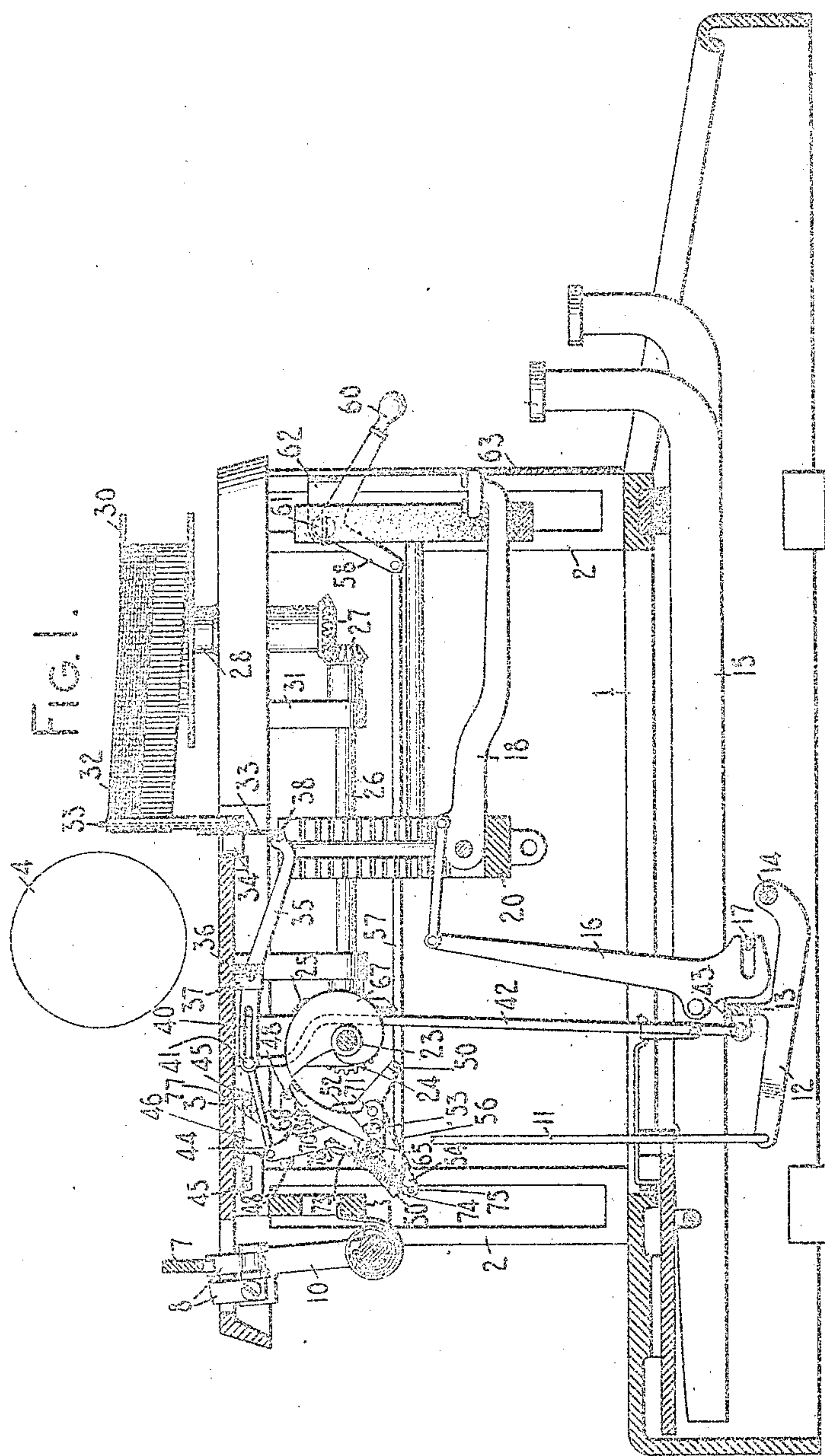


990,406.

R. H. STROTHER.
TYPE WRITING MACHINE.
APPLICATION FILED FEB. 3, 1910.

Patented Apr. 25, 1911.

3 SHEETS-SHEET 1.



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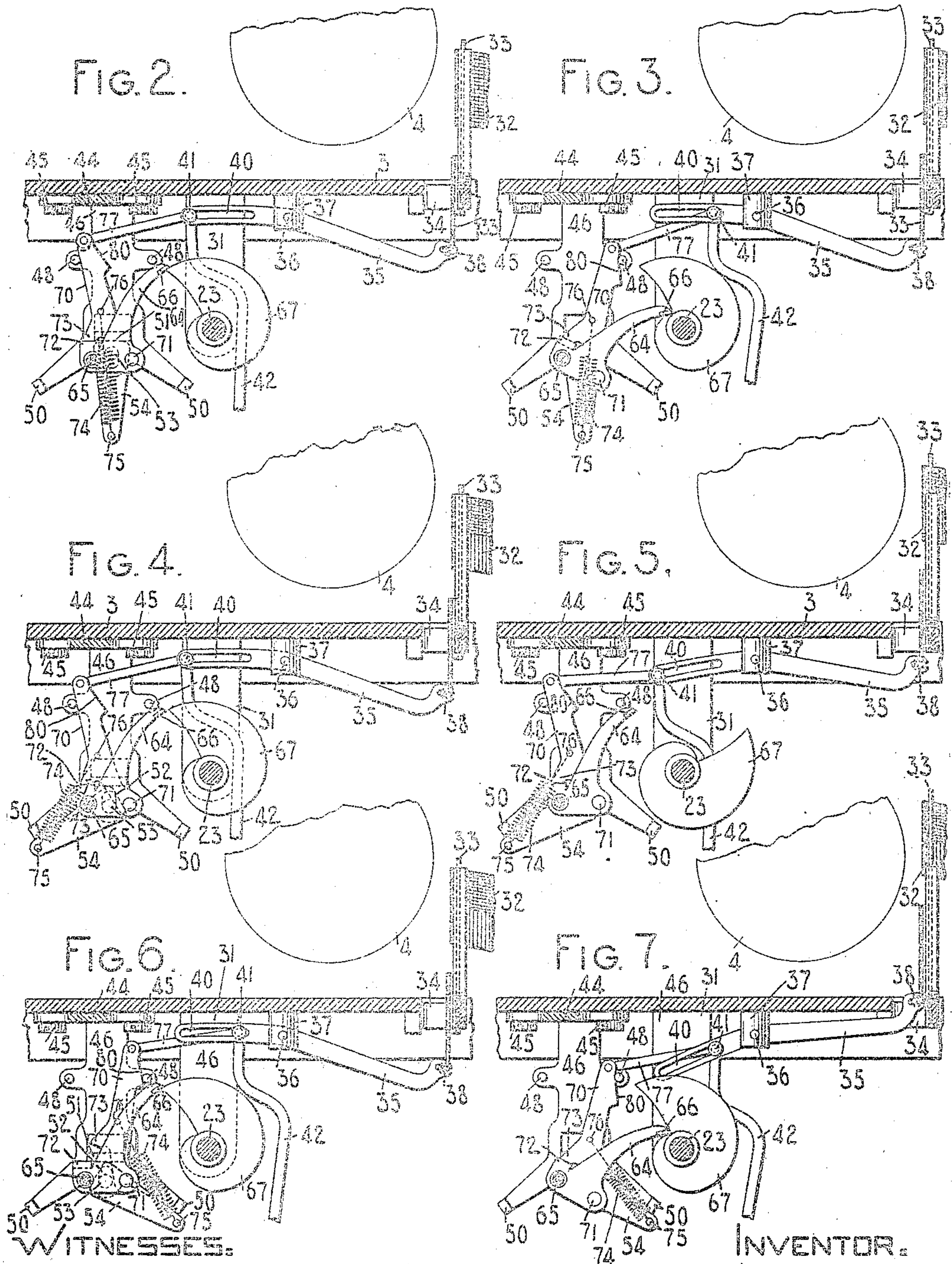
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Patented Apr. 25, 1911.

3 SHEETS—SHEET 2.



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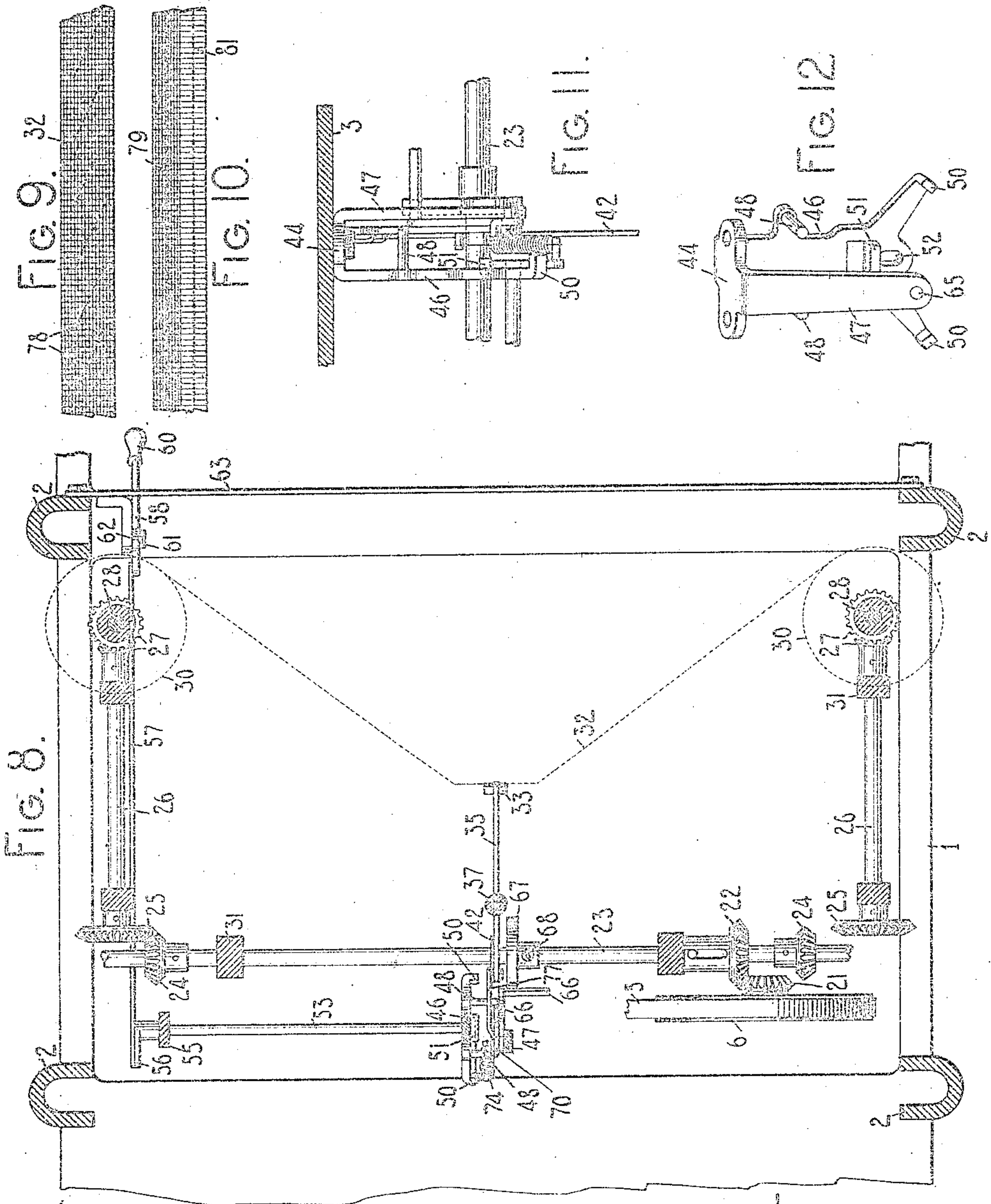
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3 SHEETS-SHEET 3.

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UNITED STATES PATENT OFFICE.

ROBERT H. STROTHER, OF MONTCLAIR, NEW JERSEY, ASSIGNOR TO UNION TYPE-WRITER COMPANY, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

990,406.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed February 3, 1910. Serial No. 541,912.

To all whom it may concern:

Be it known that I, ROBERT H. STROTHER, citizen of the United States, and resident of Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more particularly to the ribbon mechanism of such machines.

One of the objects of my invention is to provide improved means for controlling the vibrator of a visible typewriter so as to write from either the upper or lower stripe of the ribbon, this being particularly useful where the ribbon has two kinds of ink on it.

Another object is to provide improved means for so controlling the vibrator as to give, in effect, a cross feed to the ribbon so as to utilize the entire width of a ribbon having only one kind of ink.

Another object is to combine these two devices in one, and to provide for instantly changing the ribbon mechanism either for writing on the upper stripe or the lower stripe of the ribbon or for using the cross feed, these several changes being made by a simple adjustment of a hand lever.

Another object is to attain the above ends by very simple and inexpensive, but effective, devices.

To the above and other ends my invention consists in certain features of construction and combinations and arrangements of parts all of which will be fully set forth herein and particularly pointed out in the claims.

In the accompanying drawings:—Figure 1 is a front to rear vertical sectional view of so much of a typewriting machine as is necessary to illustrate the embodiment of my invention therein. Figs. 2 to 7 inclusive are fragmentary front to rear sectional views of the principal parts of the mechanism of my invention and showing the parts in different positions. Figs. 2 and 3 show the mechanism set for the automatic cross feed, parts being in different positions in the two figures. Figs. 4 and 5 show the mechanism set for printing from the upper stripe of a two color ribbon, parts being in different positions in the two views. Figs. 6 and 7 show the mechanism set for printing from the

lower stripe of a two color ribbon, parts being in different positions in the two views. 55 Fig. 8 is a plan view in horizontal section just beneath the top plate of the machine. Fig. 9 is a view of a fragment of ribbon and showing the character of the cross-feed. Fig. 10 is a similar view of a two color ribbon showing the lines on which the types strike against the ribbon. Fig. 11 is a rear elevation of some of the mechanism shown in Fig. 4, parts being in section and parts broken away. Fig. 12 is an isometric 60 view of the bracket in which the principal parts of the mechanism are mounted.

My invention is applicable or adaptable generally to visible typewriters. It is here shown applied to a machine of the general 70 character of the Monarch typewriter. The main frame of this machine comprises a base 1, corner posts 2, a top plate 3 and a platen 4 which is mounted on a carriage, not shown, which carriage is moved across from 75 the machine by means of a strap 5, Fig. 8, connected with a spring drum 6. The motion of said carriage is controlled by mechanism comprising a feed rack or escapement wheel 7, Fig. 1, which is controlled by dogs 80 8 mounted on a dog rocker 10, which is connected by a link 11 with an arm 12 connected with a universal bar 13, said arm and universal bar constituting parts of a universal bar frame which also comprises a rock shaft 85 14 pivoted in the base of the machine. Said universal bar lies beneath a series of printing key levers 15 to which are pivoted sub-levers 16 that cooperate with a fulcrum rod 17, and which are connected with type bars 90 18 which are arranged to strike against the front face of the platen 4. The type bars are mounted on a segment 20 which is arranged to be shifted up and down for upper and lower case printing. 95

The ribbon is driven by a train of gearing and shafting including a beveled gear 21 which is driven from the spring drum 6 and meshes with a beveled gear 22, suitably mounted on a transverse driving shaft 100 23. Said driving shaft has near its ends, pinions 24 that mesh with gears 25 mounted on shafts 26 which at 27 are geared to vertical spool shafts 28, said spool shafts carrying ribbon spools 30. The shafts 23 and 26 105 are journaled in hangers 31 depending from

the top plate 3. The ribbon 32 is led from one spool to the other through a vibrator 33 which is slidably mounted on a bracket 34 mounted on the top plate of the machine.

5 Said vibrator normally stands below the writing line so as to render the writing normally visible.

10 The parts thus far described may be of the ordinary Monarch construction or of any suitable construction.

The ribbon vibrator is operated by a lever 35 which is pivoted at 36 in a bracket 37 depending from the top plate 3, the forward end of said lever being connected 15 with the lower end of the vibrator by a pin and slot connection 38. The rear arm of the lever 35 is formed with a radial slot 40 in which there lies a headed pin 41 projecting from the upper end of a link 42 which at its 20 lower end is pivoted at 43 to the universal bar frame. The construction is such that when the universal bar is depressed the vibrator is moved up to cause the ribbon to cover the printing point, and the height 25 to which the vibrator is elevated depends upon the position of the pin 41 in the slot 40. When said pin is at the rear end of the slot as shown in Fig. 4, and the universal bar is operated, the ribbon will be moved 30 up as shown in Fig. 5 bringing the upper stripe of the ribbon to printing position. When said pin is in the forward end of the slot nearer to the pivot 36 as shown in Fig. 6, then when a key is operated the ribbon 35 is thrown to a greater height bringing the lower stripe thereof to printing position as shown in Fig. 7. When said pin stands in some intermediate position the ribbon is thrown to a greater height than in Fig. 5, 40 and to a less height than in Fig. 7, the exact distance depending upon the position the pin 41 occupies at the time.

My improvements, in the specific embodiment thereof shown in the present case, consist in devices for controlling the position 45 of the pin 41 in the slot 40, although said devices are also capable of controlling other forms of variable-throw vibrator-operating mechanism. The principal parts of these 50 devices are mounted in a bracket 44 which is secured to the under side of the top plate by screws 45 (see Figs. 11 and 12). Said bracket has two depending arms 46 and 47 from the first of which project at the upper 55 part two stops 48 and at the lower part two stops 50. Said arm 46 also has a flat horizontal abutment 51 struck out therefrom and just beneath said abutment is a bearing opening 52 somewhat elongated in an up 60 and down direction. A rock shaft 53 has one end projecting through the opening 52 and said rock shaft has an arm 54 rigidly mounted on said end and extending downward therefrom at various angles as shown 65 in Figs. 2, 4 and 6. The stops 50 cooperate

with this arm 54 to limit its motion in a front or back direction. As shown in Fig. 8 the shaft 53 has its right hand end journaled in a bracket 55 depending from the top plate and on the end of said shaft there 70 is mounted an upstanding arm 56 to which is pivoted a link 57 that extends toward the front of the machine where it is pivoted to a bell crank 58 having a handle 60 on its forwardly directed arm. Said bell crank 75 is pivoted at 61 on a bracket 62 which is here shown as secured to the front plate 63 of the machine so that the handle 60 is just above, and convenient to the key board of the machine. The parts are set to the re- 80 spective positions shown in Figs. 2, 4 and 6 by moving the handle 60 up or down.

A lever 64 is pivoted in the bracket arm 47 at 65. In Figs. 2-7 this bracket arm is sectioned away in order to show the mecha- 85 nism better and the pivot screw 65 is shown in section. The free end of the lever 64 has an arm 66 bent off horizontally therefrom as shown in Fig. 8, and this arm constitutes a follower that coöperates with a cam 67 90 secured on the transverse driving shaft 23 of the ribbon feed mechanism by a set screw 68. In the Monarch machine this driving shaft has an endwise motion for the purpose of reversing the direction of ribbon 95 feed and the arm 66 is made long enough to rest on the cam in either position of the shaft. A second arm 70 is pivoted to the arm or lever 64 at 71, the pivot 71 being in front of the pivot 65 of said lever 64. The 100 lever 64 has an ear 72, Fig. 6, bent off from the heel thereof, and the arm 70 has a heel 73 that is adapted to be pressed against the ear 72 under certain conditions to limit the relative motion of the arms 64 and 70 in 105 one direction. The actual motion of the arm 70 is limited by the stops 48 above referred to. A contractile spring 74 is connected at its lower end to a pin 75 projecting from the lower end of the arm 54 and 110 at its upper end to a pin 76 projecting from the arm 70. The upper end of the arm 70 is connected by a link 77 with the pin 41.

As will be seen by the broken lines in Figs. 2, 4 and 6, the upper end of the arm 54 is 115 made broad and straight so that when the parts are in the position shown in Fig. 2 this arm is held flat against the abutment 51 by the tension of the spring 74.

The cam 67 may be of any one of quite 120 a variety of forms, any form adapted to give a cross feed to the ribbon being suitable. This cam could be merely an eccentric, for example, but it is here shown as a snail cam. In Fig. 2 the follower 66 is shown 125 resting on the highest point of the cam, and in Fig. 3, the shaft 23 having turned a little farther, the follower has dropped down to the lowest part of the cam. It will be seen that in both figures the line along which

the tension of the spring 74 is exerted is within the flat upper end of the arm 54 so that this spring tends to hold said arm pressed flat against the abutment 51. It will be seen that the line of force of the spring is at the right of the pivot 65 of the lever 64 so that the tension of said spring tends to hold the follower 66 pressed against the cam. It will also be seen that in both these positions the line of force of the spring is at the left of the pivot 71 of the arm 70 so that the tension of the spring tends to hold the heel 73 of said arm down against the ear 72 of the lever 64, thus causing said lever 64 and arm 70 to move as a single lever. The result of this construction is that the follower 66 and lever 64 are controlled by the cam 67 and that their motions are imparted to the lever 70 and through said lever to the pin 41. Beginning with the position shown in Fig. 3 where said pin is at the forward end of the slot 40 and where the vibrator has its greatest extent of upward motion, the pin 41 is slowly drawn to the left in said figure until it reaches its extreme rear position shown in Fig. 2 when it drops back to the position in Fig. 3. The result of this construction is that the successive blows of the types against the ribbon are along such lines as the lines 78 in Fig. 9, the inclination of these lines being due to the fact that at the same time the pin 41 is traversing the slot 40, the ribbon itself is also being fed longitudinally. The type first strikes the ribbon near the upper part thereof and gradually strikes lower and lower on the ribbon until the follower drops from the position in Fig. 2 to that of Fig. 3, whereupon the next type impression is at the top of the ribbon again as indicated in Fig. 9. It will of course be understood that the form of these lines 77 will depend upon the outline of the cam 67. Their form is more or less immaterial so long as the result is to utilize the whole width of the ribbon.

It will be understood that the arm 54 occupies the position shown in Figs. 2 and 3 when the handle 60 occupies its middle position. If said handle be moved down to the position shown in Fig. 1, the arm 54 will be moved back to the position shown in Figs. 1 and 4. It will be seen that this will cause the left hand end of the shaft 53 to move downward somewhat on account of the shape of the upper part of the arm 54 and its engagement with the abutment 51 and it is for this reason that the hole 52 is elongated as shown in Fig. 12.

When the parts occupy the positions shown in Fig. 4 the pin 75 is thrown so far to the rear, or to the left in Fig. 4, that the line of force of the spring 74 comes at the rear of the pivot 65 of the lever 64. In this position of the parts, therefore, the heel

73 of the lever 70 is pressed down against the ear 72 and the lever 64 is held up in its extreme elevated position irrespective of the position of the cam 67; and the arm 70 is held continuously against the rear stop 48, thus holding the pin 41 at the rear end of the slot 40 and causing the ribbon to be thrown always to its least height so as to print along the straight line 79 of Fig. 10.

It will be seen that the parts are here entirely out of control of the cam 67. When the parts are in this position the tension of the spring 74 not only holds the arm 70 in its rearmost position but it also holds the arm 54 in its rearmost position so that all of the parts tend to remain in this adjustment until they are moved out of it by hand.

When the handle 60 is moved to this uppermost position the arm 54 is swung to the position shown in Figs. 6 and 7 where it is arrested by the forward one of the stops 50. In this position the line of force of the spring 74 is such as to tend to hold the arm 54 in this forward position. It will also be seen that the line of force of the spring is not only forward of the pivot 65 but that it is also forward of the pivot 71 so that the spring tends to hold the follower 66 against the cam 67 at all times, but it holds the arm 70 against the forward stop 48 irrespective of the position of the lever 64. It will be seen by comparing Figs. 6 and 7 that the motion of the lever 64 moves the arm 70 up and down. The forward edge of this arm is therefore formed at 80 in such a way that as it slides along the stop 48 it holds the pin 41 in the same part of the slot, that is to say, it holds said pin in the forward end of said slot. When the parts are in this position the writing is along the lower stripe of the ribbon as indicated by the line 81 in Fig. 10. It will of course be apparent that the settings shown in Figs. 4 and 6 are more especially useful with a two-color ribbon, parts being set as shown in Fig. 4 for writing in one of said colors and set as shown in Fig. 6 for writing in the other color. The setting shown in Fig. 2 is more especially useful in a ribbon having only one kind of ink and where it is desired to utilize the whole width of the ribbon.

It will be seen that all of the various settings of the mechanism are controlled by the spring 74, the action of the vibrator being determined by the direction in which this spring pulls. The spring not only controls the pin 41 and maintains it in whatever position it should be in at the time, but it also maintains the arm 54 and handle 60 in their adjusted positions. For this reason perhaps no other retaining device is necessary for said lever 60, but if desired some simple form of detent can be provided for maintaining said handle more securely in either one of its three positions.

Various changes can be made in the details of construction and arrangement without departing from my invention.

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

1. In a typewriting machine and in ribbon mechanism, the combination of two arms the first pivoted to the second and the second pivoted to a fixed part, a spring acting on the first arm, means for changing the direction of force exerted by said spring so as to make the line of said force stand between said pivots or outside of either pivot, means for controlling the position of the second arm, and ribbon-vibrator-operating mechanism controlled by the first arm.

2. In a typewriting machine and in ribbon mechanism, the combination of two arms the first pivoted to the second and the second pivoted to a fixed part, a cam for controlling the position of the second arm, a spring acting on the first arm, means for changing the line of force of said spring so that said line passes between said pivots or outside of either pivot, means for limiting the relative motion of said arms in one direction, and ribbon-vibrator-operating mechanism controlled by the first arm.

3. In a typewriting machine and in ribbon mechanism, the combination of two arms the first pivoted to the second and the second pivoted to a fixed part, means for limiting the relative motion of said arms in one direction, means for controlling the position of the second arm, a spring acting on the first arm, means for changing the direction of force exerted by said spring so that the line of force passes either between said pivots or outside of either pivot, stops for limiting the motion of said first arm, and ribbon-vibrator-operating mechanism controlled by said first arm.

4. In a typewriting machine and in ribbon mechanism, the combination of two arms the first pivoted to the second and the second pivoted to a fixed part, a cam for controlling the position of said second arm, a spring acting on said first arm, means for changing the direction of the force of said spring so that the line of force passes either between said pivots or outside of either of them, and ribbon-vibrator-operating mechanism controlled by said first arm.

5. In a typewriting machine and in ribbon mechanism, the combination of two arms the first pivoted to the second and the second pivoted to a fixed part, means for controlling the position of the second arm, a spring connected at one end to the first arm, a pivoted device to which the other end of said spring is connected, hand operated means for swinging said device about its pivot to bring the line of force of said spring

either between said pivots or outside of either of them, and ribbon-vibrator-operating mechanism controlled by said first arm.

6. In a typewriting machine and in ribbon mechanism, the combination of a cam, a follower for said cam, a spring, means for changing the direction of the force of said spring by hand, said spring when in one position pressing said follower against said cam and when in another position holding said follower from said cam, and ribbon-vibrator-operating mechanism controlled by said spring and follower.

7. In a typewriting machine and in ribbon mechanism, the combination of an arm, a spring acting on said arm, means for changing the direction of the force of said spring so that in one position of said means said spring draws the arm in one direction and in another position of said means said spring draws the arm in the opposite direction, and ribbon-vibrator-operating mechanism controlled by said arm.

8. In a typewriting machine and in ribbon mechanism, the combination of two arms the first pivoted to the second, means for controlling the position of the second arm, means for limiting the relative motion of the two arms in one direction, a spring connected at one end with the first arm, means for moving the other end of the spring to either of three positions, said spring in one of its positions having its line of force between the two pivots so as to press the first arm against said motion-limiting means and so as to press the second arm against said controlling means, said spring in another position having its line of force outside of the fixed pivot of the second arm whereby said second arm is held away from its controlling means, and said spring in its third position having its line of force outside of the pivot of said first arm whereby said first arm is drawn away from said motion-limiting means and thus removed from the control of the second arm; and ribbon-vibrator-operating mechanism controlled by said first arm.

9. In a typewriting machine and in ribbon mechanism, the combination of two arms the first pivoted to the second and the second pivoted to a fixed part, means for limiting the relative motion of the two arms in one direction, a spring acting on the first arm, means for changing the direction of the force of the spring, said means when in one position causing said spring to press said first arm against said motion-limiting means whereby said first arm is under the control of said second arm and said means when in another position tending to move said first arm away from said motion-limiting means whereby said first arm is out of the control of said second arm, means for controlling

the position of said second arm; and ribbon-vibrator-operating mechanism controlled by said first arm.

10. In a typewriting machine and in ribbon mechanism, the combination of a ribbon vibrator, means for operating said vibrator, and means for controlling the height to which said vibrator is thrown at each operation, said controlling means including a spring, means whereby the operation of the ribbon vibrator is determined by the direction of the line of force of said spring, and means for changing the direction of said line of force.

11. In a typewriting machine and in ribbon mechanism, the combination of an arm, hand operated means for turning said arm, said arm having a straight end, a fixed abutment against which said straight end is adapted to be pressed, a spring connected with the free end of said arm and tending to press said arm against said abutment whereby when said arm is in a middle position said spring presses the flat end thereof against said abutment and holds said arm in said middle position and whereby when said arm is turned out of its middle position in either direction said spring tends to hold the arm in either position; and ribbon-vibrator-operating mechanism controlled by said spring.

12. In a typewriting machine and in ribbon mechanism, the combination of a ribbon vibrator, an operating lever for said vibrator, a link connected with said lever in such fashion that the point of connection of the link can be moved toward and from the fulcrum of the lever, an arm for controlling the position of said link with relation to said lever, a second arm to which the first arm is pivoted, said second arm being pivoted to a fixed part, means for controlling the position of said second arm, a spring acting on said first arm, and means for changing said spring so as to locate its line of force either between said pivots or outside of either of them.

13. In a typewriting machine and in ribbon mechanism, the combination of two arms the first pivoted to the second and the second pivoted to a fixed part, means for controlling

the position of the second arm, ribbon-vibrator-operating mechanism controlled by the first arm, and means adjustable at will either to cause the first arm to move with the second or to remain stationary independently of the second.

14. In a typewriting machine and in ribbon mechanism, the combination of two arms the first pivoted to the second and the second pivoted to a fixed part, a cam for controlling the position of the second arm, ribbon-vibrator-operating mechanism controlled by the first arm, and means adjustable at will to cause the first arm either to move with the second or to remain stationary independently of the second.

15. In a typewriting machine and in ribbon mechanism, the combination of two arms the first pivoted to the second and the second pivoted to a fixed part, a cam for controlling the position of the second arm, ribbon-vibrator-operating mechanism controlled by the first arm, and means adjustable at will to cause said first arm either to move with the second or to remain stationary in one position independently of the second, or to remain stationary in another position in which the second arm also remains stationary.

16. In a typewriting machine and in ribbon mechanism, the combination of two movable members, ribbon-vibrator-operating mechanism controlled by the first of said members so as to vary the throw of the vibrator, means for controlling the second of said members so as to obtain a cross feed of the ribbon through said first member, and means adjustable at will to cause the first of said members either to move with the second member or to remain in a relatively stationary position with respect to the vibrator-operating mechanism while the second member continues in operation.

Signed at the borough of Manhattan, city of New York, in the county of New York and State of New York, this 1st day of February, A. D. 1910.

ROBERT H. STROTHER.

Witnesses:

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CHARLES E. SMITH.