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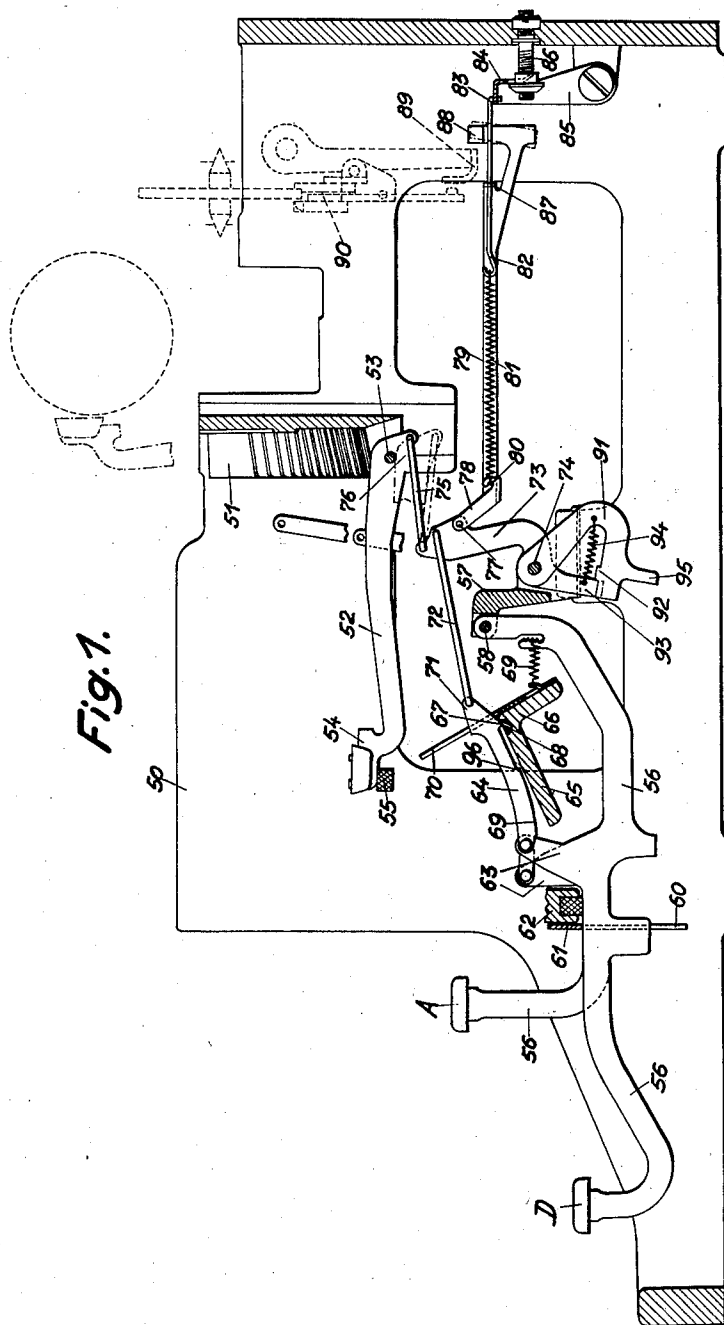
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**2,008,384**

### TYPE BAR ACTUATING MEANS

Filed Dec. 14, 1933

3 Sheets-Sheet 1



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July 16, 1935.

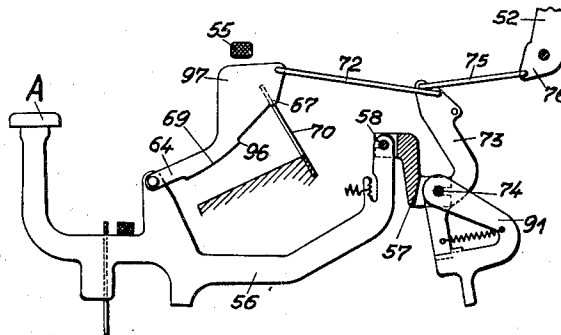
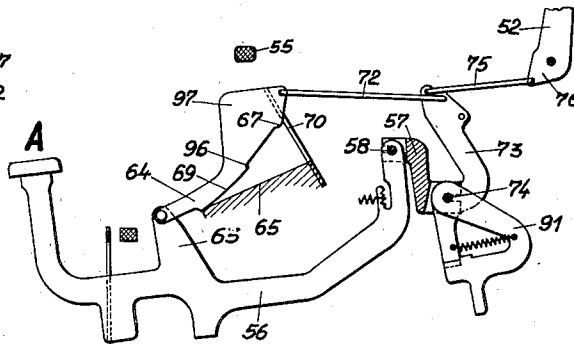
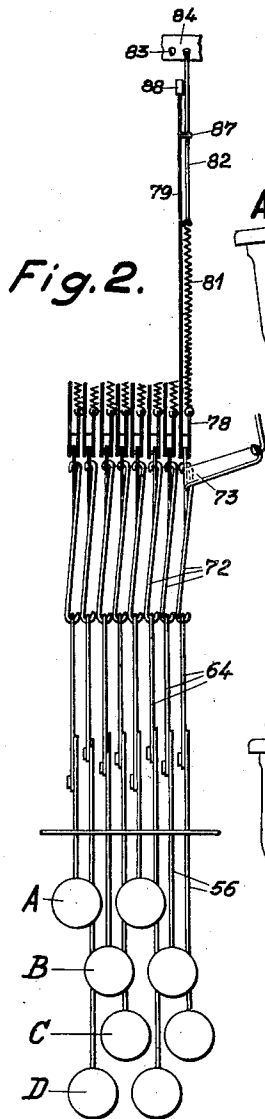
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TYPE BAR ACTUATING MEANS

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3 Sheets-Sheet 2



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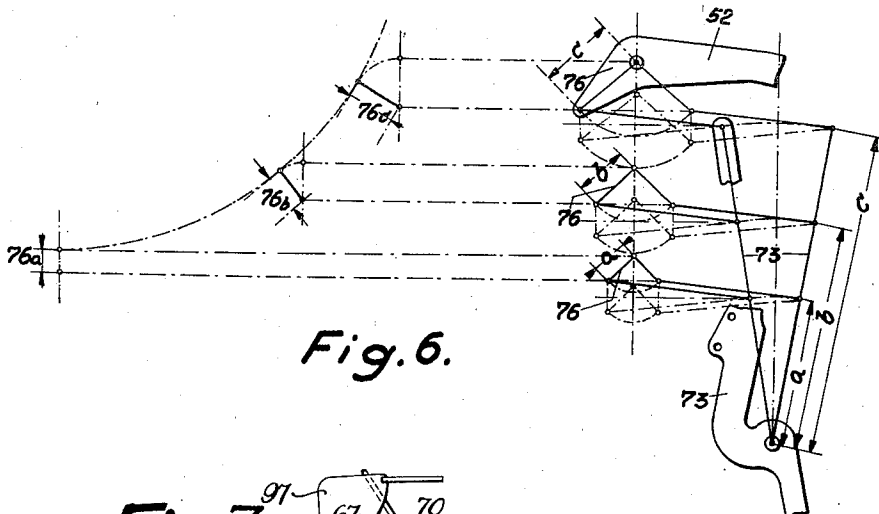
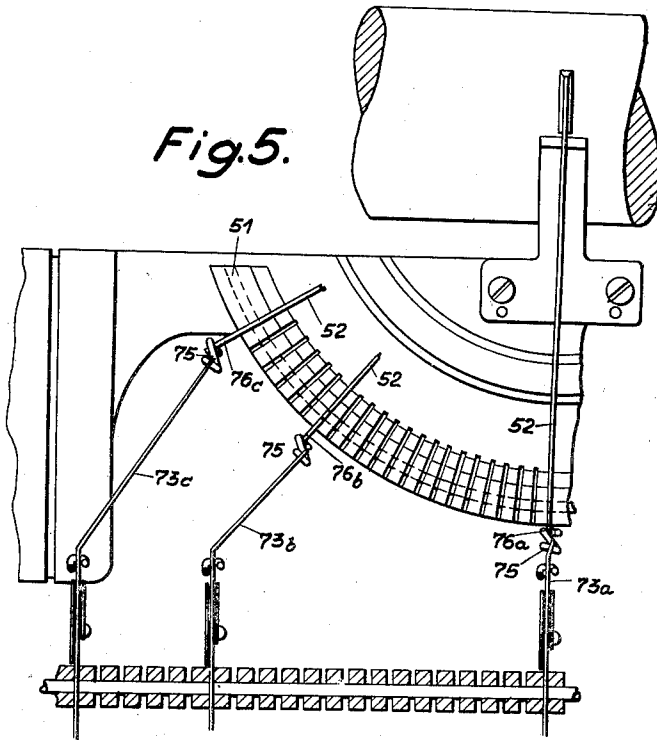
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TYPE BAR ACTUATING MEANS

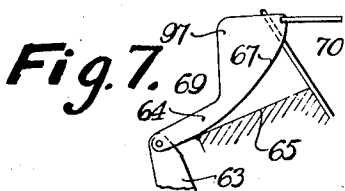
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*Fig. 5.*



*Fig. 6.*



*Fig. 7.*

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## UNITED STATES PATENT OFFICE

2,008,384

## TYPE BAR ACTUATING MEANS

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Application December 14, 1933, Serial No. 702,356  
In Germany December 28, 1932

8 Claims. (Cl. 197—27)

This invention relates to a type-bar actuating means for typewriters, calculating machines and the like, in which the movement of all key bars rocking about a common axis is transmitted to the type bars or intermediate bars through the medium of rocker bars and connecting rods. In machines of this kind hitherto known it has merely been usual to ensure that the type bars are imparted an increasing acceleration.

In the machine according to the invention not only are the type bars operated with an increasing speed, but also attention is paid to the fact that all keys, irrespective of the row in which they happen to be situated, are movable to the same extent and may be struck with equal force.

This advantage is accomplished by the fact that the rocker bars operated by the key bars are so embodied in respect of the entire machine that despite the different lengths of the key bars the rear ends of the rocker bars of all type bar actuating means possess the same extent of movement, the same acceleration and the same force of movement. The essence of the invention accordingly consists in the fact that the rocker bars belonging to each row of key bars are pivoted to the key bars in such fashion with the end directed towards the keys that the points of engagement of the rocker bars with the short key bars are disposed at a greater distance from the axis of movement of the key bars than those in respect of the long key bars, while the curved portions of the rocker bars are so formed that the rear ends of the rocker bars, situated in alignment, are imparted the same degree of movement, the same acceleration and the same amount of force.

By reason of this arrangement it is possible, through the medium of connecting rods of equal length, to operate by means of the rocker bars intermediate levers performing the same angular movement, which provides the possibility of furnishing a mechanical drive which will operate the type bars without exerting a reaction of any kind on the type bars, whereby the key bars, with small extent of movement, serve as actuating elements for the mechanical drive. The same force of impact and the same acceleration on the part of all type bars may then be accomplished by proper selection of the lever transmission at the type bars and intermediate bars.

The type bar actuation according to the invention is particularly adapted for typewriters having a liftable and lowerable type bar segment.

A form of embodiment of the type-bar actuating means according to the invention is illustrated

by way of example in the accompanying drawings, in which

Fig. 1 is a longitudinal section through a typewriter furnished with type-bar actuating means.

Fig. 2 is a plan view showing the arrangement of the key bars.

Figs. 3 and 4 each show a position of the transmission members between the key bars and type bars.

Fig. 5 is a part elevational view of the type-bar segment with three different type-bar drives, and

Fig. 6 is a graphical representation of the type-bar drive.

Figure 7 is a modified form of a rocker bar.

The typewriter possesses in the usual conventional arrangement the frame 50, in which there is mounted the type bar segment 51 either firmly or adjustable upwards and downwards. The type bars 52 move in the usual fashion about an axis 53, and rest in the stationary position with the heads 54 on a pad 55. For moving the type bars 52 there are employed the key bars 56. Of these there are usually provided four rows, which in the drawings are designated A, B, C and D. All key bars 56 move about a shaft 58 mounted in the comb 57, and are acted upon by springs 59, which tend to maintain the key bars 56 in the lifted position. The key bars 56 are guided in a comb 60, and rest in the stationary position against the elastic fitting 61 of a transverse bar 62.

The key bars 56 each possess an arm 63, with which they each engage with a rocker bar 64. The rocker bars 64 rest against the one arm 65 of the angle bar 66, which is mounted in the side portions of the frame of the machine. In the stationary position of the key bars 56 and the rocker bars 64 the latter rest merely with the projection 67 on the arm 65. At the point of contact of the projections 67 an elastic fitting 68 is let into the bar. At a certain distance from the projection 67 there commences the curved rocker surface 69, which extends almost to the point of engagement of the arm 63. The rocker levers 64 are guided in a comb 70. To the end 71 of the rocker bars 64 there is pivoted a connecting rod 72, the opposite end of which engages with a rocking lever 73. The rocking lever 73 moves about a shaft 74 of the comb 57, and its extreme end is connected by a connecting rod 75 with the actuating arm 76 of the type bar 52.

The stationary position of the rocker bar 64, the rod 72 and the intermediate lever 73 is selected in such fashion that the pivot point situated between the point of engagement of the arm 55

63 with the rocker bar 64 and the point of engagement with the intermediate lever 73 is located above a straight line connecting these two points of engagement. In consequence the type bar 52 may be moved manually or also mechanically by the intermediate lever 73 without movement on the part of the key bars.

There engages with the intermediate lever 73 at 77 a fork 78 possessing an extension bar 79 extending towards the rear end of the machine. On the fork 78 there is provided a hook 80, which is engaged by a spring 81, the opposite end of which is anchored to a hooked rod 82. The hooked rod 82 is suspended with its free end in apertures 83 in a bar 84, which rests on rocking levers 85 and may be adjusted by means of the adjustment screw 86 for the purpose of regulating the tension of the springs 81. The extension bar 79 possesses an eye 87, with which the same is guided on the hooked rod 82. At the rear end the extension bar 79 possesses a transverse arm or operating member 88, which is reinforced by being bent over at the upper end. This reinforced operating member 88 may engage with the universal bar 89, shown in dotted lines, for the shift mechanism 90 and the remaining universally driven parts.

In addition to each intermediate lever 73 there is also provided a lever 91, which is likewise able to rock about the shaft 74. The lever 91 is bent in hook-shaped fashion, and possesses a projection 92, by means of which it is able to rest against a depending arm 93 of the intermediate lever 73.

Between the arm 93 and the lever 91 there is provided a spring 94, which draws the lever 91 towards the arm 93. The lever 91 is furnished with a projection 95, which may be engaged by the mechanical drive, assuming that this should be provided.

The operation of the type bar actuating mechanism is illustrated in Figs. 1-3. Upon depression of a key bar 56 the rocker bar 64 is first rocked about the projection 67, and the arm 63 of the key bar engages with the long lever arm, so that the end 71 of the short lever arm lifts the type bar 52, through the medium of rod 72, lever 73, the rod 75 and the short lever arm, with considerable force but with slow movement from the pad 55. When the key bar is in motion, the point 96 of the rocker bar 64 meets against the member 65, so that the point of oscillation of the rocker bar is displaced to the point 96. At this moment the two arms of the rocker bar are of approximately equal length. Since the curved portion 69 takes effect from the point 96, the ratio in the length of the lever arms continues to vary, upon additional depression of the key bar, in the manner just described, so that with approximately uniform rate of movement of the key the type bar 52 is accelerated more and more up to the time it strikes the platen, until it reaches the position according to Fig. 3. At the same time the spring 81 is tensioned, and the universal bar actuated by the extension bar 79. When the type bar 52 strikes the platen, the spring 81 returns the lever 73, and accordingly the type bar 52 and the rocker bar 64, into its original position. At the same time the key bar 56 is returned to its initial position by the spring 59 independently of the remaining parts.

If the type bar, for example for cleaning purposes, is rocked by hand, the key bar remains stationary, and merely the rocker bar 64, the rods 72 and 75 and the intermediate lever 73 are rocked into the position according to Fig. 4. Since

in this connection the intermediate lever 73 performs the same movement as when the type bar 52 is moved by the key bar 56, it will be obvious that mechanical drive of the type bars may be effected by operation of the type bars by the actuating roller through the medium of corresponding intermediate members of the usual kind without any resulting reaction of the key bars. The key bars 56 may accordingly be employed for initiating mechanical operation of the type bars in any of the known ways.

If all rocker bars 64 were made the same over the entire width of the machine, the keys in the different rows A, B, C and D, with equal degree of oscillation on the part of the rocker bars, would require to perform movements of different extent, viz., row A the smallest movement and row D the greatest movement. These different degrees of movement are extremely undesirable, and occur in particular if the key bars are too short in themselves.

To overcome this drawback, and to obtain completely similar movements on the part of the keys, the rocker bars 64 are made of different length, viz., in such fashion that the rocker bars pertaining to the short key bars A are made longer than the rocker bars 64 pertaining to the longer key bars B, C or D. Beyond this the rocker curve 69 of the levers 64 is furnished with a different radius, so that with the same extent of movement of all keys the ends 71 of all rocker bars perform the same stroke.

In the form of embodiment illustrated in the drawings there is provided a recess in the rocker bar between the projection 67 and the commencement of the rocker curve 69. This recess might also be dispensed with, and proceeding from the point 96 the rocker curve would be continued as tangent up to the projection 67 without varying in any way the operation of the rocker bar 64. It is also possible to provide on the rocker bars 64 flyweights 97, which complete the stroke of the type when the key bars 56 or the intermediate levers 73 do not impart any further movement to the type bars, in a manner similar to that in connection with so-called silent machines.

It will be obvious from the above that all intermediate levers 73 perform the same angular movements. In view, however, of the curved type bar segment the upwardly directed arms of the intermediate levers require to be all the longer the more they are situated towards the outside of the machine in order to avoid an inclined pull of the rods on the lever arm 76 of the type bar.

In the machine as described it has been assumed that the type bars do not perform equal strokes, but that the movement thereof increases the greater the distance of the particular type bar from the center of the machine. In order now to accomplish that the rocking motion (equal over the whole width of the machine) of the intermediate levers 73, which also increase towards the outside, is correctly transmitted to the type bars 52, the length of the arms 76 is made to increase merely to such extent towards the sides of the machine that pertaining to greater rocking angles of the type bars levers there are corresponding rocking chords of the type bar arms. A further condition for the increase of the lever arms 73, 76 consists in the fact that all of the pull rods 75 connecting the same are disposed vertically to the type bar segment in the stationary position or operative position of the type. If the machine is one having a shiftable type bar segment, the same remark also

applies when the segment is in the half-shifted position. In this manner it is accomplished that despite dissimilar angle of operation of the single type bars 52 and equal rocking angle of all intermediate levers 73 the motion is correctly transmitted.

In Figs. 5 and 6 there are shown three different type bar drives, viz., one for a middle type bar 52, one for a type bar situated in the outer third of the segment, and one for the type bar situated in the extreme outside position. Fig. 5 shows in plan view of the type bar segment 51 the intermediate levers 73, the pull rods 75 and the type bars with their arms 76 in projection, i. e., shortened. The true lengths of the levers are shown in Fig. 6. This figure is to be assumed as having been derived by passing on each occasion through the fulcrum of the arm 76 and the pull rod 75 a vertical plane on to which the single members are projected. The segment in the shifted position is indicated in broken lines. It will be quite apparent from Fig. 6 that in the half-shifted position of the segment the pull rod 75 is situated vertically to the direction of movement of the segment. With a view to mass production it may be desirable to vary the lengths of the intermediate levers 73 and the type bar arms 76 merely in groups, so that the rod 75 possess within certain narrow limits a varying inclination in relation to the type bar segment.

It will be understood that no limitation is made to the particular form of embodiment shown in the accompanying drawings, and that numerous modifications and alterations are quite possible within the meaning of the above description and the annexed claims without departing from the spirit of the invention.

What I claim as new and desire to secure by Letters Patent is:

1. A type bar actuating means for typewriters, calculating machines and the like, comprising key bars arranged in rows and rocking about a common axis, and rocker bars and connecting rods transmitting the motion from the said key bars to the type bars, the rocker bars pertaining to each particular row of key bars being so pivoted to the said key bars with the end directed towards the keys that the points of engagement of the said rocker bars with the shorter key bars are situated at a greater distance from the said common axis than those of the longer key bars, said rocker bars each having a curved rolling edge, a fixed bar having a surface over which the rocker bars are adapted to roll and the curved edges of the said rocker bars being so formed that the rear ends of the said rocker bars, situated in a line, perform an equal degree of movement and receive equal acceleration and equal force, substantially as described.

2. A type bar actuating means as claimed in claim 1, which includes intermediate levers additional to the rocker bars for transmitting the motion from the key bars to the type bars and connected between pairs of the rods.

3. A type bar actuating means as claimed in claim 1, wherein the rocker bars are of varying length and the rolling edges having curvatures of varying radii, so that with equal extent of

movement on the part of the keys situated in the different rows all rocker bars perform the same angular movement.

4. A type bar actuating means as claimed in claim 1, wherein the curved edges of the rocker bars are so formed that the said bars first rock about a fixed point for initiating the movement of the type bars, and after the requisite initial speed of the type bars has been attained impart to the type bars an increasing speed by varying their lever length as the result of a rolling movement.

5. A type bar actuating means as claimed in claim 1, wherein the first point of oscillation of the rocker bars is situated in the tangential extension of the previously terminating curved edges of the rocker bars.

6. A type bar actuating means for typewriters, calculating machines and the like, comprising key bars arranged in rows and rocking about a common axis, and rocker bars, connecting rods and intermediate levers transmitting the motion from the said key bars to the type bars, the point of engagement of the said connecting rods with the said rocker bars being situated above the line connecting their point of connection with the said intermediate levers and the point of connection of the said key bars with the said rocker bars, so that one end of the rocker bars may be elevated when the type bars are moved without causing movement of the key bars.

7. A type bar actuating means for typewriters, calculating machines and the like, comprising key bars arranged in rows and rocking about a common axis, and rocker bars having a curved edge operating upon a fixed surface, connecting rods and intermediate levers transmitting the motion from the said key bars to the type bars, the said intermediate levers being mounted independently of the said key bars and performing the same angular movement over the whole width of the machine and acting with increasing length of lever on the type bars, and the said type bars moving to different angular extents and their operating lever lengths increasing in similar fashion but not in a line, so that merely the chord of oscillation of all type bar arms is adapted to the varying extent of movement on the part of the said type bars, the curved edges of the rocker bars being such that the uniform movement of the key bars will be transmitted by increased speed to the type bars.

8. A type bar actuating means for typewriters, calculating machines and the like, comprising key bars arranged in rows and rocking about a common axis, and rocker bars, connecting rods and intermediate levers transmitting the motion from the said key bars to the type bars, a fixed surface upon which said rocker bars are adapted to roll whereby points of contact between said rocker bars and the fixed surface are constantly moving from a point adjacent one end of the rocker bars towards the other end of said bars, a line passing through the axis of oscillation of the said intermediate levers parallel to the path of movement of the type bar segment bisecting the angle of oscillation of the said intermediate levers.

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