

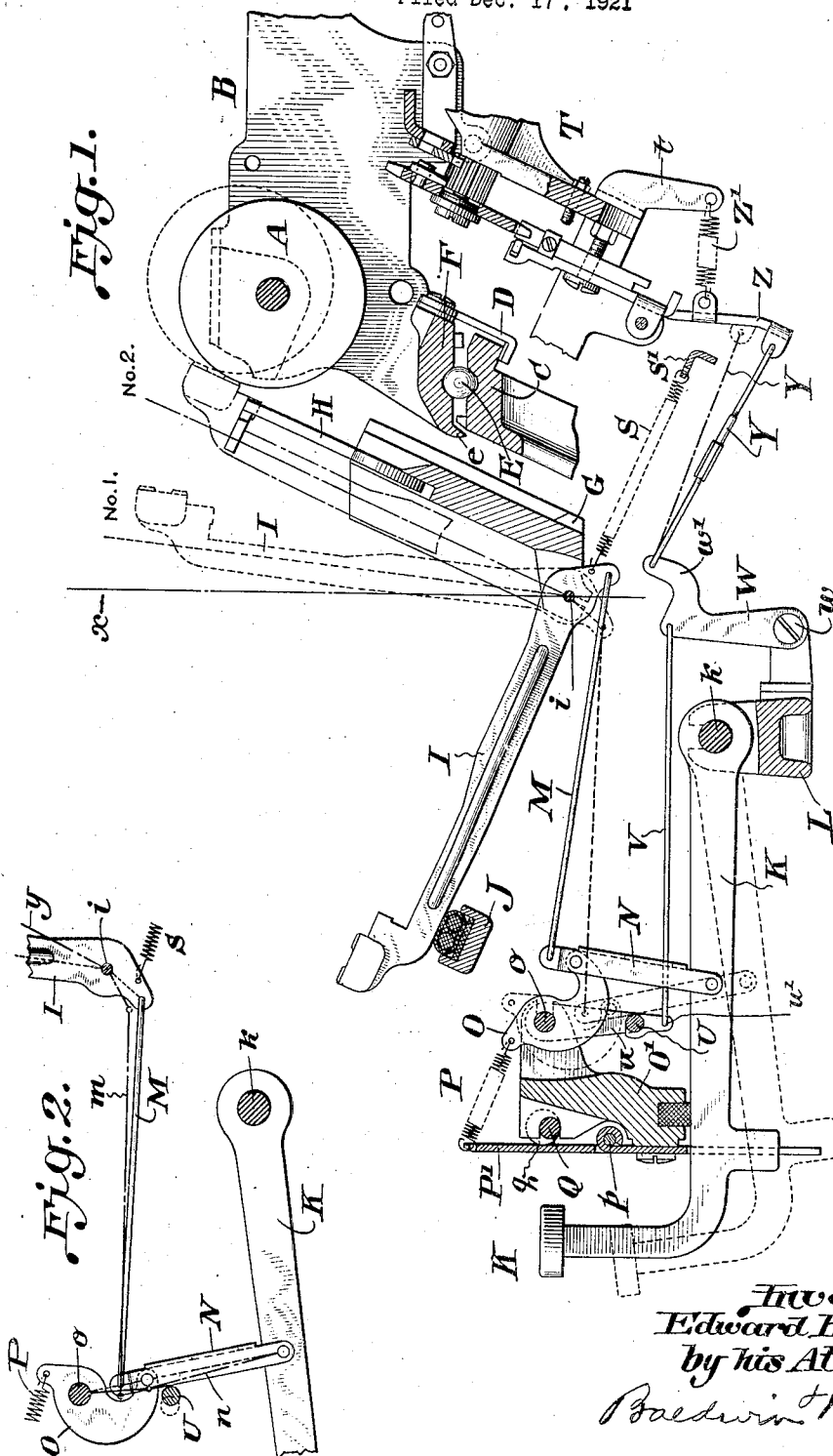
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E. B. HESS

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TYPEWRITING MACHINE

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UNITED STATES PATENT OFFICE.

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TYPEWRITING MACHINE.

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To all whom it may concern:

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

This invention relates to typewriting machines of the front strike, visible kind, in which the type bars are impelled to the printing point on the platen by the depression of the key levers which are connected to the heels of the type bars by flexing connections which are of such nature as to move the type bars toward the platen with accelerated velocity. Such mechanism, broadly considered, is found in all Standard Royal machines, and in the machine now in use and shown in my Patent No. 1,390,708 of September 13, 1921, I have illustrated an arrangement of flexing connections between the key levers and the type bars whereby the noise produced by the impact of the type bars on the platen is greatly reduced.

According to my present improvements, the broad inventions shown in said patent are embodied in a novel arrangement of the connections between the key levers and the type bars.

In the now well known Standard Royal machines, the type bars are operated by pull links, the front ends of which are connected to short front links or arms pivoted to move about a fixed axis in the front part of the machine, and these front links or arms are connected by vertically arranged links to the key levers, the connections being made with the front links at the upper ends of the vertical links; and no provision is made for moving the front links and the vertical links to a dead center or toggle locking position to produce the results specified in my patent above mentioned. In said patent, however, a construction is shown whereby said toggle locking or dead center position is obtained between the pivots of the type bars and the pivotal connections of the pull links with the type bars and with the front levers.

By my present improvements a change has been made in these connections which are such as to cause the toggle locking condition to be produced between the front links and the vertical links, so that when a key lever is depressed the associated type bar is moved

to a position considerably in advance of the platen, the further movement of the type bar to the platen being caused by the momentum thereof.

Preferably the horizontally arranged pull links, which are connected at their rear ends to the heels of the type bars, have their front ends connected to the upper ends of vertically arranged links, the lower ends of which are pivotally connected with the key levers. Short levers or arms are pivotally mounted in front of the vertical links and are pivotally connected with said vertical links between their upper and lower ends in such manner that when the keys are depressed, the type bars are operated in the manner before described, that is, to move them to a position considerably in advance of the platen, the further movement of the type bars to the platen being caused by their momentum.

The type action is associated with universal bar mechanism which operates the escapement, the universal bar being operated by the vertical links during the momentum period of the type bars.

In connection with this mechanism I employ an adjustable plate which is constructed to serve as a comb guide for the key levers and also as a support for the front ends of springs attached to the short lever arms and which assist in returning the parts to normal position.

The type action is well adapted for use in a machine where the platen is set low and is mounted in a carriage which is shifted obliquely.

In the accompanying drawings:—

Figure 1 shows a vertical section through parts of a typewriting machine embodying my improvements, the positions of some of the parts at different times being indicated by dotted lines.

Figure 2 is a detail view showing by full lines the position of certain parts at the commencement of the momentum period, and by dotted lines the position of some of these parts during the movement of the type bars to the printing point.

The platen A is mounted in a carriage, part of which is indicated at B. The front portion of the carriage is supported by a shift rail C and the carriage rail F is connected therewith by devices D of well known construction. A ball bearing E is inter-

posed between the carriage rail and the shift rail and the carriage rail is formed with a downwardly extending flange *e* which strengthens it and also serves as a shield to prevent the entrance of dust into the ball bearing. It will be observed that while the shift rail is arranged obliquely, its upper side forming the lower member of the ball race is horizontal and the under side of the carriage rail is also horizontal. In this way, while the carriage may be shifted obliquely for case printing, it moves horizontally for letter spacing in a plane which is truly horizontal.

The type bar segment *G* is arranged obliquely and is provided with a type bar guide *H* as shown. Type bars *I* are pivotally connected to the segment at *i* and their outer ends are supported by a cushioned type bar rest *J*. Normally the type bars are inclined from their inner rear ends upwardly and forwardly as shown, and when operated by the keys, they pass over the vertical line *x* extending through the type bar pivots to the point No. 1 and are then moved by their momentum to the point No. 2 when they impinge the platen.

The key levers *K* are pivotally connected at their inner ends *k* to a frame *L* and they are connected with the type bars by the new type action shown, comprising pull links *M*, vertical links *N*, and short arms *O*. The arms *O* are preferably, though not necessarily, of the shape shown and they are all mounted on a horizontally arranged rod *o* supported in the frame piece *O'*. The upper front ends of the arms *O* are connected by springs *P* to a vertical plate *P'* pivotally mounted at *p* on the frame *O'*. A rod *Q* has an eccentric *q* bearing against the rear face of the plate and may be turned or adjusted to vary the tension of the springs *P*. The plate *P'* is prolonged downwardly to form a comb guide for the key levers. Each arm *O* is connected by a vertically arranged link *N* with an associated key lever. Each link extends upwardly and rearwardly from its connection with the key lever and its upper end is connected by a horizontally arranged pull link *M* with the heel of an associated type bar. It will be observed that the pivotal connection between the link *N* and the short arm *O* is made below the point where said link *N* is connected with the pull link.

The type bars are normally held in their lower position by springs *S* attached to their heels and connected with the frame part *S'*.

When a key lever is depressed to the position shown by dotted lines in Figure 1, the associated link *N* is moved to the position shown by dotted lines in the same figure. The pull link is also moved to the dotted line position indicated and the type bar is raised to position No. 1, which it will be ob-

served is behind the vertical line *x* passing through the pivots of the type bars. The further movement of the type bar to the platen is caused by its momentum, and this movement is also assisted by gravity, as the type bar passes the vertical plane above the pivots of the type bars and this assistance afforded by gravity occurs during the latter portion of the momentum period and also thereafter. In this way the movement of the keys is cushioned and the operation is facilitated.

When a type bar reaches position No. 1, the parts *M*, *N* and *O* are in the position shown by full lines in Figure 2, but the momentum of the type bar causes it to assume the position shown at *y* and the parts *M* and *N* assume the position indicated at *m* and *n* in Figure 2. When the parts *M*, *N* and *O* are in the position indicated by full lines in Figure 2, the joints or pivotal connections between the link *N* and the key lever, and between said link and the pivot of the arm *O* are in line with each other, which is a toggle locking or dead center position and this condition is changed when the type bar is moved by its momentum to the platen. In this way a very effective type action is produced which causes the type bars to operate on the platen with reduced noise and as will be apparent from an inspection of the drawings, it is especially adapted to an oblique strike machine where the platen is set low and occupies a position in a plane considerably behind the type bar pivots.

Escapement mechanism is indicated generally at *T*. It is of well known construction and is operated by universal bar mechanism of novel construction. As shown, a front bar or universal bar proper, indicated by the letter *U*, is supported by hangers *u* depending from the rod *o*. An arm *u'*, extending downwardly from the bar *U*, is connected by a link *V* with a vertical lever *W* pivoted at its lower end to a bracket at *w*. An arm *w'* of this lever, which extends upwardly and rearwardly therefrom, is connected by an adjustable link *Y* with the rocker plate *Z* of the escapement mechanism. A spring *Z'*, attached to the rocker plate and to an arm *t* of the escapement frame returns the rocker plate and the universal bar mechanism to normal position. Normally the links *N* are out of contact with the universal bar *U*. When the links are moved to the toggle locking position indicated by dotted lines in Figure 1 and full lines in Figure 2, the links *N* come in contact with the bar *U* and then as the upper ends of the links *N* are moved forwardly, the universal bar is moved in the manner indicated in Figure 2 and the escapement is operated.

It will be observed that the type bars are moved a considerable distance toward the platen before the universal bar is operated

so that the universal bar mechanism is actuated during the latter part of the movement of the type bars to the platen. Preferably and actually as shown in the drawings, such movement of the universal bar is caused during the momentum period of the type bars. In this way double printing or imperfect printing of a similar character is avoided.

The connections between the universal bar mechanism and the escapement mechanism is such that the carriage may be shifted without its interfering with the proper operation of the mechanism. This is indicated by dotted lines in Figure 1. When the carriage is raised for upper case printing, the escapement mechanism is raised with it and the link Y is moved to the dotted line position shown, and in such position the mechanism is in condition to operate in the same manner that it does when the carriage is in lower case position.

I claim as my invention:

1. In a typewriting machine, the combination with the key levers and the type bars, of links connecting the key levers and the type bars, arms pivoted to move about a horizontal axis in front of the links and connected therewith, springs attached to said arms, a pivoted plate in front of said arms, and means for turning the plate about its pivotal axis to adjust the tension of the springs.

2. In a typewriting machine, the combination with the key levers and the type bars, of links connecting the key levers and the type bars, arms connected with the links and pivoted to move about a horizontal axis in front of the links, springs attached to the arms, a vertical plate pivoted to move about a horizontal axis in front of the arms to which the springs are attached, and means for turning the plate about the axis of its pivot to adjust the tension of the springs.

3. In a typewriting machine, the combination with the key levers and the type bars, of links connecting the key levers and the type bars, arms connected with the links and pivoted to move about a horizontal axis in front of the links, springs connected with the arms, and a vertically arranged plate mounted to move about a horizontal axis in front of the arms and to which the springs are connected, said plate being formed at its lower end with a comb guide for the key levers.

4. In a typewriting machine, the combination with the key levers and the type bars, of escapement mechanism, arms pivoted to turn about a horizontal axis near the front of the machine, connections between the key levers and the type bars including links pivoted to said arms, and universal bar mechanism including a bar in front of said links, a lever, and means con-

necting said lever to said bar and to said escapement mechanism.

5. In a typewriting machine, the combination with the key levers and the type bars, of escapement mechanism, arms pivoted to turn about a horizontal axis near the front of the machine, connections between the key levers and the type bars including links pivoted to said arms, and universal bar mechanism comprising a bar in front of said links and actuated thereby, a lever mounted in the rear of the key levers, a link connecting said bar and lever, and a link connecting said lever and the escapement mechanism.

6. In a typewriting machine, the combination with the key levers and the type bars, of escapement mechanism, short vertical links pivotally connected with the key levers, long horizontally arranged links connecting said vertical links with the heels of the type bars, arms mounted to move about a horizontal axis and pivotally connected with the vertical links, and universal bar mechanism comprising a front bar with which the links make contact when the key levers are depressed, a lever, a link connecting it with said universal bar, and a link connection between said lever and the escapement mechanism, the connections between the key levers and the type bars being such that when a key is depressed, the associated type bar is moved to a toggle locking position in front of the platen and at a considerable distance therefrom, the further movement of the type bar to the platen being caused by its momentum during which momentum period the escapement mechanism is operated.

7. In a typewriting machine, the combination with the key levers, the type bars, and connections therebetween, of an obliquely arranged segment to which the type bars are pivotally connected, a platen carriage mounted to move obliquely and carrying the upper member of a ball race, and a shift rail mounted to move obliquely for case printing and provided with the lower member of the ball race, the opposing surfaces of said members lying in horizontal planes.

8. In a typewriting machine, the combination with a key lever and a type bar, of a vertical link pivotally connected with the key lever, a horizontal link pivotally connected with the vertical link and with the associated type bar, and an arm mounted to move about a fixed horizontal axis and pivotally connected with said vertical link, a full depression of the key lever moving the vertical link and the arm to dead center relation with the type bar at a distance from the platen, from which position it completes its travel by momentum alone, thus reducing noise.

9. In a typewriting machine, the combi-

nation with a key lever and a type bar, of a vertical link pivotally connected with the key lever, a horizontal link pivotally connected to the vertical link and to the associated type bar, and means tending to draw said vertical link forwardly when a key is depressed, a full depression of the key moving the vertical link and said means to dead center relation with the type bar at a distance from the platen, from which position it completes its travel by momentum alone, thus reducing noise.

10. In a typewriting machine, the combination with a key lever and a type bar, of a vertical link pivotally connected with the key lever, a horizontal link pivotally connected to the vertical link and to the associated type bar, and a member pivoted to the frame and to the vertical link below its pivotal connection with the horizontal link, a full depression of the key

lever moving the vertical link to a position in which its ends are in a straight line with the pivot of said member.

11. In a typewriting machine, the combination with a key lever and a type bar, of a link pivotally connected to the key lever, a second link pivotally connected with the first link and with its associated type bar, and pivotally mounted means pivoted to the first link and tending to draw it forward when a key is depressed, a full depression of the key moving the vertical link and said means to dead center relation and the type bar to a position in front of the platen and at a considerable distance therefrom, from which position it completes its travel by momentum alone, thus reducing noise.

In testimony whereof, I have hereunto subscribed my name.

EDWARD B. HESS.