Oct. 19, 1954 O. REICHERT ET AL 2,692,037

KEY FOR OFFICE MACHINES

Filed March 23, 1950 2 Sheets-Sheet 1

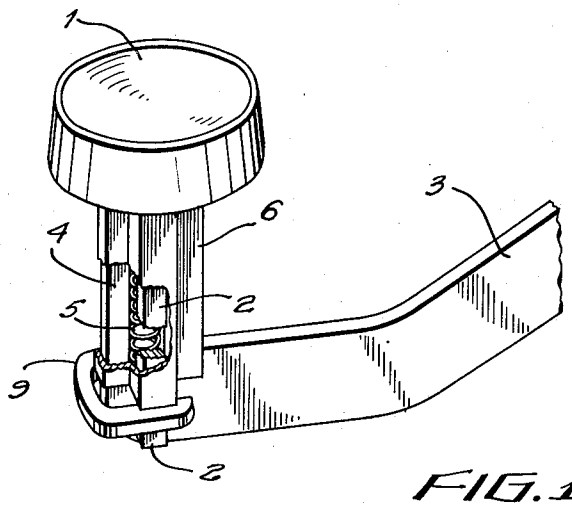


FIG. 1.

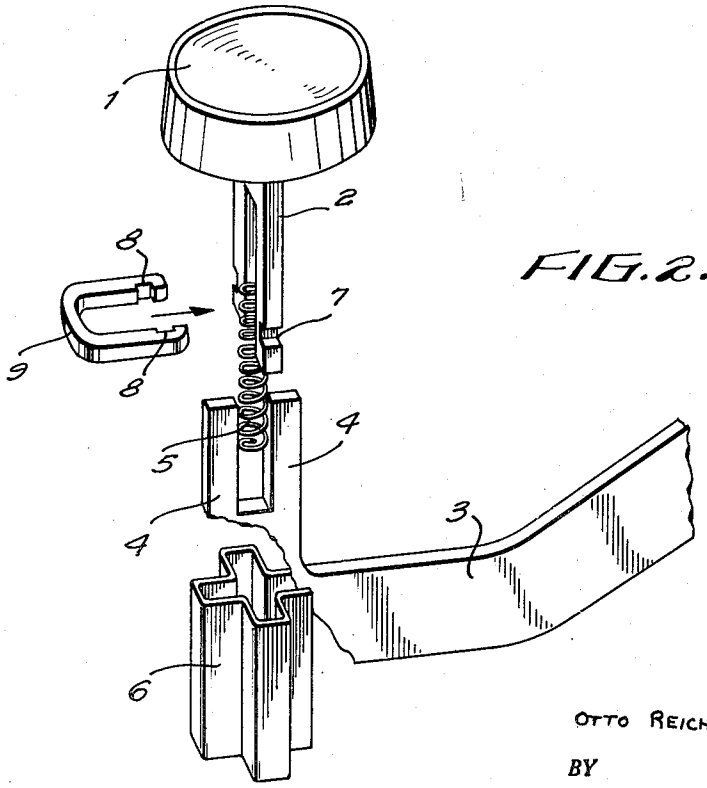


FIG. 2.

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FIG. 4.

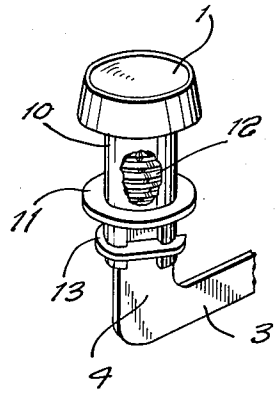
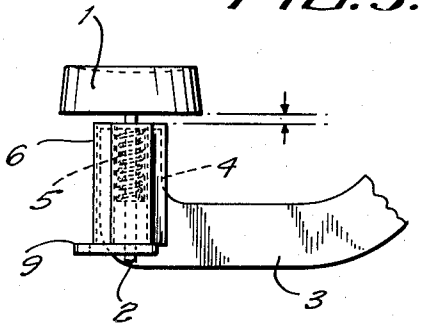


FIG. 3.



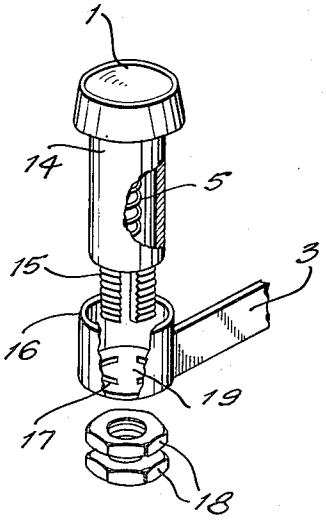


FIG. 5.

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UNITED STATES PATENT OFFICE

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KEY FOR OFFICE MACHINES

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Application March 23, 1950, Serial No. 151,374

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14 Claims. (Cl. 197—103)

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The present invention relates to a key for office machines such as typewriters, adding machines, bookkeeping machines and the like.

It is an object of the present invention to relieve the back pressure exerted on the key.

It is another object of the present invention to provide an office machine with keys which are easily operated without tiring the fingers of the operator.

It is a further object of the present invention to reduce the strain on the nerves of the finger tips of the operator and to avoid painful inflammations of the nerves and diseases thereof which are hard to cure.

The present invention consists in an office machine comprising in combination, a key adapted to be depressed, a member adapted to be actuated by the depression of the key, and a resilient element inserted between said key and said member.

A preferred embodiment of the present invention comprises a first member rigidly connected to the key, a second member adapted to be actuated by the first member on a depression of the key, and a resilient element inserted between the members.

According to a preferred embodiment of the present invention a device is provided for limiting the mutual motion of the members.

In a preferred embodiment of the present invention a member is arranged below the key and rigidly connected to same, and a lever is adapted to be actuated by the member on a depression of the key, a resilient element being arranged between the member and the lever.

Preferably the members are designed so as to slide on each other.

In one embodiment of the present invention the members are fork-shaped, the second fork-shaped member being arranged transversely to the first fork-shaped member.

Preferably a sleeve having a cross-shaped cross-section is attached to the second fork-shaped member, the first fork-shaped member extending into said sleeve and projecting with its forked end beyond the sleeve. Preferably the device for limiting the mutual sliding motion of the fork-shaped members is designed as a resilient stirrup cooperating with the forked end of the first fork-shaped member.

According to another embodiment of the present invention a first hollow member, preferably of cylindrical shape, is rigidly connected to the key, whereas a second member is arranged for sliding motion with respect to the first hollow member and preferably has a portion provided with apertures through which the first member penetrates.

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According to another embodiment of the present invention both members are shaped as hollow cylinders arranged for sliding motion with respect to each other, one of the cylinders penetrating through the other of the cylinders. Preferably a screw nut is attached to one of said cylinders and limits the mutual motion of the cylinders.

The resilient element may be designed as a compression spring or as a bellows inserted between the two members.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Figure 1 is a perspective view of the first embodiment of the present invention, some parts being broken away for the sake of clearness;

Figure 2 is an exploded view of the device shown in Figure 1;

Figure 3 is a diagrammatic side elevation of the device shown in Fig. 1 on a slightly reduced scale;

Figure 4 is a perspective view of a second embodiment of the present invention, some parts being broken away; and

Figure 5 is a partly exploded perspective view of a third embodiment of the present invention, some parts being broken away.

Referring now to the drawings and first to Figs. 1, 2 and 3, an operating key 1 adapted to be depressed by the finger of the operator, is rigidly connected to a first member 2 which has preferably a fork-shaped design with the forked ends turned downwards. The key may consist of Bakelite. A second member 4 designed preferably as a fork turned upwards forms part of a lever 3 forming part of the key mechanism (not shown). The two fork-shaped members 2 and 4 are transversely arranged with respect to each other and can slide along each other in the direction of the axes thereof. In the hollow space formed by the fork-shaped members 2 and 4 is inserted a helical compression spring 5 which urges the fork-shaped members 2 and 4 away from each other. A sleeve 6 having a cross-shaped cross-section is attached to the second fork-shaped member 4 and serves for guiding the first fork-shaped member 2 which projects with the lower end of its fork-shaped part beyond the sleeve 6 as clearly shown in Fig. 1 and Fig. 3. The fork-shaped end of the member 2 is provided with two oppositely arranged grooves 7 at the outer faces thereof

which are engaged by two corresponding grooves 8 of a resilient stirrup 9. The stirrup 9 limits the mutual motion of the members 2 and 4. The operation of this device is as follows:

In the rest position the parts have the position shown in Fig. 3, in which the compression spring 5 is only slightly or not at all compressed. When the operator depresses the key 1, the compression spring 5 is compressed while the key 1 is lowered through a certain distance indicated by the arrows in Fig. 3. After the key 1 has moved through this distance, it comes into engagement with the part 4 and actuates the same. When the pressure is relieved from the key 1, the parts return to the position shown in Figure 3, the return motion of the key 1 being limited by the stirrup 9 which abuts against the lower end of the sleeve 6. It will be understood that by the insertion of the spring 5 the touch of the machine is rendered more or less light.

Referring now to Figure 4 of the drawings the key 1 is rigidly connected to a substantially cylindrical hollow member 10, the lower end of which is slotted. The second member 4 connected to the lever 3 has at its upper end a preferably circular disc 11 provided with apertures through which the slotted portion of the first member 10 penetrates. Within the cylindrical member 10 a resilient bellows 12 is arranged which has a similar effect to the helical spring 5 in the embodiment shown in Figs. 1–3. The slotted ends of the member 10 are provided with grooves or notches for engaging a resilient stirrup 13 which abuts in the rest position against the lower face of the disc 11 under the pressure of the bellows 12.

The operation of this device is substantially the same as that of the device shown in Figs. 1–3.

Referring now to Fig. 5 of the drawings the key 1 is rigidly connected to the first member 14 designed as a hollow cylinder the lower end of which is slotted so as to form portions 15 provided with an outer thread. The second member 16 rigidly connected to the lever 3 is designed as a cylindrical trough 16, to bottom 19 of which is provided with apertures 17, through which the threaded portions 15 of the first member 14 penetrate after which a screw nut 18 is screwed on the threaded portions 15. A helical spring 5 is inserted in the hollow cylinder 14 and abuts against the upper face of bottom 19 of the cylinder 16. The nut 18 serves for limiting the mutual motion of the parts 14 and 16 and also for adjusting the initial compression of the spring 5 by adjusting the position of the bottom 19 of the part 16 with respect to the part 14 in the rest position of the device.

The operation of this device is substantially the same as that of the device shown in Figs. 1–3.

The resilient members such as the spring 5 or the bellows 12 can be so arranged and dimensioned that they come into action at the beginning of the motion of the key or only in the later part thereof.

The devices described hereinabove are extremely simple and inexpensive to manufacture. They are suitable for any keys of the keyboard, for instance with typewriters not only for the letter keys but for the shift keys, the tabulator key, the margin keys and for the back spacer key. The key according to the invention can also be used for any other type of office machines such as calculating machines, bookkeeping machines, cash registers and the like.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of office machines differing from the types described above.

While I have illustrated and described the invention as embodied in a key for office machines, I do not intend to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of my invention.

Without further analysis, the foregoing will so fully reveal the gist of my invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What I claim as new and desire to secure by Letters Patent is:

1. An office machine, comprising in combination, a key adapted to be depressed; a first fork-shaped member rigidly connected to said key; a second fork-shaped member arranged transversely to said first fork-shaped member and adapted to be actuated by said first member on a depression of said key; a resilient element inserted between said fork-shaped members; a sleeve having a cross-shaped cross-section and attached to said second fork-shaped member, said first fork-shaped member extending into said sleeve and projecting with its forked end beyond said sleeve; and a blocking means secured to said projecting forked end of said first fork-shaped member for limiting the mutual sliding motion of said fork-shaped members.

2. An office machine, comprising in combination, a key adapted to be depressed; a first fork-shaped member rigidly connected to said key; a second fork-shaped member arranged transversely to said first fork-shaped member and adapted to be actuated by said first member on a depression of said key; a resilient element inserted between said fork-shaped members; a sleeve having a cross-shaped cross-section and attached to said second fork-shaped member, said first fork-shaped member extending into said sleeve and projecting with its forked end beyond said sleeve; and a resilient stirrup cooperating with the forked end of said first fork-shaped member and limiting the mutual sliding motion of said fork-shaped members.

3. An office machine, comprising in combination, a key adapted to be depressed; a first hollow member having cylindrical shape and rigidly connected to said key; a second member arranged for sliding motion with respect to said first hollow member and having a portion of greater cross section than said first hollow member and being provided with apertures through which one end of said first member penetrates; a resilient element inserted between said members; and a device on said one end of said first member for limiting the mutual motion of said members.

4. An office machine, comprising in combination, a key adapted to be depressed; a first hollow member rigidly connected to said key; a second member arranged for sliding motion with respect to said first hollow member and having apertures through which portions of said first member project; a resilient element inserted between said members; and a resilient stirrup at-

tached to said projecting portions of said first member and limiting the mutual motion of said members.

5. An office machine, comprising in combination, a key adapted to be depressed; a first member rigidly connected to said key; a second member adapted to be actuated by said first member on a depression of said key; a resilient element inserted between said members, said members being shaped as hollow cylinders arranged for sliding motion with respect to each other, one of said cylinders penetrating through the other of said cylinders; and a removable device for preventing said cylinders and said resilient element from falling apart and for limiting the mutual motion of said cylinders and being secured to said portion of said cylinder penetrating through the other of said cylinders.

6. An office machine, comprising in combination, a key adapted to be depressed; a first member rigidly connected to said key; a second member adapted to be actuated by said first member on a depression of said key; a resilient element inserted between said members, said members being shaped as hollow cylinders arranged for sliding motion with respect to each other, one of said cylinders penetrating through the other of said cylinders; and a screw nut attached to the end of said cylinder penetrating through the other of said cylinders and limiting the mutual motion of said cylinders.

7. An office machine, comprising in combination, a key adapted to be depressed; a first hollow member having cylindrical shape and rigidly connected to said key; a second member arranged for sliding motion with respect to said first hollow member and having a portion provided with apertures through which said first member penetrates; a resilient element inserted between said members; and a removable device attached to said first hollow member at the portion thereof extending through said apertures in said second member for preventing said members and said resilient element from falling apart and for limiting the mutual motion of said members.

8. In an office machine, a key arrangement, comprising, in combination, a vertically extending guiding sleeve having a bottom opening at its lower end and a top opening at its upper end; a lever secured to said guiding sleeve; a vertically extending elongated holding member being longer than said guiding sleeve and passing through the same projecting with its upper end through said top opening of said guiding sleeve and with its lower end through said bottom opening of said guiding sleeve; a key secured to said upper end of said holding member; abutment means in said guiding sleeve arranged spaced from said top opening thereof; spring means located between said abutment means and said vertically extending holding member permanently urging the same together with the key secured thereto in upward direction; and blocking means secured to the lower end of said holding member permanently holding the same below said lower end of said guiding sleeve, so that said key is secured to said lever for limited vertical movement while being permanently urged in upward direction.

9. In an office machine, a key arrangement, comprising, in combination, a vertically extending guiding sleeve having a bottom opening at its lower end and a top opening at its upper end; a lever secured to said guiding sleeve; a vertically extending elongated holding member being longer than said guiding sleeve and passing through the same projecting with its upper end through said top opening of said guiding sleeve and with its lower end through said bottom opening of said guiding sleeve, said guiding sleeve being provided with means for preventing rotating movement of said elongated holding member passing through said guiding sleeve; a key secured to said upper end of said holding member; abutment means in said guiding sleeve arranged spaced from said top opening thereof; spring means located between said abutment means and said vertically extending holding member permanently urging the same together with the key secured thereto in upward direction; and blocking means secured to the lower end of said holding member permanently holding the same below said lower end of said guiding sleeve, so that said key is secured to said lever for limited vertical movement while being permanently urged in upward direction.

10. In an office machine, a key arrangement, comprising, in combination, a vertically extending guiding sleeve having a bottom opening at its lower end and a top opening at its upper end; a lever secured to said guiding sleeve; a vertically extending elongated holding member being longer than said guiding sleeve and passing through the same projecting with its upper end through said top opening of said guiding sleeve and with its lower end through said bottom opening of said guiding sleeve; a key secured to said upper end of said holding member; abutment means in said guiding sleeve arranged spaced from said top opening thereof; spring means located between said abutment means and said vertically extending holding member permanently urging the same together with the key secured thereto in upward direction; and blocking means removably secured to the lower end of said holding member permanently holding the same below said lower end of said guiding sleeve, so that said key is secured to said lever for limited vertical movement while being permanently urged in upward direction.

11. In an office machine, a key arrangement, comprising, in combination, a vertically extending guiding sleeve having a cross-shaped cross section and having a bottom opening at its lower end and a top opening at its upper end; a lever secured to said guiding sleeve; a vertically extending elongated holding member being longer than said guiding sleeve and passing through the same projecting with its upper end through said top opening of said guiding sleeve and with its fork-shaped lower end through said bottom opening of said guiding sleeve; a key secured to said upper end of said fork-shaped holding member; abutment means in said guiding sleeve arranged spaced from said top opening thereof; spring means located between said abutment means and said vertically extending fork-shaped holding member permanently urging the same together with the key secured thereto in upward direction; and blocking means secured to the lower end of said fork-shaped holding member permanently holding the same below said lower end of said guiding sleeve so that said key is secured to said lever for limited vertical movement while being permanently urged in upward direction.

12. In an office machine, a key arrangement, comprising, in combination, a vertically extending guiding sleeve having a cross-shaped cross section and having a bottom opening at its lower end and a top opening at its upper end; a lever secured to said guiding sleeve and being formed

with a first upwardly extending fork-shaped holding member extending through said guiding sleeve; a second vertically extending elongated holding member arranged transversely to said first upwardly extending fork-shaped holding member being longer than said guiding sleeve and passing through the same projecting with its upper end through said top opening of said guiding sleeve and with its fork-shaped lower end through said bottom opening of said guiding sleeve; a key secured to said upper end of said fork-shaped holding member; abutment means in said guiding sleeve arranged spaced from said top opening thereof; spring means located between said abutment means and said vertically extending fork-shaped holding member permanently urging the same together with the key secured thereto in upward direction; and blocking means secured to the lower end of said vertically extending fork-shaped holding member permanently holding the same below said lower end of said guiding sleeve, so that said key is secured to said lever for limited vertical movement while being permanently urged in upward direction.

13. In an office machine, a key arrangement comprising, in combination, a vertically extending cylindrical guiding sleeve having a bottom opening at its lower end and a top opening at its upper end; a lever secured to said cylindrical guiding sleeve; a vertically extending elongated holding member being longer than said guiding sleeve and passing through the same projecting with its upper end through said top opening of said guiding sleeve and with its lower end through said bottom opening of said guiding sleeve; a key secured to said upper end of said holding member; abutment means in said guiding sleeve arranged spaced from said top opening thereof; spring means located between said abutment means and said vertically extending holding

member permanently urging the same together with the key secured thereto in upward direction; and blocking means secured to the lower end of said holding member permanently holding the same below said lower end of said guiding sleeve, so that said key is secured to said lever for limited vertical movement while being permanently urged in upward direction.

14. In an office machine, a key arrangement, comprising, in combination, a vertically extending guiding sleeve having a bottom opening at its lower end and a top opening at its upper end; a lever secured to said guiding sleeve; key means composed of a key and a vertically extending elongated holding member secured to the bottom face of said key, being longer than said guiding sleeve and passing through the same projecting with its upper end through said top opening of said guiding sleeve and with its lower end through said bottom opening of said guiding sleeve; an abutment means in said guiding sleeve arranged spaced from said top opening thereof; spring means located between said abutment means and said key means permanently urging the same in upward direction; and a blocking means secured to the lower end of said holding member permanently holding the same below said lower end of said guiding sleeve, so that said key is secured to said lever for limited vertical movement while being permanently urged in upward direction.

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