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POWER OPERATED TYPEWRITING MACHINE

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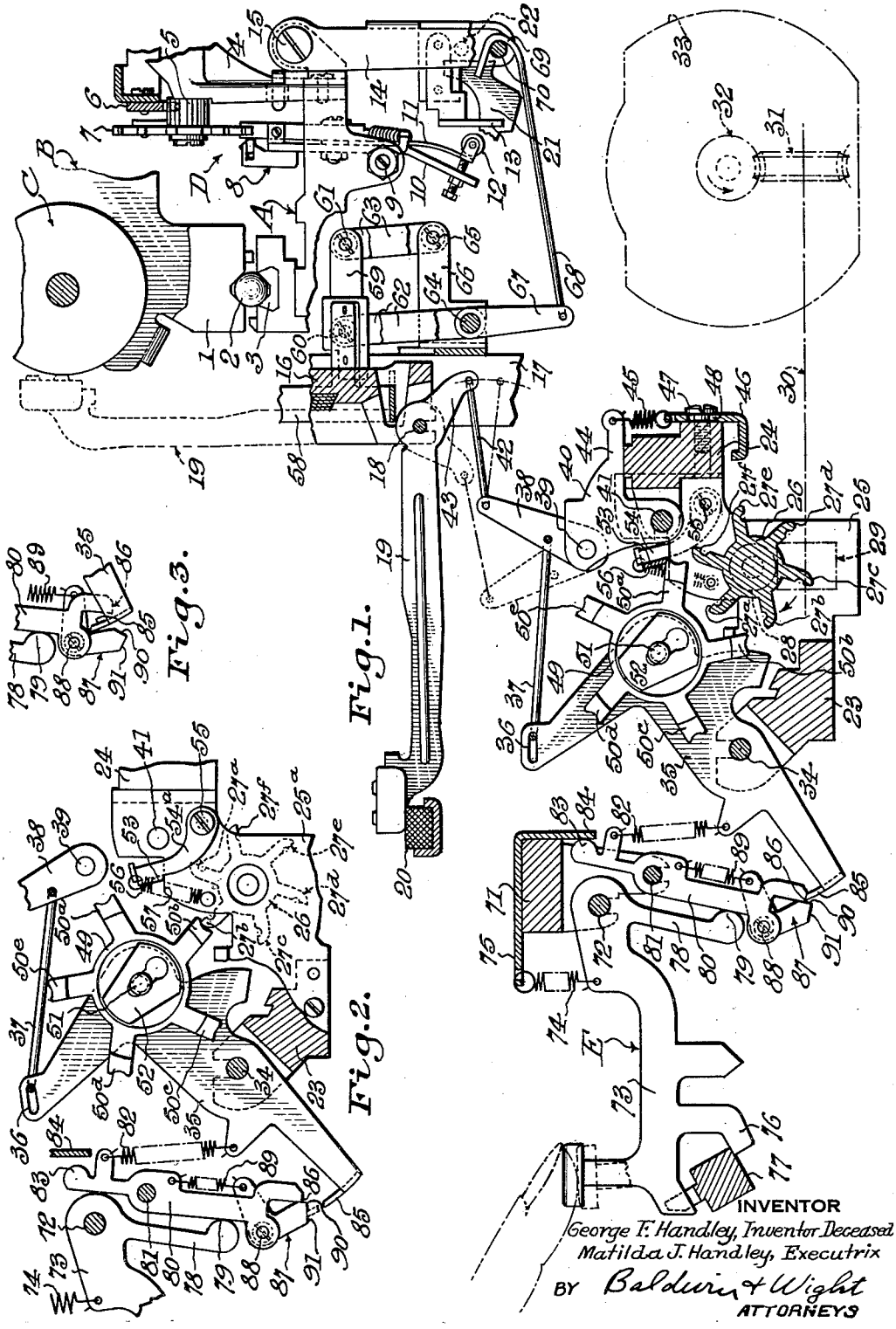


Fig. 1.

Fig. 2.

Fig. 3.

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POWER OPERATED TYPEWRITING MACHINE

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8 Claims. (Cl. 197—17)

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This invention relates to typewriting machines, and more particularly to power operated mechanism for actuating various instrumentalities included in such machines, for example type action, escapement mechanism, and ribbon vibrator mechanism.

An object of the invention is to provide mechanism embodying structural features and arrangements providing advantages as compared to prior mechanism of the same general kind.

Another object is to provide mechanism of the kind referred to including a new and improved arrangement of parts for preventing overthrowing of a drive transmitting element, for example a star wheel, so as to insure that at the end of each operating cycle the parts will be positioned properly for further cooperation with each other when the next operating cycle is begun.

Another object is to provide a simple and improved means for absorbing shocks when a power driven element is connected to a device or instrumentality to be operated.

Another object is to provide mechanism, preferably including a universal bar, adapted to be operated by a type carrying member for actuating other parts, for example escapement mechanism and/or ribbon vibrator mechanism.

Another object is to provide key operated means for controlling the operation of the power driving mechanism in which a finger operated key lever or the like can return to normal position while the driving mechanism is in action, the arrangement being such that the finger operated member returns immediately upon being released by the operator.

A further object of the invention is to provide novel means for preventing repeated operation of a type bar or other instrumentality when a key lever is held in depressed position.

Other objects will become apparent from a reading of the following description, the appended claims, and the accompanying drawing, in which:

Figure 1 is a vertical section taken fore and aft of a typewriter equipped with mechanism embodying the invention, some conventional typewriter parts being shown only fragmentarily and others being omitted, the illustrated parts being shown in their normal or inactive positions;

Figure 2 is a fragmentary view of some of the mechanism illustrated in Figure 1 but showing the parts in active or operating positions; and

Figure 3 is a detail view in elevation showing certain parts in intermediate positions, that is

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positions occupied immediately after the beginning of an operating cycle.

Mechanism constructed in accordance with the invention is illustrated as being embodied in a typewriter having a basic structural arrangement generally similar to that of the Royal Standard typewriter. Conventional parts included in this basic structure and shown in part in the accompanying drawing include a stationary frame, a portion of which is indicated at A. Mounted for reciprocation on the frame A is a carriage B equipped with a cylinder or platen C. The carriage is equipped with a bottom rail 1 which is supported by ball bearings 2, in turn carried by a bottom rail 3 mounted on the frame part A.

Letter spacing travel of the carriage B is controlled by an escapement mechanism D of known form including an escapement frame 4 mounted on the main frame A and serving to journal an escapement pinion 5 meshing with a carriage escapement rack 6. An escapement wheel 7 fast with the pinion 5 is adapted to cooperate with a dog rocker assembly 8 pivoted on the frame A as at 9. The assembly 8 includes a depending arm 10 and adjustable blade support 11 for a roller 12 adapted to be operated by a pressure plate 13 carried by a trip frame 14 pivoted as at 15.

In operation, when the trip frame 14 is rocked clockwise, the pressure plate 13 engages the roller 12 to rock the dog assembly 8 forwardly, and when the frame 14 returns to the position shown in Figure 1 the rocker assembly 8 moves back to its starting position. To and fro rocking of the assembly 8 through one complete cycle permits a step rotation of the escapement wheel 7 and movement of the carriage B through a single letter space increment.

A type bar segment 16 is mounted for vertical shifting on the frame A by guide legs, one of which is shown at 17. The segment 16 carries a pivot wire 18 serving as the fulcrum for a plurality of type carrying members or bars, one of which is shown at 19. When the type bar 19 is in its inactive position as shown in full lines in Figure 1, the type head is supported upon a rest 20 carried by the frame A. The active or printing position of the type carrying member 19 is indicated at dotted lines in Figure 1.

A device 21, arranged to be engaged and pushed forwardly by a pin 22 on the trip frame 14, is adapted to be connected to ribbon vibrator mechanism, for example in the manner shown in the patent to Degener 1,781,570 granted November 11, 1930. The arrangement is such that each time the trip frame 14 is rocked to actuate the escape-

ment mechanism in the manner previously described, the device 21 will be thrust forwardly so as to operate the ribbon vibrator mechanism for positioning the ribbon (not shown) in operative position at the writing line.

Power operated mechanism is provided for operating the type actions, the escapement mechanism D, and the device 21 for actuating the ribbon vibrator. For mounting parts of the power operated mechanism the frame A is provided with cross bars 23 and 24 and with end plates 25 and 25a. Journalled for rotation on the end plates is a power driven shaft element 26 formed with projections 27a, 27b, 27c, 27d, 27e, 27f. The element 26 may be rotated continuously through the medium of a pair of gears 28 and 29 connecting the element 26 to a shaft 30 which in turn is driven by a worm wheel 31 in mesh with a worm 32 on the shaft of an electric motor 33. The mounting of the shaft element 26 and its driving mechanism may be generally similar to the arrangemen shown in the patent to Degener 1,781,720 granted November 18, 1930.

The frame cross bar 23 supports a pivot rod 34 which serves as a fulcrum for a plurality of power transmitting elements, one of which is shown at 35. One such power transmitting lever is associated with each type action and it will be understood that the description of the mechanism for operating the type action shown in the drawing is applicable to the mechanism for operating each of the companion type actions, not shown. The upper arm of the lever 35 is formed with a slot 36 which receives the angularly bent front end of a link 37, the rear end of which is pivotally connected to a lever 38 pivoted as at 39 on a cushioning lever 40 fulcrumed as at 41 on the cross bar 24. The fulcrum 41 serves to pivot a plurality of cushioning levers, one associated with each type action, all of the cushioning levers being similar to the lever 40. A link 42 is interposed between the upper end of the lever 38 and the device to be operated, as shown the heel or short arm 43 of the type bar 19. The cushioning lever 40 includes an arm 44 which projects rearwardly and overhangs the cross bar 24, the overhanging arm being urged downwardly against the cross bar 24 by a spring 45 connected between the arm 44 and a plate 46 adjustably mounted on the cross bar by screws 47 extending through vertically elongated slots 48 in the plate 46. The springs 45 associated with all of the type actions are anchored on the plate 46 and the tensioning of all of the springs can be adjusted simultaneously by changing the vertical position of the plate.

In operation, when the lever 35 is rocked counterclockwise as viewed in Figure 1, the link 37 moves forwardly and pulls on the lever 38. This will cause the cushioning lever 40 to rock slightly counterclockwise against the urge of the cushioning spring 45 while simultaneously movement of the lever 38 will pull the link 42 forwardly to start the type bar 19 on a printing stroke. The initial short rocking of the lever 40 against the urge of the spring 45 has the effect of cushioning the type bar operating impulse so that the type bar is not subjected to harmful shock when it is first moved from its position of rest. During further rocking of the power lever 35 and the lever 38, the link 42 will be moved forwardly to complete the printing stroke of the type bar under the combined action of the power lever 35 and the return movement of the cushioning lever 40 caused by recontraction of the spring 45. Thus the yieldably mounted cushioning lever 40 serves both to cushion the pick-up of the type bar from its at rest position and to impart additional acceleration to the type bar movement after the type bar is well under way toward printing position. The effectiveness of the cushioning lever in performing these two functions depends upon the delicate adjustment of the springs 45. These can be correctly and nicely adjusted by the simple means provided for positioning the anchoring plate 46.

The power operated levers 35 normally are out of driving relation with respect to the power driven element 26 but are adapted to be brought into driving relation with respect thereto under the control of the operator in such a way that the levers 35 are rocked by power supplied by the motor 33. To this end a star wheel 49 provided with fingers 50a, 50b, 50c, 50d, 50e is journalled on each power operated lever 35 by a headed pin 51. A spring washer or plate 52 is provided for imposing a frictional drag upon the rotation of the star wheel 49 on its journal 51. Key operated mechanism generally designated E and to be described later, normally maintains the associated lever 35 in such position that the star wheel fingers are out of the path of rotation of the projections on the shaft element 26.

When the parts are in their normal or inactive positions, one star wheel finger, as shown the finger 50a, engages a stop blade or bar 53 forming the cross piece of a bail having arms 54—54a pivoted at 55 on the end plates 25 and 25a respectively. Springs 56 bias the bail to hold it yieldably in its normal position in which the bail bar 53 contacts limit surfaces 57 on the end plates 25—25a.

In operation, the key controlled mechanism E is actuated in a manner to be described for first causing the lever 35 to rock clockwise, moving idly with respect to the link 37 because of the lost motion provided by the pin and slot connection 36. The star wheel finger 50a moves downwardly a short distance from the bail bar 53 and into the range of movement of the projection 27a on the power driven shaft element 26. The projection 27a engages the downwardly facing side edge of the finger 50a and rotates the star wheel slightly so as to position the cupped end of the next succeeding finger 50b for engagement by the tip of the shaft projection 27b. As the shaft 26 continues to rotate with the projection 27b engaging the cupped end of the finger 50b, the star wheel will be raised so as to rock the power lever 35 to the position shown in Figure 2. During this movement of the lever 35 and the star wheel, the finger 50a will engage the tapered bottom edge of the bail bar 53, causing the bail to be deflected clockwise against the urge of the springs 56, thus permitting the star wheel finger 50a to pass on to the position shown in Figure 2. As soon as the finger 50a is moved beyond the bail bar 53, the bail will be returned to its starting position so as to be ready to be engaged by the star wheel finger 50b after the latter has broken off contact with the shaft projection 27b. Engagement of the finger 50b with the bail bar 53 positively arrests rotation of the star wheel, preventing its overthrowing and assuring that the parts will come to rest in the positions necessary to insure proper cooperation for the next operating cycle. The springs 56 bias the bail bar stop 53 into normal position with force sufficient to prevent overthrowing of the star wheel under the influence of its rotative inertia but insufficient

to prevent yielding or deflection of the stop 53 when the star wheel is driven positively by the power operated shaft 26. The bail 53—54 is mounted on the frame independently of the power transmitting assembly 35—49 and the single stop bar 53 is adapted to cooperate with all of the star wheels 49, it being unnecessary to provide a separate overthrow preventing stop for each star wheel.

Operation of the type bar is utilized to rock the trip frame 14 for actuating the escapement mechanism D and the ribbon vibrator operating device 21. In the form shown, a universal bar 58 is mounted to be engaged by any type bar 19 when the latter is moved to printing position. The universal bar 58 is connected to links, one of which is shown at 59 as extending rearwardly for pivotal connection as at 60 and 61 to the upper ends of spaced rock arms 62 and 63 respectively. The rock arms are pivoted as at 64 and 65 on a bracket 66 mounted on the frame member 17. The rock arm 62 is fast on the pivot shaft 64, also fast with which is a depending arm 67 connected at its lower end to a link 68, the rear end portion of which is looped at 69 around a rod 70 on the trip frame 14.

In operation, when a type bar moves to printing position as indicated in dotted lines in Figure 1, the universal bar 58 is moved rearwardly so as to thrust the link 59 rearwardly and rock the arms 62, thereby rocking the shaft 64 and swinging the depending arm 67 to pull the link 68 forwardly and rock the trip frame 14 clockwise. As previously explained, such rocking of the trip frame operates the escapement mechanism D and the device 21 for actuating the ribbon vibrator.

The key operated mechanism E is supported upon a cross bar 71 fast with the frame A and equipped with a pivot rod 72 which mounts a plurality of key levers, one of which is shown at 73. A spring 74 interposed between each key lever 73 and an anchor plate 75 on the cross bar 71 yieldably holds the key lever in its normal position determined by engagement of a stop finger 76 with a fixed cross bar 77.

The key lever 73 is provided with an arm 78 formed with a heel 79 having a one way driving connection with a blocking interponent lever 80 pivoted as at 81 on the frame part 71. The blocking part 80 is urged clockwise as viewed in Figure 1 by a spring 82 interposed between the upper end of the lever 80 and the associated power lever 35. Movement of the blocking lever 80 under the urge of the spring 82 is limited by engagement of a stop portion 83 on the upper end of the lever 80 with a depending flange 84 on the spring anchor plate 75. The spring 82 also constantly urges the power lever 35 to rock clockwise thus serving as a means for effecting relative movement between the axes of the star wheel 49 and power driven element 26. Normally, however, the lever 35 is held inactive in the position shown in Figure 1 by engagement of a stop part 85 on the lever 35 with a primary abutment surface 86 on the lower end of the stop lever 80.

It will be seen that if the key lever 73 is depressed so as to rock the stop lever 80 counterclockwise to the position shown in Figure 3, the primary abutment surface 86 will be moved clear of the stop part 85, thereby permitting the lever 35 to be rocked clockwise by the spring 82. Thus the spring 82 will impart to the lever 35 the initial clockwise movement required to effect cooperative driving connection between the star wheel and the shaft element 26 whereupon the type action, the escapement mechanism, and the device 21 all will be operated in the manner previously described.

The one way drive connection between the key lever 73 and the key operated blocking lever 80 makes it possible for the key lever to return to its normal position while the blocking lever is still in its operated position, as shown in Figure 3. Thus, the key lever 73 is, in effect, disconnected from the power driving and transmitting mechanism while driving effort is being transmitted. Consequently the operator will not experience the unnatural "touch" or feeling of having the key lever remain down after finger pressure has been discontinued.

In accordance with the invention, new and improved means are provided for preventing repeated operative connection of a star wheel to the shaft element 26 in the event the associated key lever 73 is held depressed. A supplemental stop lever 87 is pivoted as at 88 on the lever 80 and is urged to the normal position shown in Figure 1 by a spring 89 interposed between the levers 80 and 88. The stop lever 87, preferably a bell crank, is formed with a trip face or shoulder 90 which, in the normal position of the lever 87, extends at an angle to the primary abutment surface 86 and engages the lower end of the lever 80 for limiting movement of the lever 87 under the urge of the spring 89. The lever 87 is formed also with a secondary abutment surface 91 which, in the normal position of the lever 80, forms substantially a continuation of the primary abutment surface 86.

In operation, when the key lever 73 is depressed and the stop lever 80 correspondingly is rocked counterclockwise, the stop part 85 is engaged by the trip face 90 whereby the bell crank lever 87 is deflected against the urge of the spring 89 and is moved to the position shown in Figure 3. This enables the stop part 85 to move up between the depending arm of the lever 87 and the lower end of the stop lever 80, thus enabling the power lever 35 to move the star wheel 49 into cooperative position with respect to the power driven element 26 in the manner previously described. If the key lever 73 is held depressed, the stop part 85 will be withdrawn from between the bell crank lever 87 and the lower end of the stop lever 80 when the power lever 35 is rocked counterclockwise under the driving action of the shaft 26. The spring 89 will then swing the bell crank lever 87 to its normal position on the stop lever 80 so that when the power lever 35 begins to return to its normal position, the stop part 85 will engage the secondary abutment surface 91. This will bring the power lever 35 to rest so as to prevent the star wheel fingers from being moved into the path of the projections on the power driven element 26. Consequently, there can be no repeated operation of the power lever 35 while the key lever 73 is being held depressed. In order to effect another cycle of operation of the lever 35, it is necessary to permit the key lever 73 to return to normal position and to then depress it again so as to cause the bell crank lever 87 to be deflected to its Figure 3 position to thereby permit the power lever 35 to rock clockwise sufficiently to bring the star wheel fingers into the paths of the projections on the shaft element 26.

The mechanism disclosed herein embodies the invention in the form now preferred, but it will be understood that some changes may be made in the construction and relative arrangement of

the parts without departing from the invention as defined in the claims.

What is claimed is:

1. In a power operated typewriter or like machine, a type action; a power lever; means connecting said power lever to said type action; a rotatable power driven element having projections thereon; a star wheel journalled on said power lever and having fingers normally disposed out of the path of said projections; means for moving said star wheel to bring its fingers into the path of said projections for actuating the lever and the type action; and means for preventing overthrowing of the star wheel comprising a stop engageable by the star wheel when the star wheel is in normal position, and means mounting said stop to yield from its operative position when the star wheel is driven by said power driven element, said stop being biased towards its operative position sufficiently to prevent its yielding from operative position under the rotative inertia action of the star wheel but insufficiently to prevent its yielding from operative position under the action of the star wheel when the latter is driven by said power driven element.

2. In a power operated typewriter or like machine, a type action; a power lever; means connecting said power lever to said type action; a rotatable power driven element having projections thereon; a star wheel journalled on said power lever and having fingers normally disposed out of the path of said projections; means for moving said star wheel to bring its fingers into the path of said projections for actuating the lever and the type action; and means for preventing overthrowing of the star wheel comprising a stop engageable by the star wheel when the star wheel is in normal position, means mounting said stop to yield from its operative position when the star wheel is driven by said power driven element, and a spring urging said stop towards its normal position with force sufficient to prevent the stop from yielding from operative position under the rotative inertia action of the star wheel but insufficient to prevent the stop from yielding from operative position under the driving action of the star wheel when the latter is driven by said power driven element.

3. In a power operated typewriter or like machine, a frame; a type action mounted on said frame; a power lever pivoted on said frame; means connecting said power lever to said type action; a power driven element journalled for rotation on said frame and having projections thereon; a star wheel journalled on said power lever and having fingers normally disposed out of the path of said projections; means for moving said star wheel to bring its fingers into the path of said projections for actuating the said lever and thereby said type action; and means for preventing overthrowing of said star wheel comprising a stop movably mounted on said frame and being biased to a normal position in which it is engageable by a star wheel finger when the star wheel is in normal position, the bias on said stop being sufficient to prevent movement of said stop from its normal position under the inertia of said star wheel but insufficient to prevent movement of said stop from its normal position by said star wheel when the latter is driven by said power driven element.

4. In a power operated typewriter or like machine, a frame; a type action mounted on said frame; a power lever pivoted on said frame; means connecting said power lever to said type action; a power driven element journalled for rotation on said frame and having projections thereon; a star wheel journalled on said power lever and having fingers normally disposed out of the path of said projections; means for moving said star wheel to bring its fingers into the path of said projections for actuating the said lever and thereby said type actions; and means for preventing overthrowing of said star wheel comprising a stop, means pivoting said stop on said frame, and a spring yieldably holding said stop in a normal position in which it is engageable by a star wheel finger when said star wheel is in normal, inactive position.

5. In a power operated typewriter or like machine, a frame; a type action mounted on said frame; a power lever pivoted on said frame; means connecting said power lever to said type action; a power driven element journalled for rotation on said frame and having projections thereon; a star wheel journalled on said power lever and having fingers normally disposed out of the path of said projections; means for moving said star wheel to bring its fingers into the path of said projections for actuating the said lever and thereby said type action; and means for preventing overthrowing of said star wheel comprising a bail including a stop bar extending parallel to the axis of rotation of said star wheel, means pivoting said bail on said frame, a limit surface on said frame engageable by said bail for determining a normal position of the bail in which the bail stop bar is engageable by said star wheel for preventing inertia overthrowing of the latter, and a spring for urging said bail into engagement with said limit surface and being yieldable to permit said bail stop bar to be moved out of stopping position when said star wheel is driven by said power driven element.

6. In a power operated typewriter or like machine, a frame; a type-carrying member mounted on said frame; a power driven element on said frame; a power lever mounted on said frame and normally being disconnected from said element; means for effecting operative connecting of the power lever to said element for operating said power lever; and means for actuating said type-carrying member when said power lever is operated comprising a cushioning lever pivoted on said frame and having an arm engageable with said frame when said cushioning lever is in normal position, a spring anchored at one end on said frame and at its other end engaging said arm for yieldably holding said cushioning lever in its said normal position, an actuating lever pivoted on said cushioning lever, means connecting the actuating lever to said type-carrying member, and means connecting said actuating lever to said power lever.

7. In a power operated typewriter or like machine, a frame; a type-carrying member mounted on said frame; a power driven element mounted on said frame; a power lever mounted on said frame and normally being disconnected from said element; means for effecting operative connecting of the power lever to said element for operating said power lever; and means for actuating said type-carrying member when said power lever is operated comprising a cushioning lever pivoted on said frame and having an arm engageable with said frame when said cushioning lever is in normal position and overhanging a portion of said frame, a plate mounted on said frame for adjustment towards and from said overhanging lever arm, a coil spring having its opposite ends connected respectively to said overhanging lever arm

and said plate, an actuating lever pivoted on said cushioning lever, means connecting the actuating lever to said type-carrying member, and means connecting said actuating lever to said power lever.

8. In a power operated typewriter or like machine, a frame; a type-carrying member mounted on said frame; a power driven element mounted on said frame; a power lever mounted on said frame and normally being disconnected from said element; means for effecting operative connecting of the lower lever to said element for operating said power lever; and means for actuating said type-carrying member when said power lever is

operated comprising a cushioning lever pivoted on said frame and having an arm engageable with said frame when said cushioning lever is in normal position, a spring anchored at one end on said frame and at its other end engaging said arm for yieldably holding said cushioning lever in its said normal position, an actuating lever pivoted at one of its ends to said cushioning lever, a link pivotally connecting the opposite end of said actuating lever to said type-carrying member, and a link pivotally connecting said power lever to said actuating lever intermediate the ends thereof.

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