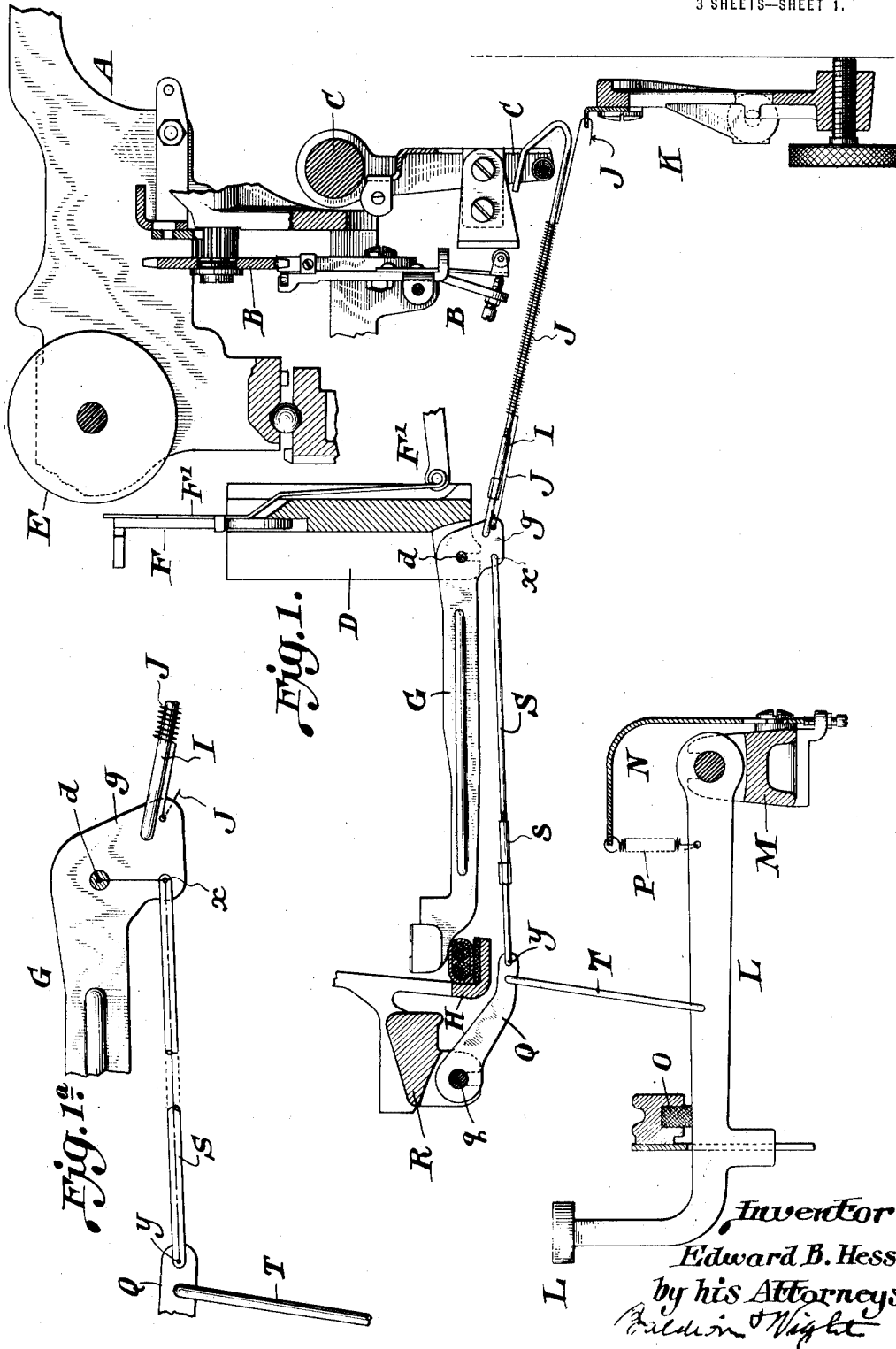


1,390,708.

Patented Sept. 13, 1921.

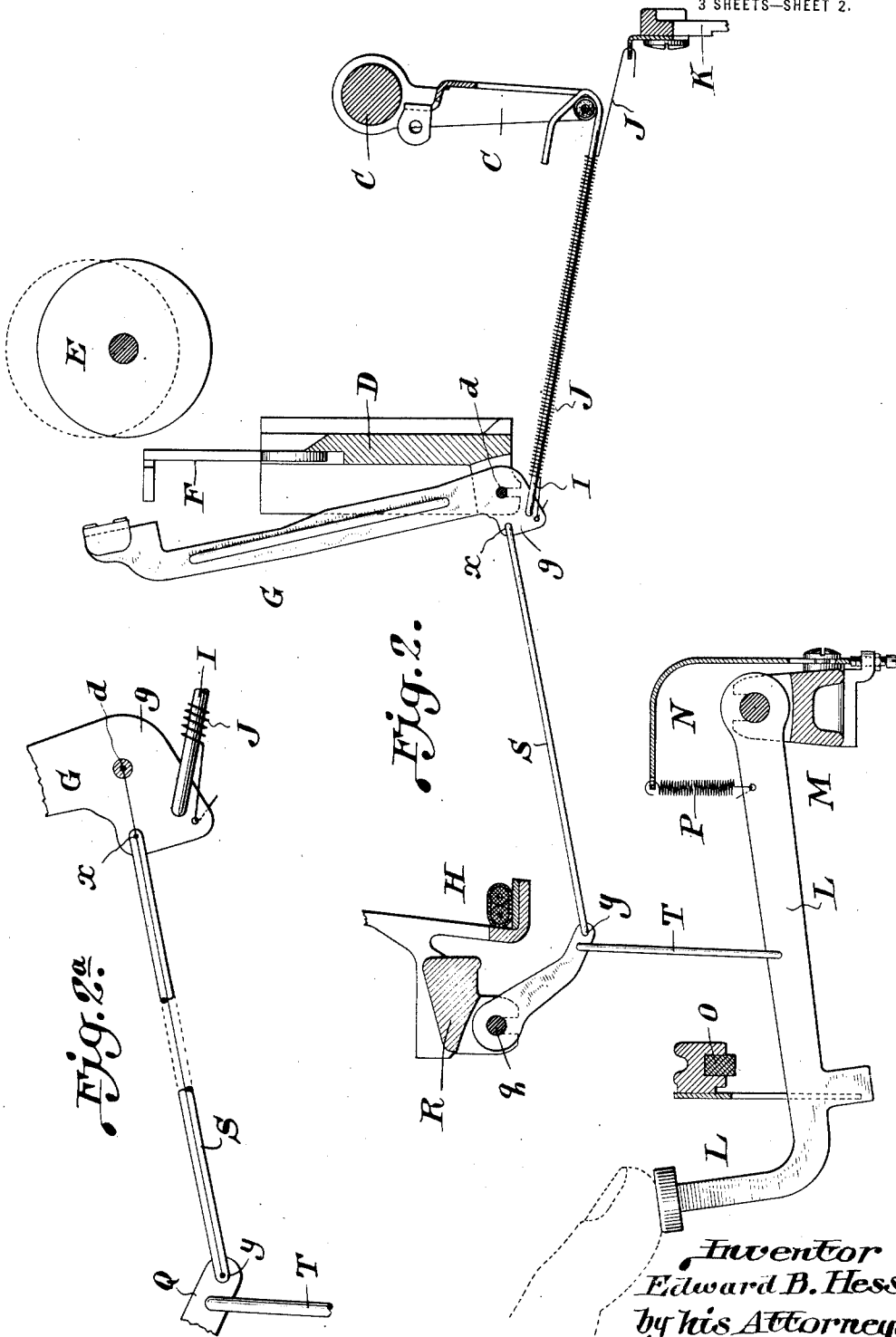
3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.



Inventor
 Edward B. Hess
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1,390,708.

3 SHEETS—SHEET 3.



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TYPEWRITING-MACHINE

1,390,708.

Specification of Letters Patent. Patented Sept. 13, 1921.

Application filed July 1, 1921. Serial No. 481,771.

To all whom it may concern:

Be it known that I, EDWARD BERNARD HESS, a citizen of the United States, residing in Manhattan Beach, Kings county, New York, N. Y., have invented certain new and useful Improvements in Typewriting-Machines, of which the following is a specification.

This invention relates particularly to type actions for typewriting machines, and especially to the class of actions in which toggle connections are made between the key levers and the type bars, such connections being so organized that the movement of the type bars is accelerated as they move toward the printing point. Such actions are commonly used in the Standard Royal machines and are shown in many prior patents, being well illustrated, for instance, in Patent No. 1,084,547, of Jan. 13, 1914.

In such machines the movement of the key levers through flexing and accelerating connections causes the type to move in an arc of approximately 90° directly to the printing point, while the type bars abut against a striking plate which serves to assist in stopping the movement of the bars and to ease the intensity of the impact of the type on the platen. In such machines considerable noise is made when the type strike the platen and when the type bars impinge on the striking plate, and the principal object of my present invention is to materially reduce such noise. This I accomplish by eliminating the striking plate and by a new way of connecting the key levers with the type bars which is such that the depression of the keys will cause the type to be raised positively to a point in front of the platen and a considerable distance therefrom and thereafter to be moved into contact with the platen by the momentum of the type bars. This is done each time that a key is depressed and before it has commenced its return movement after depression. In this way, while the type bars are carried upward with an accelerated movement this movement is arrested quickly before the type reach the platen while the momentum of the type bars, obtained by this accelerated movement, causes the type to impinge the platen with reduced force and with consequent reduction in noise but with sufficient power to make clear impressions.

These results are accomplished without

the use of a striking plate or stops which have heretofore been a source of noise and there are no latches, separable parts or loose connections in the mechanism which would interfere with the positive and reliable operation thereof.

In carrying out my invention, the key levers are connected to the front links of the toggles in the way commonly employed in Royal machines and the front links are connected with the heels of the type bars by pull links in a novel way. Instead of connecting the front links to the heels of the type bars behind their pivotal connection with the segment, they are connected therewith at selected points approximately in vertical planes below the pivotal connections between the type bars and the segments so that in operation the points of pivotal connection between the pull links and the heels of the type bars instead of traveling in horizontal arcs, as heretofore, traverse arcs which are inclined forwardly and upwardly. In this way when a key is depressed the link connection is flexed or bent to decrease the oblique angle between the front link and the pull link to such an extent as to move the type bar, with which it is connected, from the normal at rest position to a position considerably in advance of the platen. This is done during the depression of the key but the momentum of the type bar causes it to move farther rearward and impinge the platen during which time the key lever makes a partial upward or return movement. The stroke thus given to the platen is a comparatively light one but sufficient to make a clear impression. Surplus or undue force, however, is eliminated and thus noise is greatly reduced.

In this new organization for the type bar action it has been found desirable to divide the spring action for returning the type bars and the key levers to normal and holding them against vibration. The springs employed for returning the type bars to normal are made lighter than heretofore so that when the type bars are being moved by their momentum to the printing point the tension of the springs will not be too great but as the springs thus weakened are not entirely sufficient to return the key levers and other parts connected therewith to normal and properly hold them, it has been found desirable to directly connect other

springs with the key levers to assist in their return movement.

Of course where momentum is depended upon to complete the movement of the type bars a very delicate adjustment of the spring tensions and a very exact adjustment of the pivotal connections must be made in order that the type bars may be moved with an accelerated movement through the major portion of their excursion to the platen and may thereafter be moved with just the right amount of force to the platen to make clear impressions with the minimum amount of noise.

My improvements are illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatic view in side elevation of parts of a typewriting machine of the Royal type illustrating the novel features of my present invention. In this figure of the drawings the parts are shown in normal or inactive position.

Fig. 1^a is a detail view on an enlarged scale more clearly showing the relative arrangement of the pivot points of the pull link with the front link and with the heel of the type bar. It will be observed that in this case the pivot point at the rear end of the pull link with the heel of the type bar is directly under the pivotal connection of the type bar with the segment. It will also be observed that a line drawn from the pivotal connection of the pull link with the front link to the pivotal connection of the pull link with the type bar is arranged substantially at right angles to a line drawn from the pivotal connection of the pull link to the pivot of the type bar.

Fig. 2 is a view of part of the mechanism shown in Fig. 1 and illustrates the position assumed by the part when a key lever has been fully depressed. It will be observed that the depression of the key lever does not cause the type bar to be carried fully to the platen.

Fig. 2^a is a view on an enlarged scale of part of the mechanism shown in Fig. 2, and it will be observed that at this time the front and rear pivots of the pull link are in a direct line with the pivotal connection between the connected type bar and the segment.

Fig. 3 is a view similar to Fig. 1, showing how the type bar is drawn to a point a considerable distance in front of the platen when a key lever is fully depressed and it also shows how the type bar is carried by momentum to the platen after the key lever has been depressed, and it indicates that during this last movement of the type bar the key lever has been raised to some extent.

Fig. 3^a is a view on an enlarged scale showing more clearly the arrangement of the parts shown in Fig. 3. As indicated, the pivotal connection of the pull link with the heel of the type bar has moved from the po-

sition shown in Fig. 1 through an arc which is inclined forwardly and upwardly, the dotted position indicated at 1 being the position the pull link assumes when the type bar has been raised to the position shown by dotted line in Fig. 3. The position indicated by the line 2 is the position that the pull link assumes when the type bar has been further moved forward or to its full extent in engagement with the platen. During this movement the key lever has been raised to the position shown by full lines in Fig. 3. The relative position of the lines shown in the diagram is somewhat exaggerated for purpose of clearness.

Parts of a typewriter carriage are indicated at A and B indicates part of the escapement mechanism. A universal bar is shown at C and a type bar segment at D. The platen is shown at E, F indicates a type bar guide and F' part of a vibrator. The type bars G are formed with heels *g* and they are pivotally mounted at *d* in the usual way. The type bars extend forwardly from their pivots as usual, their front or type-carrying ends being normally supported on a type bar rest H. The heels of the type bars are connected by links I with the universal bar C and the return springs J of the type bars are connected to the rear portions of the heels of the type bars and to rear supports K which are adjustable by devices shown so that all the springs may be adjusted in unison.

The key levers L are pivotally supported at their rear ends in a support M, carrying an overhanging dust-shed N, and these levers are normally pulled against a cushion stop O by light springs P extending from the front of the shed to the levers and connected thereto a short distance in front of their pivots. By adjusting the position of the shed vertically the tension of the springs may be collectively varied. No stops are employed to arrest the downward movement of the levers, this downward movement being cushioned in a manner hereinafter explained. The front links Q are pivotally connected at *q* with a support R as heretofore, and each front link is connected by a rod or pull link S with the heel of a type bar. The length of this link may be adjusted by devices *s*. Each link Q is connected with a key lever L by a link T in the usual way.

It will be observed that instead of connecting the rear end of the link S with the heel of the companion type bar at a point decidedly in rear of a vertical plane passing through the pivotal connection of the type bar with the segment, it is connected therewith at a point below said type bar pivot and approximately in the same vertical plane as the type bar pivot. When the connection was made at the rear of the heel this point of connection described an arc substantially

horizontal or with a horizontal chord and the type bar was moved with increasing velocity all the way to the platen which it struck with considerable force and with considerable noise. In the new arrangement the connection between the pull link and the type bar is such that it traverses an arc which is inclined forwardly and upwardly and the connections are such, as before stated, as to cause the type bar to be moved not all the way to the platen as heretofore but to a position in front of the platen, as indicated by dotted lines in Fig. 3, the further movement of the type bar to the platen being caused by the momentum of the bar.

By reference to Fig. 1 it will be observed that in normal position with the key lever elevated the links Q and S are arranged at an oblique angle to each other and the link T connecting the key lever to the front link Q is nearly vertical while the pivotal connection of the pull link S with the heel of the type bar is directly under the pivotal connection of the type bar with the segment. It will also be observed that the angle formed by lines running from the type bar pivot to the heel connection of the pull link and from this latter connection to the connection of the pull link with the front link are substantially at right angles to each other.

When a key is depressed and is moved to the position shown in Fig. 2 the links Q and S assume the position shown, thus reducing the obtuse angle between them and the type bar is brought to the position shown in Fig. 2. During this movement the pivotal connection marked *x* has moved from a position directly under the type bar pivot to such a position that it is in line with the type bar pivot and the pivotal connection *y* between the pull link and the front link and the point *x* has moved as far forward as the connections will permit as indicated by the line 1—Fig. 3^a. Any further strain given to the toggle connection does not tend to move the type bar toward the platen inasmuch as the three points referred to are in line with each other or are in a dead center position. Any further swinging movement given to the type bar will be upward and rearward and this further movement is given not by a depression of the key but by the momentum of the type bar which carries it beyond the position shown in Fig. 2 to the position shown in Fig. 3 by full lines, and at this time the pull link and the front link have been moved, in the manner indicated by the line 2—Fig. 3^a, which movement causes the key lever to be raised, in the manner indicated by full lines in Fig. 3. It will thus be observed that the connections are such that not only is such movement given to the type bars that noise is reduced but the movement of the key levers is very effi-

ciently cushioned, without other special cushioning devices, such cushioning effect being inherent in the connections also used for another purpose.

When the key levers are moved to the position shown in Fig. 2 the springs J are put under tension. These springs are ordinarily employed, as is well known, to return the type bars to normal position but in order that the tension of these springs may not interfere with the movement by momentum of the type bars, such springs are made lighter than heretofore. In view of this change in the tension of the springs they are not ordinarily strong enough to return the key levers and other parts connected therewith to normal position and hold them against vibration after the type bars have completed their excursion to the platen; therefore, in order to assist the springs before mentioned the springs P have been provided and these are preferably connected directly with the key levers, as shown. In this way sufficient freedom of movement is given to allow the momentum of the type bars to carry them to the printing point and yet the spring power, thus distributed, is sufficient to return all parts to normal and hold them.

It will be observed that the type action herein shown and described is such that the depression of a key carries the type with an accelerated movement to a predetermined position a considerable distance in front of the platen and this distance is sufficient to allow the type to further move by momentum only with a force which is sufficient only to produce a clear impression, but which is such as to effect a material reduction of noise.

By reference to Fig. 1 it will be seen that the rod I is not in engagement with the universal bar. After a key has been depressed, as shown in Fig. 2, the rod I engages the universal bar but does not move it. After this operation of the key and while the type bar is moving to the platen the rod I, which as before stated is in contact with the universal bar, moves said universal bar to the desired extent. It will thus be seen that the movement of the universal bar occurs while the type bar is being moved by momentum to the printing point.

It will be observed that in the construction shown and described there is no undue strain on the mechanism. This is demonstrated by the fact that if a key be slowly depressed the type bar will be moved only to the position shown in Fig. 2 and cannot be moved by the further depression of the key to a further extent toward the platen, but if the finger of the operator be held on the key, as indicated in Fig. 2 by dotted lines, the type bar can be moved by the other hand to the platen if the hand be ap-

plied directly to the type bar, as this rearward swinging of the type bar changes the dead center position of the parts shown in Fig. 2. From this it is apparent that it is the momentum of the type bar moving from the position shown in Fig. 2 to the full line position shown in Fig. 3 which causes the pivot points to be moved out of line, in the manner before described.

I claim as my invention:

1. In a type action, a pivoted key lever, a pivoted type bar, and connections therebetween, said lever and type bar lying in substantially parallel horizontal planes, and said connections including a link pivoted to the type bar in a substantially vertical plane with the type bar pivot and movable to a position in which said link pivot and type bar pivot lie in a substantially horizontal plane.

2. A noise reducing type action for typewriting machines, comprising toggle link connections between a type bar and a key lever movable to such an extent by the full depression of the key as to move the type bar to a toggle-locking position in front of the platen and at such a distance therefrom as to reduce noise during a further movement of the type bar about its pivot to the platen, caused by the momentum of the type bar.

3. In a type action, the combination of a key-lever, a type-bar, and connections therebetween, said connections including a link which is pivoted to the type-bar in a substantially vertical plane with the type-bar pivot when the parts are in normal position and moves during the depression of the key to a position in which the ends of the link and the type-bar pivot lie in a straight line.

4. In a noise reducing type action, a toggle locking connection comprising front links and pull links connected with the type bars and the keys, which are normally arranged at an oblique angle relatively to each other and at a reduced oblique angle when the keys are depressed to move the type bars to a link-locking position in advance of the platen and at such distance therefrom as to reduce noise during the further movement of the type bars to the platen caused by the momentum of the bars and during which latter period the obliquity of the angle between said links is increased.

5. A noise-reducing type action comprising a key lever, a type bar and toggle link connections between the type bar and the key lever, the rear end of each pull link being joined to the heel of the type bar below the point of its connection with the segment and said point of connection being pulled forward and upward when the key is depressed into line with the pivot of the type bar and the pivot of the front end of the pull link

with the front link whereby a positive movement of the type bar toward the platen is obtained, the further movement of the type bar to the platen being obtained by the momentum of the type bar.

6. A noise-reducing type action comprising a key lever, a type bar, a front link connected with the key lever, a pull link connecting the front link with the heel of the type bar, the pivotal connection of the pull link with the type bar and the pivotal connection of the pull link with the front link being in a line normally at approximately right angles to a vertical line drawn through the pivot of the type bar and the rear pivotal connection of the front link, the connections between the key lever and said links being such that when a key is depressed the pivotal connection of the pull link with the heel of the type bar is moved into a direct line between the pivot of the type bar and the pivotal connection of the pull link with the front link.

7. A noise-reducing type action comprising a key lever, a type bar, a front link connected with the key lever, a pull link connecting the front link with the heel of the type bar below its pivotal connection with the segment and at a point which traverses an arc extending forwardly and upwardly, when the type bar moves toward the platen, to a point in a direct line passing through the pivot of the type bar and the front and rear pivots of the pull link when the key has been depressed to its full extent, the further movement of the type bar to the platen being caused by the momentum of the type bar which moves the pivotal connection between the pull link and the type bar upward and out of the direct line between the type bar pivot and front pivotal connection of the pull link with the front link.

8. A noise reducing type action for typewriting machines, comprising toggle link connections between a type bar and a key lever movable to such an extent by the full depression of a key as to move the type bar to a toggle-locking position in front of the platen and at such a distance therefrom as to reduce noise during the further movement of the type bar about its pivot to the platen caused by the momentum of the type bar and at which time occurs a short return movement of the key lever which cushions the touch on the key.

9. In a typewriting machine, a universal bar, a type action comprising a key-lever, a type-bar, and constantly acting positive connections therebetween, certain of said connections passing through a dead-center position during the travel of the type-bar to printing position, and connections from the type-bar to the universal bar which commences and continues to operate the latter

only after the parts have passed said dead-center position by the momentum of the type bar.

10. A noise-reducing type action comprising a pivoted type bar, a key lever, a front link connected with the key lever, a pull link connected with the front link and with the heel of the type bar at a point which travels forwardly and upwardly when the type bar is raised by the depression of the key to a plane in a direct line between the pivot of the type bar and the pivotal points at opposite ends of the pull link, a return spring connected with the heel of the type bar, and a return spring connected with the key lever, and means for adjusting the tension of these springs.

11. A noise reducing type action for typewriting machines, comprising toggle link connections between a type bar and a key lever movable to such an extent by the full depression of the key as to move the type bar to a toggle-locking position in front of the platen and at a distance therefrom of considerably more than 5° to reduce noise during a further movement of the type bar about its pivot to the platen, caused by the momentum of the type bar.

12. In a typewriting machine, a series of key levers, individual return springs therefor, and a series of type bars, individual return springs therefor, connections between the key levers and type bars including reverse toggles having links which pass through dead center position relative to said type bar, and separate means for collectively adjusting each of said series of return springs.

13. In a type action, the combination of a key-lever, a type-bar, and connections therebetween, said connections including a member which is pivoted to the type-bar at a point substantially in the same vertical plane as the type-bar pivot when the parts are in normal position and moves during the depression of the key to a position in which the ends of the member and the type-bar pivot lie in a straight line.

14. In a type action, the combination of a key-lever, a type-bar, and toggle connections therebetween, said connections including a link which is pivoted to the type-bar at a point substantially in the same vertical

plane as the type-bar pivot when the parts are in normal position and moves during the depression of the key to a position in which the pivotal connections at the ends of the link and the type bar pivot lie in a straight line.

15. In a type action the combination of a pivoted key lever, a pivoted type bar, and connections therebetween, said lever and type bar lying in substantially horizontal planes and said connections including a link pivoted to the type bar directly beneath the type bar pivot and moving during the depression of the key to a dead center position, the further movement of said link caused by the momentum of the type bar bringing it to a position in which the type bar pivot and the link pivot lie in a substantially horizontal plane.

16. In a typewriting machine, the combination of a universal bar and a noise reducing type action connected therewith, comprising link connections between a type bar and a key lever movable to such an extent by the depression of the key as to move the type bar to a link-locking position in front of the platen and at such a distance therefrom as to reduce noise during the further movement of the type bar to the platen caused by the momentum of the type bar while operating the universal bar, which latter operation commences and is completed during said further movement of the type bar.

17. In a typewriting machine, a universal bar, a type action comprising a key, a type bar, and link connections between the type bar and the key movable to such an extent by the full depression of the key as to move the type bar to a link-locking position in front of the platen and at such distance therefrom as to reduce noise during the further movement of the type to the platen caused by the momentum of the type bar, and connections from the type bar to the universal bar which commence and continue to operate the latter only after said link connections have continued beyond said link-locking position.

In testimony whereof, I have hereunto subscribed my name.

EDWARD BERNARD HESS.