Nov. 28, 1967 E. O. BLODGETT 3,355,000

TYPE BAR ACTUATING MECHANISM WITH SEPARATE DRIVE AND ACTUATING BELL CRANKS

Filed May 31, 1966 3 Sheets-Sheet 1

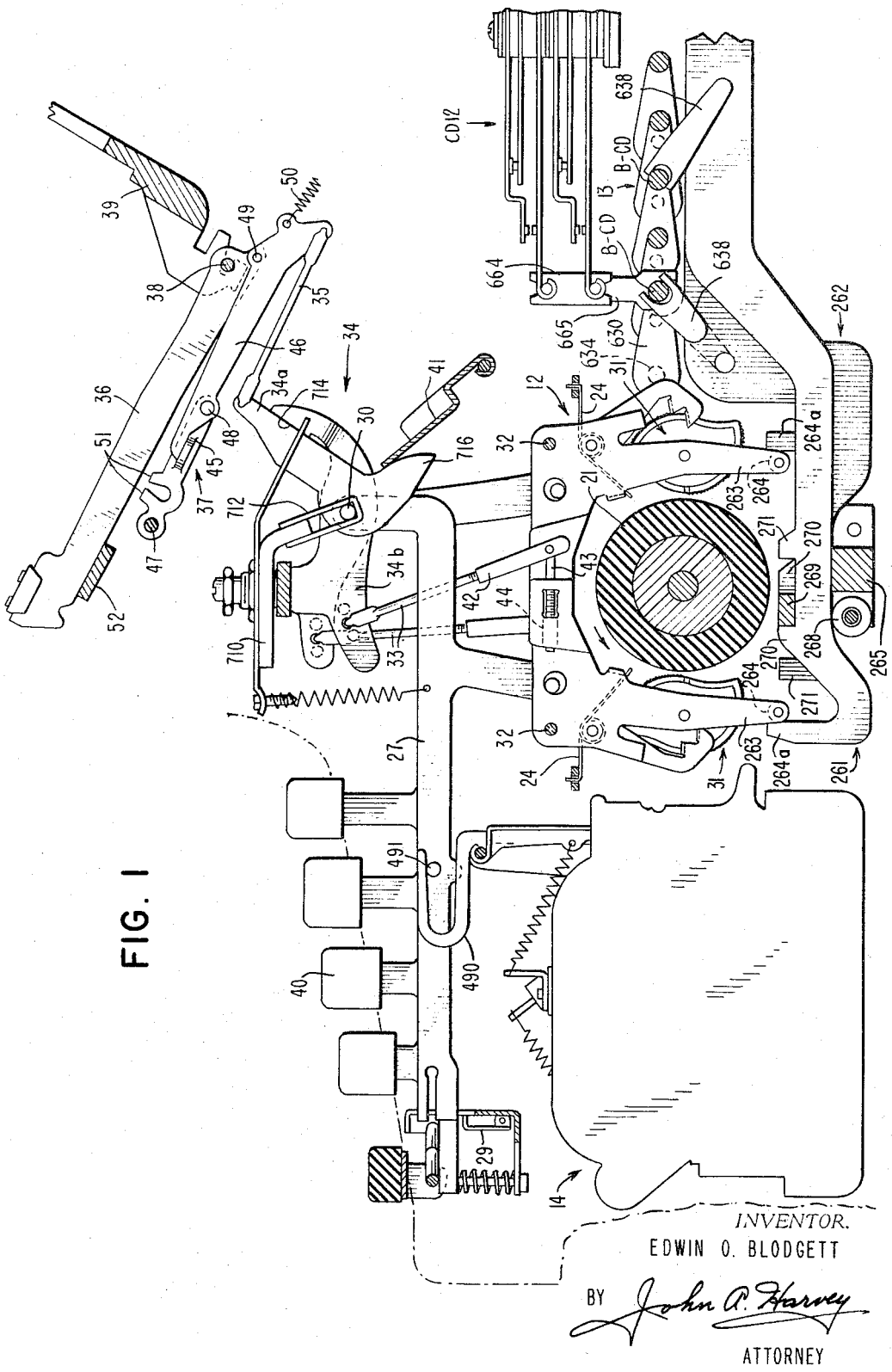


FIG. 1

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TYPE BAR ACTUATING MECHANISM WITH SEPARATE
DRIVE AND ACTUATING BELL CRANKS
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FIG. 2

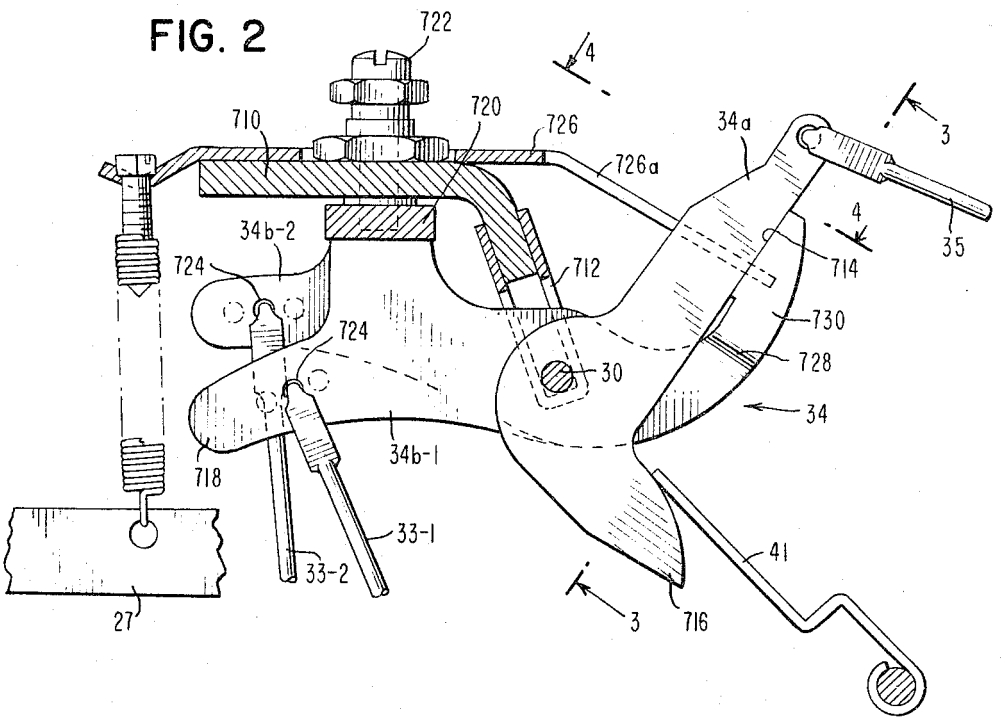



FIG. 3

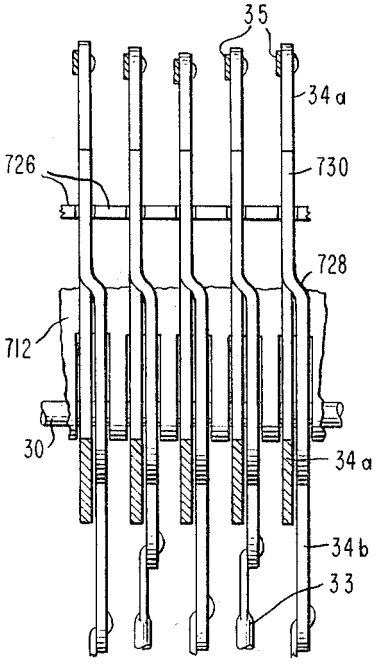



FIG. 4

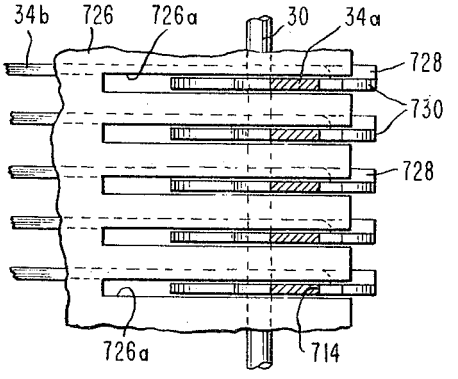
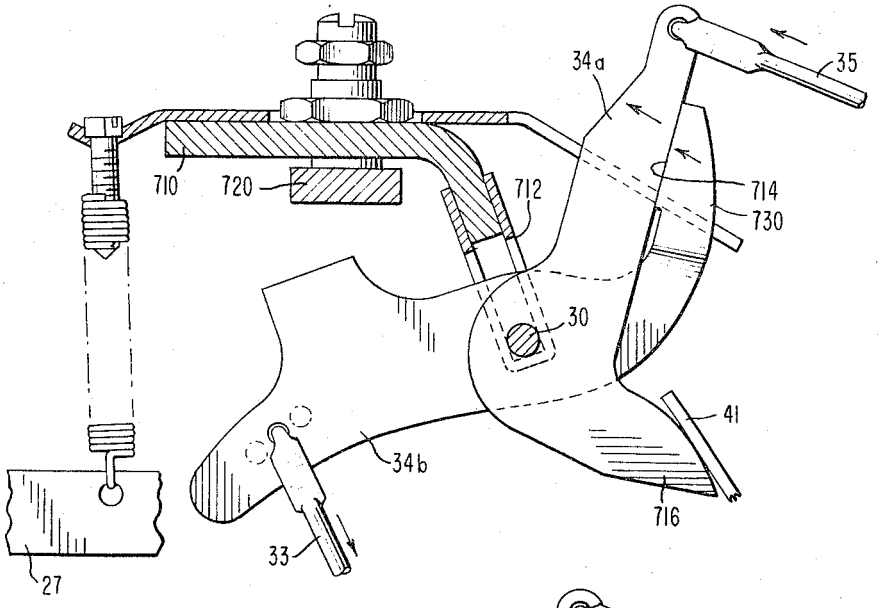


FIG. 5


34a
35
710
720
712
714
730
30
41
34b
716
33
27

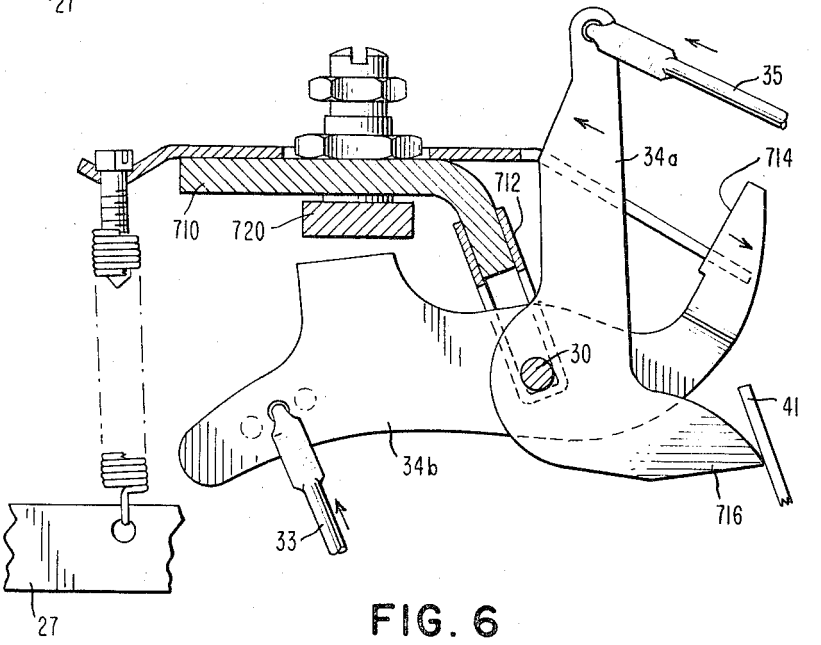

35
34a
714
712
710
720
30
41
34b
716
33
27

FIG. 6

United States Patent Office 3,355,000 Patented Nov. 28, 1967



3,355,000

# TYPE BAR ACTUATING MECHANISM WITH SEPARATE DRIVE AND ACTUATING BELL CRANKS

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Filed May 31, 1966, Ser. No. 553,911
18 Claims. (Cl. 197—17)

## ABSTRACT OF THE DISCLOSURE

A power driven type bar actuating mechanism includes for each type bar a drive bell crank and an actuating bell crank pivotally supported in side-by-side relation upon a common support axis for coaxial pivotal movement. Each drive bell crank has an offset arm extending into abutting driving engagement with an edge surface portion of the associated actuating bell crank. Each actuating bell crank is mechanically coupled to an associated pivotally supported type bar and moves the latter from a spring-bias position of rest toward a type impression position. A power drive source is selectably mechanically coupled to each drive bell crank for power drive movement thereof in one angular direction from a spring-bias position of rest, after which drive movement the drive bell crank returns under spring bias and in opposite angular direction to its position of rest. Movement of the drive bell crank in the one angular direction causes the associated type bar to be moved to its type impression position by actuating force angularly exerted through the abutting driving engagement between the drive bell crank and its associated coaxially supported actuating bell crank. The type bar thereafter returns under spring bias to its rest position and the drive bell crank likewise returns to its position of rest but independently of and prior to restoration of the associated actuating bell crank and its type bar to their positions of rest.

This invention relates to an actuating mechanism for a type bar in a writing machine. More particularly, the invention provides a novel bell crank structure coupling the type bar actuating lever of a power driven writing machine to the associated power frame assembly of the machine.

In a power driven writing machine, it has been customary to employ a single bell crank to provide a coupling mechanism between the power frame assembly and each type bar actuating lever. The bell crank has included a first arm connected by a link to the type bar actuating lever and a second arm connected by a link to the power frame assembly. Due to the curvature of the type basket in the writing machine, it has been necessary to employ bell cranks having one arm fabricated of individual different lengths corresponding to the different type bar positions. Variations in a second arm length have also been required to provide the different forces needed to attain uniform type impressions for different character type faces and for different type styles.

The requirement of different arm lengths has heretofore necessitated the design and fabrication of a large number of different single piece bell cranks for assembly with type baskets individual to each type style. The need for such a large number of bell cranks results in increased manufacturing and maintenance costs and creates problems of manufacturing, assembly scheduling, inventory and supply.

In writing machines employed in the past, the entire type bar actuating structure has been required to move from a type bar rest position to a type bar impression position. Such movement of the entire actuating mechanism has required relatively prolonged periods of movement of the associated code-selector structural elements which are responsible for the generation of coded electrical pulse signals corresponding to and identifying each actuated type bar. To enhance rapidity of machine operation and accuracy of signal generation, it is desirable to shorten the required motion period of the code selector elements.



Accordingly, it is an object of the present invention to provide an improved type bar actuating mechanism for a writing machine.

Another object of the invention is to provide an improved type bar actuating mechanism which minimizes the number of different bell crank structures required for initial writing machine assembly and subsequent operational maintenance.

A further object of the present invention is to provide a novel type bar actuating mechanism which by enabling a portion of the actuating mechanism to be restored to a rest position prior to the restoration of the type bar to a rest position permits the desirable shortening of the period of motion required for the code selector elements to generate coded electrical signal pulses.

These and other objects are carried out in the present invention by employing a novel bell crank assembly for each type bar actuating lever, the assembly being formed from two coaxially pivoted and cooperatively arranged bell cranks. Although two bell cranks have been employed in the past in power driven writing machines, they have not been coaxially pivoted and have been unable to provide for the return of one bell crank to a position of absolute rest while the other bell crank is still moving.

The invention will be more completely understood by reference to the following detailed description. In the accompanying drawings:

FIG. 1 is a vertical sectional view through a typical writing machine showing a bell crank assembly constituting a presently preferred embodiment of the present invention,

FIG. 2 is an enlarged view of the bell crank assembly of FIG. 1;

FIGS. 3 and 4 are views of portions of the bell crank assembly of FIG. 2 taken respectively along the section lines 3—3 and 4—4 in FIG. 2; and

FIGS. 5 and 6 are views similar to FIG. 2 showing the bell crank assembly in different positions during its cycle of operation.

Referring now more particularly to FIG. 1, there is shown a typical writing machine, i.e. a power driven typewriter, incorporating a bell crank assembly **34** which embodies a presently preferred form of the present invention. The general typewriter mechanism shown is substantially the same as that shown in FIG. 1 of copending application Ser. No. 407,752, filed Oct. 30, 1964 by Henry E. Smith for Easily Removable and Adjustable Code Selector Linkage Means and assigned to the assignee of the present application, now U.S. Patent No. 3,269,509, as well as that shown in FIG. 3 of U.S. Patent No. 2,700,446 issued to E. O. Blodgett on Jan. 25, 1955. In order to facilitate the description herein, the same reference numerals used in FIG. 1 of the Smith application and in FIG. 3 of the Blodgett patent are employed herein to designate like parts. Reference should be made to the Blodgett patent and to the Smith application for a complete description of the construction and operation of the general typewriter mechanism including the code selector mechanism **13** shown therein.

In FIG. 1, each of a plurality of typewriter keys **40** is supported upon an associated one of key levers **27** pivoted on a rod **30** which is supported by a cross member **710** that includes an elongated and transversely slotted U-shaped depending member or bracket **712** that cradles the rod **30** for support. A power roller **21** is mounted under power frame assembly **12** for rotation in the direction of the arrow by a suitable drive motor (not shown). Cooperating with the power roller **21** are cam units **31**

which are rotationally supported on bell cranks **263** pivotally mounted on rods **32** extending parallel to the power roller **21** and on both sides of the power roller. Each bell crank is urged by the bias force of a coiled spring **24** toward the power roller **21**. There is a cam unit **31** and bell crank **263** associated with each key lever **27**, and each bell crank in control of a type bar **36** is connected by a link structure **33** and **42–44** with bell crank assembly **34** also pivoted on rod **30**. The cam units **31** are positioned along the length of the power roller **21**, successive ones of the cam units being positioned on opposite sides of the power roller, as shown in the figure. Each bell crank assembly **34** is formed from two bell cranks **34***a* and **34***b*. The bell crank **34***b* is connected to the link **33** connected in turn to a cam unit. The bell crank **34***a* is connected by a link **35** to the associated type bar **36** through the medium of a toggle **37** which consists of articulated arms **45** and **46** joined by pin **48** and pivoted about pins **47** and **49**, respectively. A type bar restore spring **50** connected to toggle arm **46** acts to return the type bar **36** to its normal position against a rest **52**, in which position the toggle arms **45** and **46** are straightened to resist rebound of the type bar from its normal position. The linkage of the toggle assembly **37** may be adjusted by springing apart or closing a pair of ears **51** on arm **45** so that the toggle can be straight when the type bar **36** engages the rest **52**. The type bar **36** is pivoted on the usual wire segment **38** provided on a transverse type bar segment **39** located in front of the conventional platen (not shown).

A key lever locking bail **29** is provided, operated by a normally energized magnetic lock (not shown) to prevent effective operation of the keys when the power for any reason is off, or when the keys should not be operated for any other reason.

When any character or numeral or symbol key **40** is depressed, the key lever **27** causes the associated cam unit **31** operably to engage the power roller **21** in a well known way, thereby rotating the cam unit clockwise as shown in FIG. 1. The rotation of the cam unit causes its associated bell crank **263** to pivot against the bias force of its associated spring **24** and causes the associated link **33** to be drawn downwardly, thereby rocking the corresponding bell crank **34***b*. The bell crank **34***b* rocks counterclockwise as shown in FIG. 1 and, by virtue of elongated edge surface **714** which is offset to one side to bear against a corresponding edge surface of bell crank **34***a*, causes this latter bell crank also to rock. This movement of the bell crank **34***a*, through the corresponding link **35** and toggle **37**, causes type bar **36** associated with the selected key reciprocally to rock in a printing stroke and to make an impression of the type upon a worksheet (not shown) carried about the platen. The bell crank **34***a* at an end **716** thereof bears against and engages the usual universal bar **41** causing the same to rock as the bell crank proceeds through its reciprocal rocking motion. The rocking motions of the bell cranks **34***a* and **34***b* will be described in more detail below.

In FIG. 1, a code translator **14** is shown which corresponds to the code translator **14** shown and described in the Blodgett patent. The code translator serves to actuate the key levers **27**, and thus the corresponding type bars **36**, when the typewriter acts as an automatic reproducing mechanism to reproduce coded information. More particularly, the code translator is power driven from the typewriter motor and includes a plurality of hooked-end seekers **490** individual to the key levers **27** and adapted upon power-driven downward motion of a seeker to pull down an associated key lever by engagement of its hooked end with a pin **491** secured on the side of the associated key lever. The translator includes an electromagnet individual to each code element of the code signals supplied to the translator, and these electromagnets in their energized and deenergized states position code translator slides which by their composite positions select the particular seeker to be operated by the prevailing code signal supplied to the translator. Thus the code signals in effecting selective operation of successive key levers cause the typewriter cam units **31** to engage the power roller **21** to print the coded information conveyed by the coded signals supplied to the code translator **14**.

The code selector **13** corresponds to the code selector **13** shown and described in the aforesaid Smith patent and serves to provide a coded signal in response to the actuation of a particular one of the character or function keys **40**. As explained above, each time one of the typewriter keys **40** is depressed, a related one of the cam units **31** is tripped and is caused to engage the constantly rotating power roller **21**. As a result, the cam supporting bell crank **263** is rocked against the bias force of its associated spring **24** first away from the power roller **21** and then back toward the power roller and relatched in the position shown. For example, the cam bell cranks **263** to the left of the roller **21** in FIG. 1, referred to herein as front cam units and support bell cranks, are pivoted clockwise when the associated cams engage the roller, while the cam and support bell cranks to the right of the power roller, referred to herein as rear cam units and support bell cranks, are pivoted counterclockwise. Each cam unit support bell crank **263** carries a roller **264** at its lower end. Each time a cam unit is tripped and is operated, the corresponding bell crank **263** and roller **264** effects a sliding movement of an individual corresponding one of selector slides **261** and **262**. In particular, the bell cranks **263** and rollers **264** associated with the front cam units **31** engage upstanding lugs **264***a* at the forward ends of the slides **261**, whereby the slides **261** are moved initially to the left in FIG. 1 and then back to the right upon the relatching of the cam units. The bell cranks **263** and rollers **264** associated with the rear cam units **31** engage upstanding lugs **264***a* of the slides **262**, whereby the slides **262** are moved initially to the right and then back to the left upon the relatching of the cam units. It will be noted, then, that depression of one of the typewriter keys **40** results in a reciprocating movement of an associated one of the slides **261** and **262**.

When one of the slides **261** and **262** reciprocates, selected ones of bails B–CD are actuated through the operation of a link **638** pivotally coupled to the slide and to a selected one of the bails. In the code selecting mechanism, each of the slides selectively actuates one or more of the bails according to a particular code. The bails as shown and described in the aforesaid Smith patent include end arms **630** pivotally supported on pins **634** and in turn are coupled through insulating links **664** and **665** to actuate associated switches typified by switch CD12, the contacts of which switches are typically utilized to control the electrical continuity of code-signal circuits which may control a tape punch, for example, to produce a by-product punched tape.

Referring now to FIG. 2, the details of the bell crank assembly **34** associated with each type bar are shown. As described above, each bell crank assembly comprises two bell cranks **34***a* and **34***b*. Bell cranks **34***a* for all assemblies in the machine are of the same general shape but have one of 42 individual arm lengths corresponding to an individual one of the 42 positions which the associated type bar may occupy in the type basket. Bell cranks **34***b*, on the other hand, are shaped somewhat differently as between a first group which are operated by the front cam-unit bell cranks **263** and a second group which are operated by the rear cam-unit bell cranks **263**. Thus as illustrated in FIG. 2, the bell crank **34***b*–**1** in the foreground (included in the first group) and having an associated link **33**–**1** shown entirely in full lines is shaped so that its left hand end **718** is positioned lower than the left hand end of the bell crank **34***b*–**2** (included in the second group) shown in the background in FIG. 2 and of which the associated link **33**–**2** is shown partially in dotted lines. The bell cranks **34***a* and **34***b* are pivoted coaxially about rod **30** carried by the slotted U-shaped bracket **712**. A transverse stop bar **720** is supported by the cross member

710 by means of a plurality of longitudinally spaced set screw assemblies 722 which secure the stop bar to the cross member 710. By suitable adjustment of the set screw assemblies 722, the vertical position of the stop plate may be adjusted along its length to limit appropriately the travel of the bell cranks 34*b* to their non-actuated position at which they bear against the stop bar.

Each link 33 is pivotally coupled to the associated bell crank 34*b* by a lateral end pin extension thereof which passes through a hole 724 in the bell crank. In FIG. 2, three such holes have been shown in the end 718 of each bell crank 34*b*. Each such hole has its axis lying on an arc centered on the nominal pivot point of the link members 42 and 43 and of radius corresponding to the nominal adjusted length of the link members 33 and 42. Normally, only one hole is actually formed; the holes shown in phantom (and others not shown but positioned closer to the rod 30) are to illustrate the different positions along the bell crank arm that the hole 724 may assume. In particular, the distance between the rod 30 and the hole 724 (referred to herein as the "G" dimensions) varies for the different bell cranks 34*b* and is dependent upon the actuating force which the particular bell crank concerned is to impart to the associated bell crank 34*a* in attaining any desired type impression force within a range of such forces extending from a minimum for correct printing of the smallest character of symbol type face (i.e., a period or comma) to a maximum for correct printing of the largest character type face (i.e. a capital "W" or "M") in any given type style or as between different type styles which may be selected for use in the typewriter. In a typical typewriter employing as many as 44 different type bars, there are 22 "front" crank arms 34*b* and 22 "rear" crank arms and these may be provided by 22 "front" crank arms 34*b* having different G dimensions and 22 "rear" crank arms 34*b* also having different G dimensions. Thus whereas approximately 1000 individual size unitarily constructed bell cranks were heretofore needed in practice to provide crank arm differing lengths according to the position of the associated type lever in the type basket and also to provide crank arms of required differing G dimensions, an actuating mechanism embodying the present invention and having 44 type levers need use only 44 different crank arms 34*a* and a total of 22 pairs of crank arms 34*b* having pair related values of G dimensions. In practice, it has been found that 88 crank arms 34*b* of individual different G dimensions (44 "front" and 44 "rear" available crank arms) and 44 crank arms 34*a* can entirely replace the approximately 1000 individual size unitarily constructed bell cranks heretofore required in the construction of typewriters using a number of selectable type styles. The number of crank arms 34*b* can be further reduced by providing in each a series of holes 724 corresponding to individual values of the G dimension.

The bell cranks 34*a* and 34*b* are positioned by pairs in side by side relation for pivotal motion about the rod 30 and are guided in such motion by a slotted comb plate 726 secured to the cross member 710. To this end and as more clearly shown in FIG. 3, cooperating pairs of the bell cranks 34*a* and 34*b* are spaced by the slotted bracket 712 along the rod 30, and each bell crank 34*b* is formed from a flat plate having a lateral offset 728 in its remote arm so that the bell crank has arm portions effectively lying in two planes. In this fashion, the arm end 730 of each bell crank 34*b* is offset into the plane of the associated bell crank 34*a*, while the remainder of the bell crank 34*b* is in a plane adjacent to the plane of the associated bell crank 34*a*. Thus the bell crank 34*b* may pivot about the rod 30 so that the elongated edge surface 714 of its arm end 730 contacts the edge of the associated bell crank 34*a* to pivot the latter bell crank about the rod 30 as described above. FIG. 4 shows the bell cranks 34*a* and 34*b* and the slotted comb plate 726 containing guide slots 726*a* through which the bell crank 34*a* and offset arm end 730 of the bell crank 34*b* are free to move.

Referring now to FIGS. 5 and 6, the driving action of the bell crank 34*b* in actuating the bell crank 34*a* is shown. In FIG. 5, the link 33 is shown moving downwardly to pivot the bell crank 34*b* about the rod 30 in a counterclockwise direction. The elongated edge surface 714 of the offset end 730 of this bell crank bears against the edge of the bell crank 34*a* to pivot the latter also in a counterclockwise direction about the rod 30 so as to move the link 35 in the direction shown by the arrow to actuate the associated type bar. The action of the bell crank 34*b* is such as drivingly to move the bell crank 34*a* through a major portion of the first half cycle of its reciprocal cycle of motion (occupying a reciprocal range of motion approximately 33° and equal drive and restore half-cycle intervals typically of thirty millisecond length at a printing rate of twelve characters per second or about eighty-three milliseconds per character) to move the type bar from its rest position toward its type impression position. Upon termination of the drive force exerted by the bell crank 34*b*, the bell crank 34*a* with its associated type bar and interconnecting mechanical components continue to move under inertial force until the type bar reaches its type impression impact position. While the bell crank 34*a* is thus continuing its inertial movement to its type impression position, the drive bell crank 34*b* may also continue to move at least a small angular distance counterclockwise by reason of its inertial force and the inertial force of its associated drive components although in a construction embodying the present invention there is now no need for it to do so as was formerly required in prior art structures where a single unitary bell crank is employed. Accordingly, and as illustrated in FIG. 6, the restore bias force of the bias springs 24 (FIG. 1) used with the associated bell crank 263 may be made sufficiently large that the link 33 may move upward to move the bell crank 34*b* clockwise back toward its rest position against the stop bar 720 concurrently with continued counterclockwise motion of the bell crank 34*a* under inertial force to the type impression position. In any event and even though the bell crank 34*b* continues to move with the bell crank 34*a* to the type impression position of the latter, the inertia of the bell crank 34*b* and its associated drive structure is divorced from the inertia of the bell crank 34*a* and type bar with associated interconnecting mechanical components in a structure embodying the present invention. This readily permits attainment of the restoration of the bell crank 34*b* and its associated drive structure to their rest positions in a substantially shorter interval (typically of the order of approximately twenty milliseconds at the printing rate mentioned above) than that required to restore the bell crank 34*a* with its associated type bar and mechanical interconnecting components to their rest positions (a restoration interval typically of thirty milliseconds as mentioned above) under the bias force of the restore spring 50 (FIG. 1).

It will be noted, then, that the bell cranks 34*a* and 34*b* reciprocate through an angular cycle of motion in moving the associated type bar from its rest position to its type impression position and back to its rest position. The range of angular motion of the drive bell crank 34*b* may be less than the angular range of motion of the actuating bell crank 34*a*. In particular, the drive bell crank 34*b* moves through the initial half of its reciprocating cycle and during this time is in driving contact with the actuating bell crank 34*a* to move that bell crank through a portion of the initial half of its angular cycle. The drive bell crank 34*b* being separable from the actuating bell crank 34*a* may readily be controlled to commence its return to its own rest position against the stop plate 720 while the actuating bell crank 34*a* is still completing its initial half cycle of movement in moving the type bar to its type impression position. The drive bell crank 34*b* in any event desirably is controlled to return to its rest position against the stop plate 720 well in advance of the return of the actuating bell crank 34*a* to its own rest posi-

tion at which the type bar **36** engages the rest member **52** as shown in FIG. 1.

The return of the drive bell crank **34***b* to its rest position sooner than the completion of the type bar movement is highly desirable and has several important advantages. In particular, the associated cam frame assembly **31** and **263** is restored to its position of rest substantially earlier than in previous machines involving a single bell crank rather than two separate but cooperating bell cranks as in the present invention, and this permits a code selector slide **261** or **262** also to be restored to its position of rest earlier, whereby the code selector contacts remain closed for a much shorter interval of time (approximately 50%) than in previous machines involving a longer cam frame assembly cycle of movement. A further advantage of the shorter time of restoration of the bell crank **34***b* is that the associated cam frame assembly **31** and **263** can "settle down" after returning to its position of rest and while it awaits the next actuation by the power roll **21**. Such "settling down" of the cam frame assembly is desirable in connection with rapid printing in succession of the same character; i.e., where the cam frame assembly is operated at least twice in immediate succession. The "settling down" of the cam frame assembly refers to the short period of prevailing inherent vibration of the cam frame assembly and interconnected structures immediately after the initial return of the cam unit to its rest position.

The type bar actuating mechanism of the present invention, utilizing the two separate but cooperating bell cranks, has the further important advantage that it provides a more flexible and less costly arrangement from the standpoint of manufacture and maintenance than the single bell crank employed in the past. Because of the different G dimensions and the different lengths of the arms of the cranks required for different characters of a given type style and for different type styles available for use, a large number of different bell cranks had to be heretofore manufactured and kept on hand for manufacture and servicing of the typewriters. With the double bell crank arrangement of the present invention, various combinations of an appreciably smaller number of bell cranks **34***a* and **34***b* may be employed to provide the same number and variety of different sizes and shapes of unitary bell cranks necessarily employed in the past, thus greatly reducing the cost of tooling and manufacturing and minimizing the factory inventory needs for bell cranks required in each model of writing machine.

A presently preferred embodiment of the invention has been described above. It will be appreciated that modifications may be made of this embodiment which may depart from the specific structure shown. Accordingly, the invention should be taken to be defined by the following claims.

What is claimed is:

**1.** A power driven type bar actuating mechanism comprising a type bar supported for pivotal motion between type impression and rest positions, an actuating bell crank and a drive bell crank, means for supporting said bell cranks in side-by-side relation upon a common support axis for coaxial pivotal motion, means mechanically coupling said actuating bell crank and type bar to effect spring bias positioning of said type bar in said rest position thereof and for actuating-bell-crank drive motion of said type bar toward said type impression position thereof, said drive bell crank having an arm portion in abutting driving engagement with an arm portion of said actuating bell crank, and power actuating means mechanically coupled to said drive bell crank for selective power drive movement thereof in one angular direction from a position of rest and for return movement thereof in the opposite angular direction to said position of rest to move said type bar to said type impression position thereof by actuating force angularly exerted by said drive bell crank through said abutting driving engagement with said coaxially supported actuating bell crank and thereafter to permit spring-bias return movement of said type bar to said rest position thereof.

**2.** An actuating mechanism as defined in claim **1** wherein said power actuating means includes means for returning said drive bell crank to its position of rest prior to the spring-bias return of said type bar to its position of rest.

**3.** An actuating mechanism as defined in claim **2** which includes a code selector mechanism having a code slide member mechanically coupled to said power actuating means for reciprocal movement in unison with said drive bell crank and having at least one pair of coding electrical contacts operated between contact-open and contact-closed positions by said reciprocal movement of said code slide member.

**4.** An actuating mechanism as defined in claim **1** wherein said drive bell crank has an offset arm extending into abutting driving engagement with a portion of said actuating bell crank.

**5.** An actuating mechanism as defined in claim **4** wherein said offset arm of said drive bell crank terminates in an elongated edge surface engaging an edge surface portion of said actuating bell crank.

**6.** An actuating mechanism as defined in claim **1**, including a plurality of pairs of bell cranks, each pair comprising a drive bell crank and an actuating bell crank, and which further includes a plurality of said type bars individually coupled by said mechanical coupling means to individual ones of said actuating bell cranks, and wherein said support means for said drive and actuating bell cranks includes a single support rod upon which said drive and actuating bell cranks are assembled alternately in sandwiched arrangement therealong.

**7.** An actuating mechanism as defined in claim **6**, including a guide comb plate having slots therein through which portions of the actuating and drive bell cranks of each pair pass for guiding said bell cranks in their pivotal movements.

**8.** An actuating mechanism as defined in claim **1**, including a plurality of type bars individually coupled by said mechanical coupling means to individual actuating bell cranks of a plurality of pairs of bell cranks, each pair comprising a drive bell crank and an actuating bell crank, each said drive bell crank including a second arm thereon, link means coupling said second arm to said power actuating means, said link means being pivotally attached to said second arm at a preselected point thereon, the distance between said preselected point and the axis of pivotal movement of said drive bell crank being selected in accordance with impression requirements of the associated type bar.

**9.** An actuating mechanism as defined in claim **8**, wherein said link means is pivotally attached to said power actuating means, said preselected point on said drive bell crank second arm being located on an arc on the second arm having as a radius the length of said link means, said arc being formed in the rest positions of said power actuating means and said drive bell crank and having as its center the pivotal point of attachment of said link means to said power actuating means.

**10.** An actuating mechanism as defined in claim **8**, wherein each said actuating bell crank includes an arm thereon, said means mechanically coupling said actuating bell crank and type bar including linkage means pivotally attached to said actuating bell crank arm, the distance between the pivotal point of attachment of said linkage means to said actuating bell crank arm and the axis of pivotal movement of said actuating bell crank being selected in accordance with the relative position occupied by the associated type bar in a curvilinear basket assembly of type bars.

**11.** A power driven type bar actuating mechanism comprising a type bar supported for pivotal motion between type impression and rest positions, an actuating bell crank and a drive bell crank, means for supporting said bell

crank in side-by-side relation upon a common support axis for coaxial pivotal motion, means mechanically couplying said actuating bell crank and type bar to effect spring bias positioning of said type bar in said rest position thereof and for actuating-bell-crank drive motion of said type bar toward said type impression position thereof, said drive bell crank having an arm portion in abutting driving engagement with an arm portion of said actuating bell crank, and power actuating means mechanically coupled to said drive bell crank for selective power drive of said drive and actuating bell cranks in one angular direction and throughout a major portion of drive and driven angular displacements thereof to drive said type bar to said type impression position and thereafter to permit spring bias return of said type bar to said rest position thereof.

12. A power driven type bar actuating mechanism comprising a type bar supported for pivotal motion between type impression and rest positions, an actuating bell crank and a drive bell crank, means for supporting said bell cranks in side-by-side relation upon a common support axis for coaxial pivotal motion, means mechanically couplying said actuating bell crank and type bar to effect spring bias positioning of said type bar in said rest position thereof and for actuating-bell-crank drive motion of said type bar toward said type impression position thereof, said drive bell crank having an offset arm extending into abutting driving engagement with said actuating bell crank, and power actuating means for selectively power driving said drive bell crank through an angular displacement comprising a major portion of each drive half cycle and for thereafter returning said drive bell crank to a position of rest during the succeeding half cycle of a reciprocal angular cycle of motion thereof to drive said actuating bell crank and type bar through at least an initial portion of the type-impression half cycle of the angular cycle of reciprocal motion thereof sufficient to move said type bar to said type impression position after which said type bar is permitted to return by spring bias to said rest position thereof and attains said rest position subsequent to drive bell crank completion of its cycle of reciprocal angular motion.

13. An actuating mechanism as defined in claim 12 wherein said power actuating means includes means for effecting completion of the reciprocal angular motion of said drive bell crank at a rate independent of said actuating bell crank and accelerated in relation to the rate of return of said type bar to its rest position.

14. A power driven type bar actuating mechanism comprising a plurality of type bars supported for pivotal motion between type impression and rest positions, a plurality of pairs of actuating bell cranks and drive bell cranks, means for supporting the bell cranks of said pairs thereof in side-by-side pair relation upon a common support axis for common coaxial pivotal motion and including an arm on each said drive bell crank positioned in abutting driving engagement with an arm on the pair-associated actuating bell cranks, means mechanically couplying each said actuating bell crank and an individual one of said type bars for spring bias positioning of said individual type bar in said rest position thereof and for actuating-bell-crank drive of said individual type bar to said type impression position thereof, and power actuating means mechanically coupled to each said drive bell crank at a point thereon spaced from the axis of angular motion thereof according to impression requirements of the associated type bar for driving said each drive bell crank through a drive half cycle of a reciprocal angular cycle of motion to drive the associated one of said actuating bell cranks through the major portion of a driven half cycle of its reciprocal angular movement and for restoring said each drive bell crank to a position of and prior to rest independently of restoration of the associated actuating bell crank and its type bar to their positions of rest.

15. An actuating mechanism as defined in claim 14, wherein said power actuating means includes means for restoring each drive bell crank to its position of rest during an interval shorter than the restoration of said associated actuating bell crank and its type bar to their positions of rest.

16. An actuating mechanism as defined in claim 15 which includes a code selector mechanism having a plurality of code slide members individually coupled to said power actuating means for individual reciprocal movement in unison with the angular movement of an individual one of said drive bell cranks and having code selector means operatively controlled by reciprocal movements of said code slide members.

17. An actuating mechanism as defined in claim 14, wherein said mechanical coupling means is pivotally coupled to said arm of each said actuating bell crank at a point thereon spaced from the axis of angular movement thereof by a value varying with the relative position occupied by the associated type bar in a curvilinear basket assembly of type bars.

18. An actuating mechanism as defined in claim 1, which includes a plurality of pairs of drive bell cranks and actuating bell cranks pivoted about a single support rod and being assembled alternately in sandwichced arrangement along the rod and which further includes a plurality of type bars individually coupled by said mechanical coupling means to the actuating bell crank of an individual pair of bell cranks, each said drive bell crank having an offset arm terminating in an elongated edge surface in driving engagement with an edge surface of an adjacent actuating bell crank, a guide comb plate having slots therein through which portions of each pair of said actuating and drive bell cranks pass for guiding said bell cranks in their pivotal movements, each said drive bell crank including a second arm thereon, link means coupling said second arm to said power actuating means, said link means being pivotally attached to said second arm at a preselected point thereon, the distance between said preselected point and the axis of pivotal movement of said drive bell crank being selected in accordance with impression requirements of the associated type bar, said link means being pivotally attached to said power actuating means, said preselected point on said drive bell crank second arm being located on an arc on the arm having as a radius the length of said link means, said arc being formed in the rest positions of said power actuating means and said drive bell crank and having as its center the pivotal point of attachment of said link means to said power actuating means, each said actuating bell crank including an arm thereon, and said means mechanically coupling said actuating bell crank and associated type bar includes linkage means pivotally attached to said actuating bell crank arm, the distance between the pivotal point of attachment of said linkage means to said actuating bell crank arm and the axis of pivotal movement of said actuating bell crank being selected in accordance with the relative position occupied by the associated type bar in a curvilinear basket assembly of type bars.

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