

PATENT SPECIFICATION

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 (72) Inventors HANS W. MUELLER
 RICHARD E. SHATTUCK

(19)



(54) IMPROVEMENTS IN OR RELATING TO TYPING MACHINES

(71) We, SCM CORPORATION, of 299 Park Avenue, New York, New York 10017, United States of America, a corporation of the State of New York, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to power driven typing machines.

According to the invention there is provided a typing machine including a power roll rotatably mounted for engagement by actuating means to actuate a typing machine operation, a movably mounted key lever, means for restoring the key lever to a rest position, biasing means connected between an interposer and a stationary portion of the typing machine to normally bias the interposer in a first position against supporting means on the typing machine but being releasable therefrom upon depression of the key lever into a second position to cause the actuating means to engage the power roll to actuate the typing machine operation, and return means for returning the interposer to its first position during return of the key lever to the rest position.

Prior typing machine key actions are relatively expensive to manufacture, their parts are subject to a large amount of friction and wear because of their design, and they occupy a large amount of vertical space. Their designs are predicated on the use of pin-supported interposers activated by independent springs which inherently introduce friction as well as additional components into the overall structure. As will become apparent from the following, the present invention enables the provision of a typing machine having a key action that is less expensive to manufacture than prior

key actions and has less parts, and furthermore is less subject to friction and wear than previous arrangements, can be made so as to occupy very little vertical space thus enabling a typing machine to have an aesthetically pleasing low silhouette, and has the further advantage of extremely rapid response thus permitting very high typing speeds.

In a preferred embodiment of the invention, the interposer is located between a shelf on the typing machine and a spring which normally biases the interposer into engagement with the shelf. When a key lever bears against the spring to release the interposer from its first position on the shelf, the spring urges the interposer against a pawl that engages a power roll to initiate a typing operation. Potential energy is restored to the spring as the key lever lifts the interposer back to rest position. Since the key lever bears against the spring rather than the interposer there is very little friction and wear between the interposer and the shelf. In addition, the spring acts as a frictionless pivot for the interposer. The typing machine can have an aesthetically pleasing low silhouette because of the horizontal orientation and action of the interposer. Since the spring urges the interposer against the pawl, the pawl quickly engages the power roll without chattering against teeth on the power roll.

Other features and advantages of the invention and a fuller understanding thereof can be had by referring to the following description of the preferred embodiments of the invention which are illustrated in the accompanying drawings wherein:—

Figure 1 is a perspective view of part of a typing machine embodying the invention;

Figure 2 is a left side elevation view of the embodiment shown in Figure 1 with the key action in rest position;

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

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

Figure 5 is a view similar to that of Figure 4 with the type-bar actuated by the key action;

Figure 6 is a view similar to that of Figure 5 with the key action partially restored toward the rest position;

Figure 7 is a partial view similar to that of Figure 6 but showing a different key; and

Figure 8 is a perspective view of another embodiment of the invention.

Figure 1 illustrates an embodiment of the invention in conjunction with those portions of a typing machine that coact with and are relevant to the invention. The term "typing machine" as used herein applies to 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 shown in Figure 1, the key action includes a key 12 mounted on a key lever 14 that is pivotally connected to a key lever support comb 16 by a pivot pin 18 and vertically guided by a key lever guide comb 20. A cantilever flat spring 22 mounted on the key lever support comb 16 biases an arm 24 on the key lever 14 upward against a stop 26 on the key lever support comb 16. The stop 26 is composed of vinyl plastic or other suitable material.

Return means in the form of a nose 28 on the key lever 14 engages a flange 30 on an interposer 32, while the front end 34 of the interposer 32 has a prong 36 that extends into the top end 38 of coil spring 40. The interposer 32 is held on the coil spring 40 by a knuckle 42 that engages with a hook 44 on the spring 40. The bottom end 46 of the arcuate coil spring 40 is located on a stationary portion of the typing machine represented by a spike 48 on a plate 50 that is connected to the key lever support comb 16. Retaining means in the form of a lip 52 mounted on the plate 50 engages the arcuate coil spring 40 to hold the arcuate coil spring 40 on the spike 48. Before assembly, the coil spring is straight, but as can be seen from the drawings, when located between the spike 48 and the knuckle 42 on the interposer 32, it becomes curved along its length and thereby normally biases the interposer into a first position where it engages with supporting means such as shelf 88 on the typing machine.

The rear end 54 of the interposer 32 is poised above a top surface 56 of a pawl 58

that is positioned to engage one of multiple teeth 60 on a power roll 62. The pawl 58 is pivotally connected to an actuator 64 that in turn is pivotally connected to the key lever support comb 16. A coil tension spring 66 connected between the pawl 58 and the actuator 64 biases the pawl 58 counterclockwise against a bent ear 68 on the actuator 64, while a coil tension spring 70 connected between the actuator 64 and a bracket 72 on a typebar segment 74 biases the actuator 64 against an actuator stop bar 76. A link 78 pivotally connects the actuator 64 to a typebar 80 that in turn is pivotally connected to the typebar segment 74 and is normally disposed against a typebar rest 82. When actuated, the typebar 80 (guided by a typebar guide 84 mounted on the typebar segment 74) strikes a platen 86. Although the key action has been described in the singular, a complete typing machine could have as many as forty-four or more key actions. The key lever support comb 16, key lever guide comb 20, and typebar segment 74 help guide and prevent lateral movement of the key action.

Figures 2 to 6 represent successive steps during one typing operation. Other typing machine operations are also possible using the invention such as spacing, case shifting, repeat typing, and so forth. For completeness, Figure 2 shows the key action in rest position as in Figure 1.

As shown in Figure 3, initial depression of the key lever 14 to a position just prior to tripping of the interposer 32 causes the nose 28 on the key lever 14 to drop away from the flange 30 on the interposer 32 so that the interposer 32 is supported solely by the shelf 88 and the coil spring 40. Releasing means such as heel 90 on the key lever 14 contacts an intermediate portion 92 of the coil spring 40.

Just after tripping of the interposer 32, the key action is oriented as shown in Figure 4. The key lever 14 is depressed as far as possible with a space bar shaft 94 preventing further depression. The heel 90 on the key lever 14 has pushed the coil spring 40 forward (to the right) to pull the interposer 32 so that a ledge 96 on the interposer 32 has fallen off the shelf 88 on the key lever support comb 16. The top end 38 of the arcuate coil spring 40 has pivoted about the heel 90 on the key lever 14 and snapped the rear end 54 of the interposer 32 against the pawl 58 and the pawl 58 clockwise against the bent ear 68 on the actuator 64 and against the power roll 62. Since the nose 28 on the key lever 14 is below the flange 30 on the interposer 32, no part of the key lever 14 contacts the interposer 32. Therefore, no irritating jolt can be trans-

mitted back to the key 12 on the key lever 14. The action of the heel 90 against the coil spring 40 instead of against the interposer 32 sharply reduces friction between the interposer 32 and the shelf 88 as the interposer 32 is tripped.

With the key lever 14 still depressed as far as possible, one of the teeth 60 on the power roll 62 engages the pawl 58 to pivot the actuator 64 and (through the link 78) the typebar 80 counterclockwise to perform a typing operation as shown in Figure 5. The interposer 32 is now supported by the nose 28 on the key lever 14.

Upon release of the key 12, the key action begins to return to the rest position as shown in Figure 6. As the cantilever flat spring 22 lifts the key lever 14, the nose 28 on the key lever 14 lifts the interposer 32 to store potential energy in the coil spring 40 by recocking it. A repeat typing operation is prevented while the key lever 14 is depressed because the rear end 54 of the interposer 32 is below the top surface 56 of the returning pawl 58.

Thus far, the key lever 14 that has been described is for a key 12 that is nearest to the operator. Figure 7 shows a key lever 14' for a key 12' that is farthest from the operator. For ease of comparison, the key action is in the same partially restored position as the key action in Figure 6, and the same reference numerals have been used, but distinguished by primes for the parts that are not common to the two key actions.

In Figure 7 the only part that is shaped differently is the key lever 14'. In order for the shorter key lever 14' to trip and restore the interposer 32' at the same times as the key lever 14 previously described, the heel 90' on the key lever 14' is slightly shorter, and the nose 28' on the key lever 14' contacts the flange 30' on the interposer 32' at a rearward location as opposed to a forward location contacted by the nose 28 previously described. Key levers of intermediate lengths would also have their heels and noses adjusted so that they would trip and restore their interposers at the same times as the key levers 14 and 14'. If the heels and noses were not adjusted, the key actions would operate at different times during depressions and restorations of the key levers thus causing a sense of irregular operation.

Another embodiment of the invention is shown in Figure 8. This embodiment of the invention is the same as the other embodiment except for the use of an leaf spring 40" instead of the coil spring 40 and the different mounting required. Whenever possible, the parts are identified by the same reference numerals as before, but distinguished by double primes.

As shown in Figure 8, the leaf spring 40" is mounted in the same position as the coil spring 40. The bottom end 46" of the leaf spring 40" is connected to a plate 50" by a bar 98 that is screwed on the plate 50". A slot 100 in the top end 38" of the leaf spring 40" fits over a depending hook 102 on the front end 34" of the interposer 32", and a tail 104 on the front end 34" of the interposer 32" helps retain the spring 40" on the depending hook 102. The operation is the same as that using the arcuate coil spring 40.

WHAT WE CLAIM IS:—

1. A typing machine including a power roll rotatably mounted for engagement by actuating means to actuate a typing machine operation, a movably mounted key lever, means for restoring the key lever to a rest position, biasing means connected between an interposer and a stationary portion of the typing machine to normally bias the interposer in a first position against supporting means on the typing machine but being releasable therefrom upon depression of the key lever into a second position to cause the actuating means to engage the power roll to actuate the typing machine operation, and return means for returning the interposer to its first position during return of the key lever to the rest position.

2. A typing machine as claimed in claim 1, in which the return means comprises a nose on the key lever, the nose engaging the interposer.

3. A typing machine as claimed in claim 1 or 2 further comprising a second said key lever, a second said interposer, and a second said return means, the first return means being arranged to contact the first interposer at a first location, and the second return means being arranged to contact the second interposer at a second different location along the length of the interposer to compensate for differences in length between the first and second key levers.

4. A typing machine as claimed in any of the preceding claims, in which the biasing means comprises a spring.

5. A typing machine as claimed in claim 4, in which releasing means bear against an intermediate portion of the spring on depression of the key lever to release the interposer.

6. A typing machine as claimed in claim 4 or 5, in which the spring is a leaf spring.

7. A typing machine as claimed in claim 4 or 5, in which the spring is a coil spring.

8. A typing machine as claimed in claim 7, in which the spring is located between a spike on the typing machine and a



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mitted back to the key 12 on the key lever 14. The action of the heel 90 against the coil spring 40 instead of against the interposer 32 sharply reduces friction between the interposer 32 and the shelf 88 as the interposer 32 is tripped.

With the key lever 14 still depressed as far as possible, one of the teeth 60 on the power roll 62 engages the pawl 58 to pivot the actuator 64 and (through the link 78) the typebar 80 counterclockwise to perform a typing operation as shown in Figure 5. The interposer 32 is now supported by the nose 28 on the key lever 14.

Upon release of the key 12, the key action begins to return to the rest position as shown in Figure 6. As the cantilever flat spring 22 lifts the key lever 14, the nose 28 on the key lever 14 lifts the interposer 32 to store potential energy in the coil spring 40 by recocking it. A repeat typing operation is prevented while the key lever 14 is depressed because the rear end 54 of the interposer 32 is below the top surface 56 of the returning pawl 58.

Thus far, the key lever 14 that has been described is for a key 12 that is nearest to the operator. Figure 7 shows a key lever 14' for a key 12' that is farthest from the operator. For ease of comparison, the key action is in the same partially restored position as the key action in Figure 6, and the same reference numerals have been used, but distinguished by primes for the parts that are not common to the two key actions.

In Figure 7 the only part that is shaped differently is the key lever 14'. In order for the shorter key lever 14' to trip and restore the interposer 32' at the same times as the key lever 14 previously described, the heel 90' on the key lever 14' is slightly shorter, and the nose 28' on the key lever 14' contacts the flange 30' on the interposer 32' at a rearward location as opposed to a forward location contacted by the nose 28 previously described. Key levers of intermediate lengths would also have their heels and noses adjusted so that they would trip and restore their interposers at the same times as the key levers 14 and 14'. If the heels and noses were not adjusted, the key actions would operate at different times during depressions and restorations of the key levers thus causing a sense of irregular operation.

Another embodiment of the invention is shown in Figure 8. This embodiment of the invention is the same as the other embodiment except for the use of an leaf spring 40" instead of the coil spring 40 and the different mounting required. Whenever possible, the parts are identified by the same reference numerals as before, but distinguished by double primes.

As shown in Figure 8, the leaf spring 40" is mounted in the same position as the coil spring 40. The bottom end 46" of the leaf spring 40" is connected to a plate 50" by a bar 98 that is screwed on the plate 50". A slot 100 in the top end 38" of the leaf spring 40" fits over a depending hook 102 on the front end 34" of the interposer 32", and a tail 104 on the front end 34" of the interposer 32" helps retain the spring 40" on the depending hook 102. The operation is the same as that using the arcuate coil spring 40.

WHAT WE CLAIM IS:—

1. A typing machine including a power roll rotatably mounted for engagement by actuating means to actuate a typing machine operation, a movably mounted key lever, means for restoring the key lever to a rest position, biasing means connected between an interposer and a stationary portion of the typing machine to normally bias the interposer in a first position against supporting means on the typing machine but being releasable therefrom upon depression of the key lever into a second position to cause the actuating means to engage the power roll to actuate the typing machine operation, and return means for returning the interposer to its first position during return of the key lever to the rest position.

2. A typing machine as claimed in claim 1, in which the return means comprises a nose on the key lever, the nose engaging the interposer.

3. A typing machine as claimed in claim 1 or 2 further comprising a second said key lever, a second said interposer, and a second said return means, the first return means being arranged to contact the first interposer at a first location, and the second return means being arranged to contact the second interposer at a second different location along the length of the interposer to compensate for differences in length between the first and second key levers.

4. A typing machine as claimed in any of the preceding claims, in which the biasing means comprises a spring.

5. A typing machine as claimed in claim 4, in which releasing means bear against an intermediate portion of the spring on depression of the key lever to release the interposer.

6. A typing machine as claimed in claim 4 or 5, in which the spring is a leaf spring.

7. A typing machine as claimed in claim 4 or 5, in which the spring is a coil spring.

8. A typing machine as claimed in claim 7, in which the spring is located between a spike on the typing machine and a

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prong on the interposer.

9. A typing machine as claimed in claim 8, in which a hook on the coil spring is engaged with the interposer.

5 10. A typing machine as claimed in claim 9, in which the hook is hooked over a knuckle on the interposer.

10 11. A typing machine as claimed in claim 8, 9 or 10, further comprising retaining means for holding the coil spring on the spike.

12. A typing machine as claimed in claim 11, in which the retaining means

comprises a lip on the typing machine.

13. A typing machine substantially as herein described with reference to Figures 1 to 7 of the accompanying drawings.

14. A typing machine substantially as herein described with reference to Figure 8 of the accompanying drawings.

A. A. THORNTON & CO.,
Chartered Patent Agents,
Northumberland House,
303/306 High Holborn,
London, WC1V 7LE.

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