

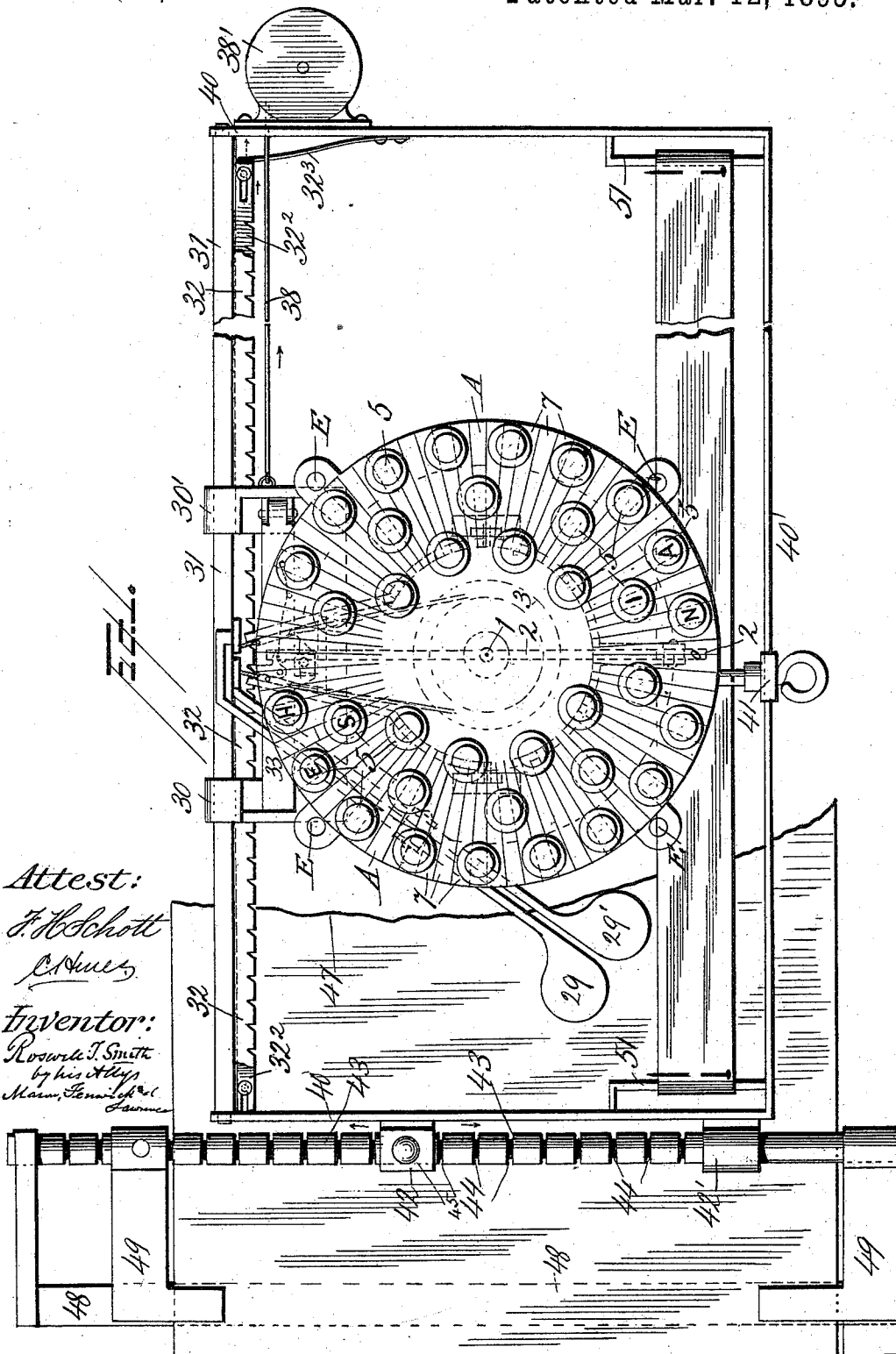
(No Model.)

3 Sheets—Sheet 1.

R. T. SMITH.
TYPE WRITING MACHINE.

No. 535,739.

Patented Mar. 12, 1895.



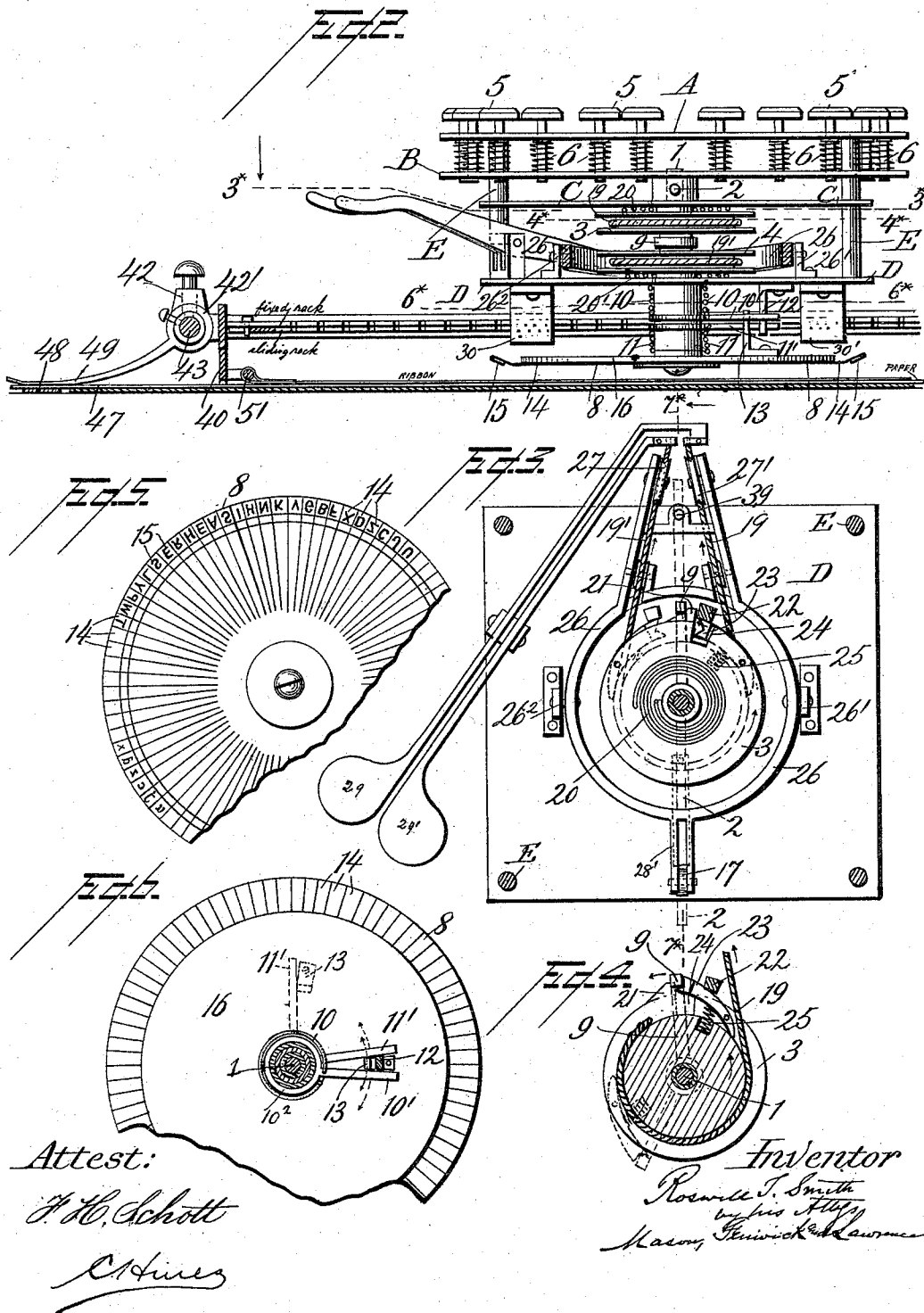
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3 Sheets—Sheet 2.

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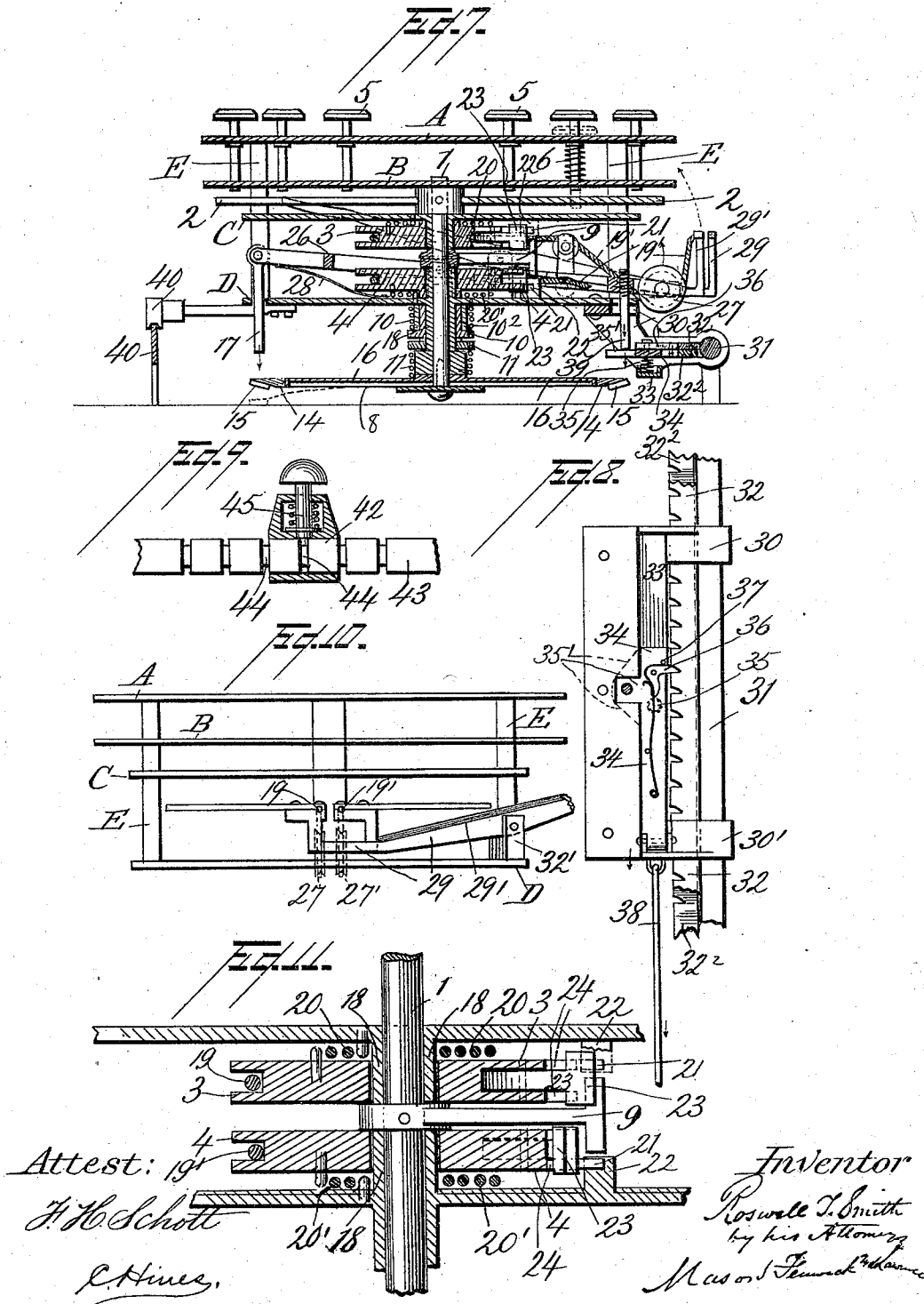
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3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

ROSWELL T. SMITH, OF NASHUA, NEW HAMPSHIRE, ASSIGNOR TO GEORGE F. KING, OF SWAMPSCOTT, MASSACHUSETTS.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 535,739, dated March 12, 1895.

Application filed August 6, 1892. Renewed August 8, 1894. Serial No. 519,776. (No model.)

To all whom it may concern:

Be it known that I, ROSWELL T. SMITH, a citizen of the United States, residing at Nashua, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Type-Writing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in typewriting machines, and the objects of the same are, first, to furnish a compact keyboard in which the keys will have but slight movement, and each key shall represent two characters, and arrest the movement of a type wheel at certain periods; second, to provide a device for giving rotation to the type wheel either to the right or left at will; and means by which the rotation of the type wheel may, in either direction, be arrested by any one of the keys in such a manner as to bring the letter upon the type wheel representing the letter upon the corresponding key directly within the action of a printing device; third, to provide a printing device adapted to act after the rotation of the type wheel has been arrested by the key; fourth, a feeding device by which either the type wheel and its connections may be fed over the paper or the paper fed in relation to the type wheel, the feeding device being essentially the same in either case; fifth, a device which furnishes power for revolving the type wheel in either direction, for printing and for actuating the device which regulates the feeding mechanism; sixth, a device for supporting the type carriage, for holding it in connection with a book, for holding the printing ribbon and performing other kindred functions required by the demands of the machine.

My invention for effecting the above mentioned objects, consists in certain novel constructions, combinations and arrangements of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view of the machine complete; but shortened by breaking through the frame. Fig. 2 is a side elevation partly in section, a

portion being broken away. Fig. 3 is a horizontal section in the line 3*3* of Fig. 2. Fig. 4 is a similar section in line 4*4* of Fig. 2. Fig. 5 is a broken inverted plan view of the type wheel. Fig. 6 is a horizontal section in the line 6*6* of Fig. 2, and also showing a broken plan view of the upper side of the type wheel. Fig. 7 is a vertical transverse section in the line 7*7* of Fig. 3. Fig. 8 is a plan view of a portion of the feeding mechanism, the actuating pin being sectioned horizontally; Fig. 9 is a detail section of the adjusting button, the spacing rod being in section. Fig. 10 is an elevation of the operating lever and supporting frame, and Fig. 11 is a detail vertical section of the pulley and clutch mechanism connected with the central shaft of the machine.

In the drawings, A is the dial plate; B, the guide plate supplementing plate A.

C and D are suitable supports for shaft 1, the finger 2 and the actuating pulleys 3 and 4. These various parts are held in relation to each other by posts E, one at each corner.

Projecting through the plates A and B are the rods or wires, preferably square, and having keys 5 at their top. These keys are held in elevation by springs 6, a spring being provided for each key and there being keys enough to represent all the characters required, and each key representing two characters. Each of these keys when pressed upon projects its supporting wire or rod through and below the plate B into the line of revolution of the finger 2, which is fast upon shaft 1. The keys are arranged in two sections, right and left, and preferably in three circular rows.

The dial when laid out is supposed to be spaced into the number of spaces required, as shown at 7, each space corresponding to a character on the printing dial 8, or a vacant space on the same. It will be understood that it is not necessary that the lines dividing the dial plate into spaces should be actually marked. They are shown so marked on the drawings merely for the sake of more clearly illustrating the relation of the type keys to the printing dial below. The keys of one section are arranged so that each alternate type space 7 shall be occupied by a key, and each alternate space shall be vacant. The

keys on the opposite sides of the dial occupy spaces corresponding in position to the vacant spaces on the other side. The shaft 1 has the actuating lever 9 and type wheel 8 and finger lever 2 firmly secured to it. This shaft has bearings in plates B, C and D. The finger 2 is a lever hung in its center and revoluble freely in either direction and is held normally to a position intermediate the two sections of the dial plate (its zero end being at 0) by the springs 10 and 11, the spring 10 acting upon the arm 10' to draw it in one direction, and the spring 11 to draw the arm 11' in the opposite direction. Both of these arms have connections with the shaft as hereinafter described, and bear upon a sleeve 18 projecting downward from the plate D, as shown in Fig. 7.

On the plate D is a depending stud 12 (Fig. 2) and upon the type wheel 8 a vertical stud 13. Both of these studs project into the path on the arms 10' and 11' in such a way that said arms are arrested, one on each side of the studs 12 and 13, and thus, if the stud 12 is fixed and the stud 13 is free, the plate D being fixed, whichever of the arms finds the stud 13 out of relation to the stud 12 will, by virtue of its spring, return stud 13 to its position; carrying with it the type dial 8 and the type dial and the finger having fixed relations, both being secured to the shaft, the finger will normally be held at zero (0) and each letter of the type wheel will be in position as relates to 0. The said type wheel is preferably made of thin metal divided into portions by slits 14, one portion for each letter, the letters being secured at 15 near the outer ends of the portions.

Above the type plate, I place a supporting plate 16, against which the type portions spring back, thus securing equal height of type. This type plate may be made of rubber and in such a way that the plate will stretch and allow the type to print. The type are set at an angle of about fifty degrees. Projecting above the type is the printing hammer 17 held so as to act vertically in plate D. When the shaft receives rotation it carries with it the finger 2 of the type wheel 8, and if any one of the keys be depressed it will arrest the arm of finger 2, which is nearest its position in the direction taken by the shaft. Now, as the character upon the type wheel which lies below the hammer corresponds to that upon the key when so arrested, it follows that a selection can be made of the type for printing by means of the keys. If the shaft is revolved in an opposite direction to that previously supposed, using the same key, this key will arrest the opposite arm of the finger, bringing a character upon the other side of the printing wheel under the hammer, this character having the same fixed relation to the key as that previously supposed. In this way I am able to have each key represent two characters, such as a capital letter and its lower case.

To give revolution to the shaft 1, the actuating device is placed between the plates C and D and midway between these plates securely fixed to the shaft is the actuating arm 9 of the shaft 1. The arm is T-shaped and the projections upon its outer end extend over the rim of the pulleys 3 and 4 a part of their width. Bearings 18 extend from each plate and support both the shaft and the pulley and prevent any force exerted upon either pulley from causing friction upon the shaft. The pulleys 3 and 4 are loose upon their bearings and are caused to revolve by cords 19 and 19', and are returned to and held in their normal position by springs 20 and 20', each pulley having a stop 21 abutting a block 22, projecting upwardly and downwardly from the plates D and C respectively. The springs 20 and 20' are connected respectively with the plate C, and the pulley 3, and with the plate D and pulley 4. These pulleys are deeply grooved for holding their respective cords, and serve as supports for dogs 23. The dogs have bearings in the rims of these pulleys, their body portion lying in the groove, and their ends are made to extend laterally beyond the groove on each side, and for this purpose a portion of the rim of the pulley is cut away, as shown at 24, Fig. 11. The dog is normally raised by spring 25 and has its forward end recessed to receive the head of the actuating arm 9, as shown in Figs. 4, 7, and 11.

In Figs. 3, 4, 7, and 11, it will be seen that the stops 21 will be held normally by springs 20 and 20' in contact with blocks 22, in which case said blocks will act upon the dogs 23 to lower them below the sweep of the extending arm on actuating lever 9, and that the arm 9 and the type wheel are free, so far as pulleys 3 and 4 are concerned, to revolve in either direction. The projection on lever 9 extends over a portion of the width of pulleys 3 and 4. The T-shaped heads on dog 23 extend the full width of the pulley, the stop 22 projecting only so far above pulleys 3 and 4 as not to come in the path of lever 9. Thus it will be seen that the dog 23 may engage lever 9 and thereby control the movements of said lever, and may be removed from action by block 22. As the pulleys and their dogs are adapted to act in opposite directions, it will be seen that by a pull on either cord 19 or 19' pulleys 3 or 4 will be reversed and by connections hereinafter described the finger 2 or type wheel 8 can be revolved in either direction at will, and so, by use of the key, bring any desired character under the printing hammer.

Encircling the actuating device is a circular or ring shaped lever 26 hinged to plate D at 26' 26'', and to one end of this device is secured the hammer 17, and at the other end are applied pulleys 27 27', and the cords 19 19' pass under these pulleys. This lever is normally held with its pulley end depressed, and its hammer end raised by a spring 28', Figs. 3 and 7. The ends of the cords are secured to the ends of the working levers 29 29'.

These levers are fulcrumed at 32' to plate D and their outer ends are adapted to receive impact from an operator's fingers. The operator strikes either lever, and its cord, acting upon the corresponding pulley, draws its dog 23 out of control of the stop 22 and the spring 25 then forces the dog into action with lever 9, fast on the shaft I, thus causing the type wheel to revolve until stopped by finger 2 striking a key, whereupon the continued action of lever 29 will overcome the force of the spring 28' and permit the hammer to print the selected character. The lever 29 causes the revolution of the type wheel 8 in one direction and lever 29' in an opposite direction. I contemplate using this printing device upon a stationary stand, the paper moving; and also with the printing device adapted to move over the paper, so as to be used in a book. To this last end, I extend from the plate D brackets 30 30' and furnish sliding connections with the rods 31. On the inner side of 31, I fix a rack 32 extending its entire length. Under this rack, I place a sliding rack 32² corresponding to 31, and capable of being held to a left hand longitudinal movement of a single rack-space by the action of a spring 32³. Between the brackets 30, 30', I place a platform 33. Above the platform, I place the hinged bracket 34 normally held up by springs 35; and extending from bracket 34 is a lip 35' shown in dotted lines, Fig. 8. On bracket 34 I place the dog 36 normally held to connection with stop 37. Secured to the bracket 30' is a cord or chain 38 actuated by a strong spring applied in box 38'. On the circular lever 26 extending downward from between the pulleys 27 27', an adjustable pin 39 is placed, which is adapted to strike and force downward bracket 34 when the lever frame 26 is returned to its normal position by the force of spring 28'. This forces the edge of the dog which rests in the rack 32 out of connection with rack 32 and into connection with the sliding rack 32², when the spring in the box 38', being much stronger than the spring 32³, the sliding rack, the brackets and attachments are all drawn to the right to the extent of one rack space. When the pressure of pin 39 on bracket 34 is removed, said bracket rises, bringing the dog 36 back into connection with the feed rack 32 to the extent of one space. When this is accomplished, the sliding rack 32 is free to resume its place, and the machine is ready for another bodily movement to the extent of a vacant space, ready for another character. The rod 31 is pivoted to the frame 40 at its end, so that the type wheel and connections may be raised and the printing seen. Projecting from the plate D is a bracket 41 which rides on the edge of the frame 40. This frame extends from one end of the rod 31 to the other end thereof in the form shown in Fig. 1. It is made of flat steel about five-eighths of an inch wide bent into the form shown. This frame 40 is connected to the clamp frame.

The frame 40, with all the parts dependent upon it, is free to lift from a horizontal position through hinged brackets 42 42', which brackets connect the printing device with the clamps which hold the machine in relation to the page of a book or a platform on which a sheet of paper may be placed. The brackets 42 42' slide freely on rod 43. This rod 43 has annular grooves 44 cut in it at such distances apart as to furnish graduations of the printing device as to line space of printing. In bracket 42 a stop pin 45 is placed and held in connection with the grooves 44 by a spring as shown in Fig. 9, and by lifting which the frame 40 and its connections may have free forward and backward motion. The rod 43 may be held in connection with a book or other form for printing by a suitable clamp. I have shown a form of clamp adapted to clasp the leaves of a book, the leaves of half of a book not being used.

47 represents a portion of the leaves; 48, a bar of metal extending across the book and adapted to pass under the leaves 47.

49 are spring clamps which clasp the upper side of the leaves.

Preferably I place under the sheet being printed a sheet of soft rubber as a bed for the type.

Projecting from the frame 40 are the wire brackets 51 on which are secured the type ribbon by pin or other device. The ribbon may be slid on the wires to secure a fresh portion. 38 is the cord which draws the bracket 30', the same being acted upon by a spring in box 38'.

The operation of my machine is as follows: Strike the key with the right hand and one of the levers with the left hand or vice versa. This causes one of the levers to draw upon one of the cords and rotate the finger and type wheel until it is arrested by a depressed key. Then by the continued action of the lever the hammer is made to print the type below it. When the hammer is down the dog is engaged, and by the action of the fixed rack, the sliding rack, which lies below it, is caused to resume its normal position. When the hammer is raised, the dog engages the sliding or lower rack and the printing device is caused to advance one space by the stronger spring drawing it, and thus the operation is performed.

What I claim as my invention is—

1. In a typewriting machine, the combination with a main frame, of a vertical revolvable shaft mounted therein, and carrying a type disk, pulleys and horizontal finger, a rocking frame carrying a hammer, a key plate provided with a series of vertically movable keys, and the levers, and cords connecting said levers with the pulleys and with the rocking frame, substantially as shown and described.

2. In a typewriting machine, the combination, with a shaft carrying a type disk, pulleys and a finger, of a key plate carrying keys, cords wound in opposite directions upon the

different pulleys and the independent operating levers, each connected to a separate cord, whereby the disk may be revolved in either direction, substantially as described.

5 3. In a typewriting machine, the combination, with a revoluble type disk, of a rocking frame carrying a hammer at one end and a roller at the other, an operating lever and a cord connected at one end to the lever and
10 fast at its inner end to the interior of the machine, said cord passing beneath the roller on the end of the rocking frame, substantially as described.

4. In a typewriting machine, the combination, with a shaft carrying type disk, pulleys and a finger, of the lever frame carrying a hammer at one end and pulleys at the other, the operating levers, the cords connecting the said levers with the shaft pulleys, said cords passing over the pulleys on the lever frame, whereby, when the shaft is revolved, the hammer will be operated, substantially as described.

5. In a typewriting machine, the combination, with the toothed feed bar, of the carriage movable thereon, the revoluble shaft, the type disk, the pulleys and finger, the key plate and keys, the operating levers and cords, the lever frame, and hammer, a rocking platform carrying a dog adapted to engage the
25 toothed feed bar, and a pendent bar on the rear end of the lever frame adapted to operate said rocking platform, substantially as described.

6. In a typewriting machine, the combination, with a type disk, of a rocking frame carrying a hammer at one end and an adjustable pin at the other, an operating lever connected with the said rocking frame and adapted to operate the type disk and a rocking platform carrying a dog adapted to en-
30 35 40

gage the feed mechanism, all of said parts being constructed, arranged and connected, substantially as described.

7. In a typewriting machine, the combination, with a revoluble shaft, of a lever arm 45 mounted thereon and provided with a T-shaped head, the pulleys having cords wound thereon, the spring actuated dog carried by each pulley and also formed with a T-head, the plates C and D, the stops 21, the blocks 50 22, the springs 20 and 21, all arranged and adapted to operate, substantially as described.

8. In a typewriting machine, the combination, with the plates C and D, of the shaft 1 carrying the sleeve 18, the arms 10' and 11', 55 the springs 10 and 11, the stops 12 and 13, and the type carrying disk, all arranged substantially as described and for the purpose set forth.

9. In a typewriting machine, the combination, with a frame, of a toothed rack bar, a supplemental toothed bar arranged beneath the main bar and adapted to move longitudinally, a spring for operating said supplemental bar, the carriage, a rocking platform 60 mounted on the frame, a spring actuated dog carried by said platform and adapted to engage the rack bars alternately, and an adjusting pin carried by the carriage and adapted to depress the rocking platform, a spring for 70 returning said platform, and means for moving the carriage on the frame, substantially as shown and described.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

ROSWELL T. SMITH.

Witnesses:

CHAS. H. PARSONS,
FRANK H. PARSONS.