April 6, 1943. J. F. SMATHERS 2,315,744

TYPEWRITING MACHINE

Filed Oct. 13, 1941

FIG.2.

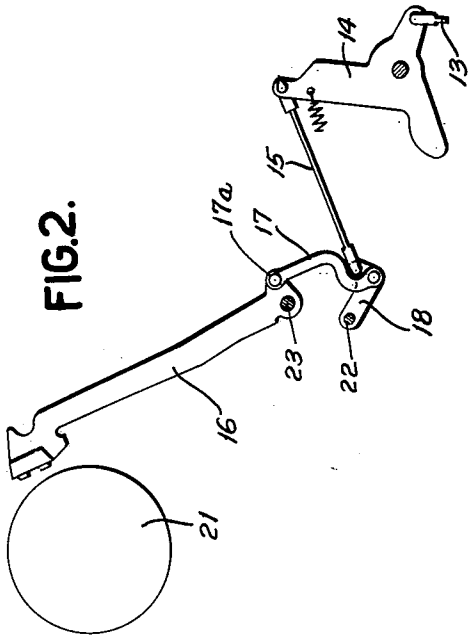
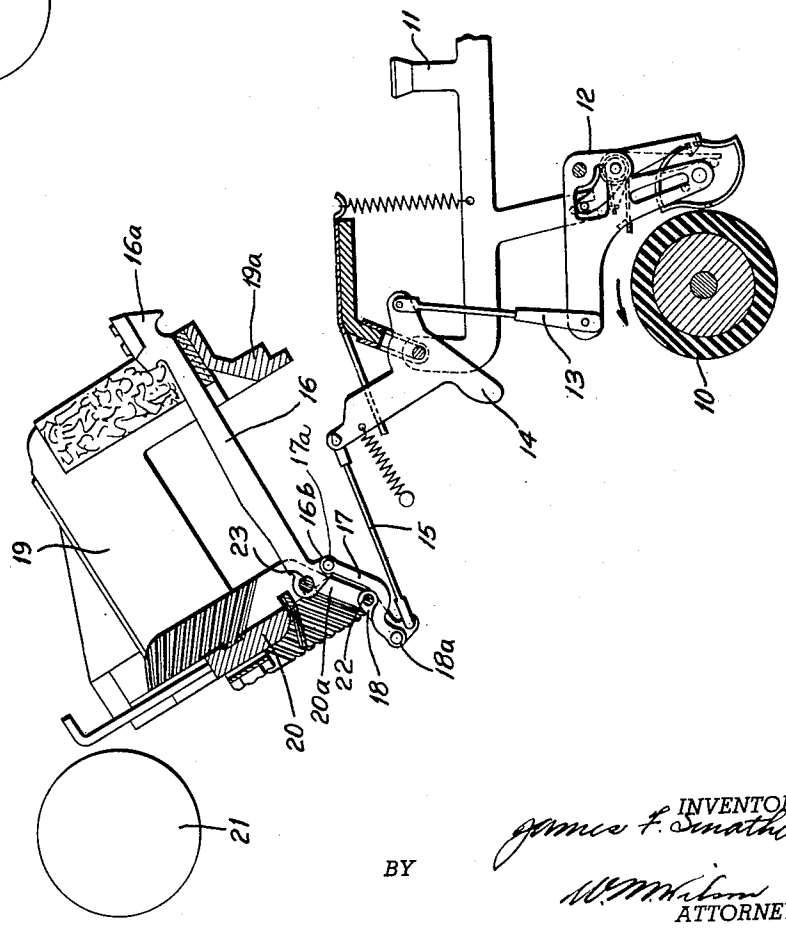


FIG.1.



INVENTOR
James F. Smathers

BY

W. M. Wilson
ATTORNEY

Patented Apr. 6, 1943

2,315,744

UNITED STATES PATENT OFFICE

2,315,744

TYPEWRITING MACHINE

James F. Smathers, Rochester, N. Y., assignor to International Business Machines Corporation, New York, N. Y., a corporation of New York

Application October 13, 1941, Serial No. 414,733

11 Claims. (Cl. 197—31)

This invention relates to typewriting machines.

The primary object of the present invention is to provide an improved rebound lock for the type bars of a typewriting machine.

An object is to provide a rebound lock which is very positive in its action and in which the effects of lost motion are so reduced that any appreciable movement of the type bar away from its position of rest is prevented.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawing, which discloses, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawing:

Fig. 1 is a diagrammatic vertical section of a power operated typewriter embodying the present invention, showing the type bars in their normal position of rest.

Fig. 2 is a view showing a type bar at the striking position.

In Fig. 1 there is shown diagrammatically the power type bar action of the well known "Electromatic" typewriter, which has also been known as the "International." It will be understood, however, that the invention may be applied to other typewriters as well. This power action is now well known in the art, consequently only a very brief description will be given.

The machine is provided with a power roller 10 which rotates continually in the direction of the arrow (Fig. 1) while the machine is in use. Each character key 11 controls a cam unit 12 which is operatively engaged with the power roller 10 whenever the key 11 is depressed. Operation of the cam unit 12 by the power roller causes said cam unit to rotate in a counterclockwise direction, thereby drawing down a link 13 and rocking clockwise a sub-lever 14. Each sub-lever 14 is connected by a link 15 to the type bar 16 through a pair of toggle links 17 and 18 which comprise the rebound lock in the present instance. The type bars 16 are pivotally mounted in the usual type basket 19 by means of a wire segment 20 and, as usual, swing in an arc of approximately 90° to the position of Fig. 2 before striking the platen 21.

As the "Electromatic" has been constructed up to the present time, it has been customary to provide each type bar with a rebound lock comprising a pair of toggle links such as are disclosed in Patent No. 1,761,758, one of the toggle links usually being pivoted to that part 19a of the type basket 19 adjacent the type bar head 16a, while the other toggle link is pivoted near one end to an arm 16b formed in the type bar and also connected at this same end to the sub-lever 14. With this construction, the common or free toggle pivot is between the end of the type bar and the segment wire 23. It has been found by practical experience that construction of the rebound lock as disclosed in the above patent is not entirely satisfactory as a certain amount of rebound of the type bar is permitted even with very accurately fitted pivots for the various links involved, with the result that collisions often occur, particularly when one type bar is commencing its stroke while the adjacent one may be rebounding slightly.

In the construction shown in Fig. 1, the difficulties with the form of the rebound lock described in the above patent have been avoided by rearranging the pivots for the rebound toggles. Instead of having the toggles straightened between the pivot 17a of toggle link 17 to the arm 16b on the type bar and the fixed pivot on a curved pivot wire located at 19a, one of the toggle links is made considerably shorter than the other and the pivots so arranged that the fixed pivot is placed between the free floating or common pivot 18a for the toggle and the pivot 17a to the type bar. This puts the floating or free pivot 18a in a straight line through the pivot wire 22 and the pivot 17a of the toggle link 17 to the type bar 16, but outside both of them. For this purpose, there is provided a fixed curved pivot wire 22 which is laid in a slot formed in a flange-like extension 20a in the segment 20, this flange being transversely slotted to correspond with the slots 20a receiving the type bars. The pivot wire 22 lies in a plane parallel with a plane containing the curved pivot wire 23 for the type bar 16.

By placing both of the pivot wires 22, 23 on the segment, the relation of the curved pivot wire 22 to the curved pivot wire 23 for type bars 16 is easily kept very accurate and uniform. This feature is of considerable practical importance because it has been found quite difficult to maintain accurate centers between the curved pivot wire 23 in the segment and the curved pivot wire for the outer ends of the toggles usually provided on a separate part of the type basket.

The link 18 is made L-shaped and its short arm is connected to the link 15. At 18a in the bend in the toggle link 18, the toggle link 17 is pivoted and this link is somewhat S-shaped so as to curve around the pivot wire 22. The other

end of the link 17, on the opposite side of the pivot wire 22 from the free or floating toggle pivot 18a, is pivoted at 17a to the arm 16b formed in the type bar. Because of the importance of the new relationship between the pivots 18a, 22, and 17a, it will be convenient in defining this relationship to refer to them in the claims as the free or floating toggle pivot, the fixed toggle pivot, and the type bar toggle pivot respectively.

By placing both of the pivots 18a and 22 in a straight line with the pivot 17a, and on the same side of the latter, the effect of lost motion in the pivot points is less accumulative than in the above patent. In the patent, the equivalent of the fixed toggle pivot 22 is on the part 19a of the type basket designated 19 with the result that any looseness in the pivots is accumulative, like the slack in the car couplers of a railroad train, to permit a considerable amount of rebound movement of the type bar. With the arrangement shown in Fig. 1, the slack is partly subtractive in effect, whereby only a very small amount of movement of the type bar is permitted which is insufficient to permit the type bar to move any appreciable amount from its position of rest except, of course, when operated in the normal way by its cam unit 12.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a typewriting machine, the combination of a segment, a type bar mounted in the segment, a sub-lever and a rebound locking toggle connected to the type bar and to the sub-lever, said rebound locking toggle comprising a short toggle link and a long toggle link, said long toggle link being pivoted to the type bar, said short toggle link being pivoted to the segment between the free pivot for the toggle and the pivot of the longer toggle link to the type bar, said pivots being arranged in substantially a straight line when the type bar is in its position of rest to prevent movement of the type bar away from its position of rest.

2. In a typewriting machine, a type bar, a segment pivotally supporting the type bar, a sub-lever for operating the type bar, means to operate the sub-lever; a rebound toggle comprising a short link fixedly pivoted to the segment and a long link pivoted to the type bar, said short link being pivoted to the segment at a point between the free pivot of the toggle and the point of pivoting to the type bar; and a link connecting said sub-lever to one of said toggle links.

3. In a typewriting machine, the combination of a segment, a type bar, a curved pivot wire for the type bar located on the segment, a second curved pivot wire located on the segment and concentric with the first pivot wire, a short toggle link pivoted at one end on the second pivot wire, a long toggle link pivoted to the type bar and to the short toggle link, the common pivot for both toggle links being located in substantially a straight line through the second pivot wire and the pivot of the long toggle link to the type bar and outside of both the latter pivot and the second pivot wire.

4. In a typewriting machine, the combination of a type bar, and a rebound toggle comprising a pair of links, one of which is shorter than the other and has a relatively fixed pivot, the other of which is pivoted to the type bar, said relatively fixed pivot being located intermediate the common or floating toggle pivot of the toggle and the pivot of the longer link to the type bar, said pivots being located in substantially a straight line to prevent movement of the type bar except by an operating force applied to the shorter toggle link.

5. In a typewriting machine, the combination of a type bar, a pair of relatively fixed pivots, on one of which the type bar is mounted, a short toggle arm mounted on the second pivot and extending downwardly away from both said fixed pivots, and a longer toggle arm pivoted to the type bar and to the short toggle arm at the end of the short arm remote from both fixed pivots, said second pivot and the pivot for the longer toggle arm being arranged in substantially a straight line whereby the type bar is normally locked.

6. In a typewriting machine, a type bar, a segment having two concentric similarly curved pivot wires one acting as a pivot for said type bar and the other as a fixed toggle pivot, and a rebound locking toggle having one arm pivoted to the type bar and the other to the fixed toggle pivot wire, the floating pivot for said toggle being located in a straight line through the fixed toggle pivot and the pivot to the type bar outside of both pivots.

7. In a typewriting machine having a normally stationary frame member with a type bar pivoted thereon and a rest for the type bar, a swing link pivoted by a fixed pivot on said frame member, a toggle link pivoted to the swing link and extending around and beyond the pivot of the swing link and pivoted to the type bar adjacent its pivot on the frame member, the two toggle link pivots being in substantial alignment with the fixed pivot of the swing link when the type bar is in the idle position against said rest and forming a lock to hold the type bar in said position, and an operating link connected to the swing link.

8. In a typewriting machine having a normally stationary frame member with a type bar pivoted thereon with a rest for the type bar, a swing link pivoted by a fixed pivot closely adjacent the type bar pivot, a toggle link pivoted to the swing link and extending around and beyond the pivot of the swing link and pivoted to the type bar adjacent its pivot on the frame member, the two toggle link pivots being in substantial alignment with the fixed pivot of the swing link when the type bar is in idle position, and an operating link connected to the swing link.

9. In a typewriting machine having a normally stationary frame member with a type bar pivoted thereon, a swing link pivoted closely adjacent to the type bar pivot, a toggle link pivoted to the type bar adjacent its pivot and extending in a direction normally longitudinally away from the type bar and around and beyond the pivot of the swing link and pivoted to the free end of the swing link, the two toggle link pivots being in substantial alignment with the fixed pivot of the swing link to lock the type bar when the type bar is in idle position, an operating link connected to the swing link, and means for

returning the link system to toggle-locking position.

10. In a typewriting machine having a type bar pivotally mounted on a part of the machine, a swing link also pivoted on a part of the machine and normally extending in a direction longitudinally away from the type bar, with its pivot spaced a short distance away from the type bar pivot, a toggle link pivoted to the type bar and having a part formed to extend around the pivot of the swing link and across the face of said swing link and pivoted to the free end thereof, an operating link connected to the swing link, and a means for normally holding the links so that the pivots of the toggle link and the pivot of the swing link are in such alignment that the type bar is securely locked in idle position.

11. In a typewriting machine having a type bar pivotally mounted on a part of the machine, means for operating said type bar including a pair of pivotally mounted links extending longitudinally away from the type bar when in its idle position, one of said links having a fixed pivot while the other link is pivoted at one end to the type bar and has its other end passing around the fixed pivot of said one link and pivoted to the free end of this link, the pivots of said links being in such alignment that the type bar is securely locked in idle position, and means for returning and holding the said links in locking position after the type bar has been operated.

JAMES F. SMATHERS.