

Dec. 31, 1957

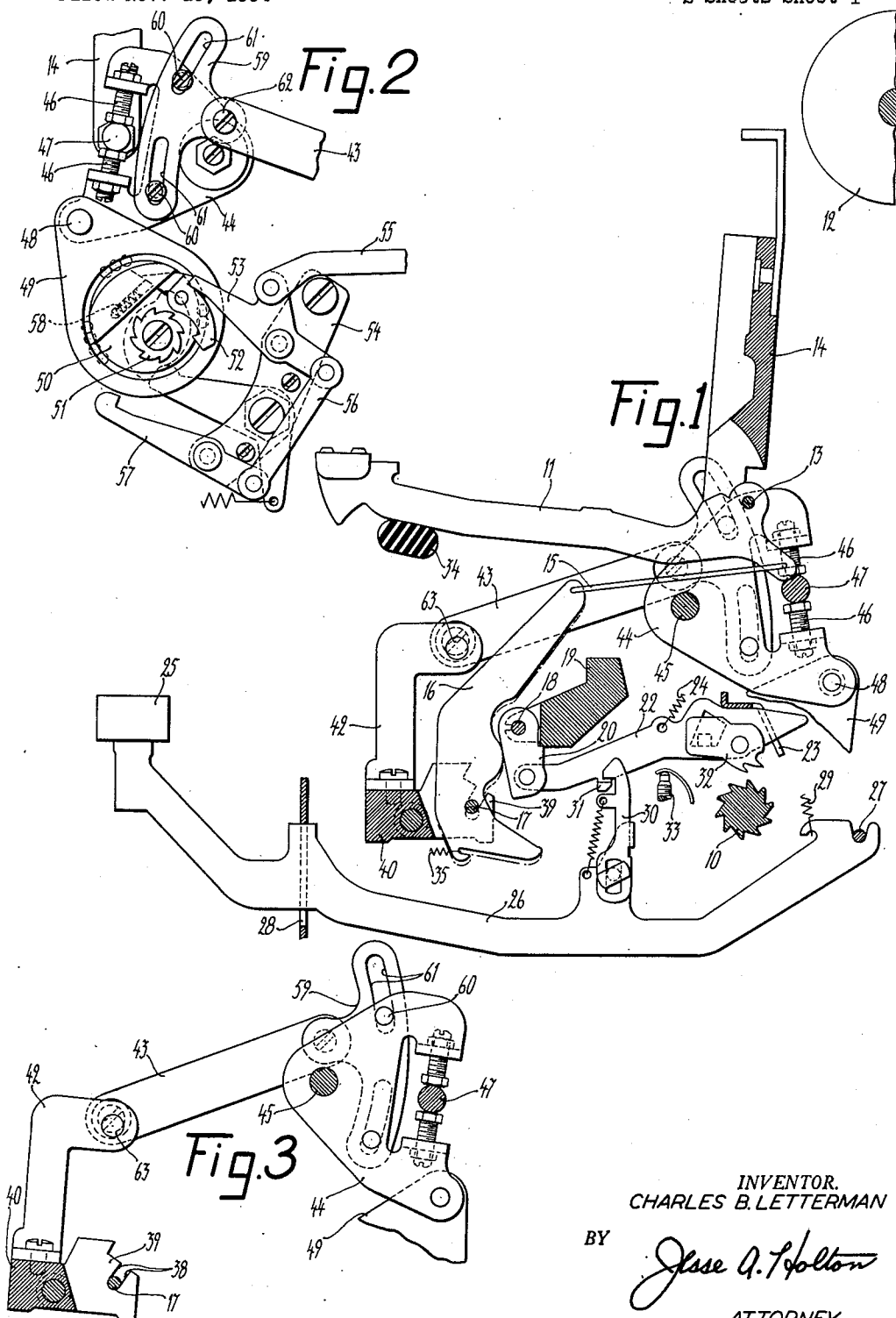
C. B. LETTERMAN

2,818,152

IMPRESSION CONTROL FOR TYPEWRITING MACHINE

Filed Nov. 19, 1954

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

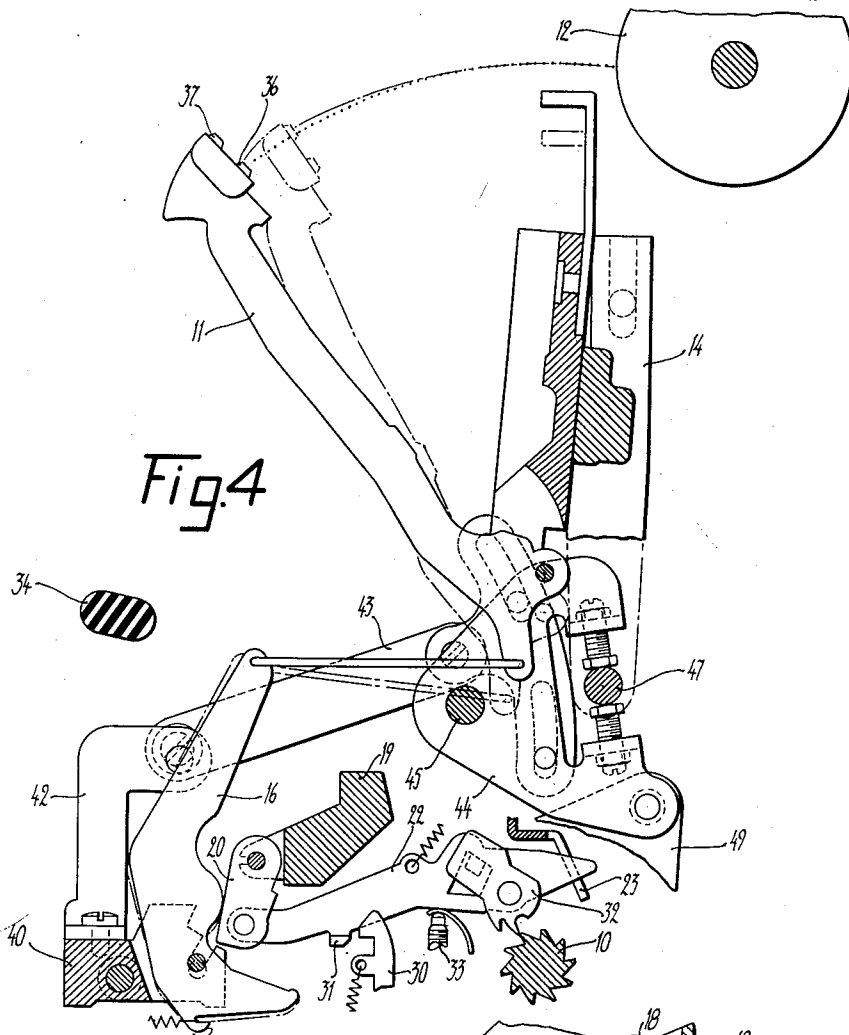


Fig. 4

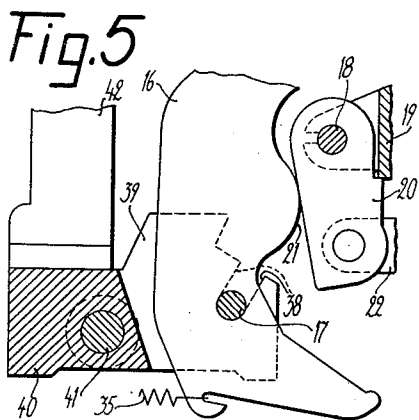


Fig. 5

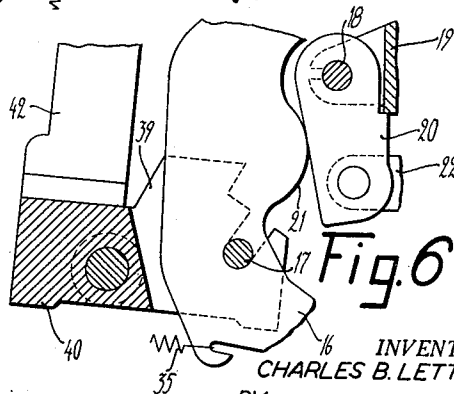


Fig. 6

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1

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IMPRESSION CONTROL FOR TYPEWRITING MACHINE

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Application November 19, 1954, Serial No. 470,093

5 Claims. (Cl. 197—17)

This invention relates to typewriting machines, especially power driven typewriting machines and more particularly to an improved type action for such machines.

While one of the advantages of a power driven typewriter over a so-called manual typewriter is that the typing impressions of the former are uniform and not dependent upon the force with which the keys are struck, it is nevertheless characteristic of such machines that unless some special provision is made, the upper case or capital letters do not print with the same degree of impression as the lower case or small letters. This is because any particular type bar is customarily impelled toward the platen with the same force for printing both upper and lower case characters and the upper case character, having a larger superficial area, strikes the platen with less unit force and consequently produces a lighter impression.

It is known to provide means operable by the case shift mechanism to cause the type bars to be impelled with greater force toward the platen when upper case characters are to be typed but such heretofore known means are generally complex, expensive and involve extensive changes in existing machines.

It is the primary object of the present invention to provide an improved mechanism for regulating the force with which the type bars of a power operated typewriter strike the platen.

It is a further object of the invention to provide an improved means operable under the control of the case shift mechanism for causing the type bars to be impelled with greater force toward the platen when typing in upper case.

These and further objects, features and advantages of the invention will become readily apparent as the description of a preferred embodiment thereof proceeds.

Referring now to the drawings:

Figure 1 is the view partially in side elevation and partially in cross section showing the invention incorporated in a power operated typewriter,

Figure 2 is a side elevational view of a case shift mechanism showing a portion of the new mechanism associated therewith,

Figure 3 is a view partially in side elevation and partially in cross section of a portion of the mechanism shown in Figure 1 and showing the parts in position for typing in upper case,

Figure 4 is a view similar to Figure 1 and showing the type bar during its movement toward the platen,

Figure 5 is an enlarged view partially in side elevation and partially in cross section showing certain parts of the type action in position for typing in lower case, and

Figure 6 is a view similar to Figure 5 and showing the parts in position for typing in upper case.

The invention is illustrated as embodied in the well known "Underwood" electric typewriter wherein a continuously rotating toothed shaft 10 supplies the power for driving type bars 11 against a letter feedable platen 12. The type bars, only one of which is shown, are mounted on an arcuate pivot rod 13 secured in a case shiftable

2

element 14 and each type bar is connected by a link 15 to the upper end of a sub-lever 16 which sub-lever is pivotally mounted on a cross shaft or rod 17. Pivotally mounted on a rod 18 extending parallel to the rod 17 and supported by a cross piece 19, is a plurality of levers or arms 20. Only one arm 20 is shown but it will be understood that there is one of these arms for each sub-lever 16. An edge of the arm 20 rests against a curved edge surface 21, see particularly Figures 5 and 6, of the sub-lever and pivotally connected to said arm is an actuator 22. The actuator 22 is guided at its free end in a comb guide 23 and is normally held in the Figure 1 position by a spring 24.

One of the keys of the standard typewriter keyboard is indicated at 25, said key being carried by a key lever 26 pivotally mounted on a rod 27. The key lever is guided in a comb guide 28 and resiliently held in normal position by a spring 29. A hook member 30 is mounted on the key lever 26 for limited pivotal and sliding movement and the hooked end of said member normally overlies a tab 31 provided on the actuator 22. Depression of a key 25 causes the hook member 30 to swing its associated actuator 22 downward about its pivotal connection with the arm 20 to engage a toothed pawl 32, mounted on the actuator for limited pivotal movement, with the toothed power shaft 10. The power shaft 10 thereupon drives the actuator toward the left as viewed in the drawings to swing the arm 20 in a clockwise direction about the rod 18. As the arm 20 swings clockwise, the engagement between the edge of said arm and the surface 21 of the sub-lever 16 causes said sub-lever to rock in a counter-clockwise direction and swing the associated type bar toward the platen, said sub-lever being mounted to move in the same plane as the arm 20 and the edge of arm 20 and the edge surface 21 of the sub-lever constituting cooperating means located between the respective pivots of the arm 20 and sub-lever 16.

For greater typing speed and for obtaining the clearest typing impressions, the type bar is driven only part way to the platen by the shaft 10 and travels the remainder of the distance under momentum. Thus a kick-off screw 33 is adjustably positioned to be contacted by the actuator after the type bar has been driven as far as desired and when the actuator contacts the kick-off screw the toothed pawl 32 is forced out of engagement with the drive shaft. As is known, there is a separate kick-off screw for each actuator so that by varying the distances that the actuators are driven by the power shaft the different sized characters can be made to print with the same degree of impression. After printing, the type bar is restored to its normal position against a rest 34 by means of a spring 35 extending between the sub-lever 16 and a stationary part of the machine.

For any particular setting of the kick-off screw 33, the arm 20 will be swung through an arc of a particular number of degrees upon every operation of the actuator and a factor which will determine the distance that the type bar will be driven toward the platen by the power shaft is the distance between the rod 18 and the initial point of contact of the arm 20 with the surface 21 of the sub-lever 16. The surface 21 is in the form of an arc of a circle so that the speed of the type bar will increase as the arm 20 swings more and more clockwise to thereby move the contact point between the arm 20 and the surface 21 away from the pivot rod 18 but the total distance that the type bar will be driven for any particular motion of the actuator and arm 20 will increase as the initial contact point between the arm and the surface 21 is moved away from the pivot rod. It will be apparent that the closer to the platen the type bar is driven, the greater will be the force with which the type will strike.

This invention provides means operable automatically

when typing in upper case to increase the initial distance between the pivot rod 18 and the point of contact between the arm 20 and surface 21. In general, this is brought about by moving the pivot rod 17 of the sub-lever 16 away from the pivot rod 18, as will presently be explained.

Figure 4 shows in full lines the position to which the type bar is driven by the power shaft when typing in lower case, the lower case type being indicated at 36, and the position to which said type bar is driven when typing in upper case is indicated in the same figure by chain-dotted lines, the upper case type being indicated at 37. Figures 5 and 6 respectively show the initial contacting positions of the arm 20 and sub-lever surface 21 when typing in lower and upper case. The additional distance which the type bar is positively driven when typing in upper case is of course such as to compensate for the larger superficial area of the upper case type and make the type of both upper and lower case strike the platen with the same unit force whereby the impressions formed by the type will be of uniform appearance.

The pivot rod 17 is carried in a series of slots 38, only one of which is shown, provided in portions 39, again only one of which is shown, of a cross bar 40 pivotally mounted between the side frame plates of the machine on stub shafts 41. A cross bar rocker arm 42 is secured to the upper edge of the cross bar 40 and a link 43 operatively and adjustably connects the arm 42 to a case shiftable yoke 44 pivotally mounted at 45 on one of the machine side plates. The yoke 44 is connected to the case shiftable element 14 by means of headed screws 46 secured in said yoke and bearing against opposite sides of a pintle 47 secured in a suitable manner to the element 14.

As best seen in Figure 2, the yoke 44 is pivotally connected at 48 to a strap 49 embracing a rotatable disc 50 eccentrically mounted upon a bearing portion of the power shaft 10. A toothed member 51 is rotatably secured to the power shaft 10 and a clutch pawl 52 is pivotally mounted on the disc 50 and normally held out of engagement with the toothed member 51 by a lever 53 pivotally mounted upon a stationary member 54. The lever 53 is connected by a link 55 to a case shift key, not shown, and by a link 56 to a hooked lever 57 pivotally mounted upon the member 54. Upon depression of the case shift key, the lever 53 is rocked out of engagement with the clutch pawl 52 permitting a spring 58 to move said pawl into engagement with the rotating toothed member 51. The movement of the lever 53 out of engagement with the clutch pawl rocks the hooked lever 57, through the link 56, to a position to be contacted by said clutch pawl as the disc 50 rotates clockwise to disengage said pawl from the toothed driving member 51 after the disc has made one half revolution. This half revolution of the disc 50 moves the pivot 48 downward to swing the yoke 44 about its pivot 45 and lower the case shiftable element 14. This of course lowers the pivot rod 13 on which the type bars are mounted and conditions said type bars for printing in upper case. The above briefly described case shift mechanism is not of the essence of the present invention and is more fully described in the patent to Halmond, No. 2,275,759.

As best shown in Figure 2, a member 59 is adjustably secured to the yoke 44 by means of a pair of screws 60 extending through a pair of curved slots 61 in said member and screwed tight in said yoke to hold the member 59 in adjusted position. One end of the link 43 is pivotally connected to the member 59 at 62 and the other end is connected to the cross bar rocker arm 42 by an eccentrically adjustable pivot 63. Thus it will be apparent that when the case shift key is operated to shift to upper case, the yoke 44 will be rocked clockwise, as viewed in Figures 1, 3 and 4 and the link 43 will pull the upper end of the arm 42 toward the right to rock the cross bar 40 in a clockwise direction and thereby lower the sub-lever pivot rod 17 from the position shown in Figure 5 to the position shown in Figure 6. Lowering of the sub-lever pivot rod causes the type bar to be driven closer to the platen by the power

shaft upon subsequent operations to increase the force of the type blow action, as previously explained. By means of the adjustments at the ends of link 43 the amount of movement of the pivot rod 17 may be regulated so as to obtain the desired degree of increased typing force for the upper case characters.

Having thus described a preferred embodiment of the invention, what is claimed is:

1. In a power operated typewriting machine, a power shaft, a type bar actuator engageable with said power shaft, a pivotally mounted lever connected to said actuator, engagement of said actuator with said power shaft causing said lever to be swung through an arc of a predetermined number of degrees, a pivotally mounted type bar having upper and lower case characters, a platen against which said characters are adapted to print, case shift means for changing the relationship between the pivotal mounting of said type bar and said platen, a type bar operating sub-lever pivotally mounted to swing in the same plane as said lever, cooperating means on said sub-lever and said lever whereby the swinging of said lever by said actuator will swing said sub-lever and thereby drive said type bar part way to said platen, said type bar traveling the remaining distance to said platen under momentum, and means operable by said case shift means to increase the distance between the cooperating means and the pivotal mounting of said lever whereby the swinging movement of said lever will be effective to drive said sub-lever through a greater arc when printing in upper case and consequently drive the type bar closer to the platen.

2. In a power operated typewriting machine, a power shaft, a type bar actuator engageable with said power shaft, a pivotally mounted lever connected to said actuators, engagement of said actuator with said power shaft causing said lever to be swung through an arc of a predetermined number of degrees, a pivotally mounted type bar having upper and lower case characters, a platen against which said characters are adapted to print, case shift means for changing the relationship between the pivotal mounting of said type bar and said platen, a type bar operating sub-lever pivotally mounted to swing in the same plane as said lever, cooperating means on said sub-lever and said lever whereby the swinging of said lever by said actuator will swing said sub-lever and thereby drive said type bar part way to said platen, said type bar traveling the remaining distance to said platen under momentum, and means operable by said case shift means to increase the distance between the cooperating means and the pivotal mounting of said lever when said case shift means is operated to condition the machine for printing in upper case whereby the movement of said lever through its predetermined arc will power operate said sub-lever through a greater arc than when printing in lower case and consequently cause said type bar to be driven closer to the platen.

3. In a power operated typewriting machine, a power shaft, a type bar actuator engageable with said power shaft, a pivotally mounted lever connected to said actuator, engagement of said actuator with said power shaft causing said lever to be swung through an arc of a predetermined number of degrees, a pivotally mounted type bar having upper and lower case characters, a platen against which said characters are adapted to print, case shift means for changing the relationship between the pivotal mounting of said type bar and said platen, a type bar operating sub-lever pivotally mounted to swing in the same plane as said lever, said sub-lever and said lever having a point of engagement located between their respective pivot points whereby the swinging of said lever by said actuator will swing said sub-lever and thereby drive said type bar part way to said platen, said type bar traveling the remaining distance to said platen under momentum, and means operable by said case shift means to increase the distance between the pivot of said lever and the point of engagement of said lever with the sub-lever

5

whereby the swinging movement of said lever through its arc of a predetermined number of degrees will be effective to drive said sub-lever through a greater arc when printing in upper case and consequently drive the type bar closer to the platen.

4. In a power operated typewriting machine, a power shaft, a type bar actuator engageable with said power shaft, a pivotally mounted lever connected to said actuator, engagement of said actuator with said power shaft causing said lever to be swung through an arc of a predetermined number of degrees, a pivotally mounted type bar having upper and lower case characters, a platen against which said characters are adapted to print, case shift means for changing the relationship between the pivotal mounting of said type bar and said platen, a type bar operating sub-lever pivotally mounted to swing in the same plane as said lever, said sub-lever and said lever having a point of engagement located between their respective pivot points whereby the swinging of said lever by said actuator will swing said sub-lever and thereby drive said type bar part way to said platen, said type bar traveling the remaining distance to said platen under momentum, and means operable by said case shift means to move the pivot of said sub-lever away from the pivot of said lever to thereby increase the distance between the pivot of said lever and the point of engagement of said lever with the sub-lever whereby the swinging movement of said lever through its arc of a predetermined number of degrees will be effective to drive said sub-lever through a greater arc when printing in upper case and consequently drive the type bar closer to the platen.

6

5. In a power operated typewriting machine, a power shaft, a type bar actuator engageable with said power shaft, a pivotally mounted lever connected to said actuator, engagement of said actuator with said power shaft causing said lever to be swung through an arc of a predetermined number of degrees, a pivotally mounted type bar having upper and lower case characters, a platen against which said characters are adapted to print, case shift means for changing the relationship between the pivotal mounting of said type bar and said platen, a type bar operating sub-lever mounted to swing in the same plane as said lever, said lever and said sub-lever having a point of engagement located between their respective pivot points whereby swinging of said lever by said actuator will swing said sub-lever and thereby drive said type bar part way to said platen, said type bar traveling the remaining distance to said platen under momentum, and means operable by said case shift means to change the point of engagement between said lever and said sub-lever relative to one of their pivot points so that the swinging movement of said lever through its arc of a predetermined number of degrees will be effective to drive said sub-lever through a greater arc when printing in upper case and consequently drive the type bar closer to the platen.

References Cited in the file of this patent

UNITED STATES PATENTS

1,775,057	Thompson	Sept. 2, 1930
2,254,764	Yaeger	Sept. 2, 1941
2,707,544	Girouard	May 3, 1955