

- [54] **TYPING MACHINE KEY ACTION**
- [75] Inventors: **Samuel D. Cappotto**, Syracuse;
Charles M. Curley, Cortland, both
of N.Y.
- [73] Assignee: **SCM Corporation**, New York, N.Y.
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- [52] **U.S. Cl.**..... **197/17**
- [51] **Int. Cl.²**..... **B41J 23/08**
- [58] **Field of Search**..... 197/17, 33

Primary Examiner—Wm. H. Grieb
Attorney, Agent, or Firm—Kenneth W. Greb; Milton
M. Wolson

[57] **ABSTRACT**

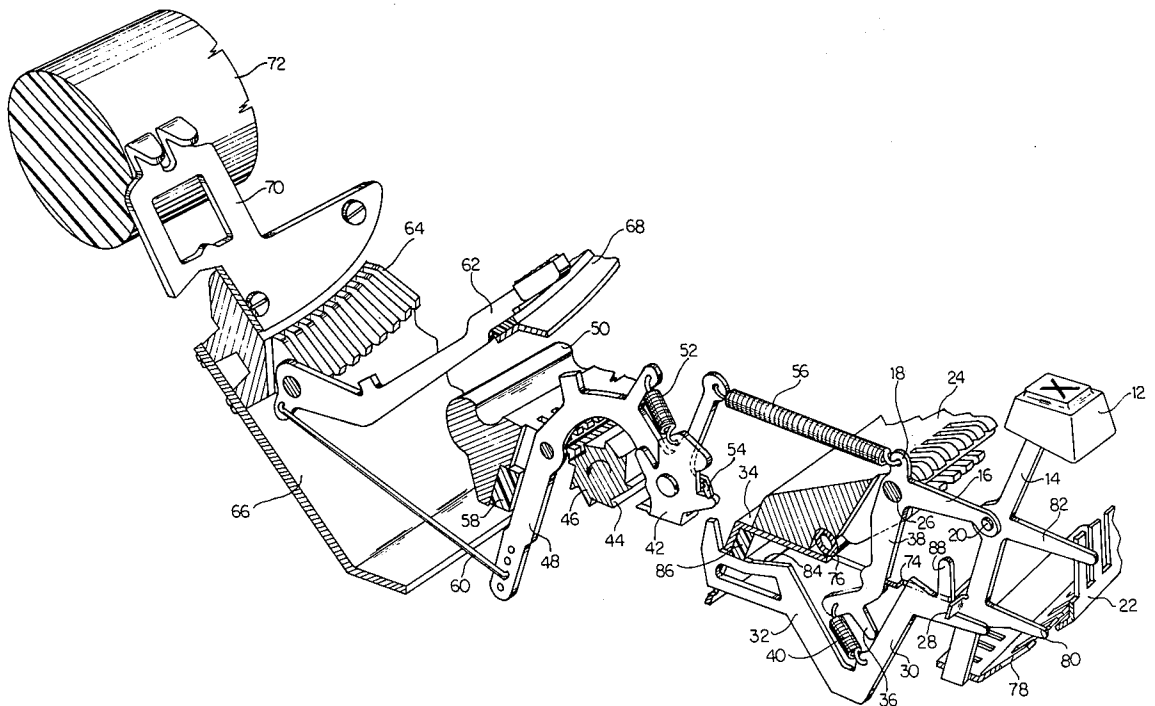
A key lever is pivotally connected to a horizontal arm of a bell crank in a typing machine key action, and a coil tension spring is connected between a vertical arm of the bell crank and a vertical arm of a horizontal interposer. Depression of the key lever pivots the bell crank to stretch the coil tension spring. When the descending key lever pushes the horizontal interposer off a ledge, the coil tension spring snaps the horizontal interposer to the rear against a pawl that engages a power roll to initiate a typing operation. A bendable tab that limits downward movement of the key lever can be bent out of the way so that the key lever can be depressed further into a repeat position thus enabling the same parts to be used for both single-action and repeat key actions. In another embodiment of the invention, a longitudinal slot is formed in the horizontal arm of the bell crank to compensate for key levers having different lengths. In both embodiments of the invention, the bell crank permits the use of a horizontal interposer thus enabling the typing machine to have an aesthetically pleasing low silhouette.

[56] **References Cited**

UNITED STATES PATENTS

2,714,948	8/1955	Schremp et al.	197/17
2,723,740	11/1955	Toeppen	197/17
2,798,584	7/1957	Kennedy	197/17
3,001,625	9/1961	Cetran et al.	197/17
3,342,295	9/1967	Hishida	197/17
3,419,123	12/1968	Salzberger et al.	197/17
3,623,587	11/1971	Link	197/17
3,638,775	2/1972	Hishida et al.	197/17
3,706,366	12/1972	Hishida et al.	197/17
3,738,470	6/1973	Osaka	197/17

8 Claims, 10 Drawing Figures



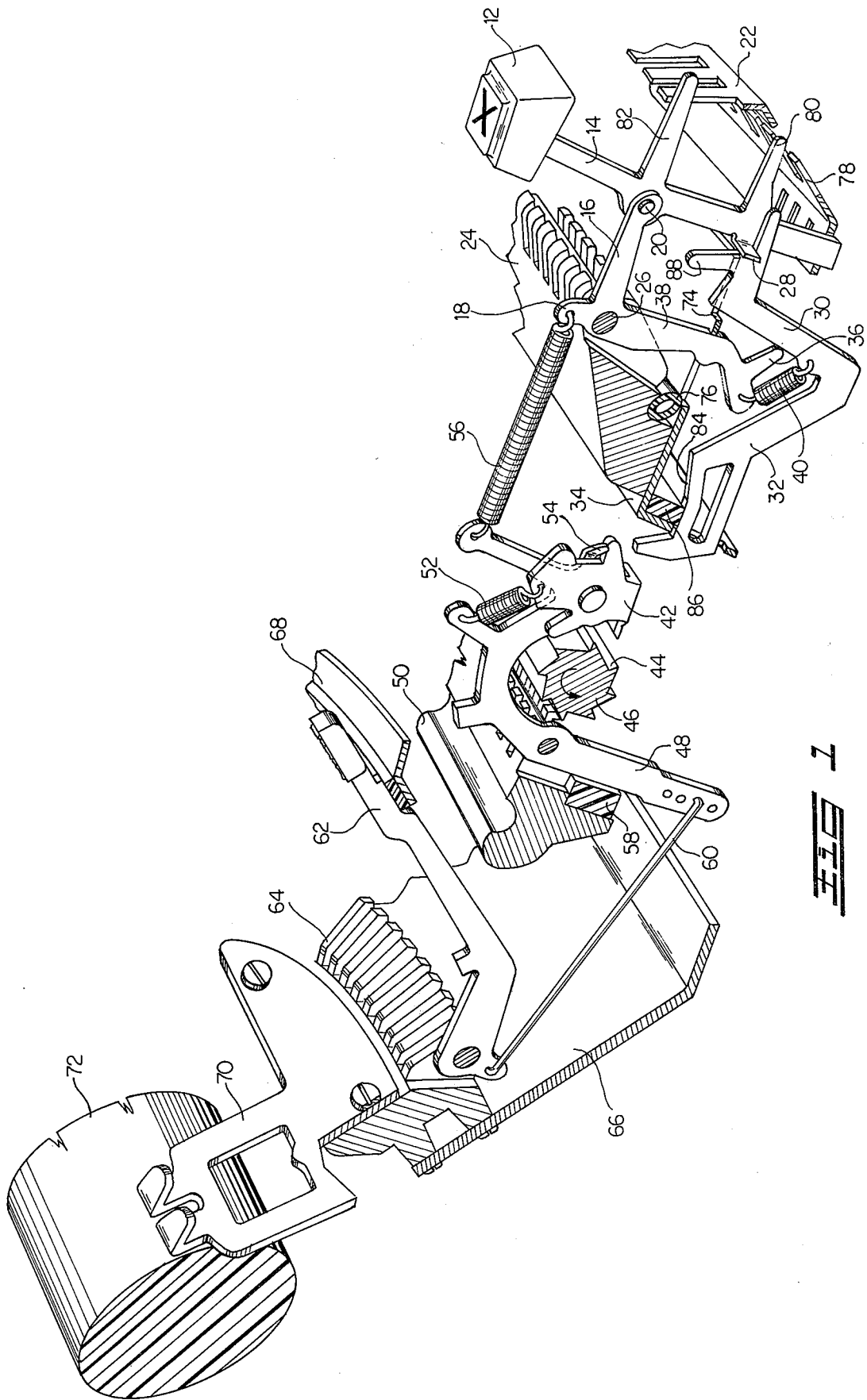
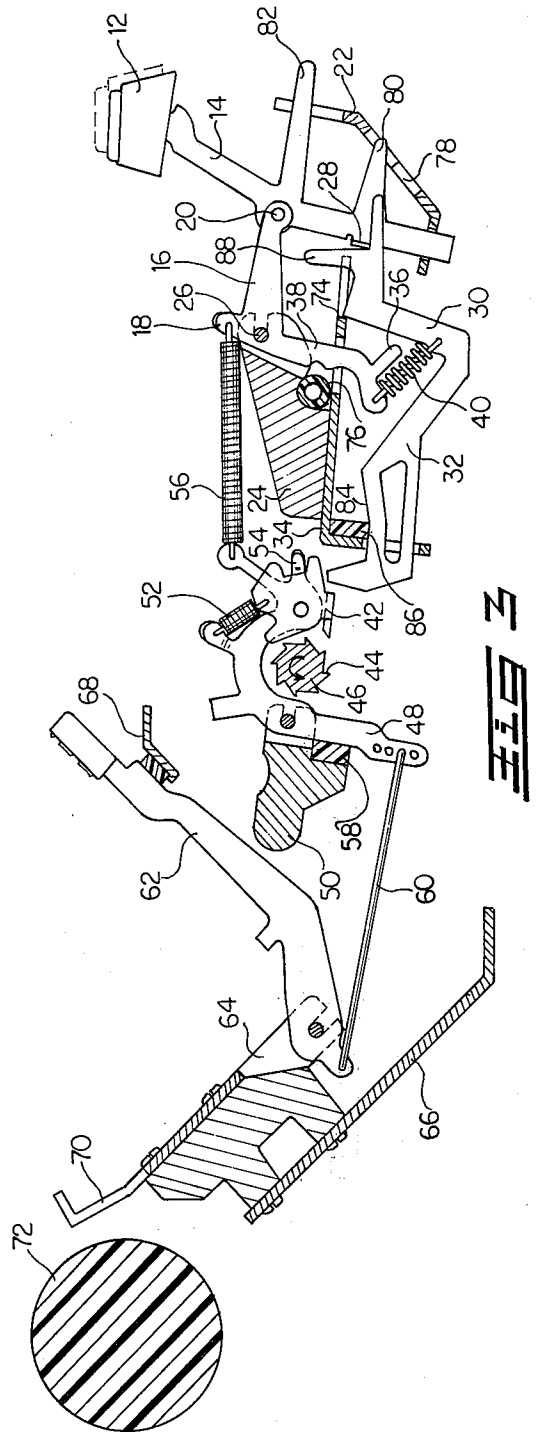
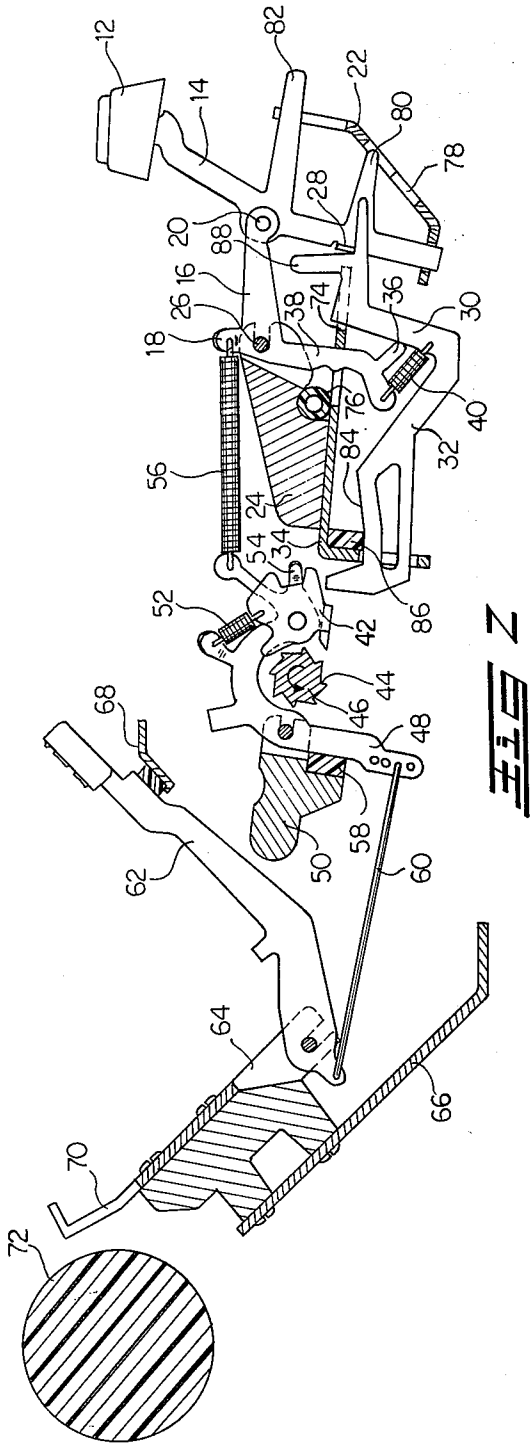


FIG. 1



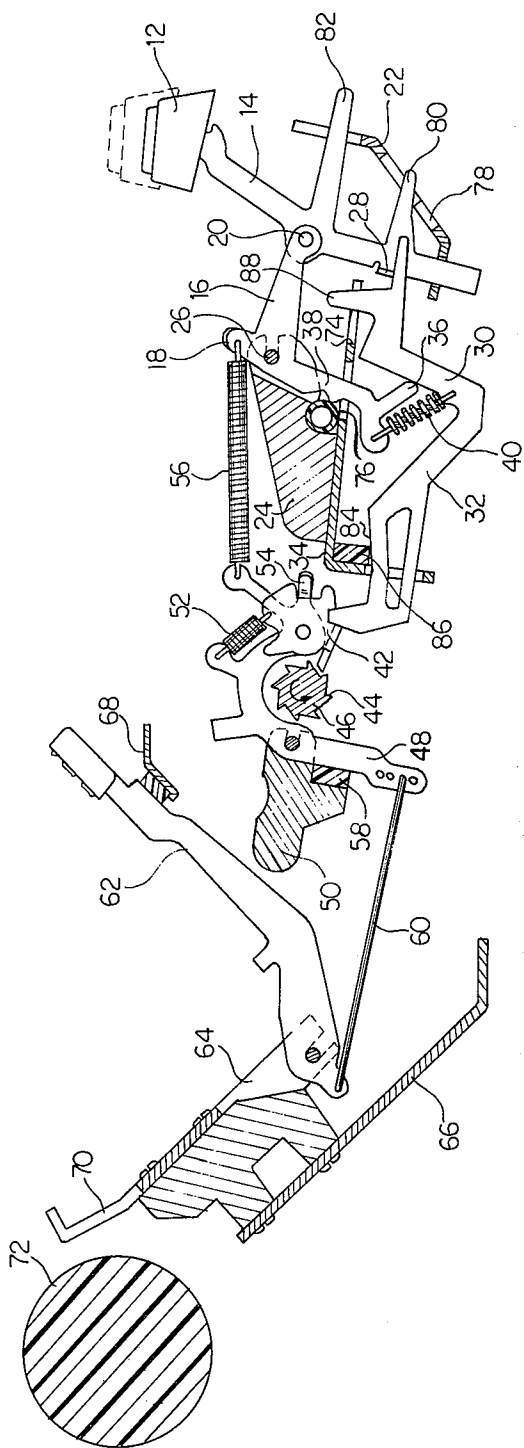


FIG 4

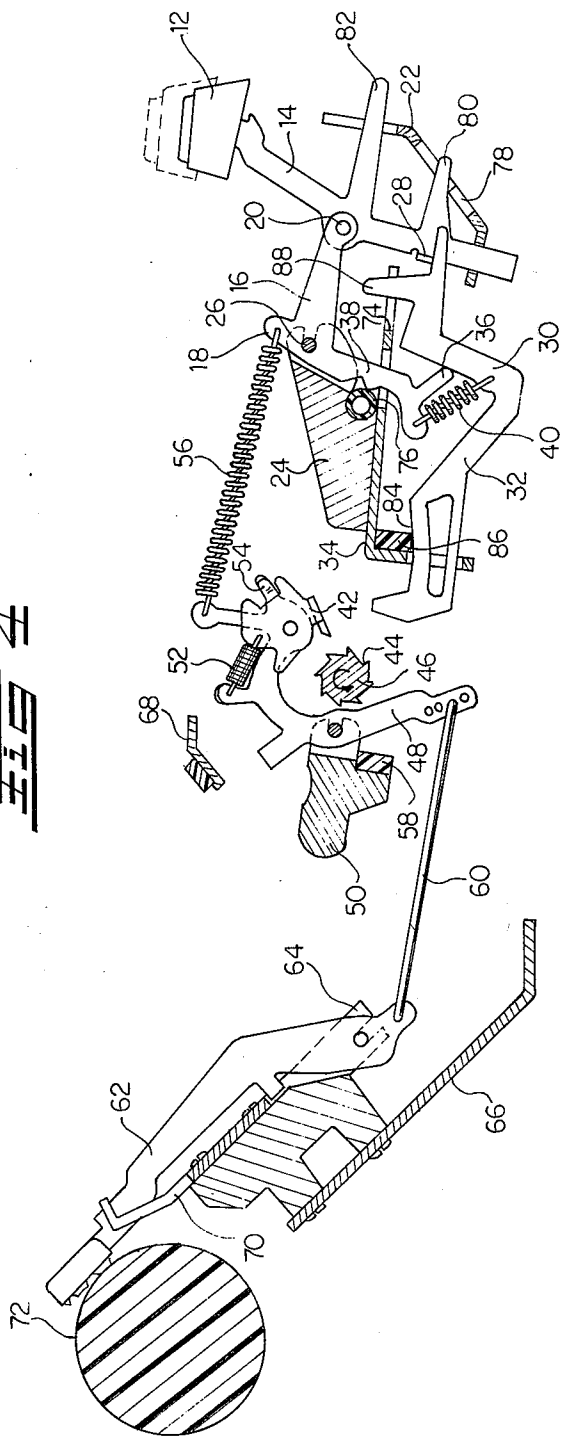
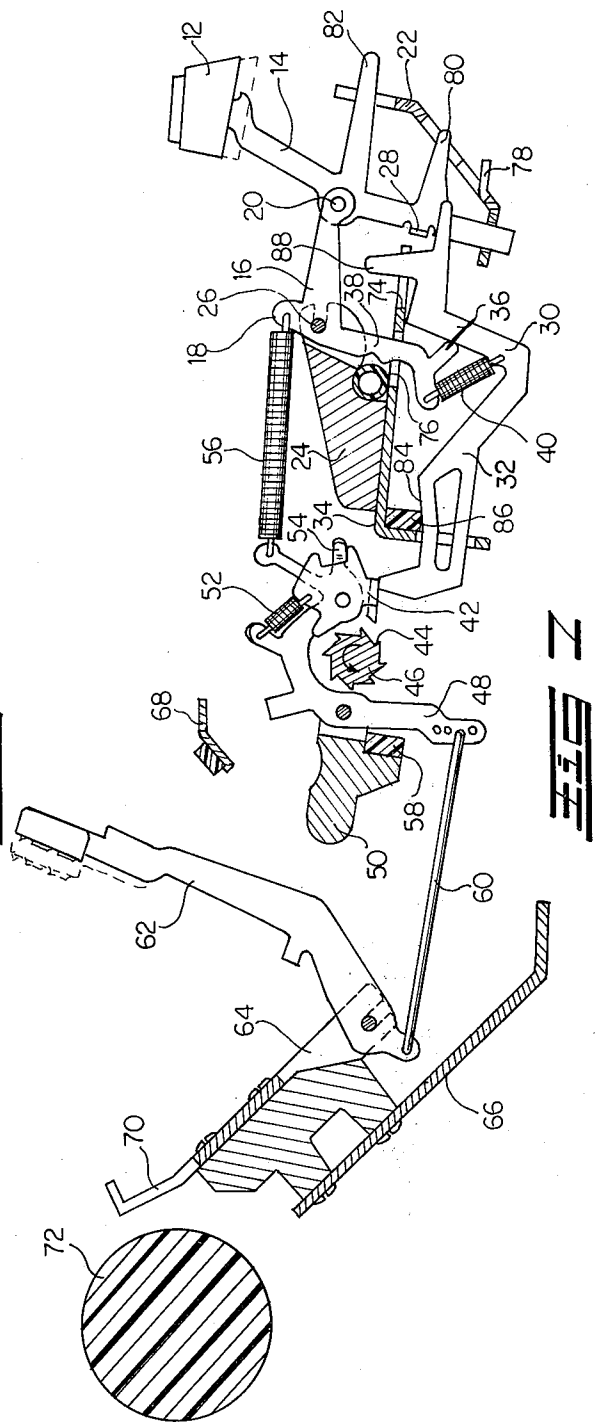
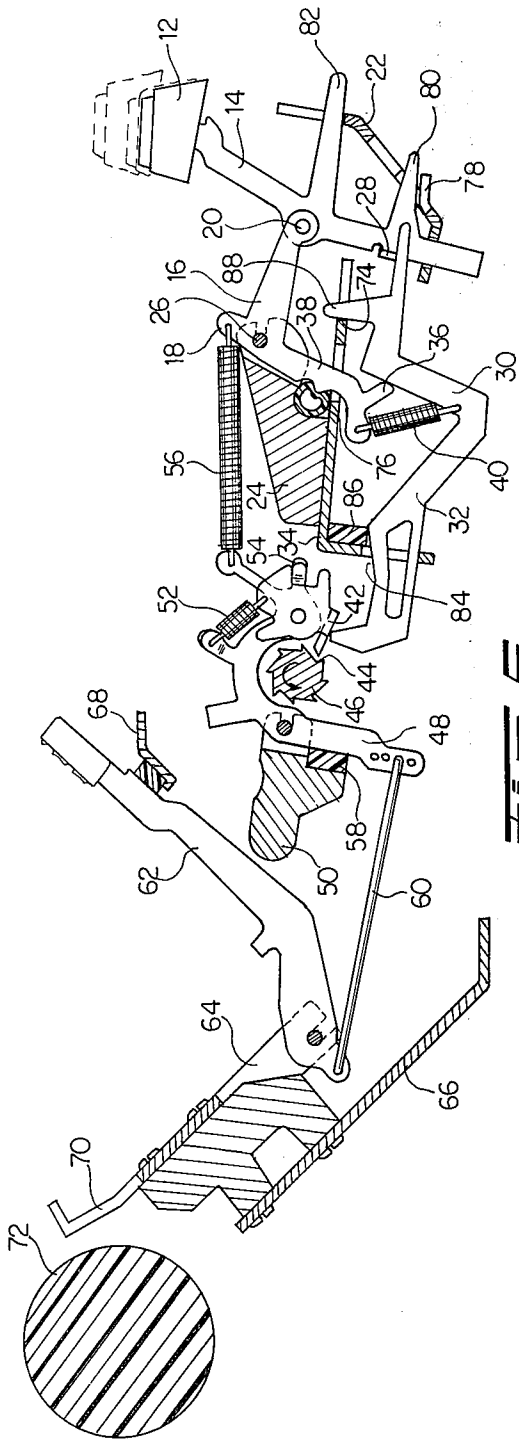
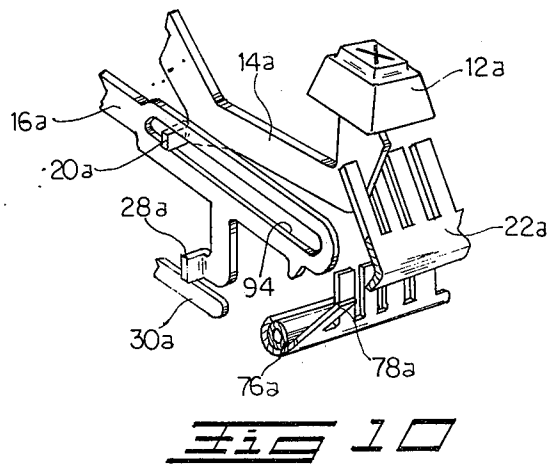
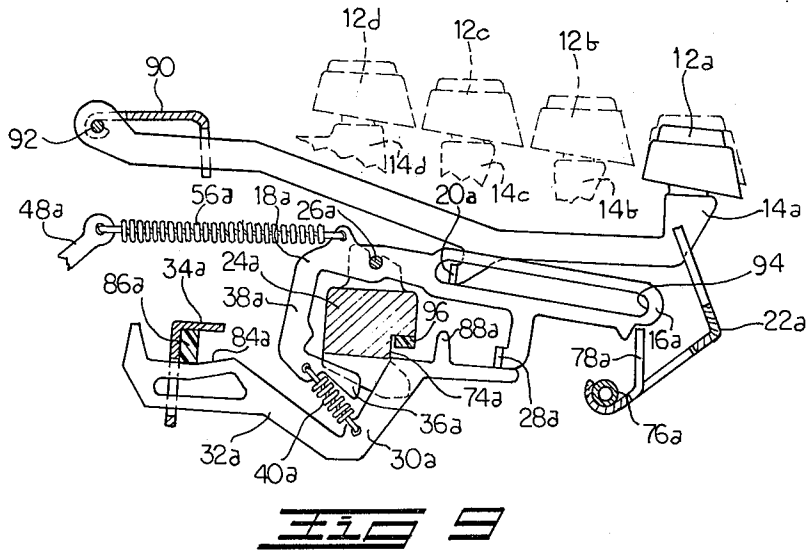
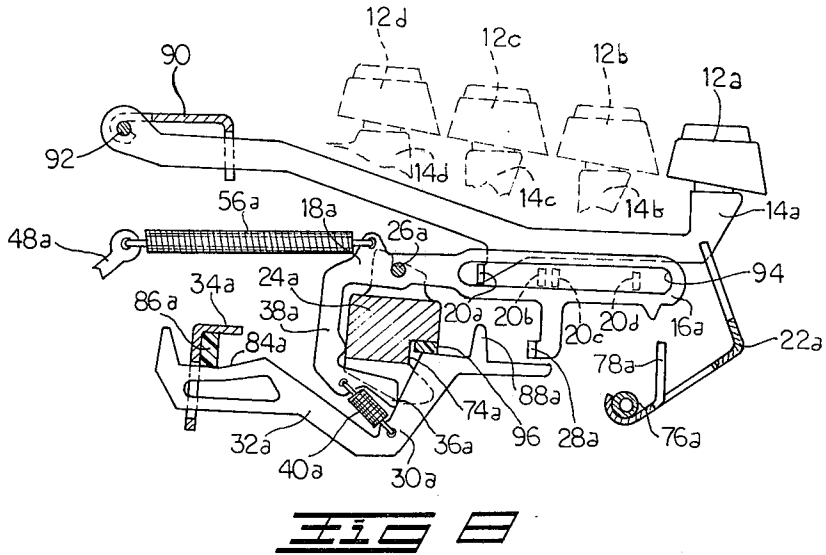


FIG 5





TYPING MACHINE KEY ACTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to key actions for power driven typing machines and more particularly to the activation arrangement for a horizontal interposer during depression of a key lever.

2. Description of the Prior Art

Prior typing machine key actions such as one disclosed in a U.S. Pat. No. 3,419,123 to Salzberger et al. still fall short of the optimum requirements for a key action. They are relatively expensive to manufacture, occupy a large amount of vertical space, and employ vertically oriented and directed interposers.

SUMMARY OF THE INVENTION

It is, therefore, an object of the invention to provide a key action that is less expensive to manufacture than prior key actions and has a minimum number of parts.

Another object of the invention is to provide a key action that reduces the vertical height required thus enabling a typing machine to have an aesthetically pleasing low silhouette.

Another object of the invention is to provide a key action of simple construction employing a horizontal interposer that acts in a horizontal direction.

Another object of the invention is to provide a rapidly responsive key action thereby permitting the attainment of increased typing speeds.

Another object of the invention is to provide a key action that may be employed in conjunction with any key and still perform with substantially the same characteristics without requiring additional compensating components other than key levers no matter what location the key action occupies in a typing machine.

A still further object of the invention is to provide a key action that can function in the single-action and repeat typing modes without the necessity of modification or additional elements.

In order to accomplish the objects of the invention, a key lever is pivotally connected to a horizontal arm of a bell crank in a typing machine key action, and a coil tension spring is connected between a vertical arm of the bell crank and a vertical arm of a horizontal interposer. Depression of the key lever pivots the bell crank to stretch the coil tension spring. When the descending key lever pushes the horizontal interposer off a ledge, the coil tension spring snaps the horizontal interposer to the rear against a pawl that engages a power roll to initiate a typing operation. A bendable tab that limits downward movement of the key lever can be bent out of the way so that the key lever can be depressed further into a repeat position thus enabling the same parts to be used for both single-action and repeat key actions. In another embodiment of the invention, a longitudinal slot is formed in the horizontal arm of the bell crank to compensate for key levers having different lengths while also enabling the same parts to be used. Since most of the parts can be stamped from sheet metal, the parts are inexpensive. The bell crank enables a horizontal interposer to be used thus enabling the typing machine to have an aesthetically pleasing low silhouette. Since the coil tension spring snaps the interposer against the pawl, the pawl rapidly engages the power roll without chattering against teeth on the power roll.

Other objects and a fuller understanding of the invention can be had by referring to the description of the preferred embodiments and the claims, taken in conjunction with the accompanying drawing as hereinafter described.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of an embodiment of the invention;

FIG. 2 is a left side elevation view of the invention shown in FIG. 1 with the key action in rest position;

FIG. 3 is a view similar to that of FIG. 2 just before tripping of the key action with the key partially depressed;

FIG. 4 is a view similar to that of FIG. 3 just after tripping of the key action;

FIG. 5 is a view similar to that of FIG. 4 with the typebar actuated by the key action;

FIG. 6 is a view similar to that of FIG. 5 after further depression of the key to a repeat position;

FIG. 7 is a view similar to that of FIG. 6 with the key action partially restored toward the rest position;

FIG. 8 is a partial left side elevation view of another embodiment of the invention;

FIG. 9 is a view similar to that of FIG. 8 just prior to tripping of the key action; and

FIG. 10 is a perspective view of the area of the key lever guide comb at the front of the typing machine.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With initial reference to FIG. 1 of the drawing, an embodiment of the invention is shown incorporated in a key action of a typing machine represented by portions thereof selected for their relevance to the invention. The term "typing machine" as applied herein can be any one of many different kinds of machines such as typewriters, ball printers, printers for computers, teletypewriters, adding machines, calculators, cash registers, and the like.

As illustrated in FIG. 1, the key action includes a key 12 mounted on a key lever 14 that is pivotally connected to a horizontal arm 16 of a bell crank 18 by a pivot pin 20 and vertically guided by a key lever guide comb 22. The bell crank 18 in turn is pivotally connected to a support 24 by a pivot pin 26. A bent projection 28 on the key lever 14 engages a vertical arm 30 of a horizontal interposer 32 that is mounted in an interposer guide comb 34. The vertical arm 30 of the horizontal interposer 32 is biased against a finger 36 on a vertical arm 38 of the bell crank 18 by a coil tension spring 40 connected between the vertical arms 30 and 38.

The horizontal interposer 32 is in front of an actuating means or pawl 42 that is positioned to engage one of multiple teeth 44 on a power roll 46. The pawl 42 is pivotally connected to an actuator 48 that in turn is pivotally connected to an actuator support comb 50. A coil tension spring 52 connected between the pawl 42 and the actuator 48 biases the pawl 42 counterclockwise against a bent ear 54 on the actuator 48, while a coil tension spring 56 connected between the bell crank 18 and the actuator 48 biases the bell crank 18 against the interposer guide comb 34 and the actuator 48 against a stop 58 on the actuator support comb 50. The stop 58 is composed of vinyl plastic or other suitable material. A link 60 pivotally connects the actuator

48 to a typebar 62 that in turn is pivotally connected to a typebar segment 64 mounted on a bracket 66. The typebar 62 is normally disposed against a typebar rest 68. When actuated, the typebar 62 (guided by a typebar guide 70 mounted on the typebar segment 64) strikes a platen 72. Although the key action has been described in the singular, a complete typing machine could have as many as 44 or more key actions. The support 24, interposer guide comb 34, key lever guide comb 22, actuator support comb 50, and typebar segment 64 help guide and prevent lateral movement of the key action.

FIGS. 2 to 7 represent successive steps in a repeat typing operation. Other typing machine operations are also possible using the invention such as spacing, case shifting, and so forth. For completeness, FIG. 2 shows the key action in rest position as in FIG. 1.

As shown in Fig. 3, initial depression of the key lever 14 to a position just prior to tripping of the horizontal interposer 32 causes the bent projection 28 on the key lever 14 to depress the horizontal interposer 32. The vertical arm 30 of the horizontal interposer 32 engages a ledge 74 on the interposer guide comb 34, and the bell crank 18 pivots clockwise to stretch the coil tension spring 40 between the bell crank 18 and the horizontal interposer 32.

Further depression of the key lever 14 to a single-action position in which the vertical arm 38 of the bell crank 18 engages a tubular stop 76 on the support 24 causes the vertical arm 30 of the horizontal interposer 32 to fall off the ledge 74 as shown in FIG. 4. The tubular stop 76 is composed of an elastic material such as vinyl plastic. Depression of the key lever 14 is limited by a bendable tab 78 on the key lever guide comb 22. The bendable tab 78 is engaged by a lower arm 80 on the key lever 14. After the horizontal interposer 32 falls off the ledge 74, the coil tension spring 40 between the bell crank 18 and the horizontal interposer 32 snaps the horizontal interposer 32 to the rear (to the left) against the pawl 42 and drives the pawl 42 clockwise against the bent ear 54 on the actuator 48 and against the power roll 46. Rearward movement of the horizontal interposer 32 is limited by the finger 36 which engages the vertical arm 30 of the horizontal interposer 32. Since the movement of the horizontal interposer 32 is substantially perpendicular to the key lever 14, no irritating jolt can be transmitted back to the key 12 on the key lever 14.

With the key lever 14 still depressed into the single-action position, one of the teeth 44 on the power roll 46 engages the pawl 42 to pivot the actuator 48 and (through the link 60) the typebar 62 counterclockwise to perform a typing operation as shown in FIG. 5.

Still further depression of the key lever 14 to a repeat position is permitted by having the bendable tab 78 on the key lever guide comb 22 bent downward into a substantially horizontal position as shown in FIG. 6. A repeat capability is desirable for symbols that are often repeated in clusters such as x's, periods, underlines, and hyphens. As the key lever 14 is pivoted downward into the repeat position, the vertical arm 38 of the bell crank 18 compresses the tubular stop 76. The tubular stop 76 increases the resistance as the key lever 14 moves from the single-action position to the repeat position, but downward movement of the key lever 14 is ultimately limited by the key lever guide comb 22 which is engaged by an upper arm 82 on the key lever

14. As the horizontal interposer 32 shifts to the rear (to the left), a cam surface 84 on the top of the horizontal interposer 32 engages a guide 86 on the interposer guide comb 34 to depress the horizontal interposer 32 below the pawl 42. The guide 86 is composed of vinyl plastic or other suitable material. Rearward movement of the horizontal interposer 32 is limited by the ledge 74 which is engaged by a tail 88 on the horizontal interposer 32. The horizontal interposer 32 moves far enough to the rear, however, so that the horizontal interposer 32 will pivot the pawl 42 clockwise against the bent ear 54 on the actuator 48 and against the power roll 46 to initiate a typing operation each time the pawl 42 strikes the horizontal interposer 32 upon return from a preceding typing operation.

Upon release of the key 12, the key action begins to return to the rest position as shown in FIG. 7. The coil tension spring 40 between the bell crank 18 and the horizontal interposer 32 pulls the finger 36 on the vertical arm 38 of the bell crank 18 against the vertical arm 30 of the horizontal interposer 32. The finger 36 will cam the vertical arm 30 of the horizontal interposer 32 back onto the ledge 74. The coil tension spring 56 between the actuator 48 and the bell crank 18 pivots the actuator 48 forward (to the right) and the bell crank 18 counterclockwise. A repeat typing operation is impossible while the key lever 14 is in the single-action position because the horizontal interposer 32 is beneath the returning pawl 42 and far enough forward (to the right) to avoid pivoting the pawl 42 clockwise against the bent ear 54 on the actuator 48 and against the power roll 46.

Another embodiment of the invention is shown in FIGS. 8 to 10. Wherever possible, the parts are identified by the same reference numerals as before, but distinguished by a's.

The embodiment of the invention introduced in FIG. 8 is similar to the other embodiment with the following exceptions. The key lever 14a is pivotally connected to a rear key lever guide comb 90 by a pivot pin 92, the pivot that pivotally connects the key lever 14a to the horizontal arm 16a of the bell crank 18a is a bent projection 20a on the key lever 14a engaging a longitudinal slot 94 in the horizontal arm 16a of the bell crank 18a, the bent projection 28a that engages the horizontal interposer 32a is on the horizontal arm 16a of the bell crank 18a, the tubular stop 76a is relocated at the key lever guide comb 22a at the front of the typing machine, and a stop 96 on the support 24a limits upward movement of the horizontal interposer 32a. The stop 96 is composed of vinyl plastic or other suitable material, and the longitudinal slot 94 enables bent projections 20b, 20c, and 20d on key levers 14b, 14c, and 14d of different lengths to trip and restore horizontal interposers at the same time without requiring any other different parts. Except for the key levers 14a, 14b, 14c, and 14d, the same key action can be used for all of the keys 12a, 12b, 12c, and 12d.

Initial depression of the key lever 14a to a position just prior to tripping of the horizontal interposer 32a places the key action in the position shown in FIG. 9. As described for the other embodiment of the invention shown in FIG. 3, the vertical arm 30a of the horizontal interposer 32a engages a ledge 74a on the support 24a, and the bell crank 18a pivots clockwise to stretch the coil tension spring 40a.

The subsequent operation to the single-action and repeat positions and return is substantially the same as that described for the other embodiment of the invention. In the single-action position, the bendable tab 78a on the key lever guide comb 22a at the front of the typing machine limits downward movement of the key lever 14a as the bendable tab 78a is engaged by the horizontal arm 16a of the bell crank 18a, and the finger 36a on the vertical arm 38a of the bell crank 18a limits rearward (leftward) movement of the horizontal interposer 32a as the finger 36a is engaged by the vertical arm 30a of the horizontal interposer 32a. As shown in FIG. 10, the bendable tab 78a on the key lever guide comb 22a at the front of the typing machine is bent out of the way to permit the key lever 14a to be further depressed to the repeat position. In the repeat position, the horizontal arm 16a of the bell crank 18a compresses the tubular stop 76a, the top of the support 24a limits downward movement of the key lever 14a as the top of the support 24a is engaged by the horizontal arm 16a of the bell crank 18a, and the front of the support 24a limits rearward (leftward) movement of the horizontal interposer 32a as the front of the support 24a is engaged by the tail 88a on the horizontal interposer 32a.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made by way of example and that numerous changes in the details of construction and the combination and arrangement of parts can be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

Having thus set forth the nature of the invention, what is claimed is:

1. In a typing machine of the kind having means for actuating a typing machine operation, a power roll rotatably mounted in the typing machine for engagement by the actuating means to actuate the typing machine operation, a substantially horizontal interposer near the actuating means, means for holding the horizontal interposer away from the actuating means, a key lever movably mounted in the typing machine, means for releasing the horizontal interposer from the holding means upon depression of the key lever, and a support, in combination, the improvement comprising:

- a. a substantially vertical arm on the horizontal interposer for engaging the holding means;
 - b. a bell crank pivotally connected to the support, the bell crank having a substantially horizontal arm, and a substantially vertical arm located to the rear of the vertical arm of the horizontal interposer;
 - c. a pivot pivotally connecting the key lever to the horizontal arm of the bell crank; and
 - d. a tension spring connected between the vertical arm of the horizontal interposer and the vertical arm of the bell crank which stretches the tension spring upon depression of the key lever until the releasing means releases the horizontal interposer from the holding means whereupon the tension spring causes the horizontal interposer to engage the actuating means and the actuating means to engage the power roll to actuate the typing machine operation.
2. The typing machine of claim 1, in which the horizontal arm of the bell crank has a longitudinal slot, the pivot engaging the longitudinal slot.
3. The typing machine of claim 1, further comprising:
- e. a finger on the vertical arm of the bell crank for engaging the vertical arm of the horizontal interposer.
4. The typing machine of claim 3, in which the releasing means includes a projection for engaging the horizontal interposer.
5. The typing machine of claim 1, further comprising:
- e. a cam surface on the horizontal interposer, the cam surface engaging a guide to alter the motion of the horizontal interposer to perform repeat typing machine operations.
6. The typing machine of claim 5, further comprising:
- f. a tubular stop composed of an elastic material, the tubular stop deformed radially and elastically as the key lever is depressed from a single-action position to a repeat position.
7. The typing machine of claim 1, further comprising:
- e. a bendable tab for stopping downward movement of the key lever at a single-action position, the bendable tab capable of being bent out of the way so that the key lever can be further depressed to a repeat position.
8. The typing machine of claim 7, in which the bendable tab is on a key lever guide comb.

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