the right of the card.

These four important considerations have been discussed in the order of their importance in determining the position of information on cards. It is evident that frequently there will be conflicts among these requirements, and when such conflicts arise, it is necessary to use good judgment in resolving them on a priority basis. To summarize, the usual priority is as follows:

1. Columns in other cards
2. Sequence on source documents
3. Method of punching
4. Type of information

Size of Fields

The number of columns required to record each type of information should be added to the memorandum list previously mentioned. For reference and controlling fields, this is determined by the largest single number to be recorded, as indicated by the codes which have been devised for the machine application. Thus, two columns might be left for month (twelve being the largest number), two for day, four for invoice number if the number series is repeated after 9,999 is reached, and two for branch if there are 99 branches or less.

With the quantitative fields, the problem becomes more difficult. In the first place, the space needed to record the largest amount may not be known, and in the second place, this amount may be very unusual. It is a good plan to provide columns enough to take care of all except the unusual cases, and to handle these by punching extra cards or by using the class selection device. For example, the amount $67,265.80 may be recorded in a six-column field by punching six cards of $9,999.99 and one card for $7,265.86 (or any combination of six-digit numbers totaling $67,265.80).

Attention should be given at this time to the possibility of consolidating certain fields on the card. The original list may include several types of information which can be carried in a single field if they do not occur simultaneously. Successive cards may be used where a spread of the data fields is not desired. This applies more particularly to quantity and amount fields.

The total of the columns assigned to all fields will indicate whether the data are within the capacity of the card, or exceed it. When the columns total less than about 100 columns, the decision must be made whether to use two cards or to reduce the number of columns to 80. If the total num-

ber of columns reaches 100 or more, it is evident that more than one card is needed. This requires separating or classifying the desired information to determine what information is to be placed in which cards. Such a division may be based upon any one of several schemes:

1. Place repetitive or recurring information in one card and temporary or non-repeating information in the second card, as in the case of master cards and detail cards.

2. Use different cards for different source documents, or make one of the new cards a dual card to be used as a source document.

3. Use different cards for different degrees of detail, or as "double entry" cards each of which affects two different accounts. Examples are accounts payable and payables distribution cards, accounts receivable and sales cards, payroll and labor distribution cards.

4. Use separate cards to produce the desired form of report. A billing job may contain heading cards, miscellaneous data card, and detail commodity cards, for the reason that such arrangement gives the simplest procedure and the best form of invoice.

In those cases where the preliminary draft of column requirements shows a need for a few columns more than the capacity of a card, some of the following expedients may be used to bring the requirements within the range of the card capacity without dropping any fields.

1. Reducing the size of reference or controlling fields by having these fields serve as subclassifications of other fields. Thus, invoice numbers may start with "1" each month instead of being numbered separately; or a separate series of salesmen's numbers may be used for each branch, instead of one series for all branches.

2. Reducing the size of reference or controlling fields by recoding to eliminate one or more digits.

3. Reducing the size of reference or controlling fields by ignoring one or more digits which may not be essential. Thus, it may be possible to punch only four digits of a six-digit invoice number and preserve positive identification.

4. Reducing the size of quantitative fields where amounts seldom exceed the capacity of the reduced field.

5. Recording in the 11th and 12th positions information which is never used for printing. This can best be used where the information to be punched is the same for large groups of cards.

6. Using multiple-punching in certain columns to reduce the number of columns required. This practice should be avoided where fields are to be listed or added, but may be very desirable in fields which are to be sorted only.

7. Using the class selector to distribute a carry-over amount which has been punched as a second card. Thus, a card punched 7,265.80 and one punched 000006 can be selected to produce 67,265.80 as the desired result, saving one column in the amount field.

8. The group sorting device may be used to eliminate common information from detail cards.

Interpretation

Determine the fields to be interpreted. Arrange them according to the method of filing the cards, with the most important information in a prominent location for easy reference.

If the total of the fields to be interpreted exceeds 45 characters with a Numerical Interpreter, or 60 characters with an Alphabetic Interpreter, eliminate unnecessary fields to be interpreted; or, with the Alphabetic Interpreter, interpret the remainder on the second line.

MACHINE CONSIDERATIONS IN CARD DESIGN

A FEW basic restrictions must be observed in designing cards if all the advantages of IBM ac-

counting are to be obtained. Actually, the rules are not limitations of the accounting routine, but they are standards that have been generally accepted so that uniform machines could be designed to perform the task of accounting more automatically.

Card design rules which are based upon machine specifications are grouped under the names of the machines to which they apply.

Key Punches

1. When less than the full number of columns of a card are to be punched on machines in which cards are manually fed, the punched fields should be placed at the right-hand end of the card.

2. No columns are visible on the key punches equipped with automatic card feeding when the card is fully inserted, the Alphabetic Printing Punches excepted. On these latter machines the top half of the card is visible except for the half-inch on both sides of the column being punched.

3. Fields to be duplicated should be grouped together and placed at the left end of the card.

4. Manually punched fields should not be interspersed among duplicated, gang punched, reproduced, or summary punched fields.

5. Fields that are always skipped, or X-skipped, should be as uniformly placed on various card forms as conditions will allow.

6. As a general rule the left side of a tumble card should be inverted when using manually fed punches; the right side should be inverted when using automatically fed punches.

7. On alphabetic printing punches, the printing appears at the top of each column and requires $\frac{3}{16}''$ from the top edge of the card.

8. On alphabetic punches, locate numerical fields together so that operator need not change from one keyboard to another more than once during the punching of the card.

The key punching operation is the only step in the IBM machine method of accounting which is not fully automatic. It is, therefore, the only phase in which the rate of production is subject to variation. Anything which can be done to simplify the work of the operator will tend to increase the rate of punching and consequently reduce the time required for the preparation of management reports.

The value of early reports makes it necessary to take every precaution in the design of cards to avoid any factors which will retard punching speed. Careful consideration should be given to these factors:

- Provide for the use of the duplicating punch and master code cards, or other automatic punches, whenever possible.
- Align fields to be skipped in such order as to accomplish the work with a minimum number of skip bars.
- The sequence of punched fields should be the same as that of the data to be punched from the original document.
- Eliminate the punching of unnecessary zeros by keeping the size of fields down to the number of columns that are absolutely essential for efficient handling of the majority of transactions.
- Do not have fewer columns in the field than are required to handle most of the transactions.
- Proper use of indicating cards and group-sorting cards will frequently eliminate the necessity for providing for some of the punched fields on detail cards.
- Provide for most legible records, especially in the design of dual cards.
- Give consideration to the use of prepunched cards.

Sorters

1. Whenever a card is to be used for statistical analysis, it is advisable to combine several classes of statistical data in a single column. This is es-

pecially true of alternative responses on questionnaires.

2. The eleventh and twelfth punching positions can be utilized for recording reference data to be sorted but never printed.

3. If the multiple column selection device is to be used to select simultaneously a group of cards from two or more small fields, they should be adjacent in order that they will appear under the ten adjacent brushes.

Accounting Machines

1. Control fields must not be skipped. Zeros must be punched in columns if other digits do not appear.

2. The eleventh position (X) punching which governs class selection or subtraction should never be placed over fields used for automatic control or alphabetic printing.

3. Data to be listed or added must be confined to the positions from 0 to 9. The eleventh and twelfth positions can be printed only on special types of machines.

Auxiliary Machines — Interpreter

1. If there are several changes of machine set-ups in the interpretation of 80-column cards, the changes in set-ups will be simplified by indicating the type bar numbers in the printing spaces.

2. In the design of cards which are to be interpreted by the Check Writing Interpreter, spaces should be provided which will permit the printing of characters in the following positions:

(a) Above the 12 position, as on the standard Interpreter
(b) Between the 12 and 11 positions
(c) Between the 11 and 0 positions
(d) Between the 0 and 1 positions
(e) Between the 1 and 2 positions

3. Check amounts are ordinarily interpreted on the lowest line of printing as shown above. The center of the type is on a line 1 1/8" from the top edge of the card.

4. In those positions in which special width pin-point type bars are used for interpreting money amounts, 10/32" must be allowed for the width of each type character. One special pin-point character requires the same space as two ordinary interpreted characters.

Multiplier and Calculating Punch

1. Fields for the products of multiplications or results of cross-footing operations should be placed as near to the right-hand end of the card as possible.

2. Fixed multipliers may be eliminated entirely from detail cards and read either from master cards or from the machine.

3. The factors to be multiplied may appear in any columns of the card.

Summary Punch

1. Fields to be duplicated, pre-indicated, or manually punched in cards that are being summary punched should appear to the left of the columns reserved for counter totals.

2. Fields to be punched from counter totals should be as near the right-hand end of the card as possible.

BASIC TYPES OF CARDS

THE CHOICE of the type of card to be designed frequently can be made only after making the preliminary study of reports, procedures, and machine operations discussed in the previous sections. IBM cards are generally of four basic types:

Transcript Cards are punched from information previously recorded on another document.

Dual Cards are punched from information recorded on the card itself, that is, the card serves a dual purpose as source document and card.

Mark Sensed Cards are automatically punched from pencil marks recorded in significant positions on the face of the card.

Summary Cards are automatically punched with totals resulting from accumulated results in the Accounting Machine or Calculating Punch.

Transcript Cards

The following pointers apply specially to the design of transcript cards:

1. Perhaps the most important rule of transcript card design is the one governing the sequence of punched fields. It is absolutely essential to place punched fields in the same sequence as the data being transcribed from the original document. This facilitates key punching and, consequently, speeds up the entire procedure.

2. All single column fields should have decoding abbreviations placed above each corresponding punching position.

3. Wherever letter type codes are used, the corresponding numerical symbols on the card should be replaced by the alphabetic characters. These should be placed slightly above the punching positions so that they will not be obliterated.

4. Whenever complement fields are used, the digits 1 to 8 should be omitted in the first column at the left of that field.

5. Whenever fraction wheels are placed on the Accounting Machine, the card columns reserved for use in recording fractions should contain only the digits corresponding to the denominator of the fraction less one. For example, if a fourths wheel is used, the column would contain only the numbers 1, 2, 3; if an eighths wheel is used, the column would contain the numbers 1, 2, 3, 4, 5, 6, 7.

6. Field headings should usually be placed along the top of the card, between the zeros and the edge, unless interpretation is provided for.

7. Field headings should be as explicit as possible. Avoid the use of obscure abbreviations.

8. Every transcript card should carry a field for reference punching which will positively identify the punched card with the original document from which it was prepared. A sales card, for example, will usually have the invoice number punched on it, or invoice date and customer may sometimes be used when card capacity is limited; in other cases the date and the last two digits of invoice number may be sufficient.

9. Avoid unnecessary duplication of reference data, such as the use of both order number and invoice number when one would provide adequate reference.

10. Whenever alternative information is to be recorded, one field should be used instead of two. For example, sales reference punching would serve to identify either an invoice or a credit memorandum; therefore a single field heading "Invoice or Cr. Memo. No." would suffice. The use of two fields — one headed "Invoice No." and the other "Cr. Memo. No." would be a waste of valuable card capacity since only one reference number would ever be punched on any one card.

11. Since no written information appears on the card, any color or striping of cards may be used.

12. Purely reference information which is never to be printed by the machine may be placed in the 11 and 12 positions of a column, or in columns set aside for multiple-punching.

13. Vertical lines used to separate fields should be drawn midway between the columns of numbers and should not reach beyond the line of column numbers at the bottom on the card.

14. Whenever five or more columns appear in a single field, dotted lines should be drawn to mark off the position of the decimal point, where it is involved, and other periods of numbers in groups of three columns.

15. It is absolutely essential that punched classifying information which is to be used for purposes of automatic control on the accounting

machines be placed in the same columns on all cards that are to be jointly processed.

16. Alignment of fields which contain data to be accumulated simplifies machine wiring for joint runs.

17. Fields for products of multiplications and summary punched totals should be placed at the right-hand end of the card for maximum machine efficiency.

18. Whenever several different card forms are to be processed together, the card form with the greatest volume should be designed for maximum efficiency. The other cards may then be made to conform with the limitations of the card with the greatest volume.

19. Twenty columns for the alphabetic punching of names is sufficient for most work. This should be carefully checked, however, on each individual job. A recent study of the columns required for recording names and addresses reveals that 95% of names of individuals can be recorded in 18 columns or less; that 95% of names of companies require 20 columns or less; that 90% of street addresses require 18 columns or less; and that 99% of cities and states (abbreviations) require 20 columns or less.

20. Be sure that the column capacity of each field is sufficient to take care of all recording except the very unusual items.

21. When designing tumble or sectional cards, be sure that the two types of work have approximately the same card volume. For instance, it would be impractical to combine sales analysis and voucher distribution on a tumble card if there were 200,000 sales items and 30,000 voucher items each month. Under such conditions 170,000 cards a month would be unused on the tumble section.

22. The nature of tumble and sectional cards ordinarily does not permit their use as dual or permanent record cards.

23. Every card form should carry the IBM industry classification code of the user. The code number is printed on the bottom center or along the end, depending upon the method of card printing.

Figure 3 is a convenient form for the layout work of designing transcript cards.

Dual Cards

Dual cards incorporate all of the principles involved in the design of transcript punched cards, as well as some additional distinctive features to facilitate their use. The design of dual cards is especially important because of their use in departments other than that in which the accounting machines are actually used. They may be found as requisitions, payroll tickets, and miscellaneous shop records throughout the plant, and therefore simplicity of design becomes one of the most important factors.

Dual cards have attained a rather wide use not only because of the part they play in the actuation of the accounting machines to prepare final reports automatically, but also because of the fact that original records may be automatically sorted in any desired sequence. In this manner the actual original document can be analyzed for any specific detail without the necessity of preparing a complete report. The dual IBM card presents the only automatic means of sorting original documents.

A dual card, as an original record, must satisfy accounting requirements. To do this it must contain all the data relative to a given transaction so that pertinent facts may be reconstructed without the aid of memory. Because of the limitations of the size of the card, care must be exercised to provide ample room to meet this requirement and still not permit the possible obliteration of the data in subsequent punching operations.

One of the factors most frequently overlooked in the designing of dual cards is the incorporation of radical changes in what is to be the new original

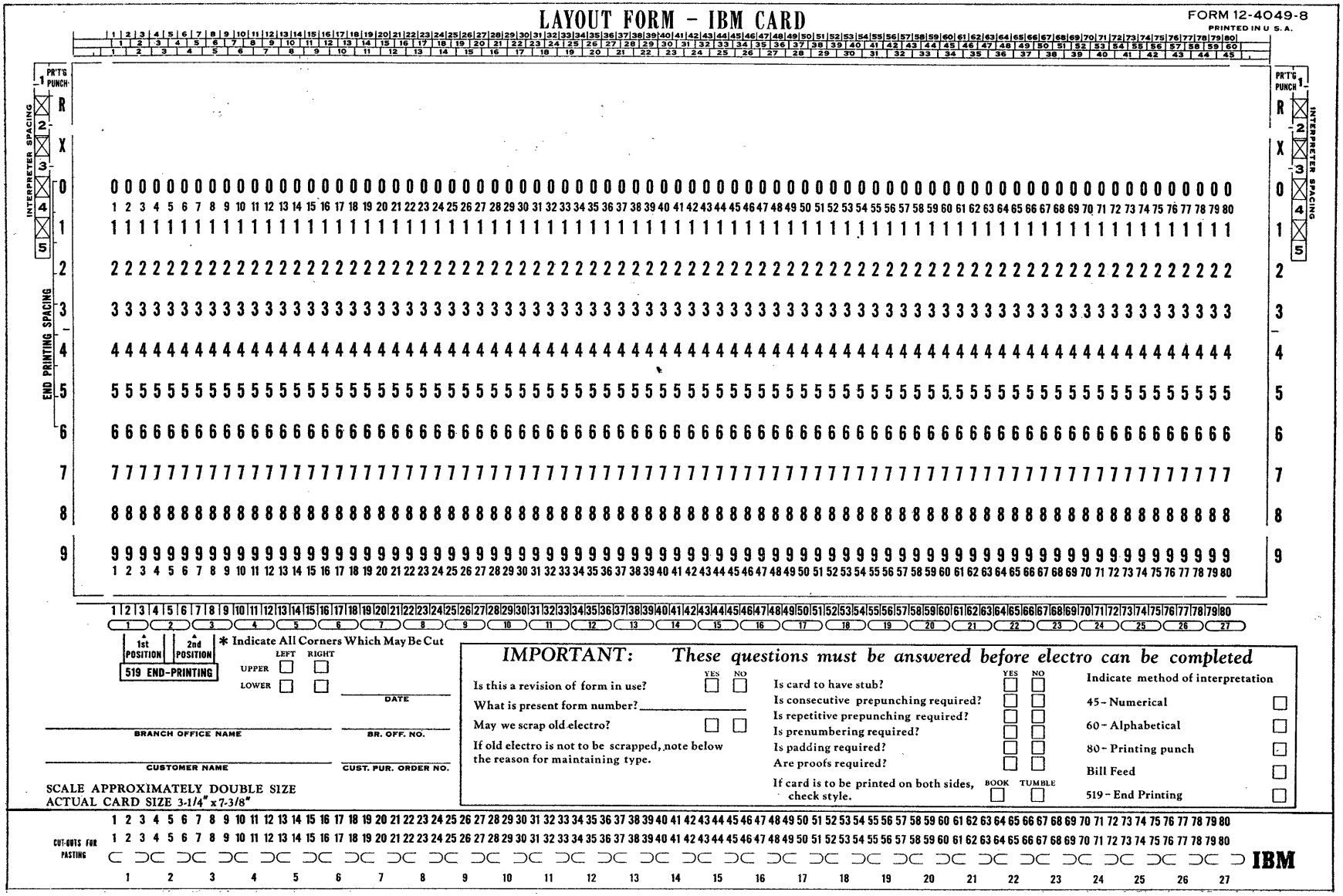

FIGURE 3. TRANSCRIPT CARD LAYOUT FORM

document. If the maximum efficiency of all clerical departments using the record is to be attained, the form of the IBM cards should resemble as closely as possible the original form which it is about to displace. Only in those instances where definite operating advantages are going to be obtained should the design be varied from the accustomed form.

The following pointers apply to the design of dual cards:

1. Generally the written information should be placed on the left end of the card to obtain visibility of recorded data while punching, except when Alphabetic Printing Punches are used. This type of punch permits complete visibility of the top half of the card except the half-inch to the left and right of the column being punched.

2. Punched fields should be placed at least 14 columns on an 80 column card to the right of the written data to be punched.

3. Dual cards, generally, should not be designed as multiple-use cards.

4. Written descriptive information should be placed in the portion of the card reserved for punched fields. This information may be readily reconstructed even though part of it may be obliterated by punching.

5. Horizontal lines should be drawn through the mid-points of the regularly printed digits. This will cause the writing to be located in such a position that it will not be obliterated by punching.

6. Do not punch purely reference information. As the dual card is the original record, no cross-reference is required.

7. Retain as many as possible of the column digits which show the positions of punching. This facilitates the reading of the punched holes wherever it may be necessary.

8. Filing information should be placed across the top or end of the card, depending upon the method of filing to be used.

9. Field headings for dual cards may be placed at either top or bottom of card.

10. Follow as closely as possible the appearance and arrangement of previously used forms to reduce to a minimum confusion in record-keeping due to changes.

11. The design of the section of the card reserved for punching should follow the rules for transcript cards.

12. Printed headings of spaces for written information should be placed so that the writing will be forced into the desired location.

13. Information to be checked visually should be placed at the left end for convenience in fanning.

14. Related information should be grouped for efficiency in recording, and ease in performing any manual calculations.

15. Adequate space should be allowed for writing. Leave ample space for remarks and descriptions. Horizontal lines for descriptive writing may be drawn in the section of the card later key punched. They should be drawn through the mid-points of punching positions so that writing will be located where least obliteration from punching will result. Provide space for authorizations or auditing information.

16. Provide for automatic printing when possible by means of addressing plates or time stamps. Measure the spacing accurately.

17. The card may serve multiple uses. One form may serve for several related records.

Figures 4 and 5 are layout forms which facilitate the design of dual cards and IBM Checks, which are a special kind of dual card.

Mark Sensed Cards

The increasing use of cards as source documents has caused mark sensing to be used to an increasing extent. Whenever clerks or other employees can be trained to mark cards properly, key punching can be reduced or eliminated. It is well to

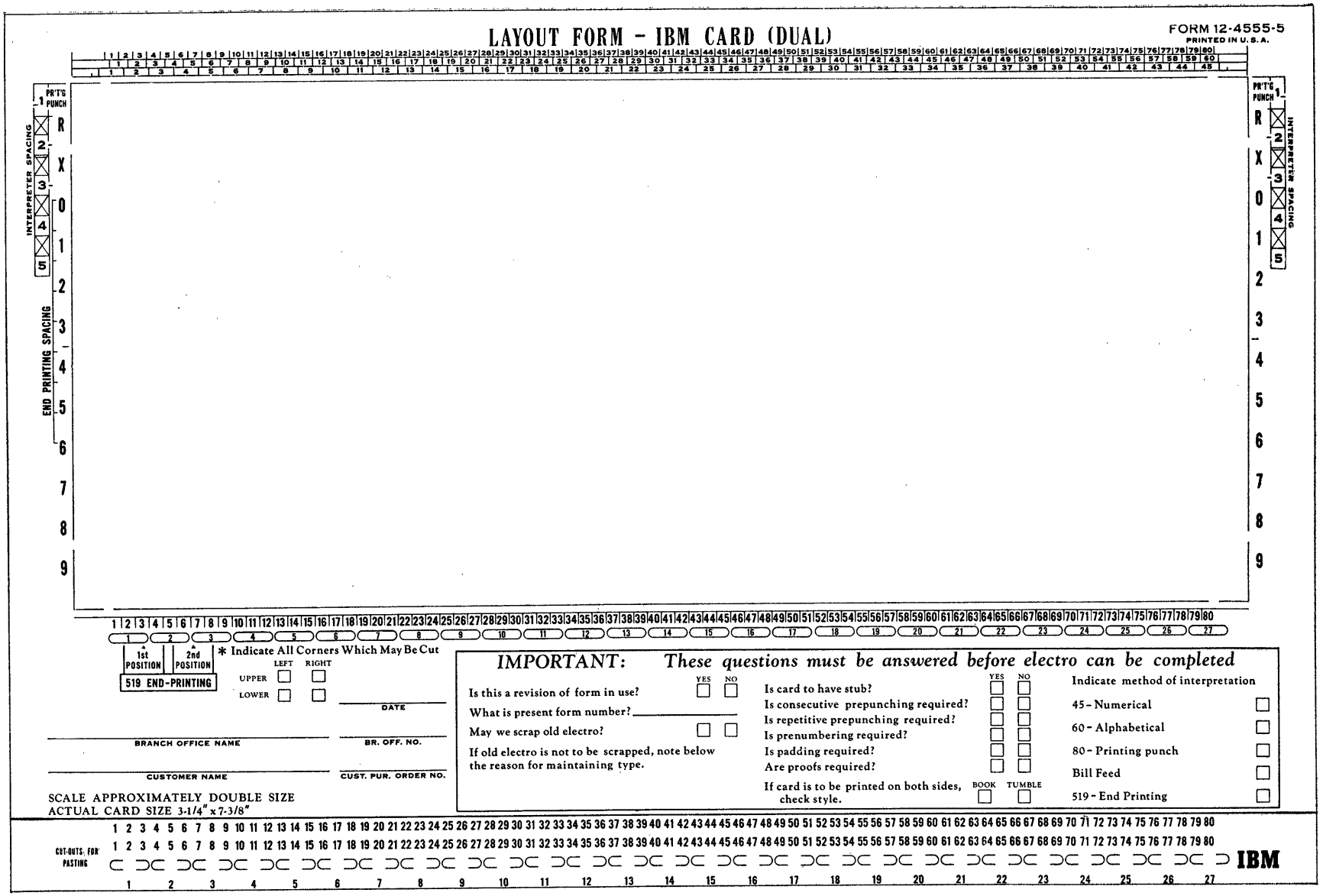

FIGURE 4. DUAL CARD LAYOUT FORM

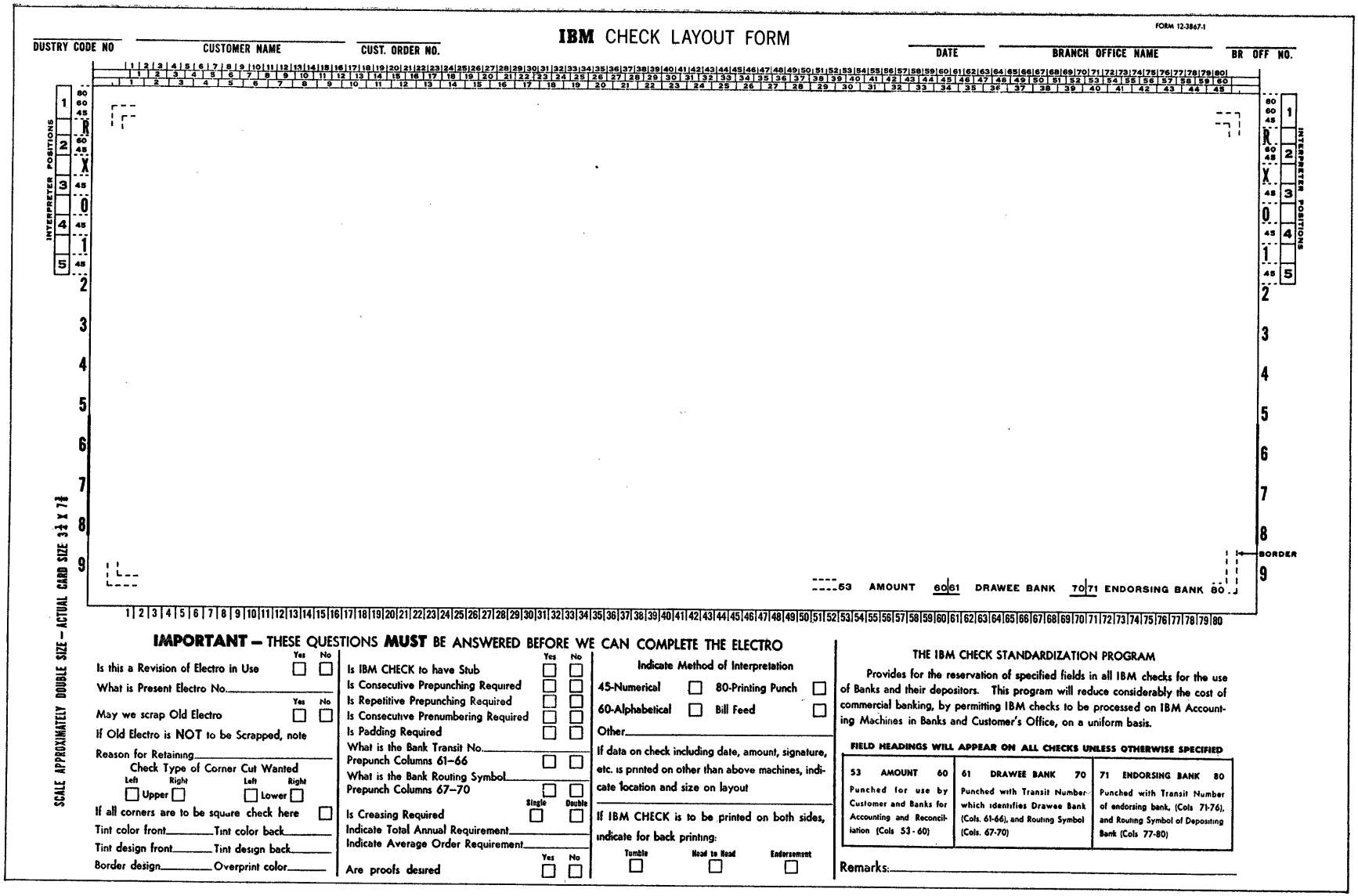

FIGURE 5. IBM CHECK LAYOUT FORM

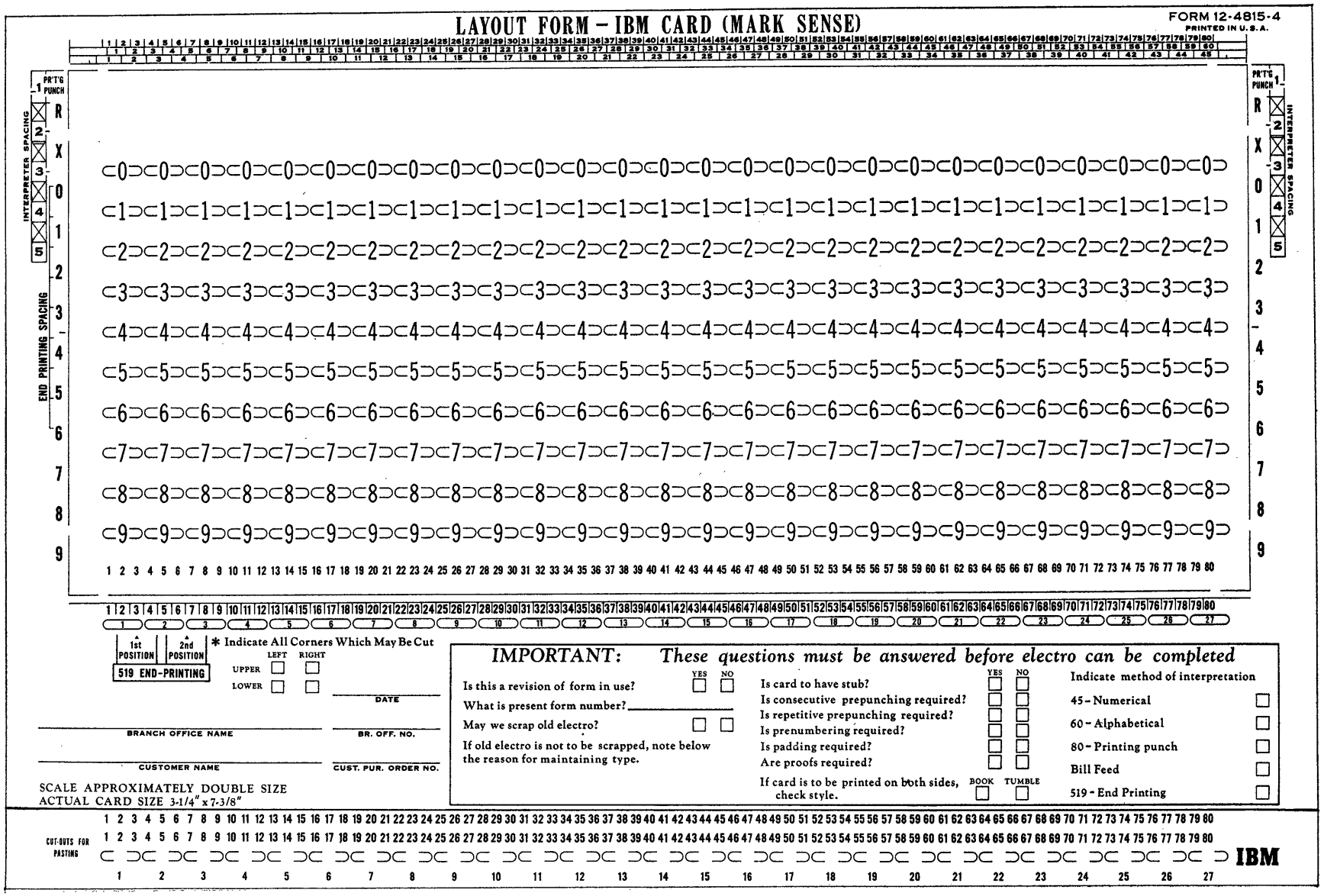

FIGURE 6. MARK SENSED CARD LAYOUT FORM

bear the following pointers in mind in designing mark sensed cards:

1. Place marking fields on the right side of the card. This allows the operator to hold the card conveniently while marking it.

2. A marking position is three-columns wide, starting with columns 1-3, 4-6, 7-9 for 27 three-column fields ending with 79-81. The marking fields must be designed over the correct card columns; the right-hand column of any mark sensing field will always be divisible by three. Each marking position is located immediately above the punching positions so that punched holes will not obliterate the marks.

3. Arrange marking fields in sequence for easy marking.

4. The marking field may be designed over punched fields.

5. The marked information may be punched in any columns on the card.

6. Include headings for all marked fields.

7. Indicate cents, decimals and commas by broken or hair lines.

8. Signatures and other writing should be placed as far from the marking fields as possible.

Figure 6 illustrates a convenient layout form for designing the mark sensed portion of a card. Sections of this layout are usually cut out and pasted on a layout form for dual cards or transcript cards.

Summary Cards

It is frequently necessary to design separate summary cards to allow for the larger quantitative figures which will appear as summary totals. It is frequently desirable to add other information such as year-to-date figures, balance-forward, and certain indicative information. The quantitative fields should align as nearly as possible with similar fields in the detail cards so as to simplify procedures and machine operations.

DRAWING THE DESIGN

IN PROCESSING newly designed cards, a great many delays and misunderstandings may be avoided if the card drafting on the layout form is done in a clear and concise manner.

A primary principle to remember as a guide in designing the card is to keep in mind who will read the printed information on the card. Machines cannot read the printing on cards. Such printing is provided as a convenience to the machine operators and clerks who will be handling the cards.

General Pointers

The following general pointers will be helpful to the designer of IBM cards, in drafting the final layout form.

1. The name of the company should appear on all of its record forms, and its trademark should be printed on all documents which reach outside organizations or individuals.

2. All essential reference information should be placed at or near the top of unbound forms to facilitate the filing and locating of permanent records.

3. Headings or titles of spaces for written information should be placed so that the actual writing will be forced into the desired position.

In Figure 7 one of the cards shows how a violation of this rule results in inconvenience. The other, a more desirable arrangement, forces the writing closer to the top. When block headings are printed at the top of a space, reference information is forced down below the point of ready visibility.

4. Information to be checked visually should be placed at the left end (or sometimes the right) of the document for convenience in fanning.

5. All related information should be grouped and placed in the position which will promote efficiency in recording. For example, on a job time

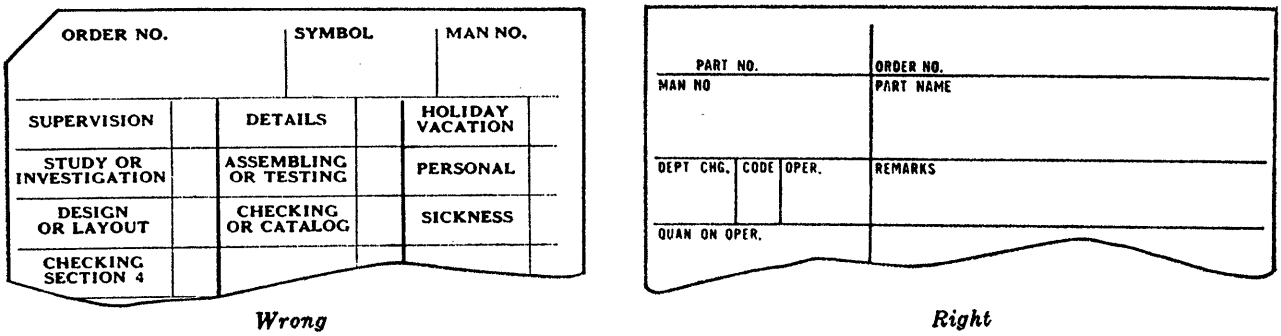

FIGURE 7. DESIGN OF BLOCK HEADINGS

record, hours should be in position for convenient notation after subtraction of start and stop time. All data recorded by shop clerks or workers should be placed together for convenience. Time registration at margin should be in sequence to facilitate visual subtraction. Rate should be located between hours and pieces to facilitate either calculation.

6. Adequate space should be provided for large writing where records are to be made by workers and not by regular shop clerks. The average machine worker is not a skilled penman and may frequently use a thick lead pencil which will necessitate provision for two or three times the minimum amount of space required by a regular clerk.

7. Ample space should be furnished for recording additional miscellaneous remarks and descriptions. Several lines may frequently be required, and therefore a large portion of the unused space may be devoted to this purpose.

8. Essential written information should be reduced to a minimum of manual recording by providing for automatic printing (such as time stamps, addressing plates, etc.) and by marking preprinted descriptions whenever practical.

9. Company slogans should appear on record forms which have wide circulation in several departments. Safety warnings to factory workers are most common.

10. Titles or descriptive headings should always be the same for like items whether they appear on various documents or at different places on the same document.

11. All duplication of items which must be recorded manually or semi-automatically should be eliminated.

12. The limitations of mechanical recording equipment such as typewriter spacing, clock registration, serial numbering machines, addressing machines, stamps, etc., should be checked carefully, in order to provide the proper position and ample room for printing.

13. When large numbers are to be written, make provision for guide lines or dots to designate the position of digits or periods of numbers. This corresponds in principle to the pen-ruling of amount fields on journal and ledger sheets.

14. The color for paper stock upon which the form is to be printed should be one that will not interfere with the utility of the record. Plain white or yellow is satisfactory and economical, but if colored paper is used to facilitate the segregation of various kinds of documents, the light colors should be used to increase the legibility of written information.

15. Care should be taken to place essential permanent information in such a position that it will not be obliterated or destroyed by stamps or punches, or torn off with detachable stubs.

16. The possibility of multiple uses should be considered. Make one document serve as a standard form for as many related records as possible. For

example, a material requisition can usually be designed to provide for recording returns to stock.

17. New documents which are to replace those already in use should be as similar to the old document as possible in order to reduce clerical confusion.

18. When the document is completely drawn up it should have a good symmetrical appearance.

Drawing the Design

Drawing the design of a given card may require the use of several layout forms: A basic transcript card form, with a section of the dual card form pasted on, and also a section of the mark sensed layout form for the mark sensed fields. In this way, the design is built up from the basic layout forms.

Using the necessary layout forms, draw the lines and write in the headings in accordance with the preliminary work sheet or card design aid. In drawing the design, the following details should be kept in mind.

1. Indicate accurate start and stop points for each line. Margins are obtained by lines (horizontal as well as vertical) that terminate at an even distance from the edge of the card. Neatness is obtained by eliminating unnecessary lines around the edges of cards.

2. Indicate heavy or light lines as desired.

3. Indicate dotted or broken lines as desired. Amount fields should indicate the decimal point between dollars and cents by means of a dotted line or a very thin line drawn vertically between columns. Large fields should indicate the comma positions between hundreds and thousands, by similar vertical lines.

4. In printing the desired headings, use correct spelling and abbreviations. Avoid obscure abbreviations; headings should be explicit. Headings should be similar to like items as they appear on other documents.

5. Indicate the correct position of printed words, printing horizontally when space permits. Avoid hyphens if possible. Avoid vertical printing, one letter underneath the other.

6. Indicate relative size of printed headings.

7. Indicate punctuation if needed.

8. Include decoding information for one-column code fields if possible. Letters or abbreviations may be printed directly above the punching positions and the number may be omitted.

9. Headings across the body of the card may specify the type of punching required on different sections: duplicating, gang punching, key punching, etc.

10. Consider placing many headings on the same card for multiple use of a single card form. Be sure the heading to be used for a given purpose is clearly identified, preferably by a digit punch opposite the desired headings.

11. Print the name of the card and the name of the company across the end of the card. Trademarks or slogans may be included.

12. Give the design a symmetrical appearance.

13. For a card used with the Alphabetical Printing Punch, continue the vertical lines that divide punching fields to the top edge of the card in order to facilitate reading of interpretation.

14. In interpretation blocks, print decimal points in "amount" fields and commas where large numbers are to be read.

15. Design the card for the interpretation of only the essential fields.

16. Place the most important reference number at the upper left corner of the card for ease in filing and locating the card.

17. Place interpreting field headings across the top of the card just beneath the printed interpretations and the punched field headings across the bottom of the card.

18. Print interpreter type-bar numbers beneath interpreting field to indicate first and last type-bar for each field.

Upon completion of the new design, answer all questions at the bottom of the layout form.

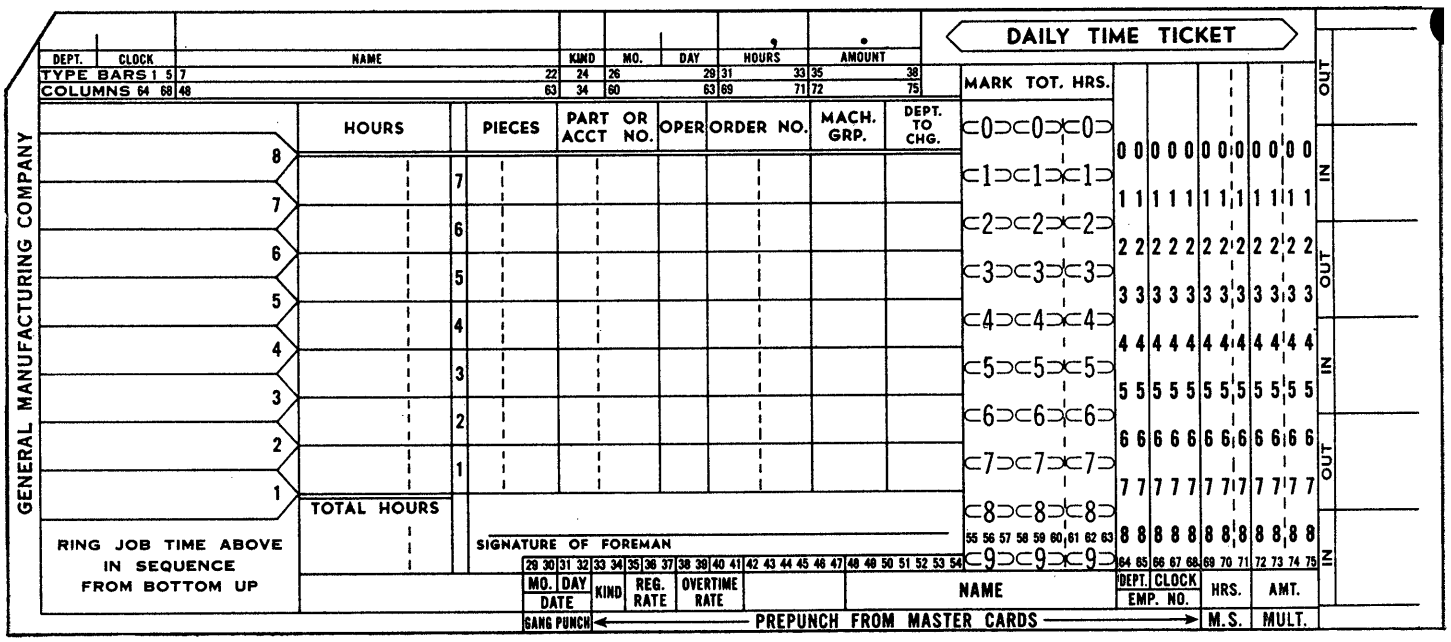

FIGURE 8. DAILY TIME TICKET

TYPICAL DESIGN OF A CARD

IT HAS BEEN determined that the information necessary for labor distribution reports, which can be obtained from the daily time ticket (Figure 8), is as follows:

Order Number
Employee Number (Department and Clock No.)
Regular Rate
Overtime Rate
Part or Account Number
Pieces
Operation Number
Machine Group
Department Charged
Kind of Labor
Amount
Hours
Date (Month and Day)

This information is listed in the left column of the Card Design Aid (Figure 9).

From the daily time ticket, it is found that certain items in this list of information are punched in the time ticket card. These columns are recorded in the next column headed "Columns in Other Cards."

The information to be key punched in the distribution card is as follows:

Order Number
Employee Number
Part or Account Number
Pieces
Operation Number
Machine Group
Department Charged
Hours

The sequence in which this information appears on the time ticket in printed or written form is indicated in the next column headed "Sequence on Source Documents."

From the proposed procedure it has been determined that the following information can be gang punched:

Date
Kind of Labor
Regular Rate
Overtime Rate

"Amount" is to be punched on the Calculating Punch. The remaining information must be key punched. This information is recorded in the next column headed "Method of Punching."

To classify information, indication is made in the next column as to whether each item is reference, classification, or quantitative information.

A study of the coding system used for classification information and experience with the number of digits needed to record quantitative information determines the card field size. This totals 47 columns, which is well within the capacity of one card, and no consideration need be given to the use of a second card. The same numbers are therefore repeated in the "final" column.

From past experience and from the proposed procedure, it is believed that visual reference will possibly be made to the cards in connection with the following items of information:

Order Number
Part or Account Number
Operation
Machine Group
Department Charged
Pieces
Date
Hours
Amount
Kind of Labor
Employee Number

These items, therefore, are checked in the next column headed "Interpretation." The number of type bars needed is the same as the number of columns for punching, and is so indicated in the next column headed "Size." These 40 columns may be interpreted on one line.

The "Order of Interpretation" is next determined and recorded. Since the cards are to be filed by "Order Number" this is placed first in order so that it will be in the upper-left corner

CARD DESIGN AID

TYPE OF CARD: CARD NAME: SOURCE DOCUMENT:

INFORMATION AVAILABLE AND REQUIRED FOR REPORTS	COLUMNS IN OTHER CARDS	SEQUENCE ON SOURCE DOCUMENTS	METHOD OF PUNCHING	R - REFERENCE C - CLASSIFICATION Q - QUANTITATIVE	CARD FIELD SIZE		INTERPRETATION		
					TRIAL	FINAL	FIELD	SIZE	ORDER
Order No.		6	KP	C	6	6	✓	6	1
Employee No.	64-68	1	KP	C	5	5	✓	5	11
Dept. No.	64-65		KP	C	(2)	(2)			
Clock No.	66-68		KP	C	(3)	(2)			
Regular Rate	35-37		GP	C	3	3			
Overtime Rate	38-41		GP	C	4	4			
Part or Account No.		4	KP	C	5	5	✓	5	2
Pieces		3	KP	Q	5	5	✓	5	6
Operation No.		5	KP	C	2	2	✓	2	3
Machine Group		7	KP	C	2	2	✓	2	4
Department Charged		8	KP	C	2	2	✓	2	5
Kind of Labor	33-34		GP	C	2	2	✓	2	10
Amount	72-75		Calc P	Q	4	4	✓	4	9
Hours	69-71	2	KP	Q	3	3	✓	3	8
Date	29-32		GP	R	4	4	✓	4	7
Month	29-30		GP	R	(2)	(2)			
Day	31-32		GP	R	(2)	(2)			
DE-1-0124-1				TOTALS→	47	47		40	

FIGURE 9. USE OF CARD DESIGN AID

of the card. Since "Employee No." is also referred to frequently it is placed last so that it will appear in the upper right-hand corner.

With this preliminary study and work sheet, the card can now be designed.

Using the transcript card layout form (Figure 3) the fields are assigned. Since interpretation will be provided for, punched field headings will be near the lower edge of the card.

First the items which have "columns in other cards" are assigned (Figure 10).

In the assignment of the key punched fields according to the sequence on the source document, two items, Employee No. and Hours, have already been assigned for the sake of column alignment. At this point there are several choices:

1. Re-assign these fields according to sequence.
2. Re-design the daily time ticket card for alignment with the re-assigned sequence.
3. Compromise for the sake of alignment.

If the last one is chosen, the fields are assigned in sequence (with the exception of the two items) as shown in Figure 11.

Upon checking the method of punching it is found that the gang punched fields are located together, key punched fields are together, and the calculating punch field is at the right where it belongs. The method of punching should be so indicated on the card.

Referring to the interpretation data on the work sheet, interpretation headings and blocks are drawn in, using the scales and guides on the layout form to determine the location of the blocks. Dividing lines between blocks are drawn to split a type bar for more legible interpretation; periods and commas are inserted as desired; first and last type bar numbers are shown; card columns from which the information is read are indicated if desired.

With the addition of card names and trademark symbols, the design of the card is completed (Figure 12). When the questions at the bottom of the layout form have been answered, the design is ready to submit for a proof to be made.

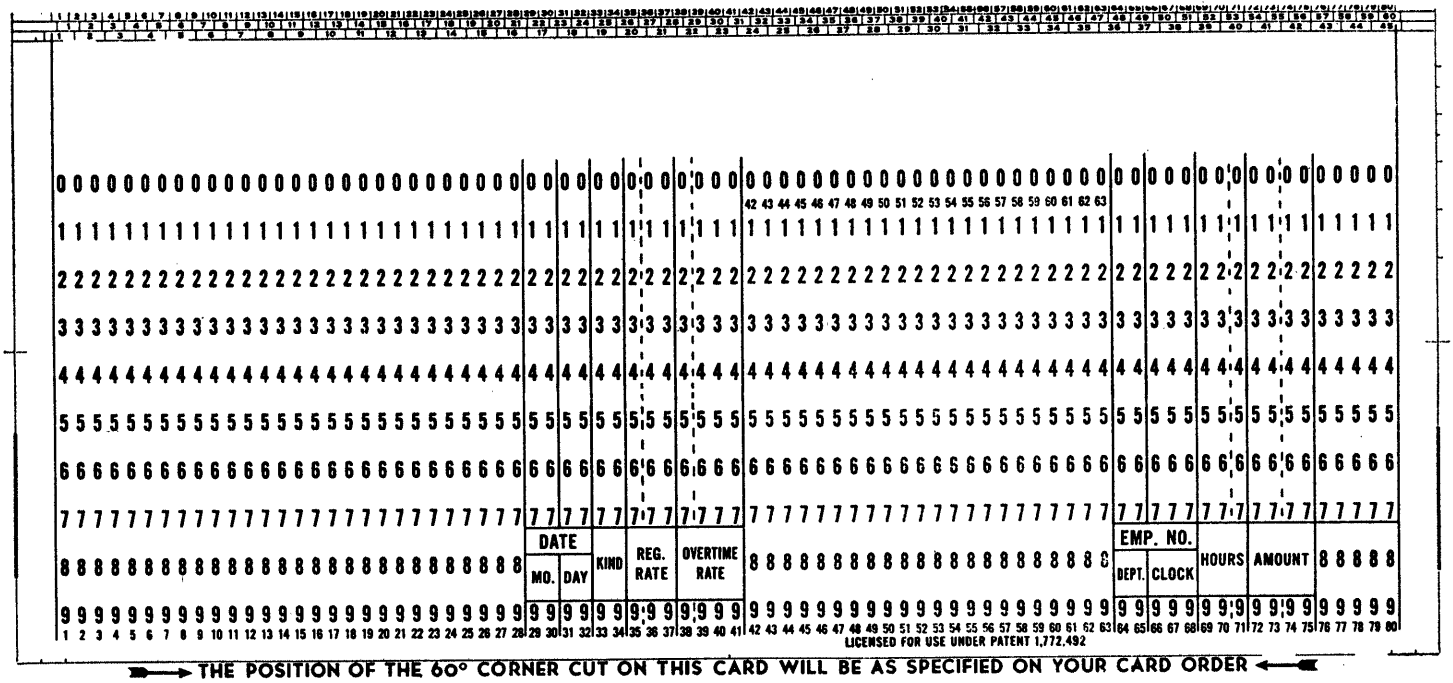

FIGURE 10. HEADINGS OF INFORMATION PUNCHED IN DAILY TIME TICKET

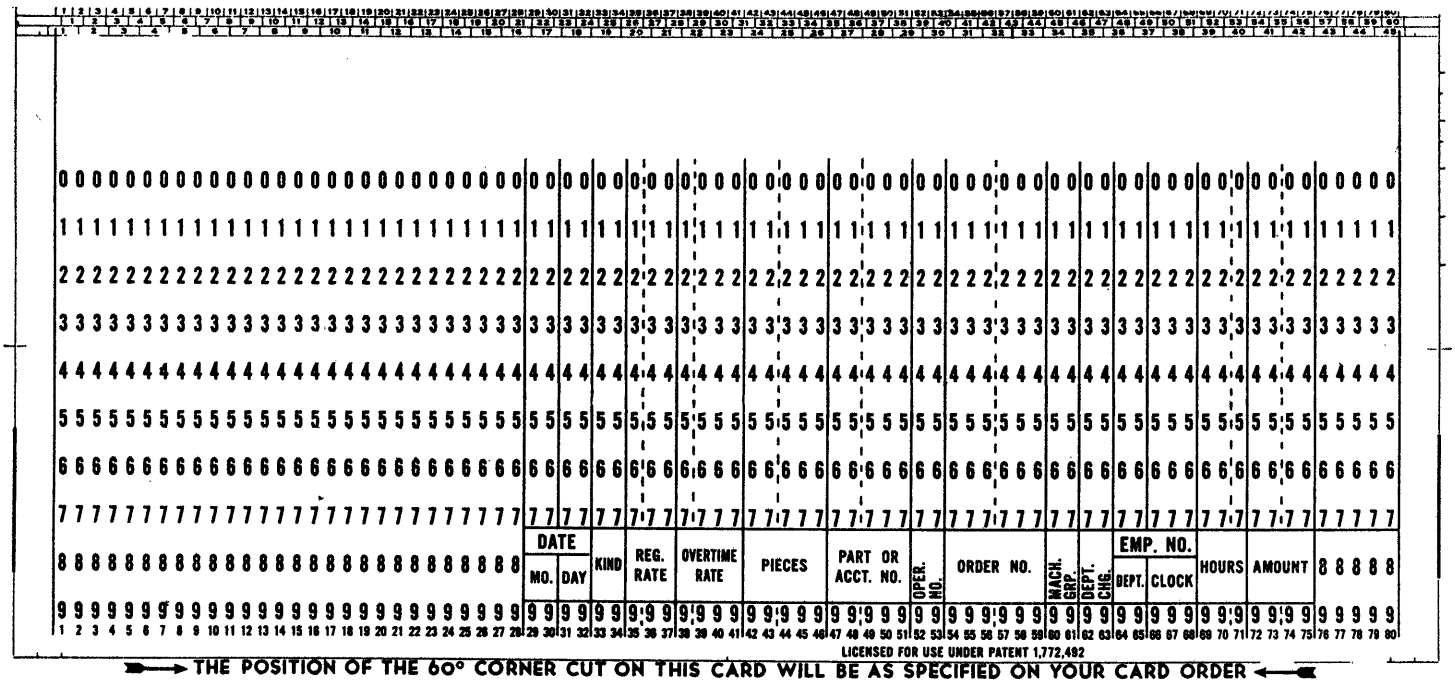

FIGURE 11. FIELDS OF ALL PUNCHED INFORMATION ASSIGNED

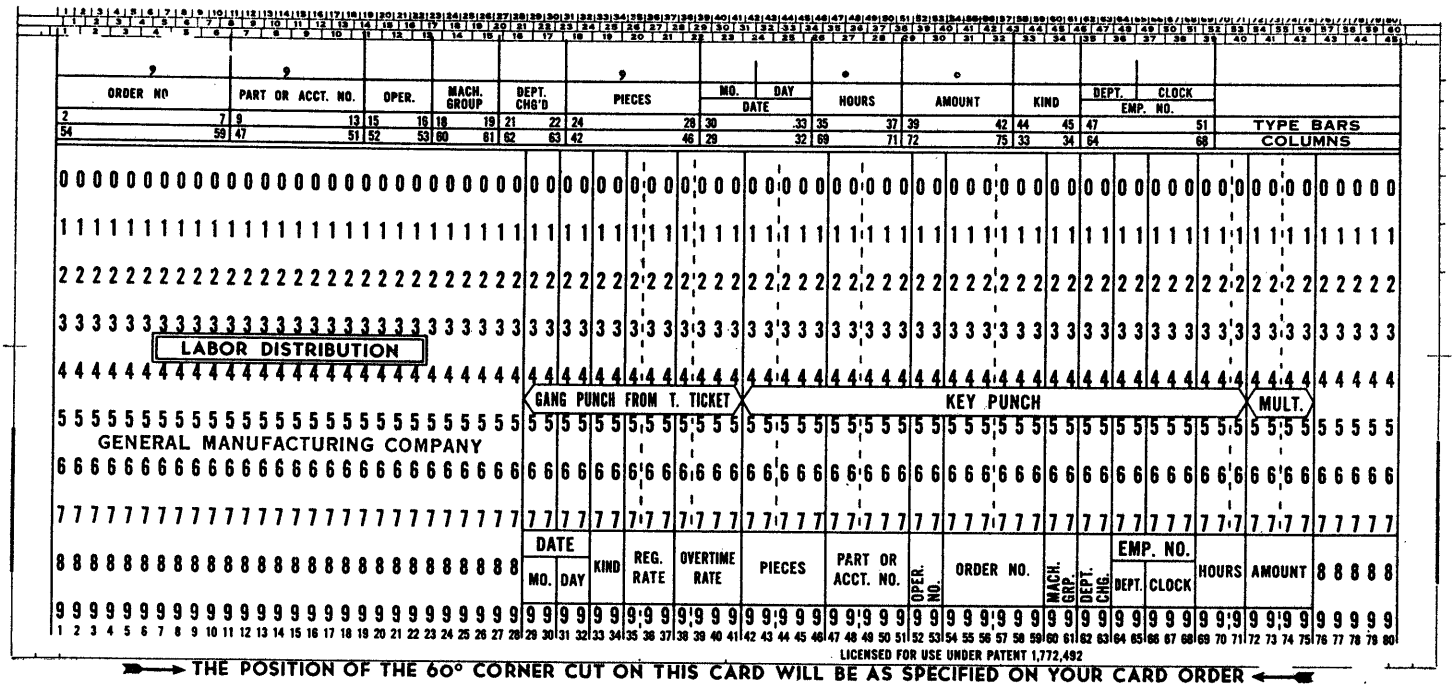

FIGURE 12. COMPLETED DESIGN FOR LABOR DISTRIBUTION CARD