

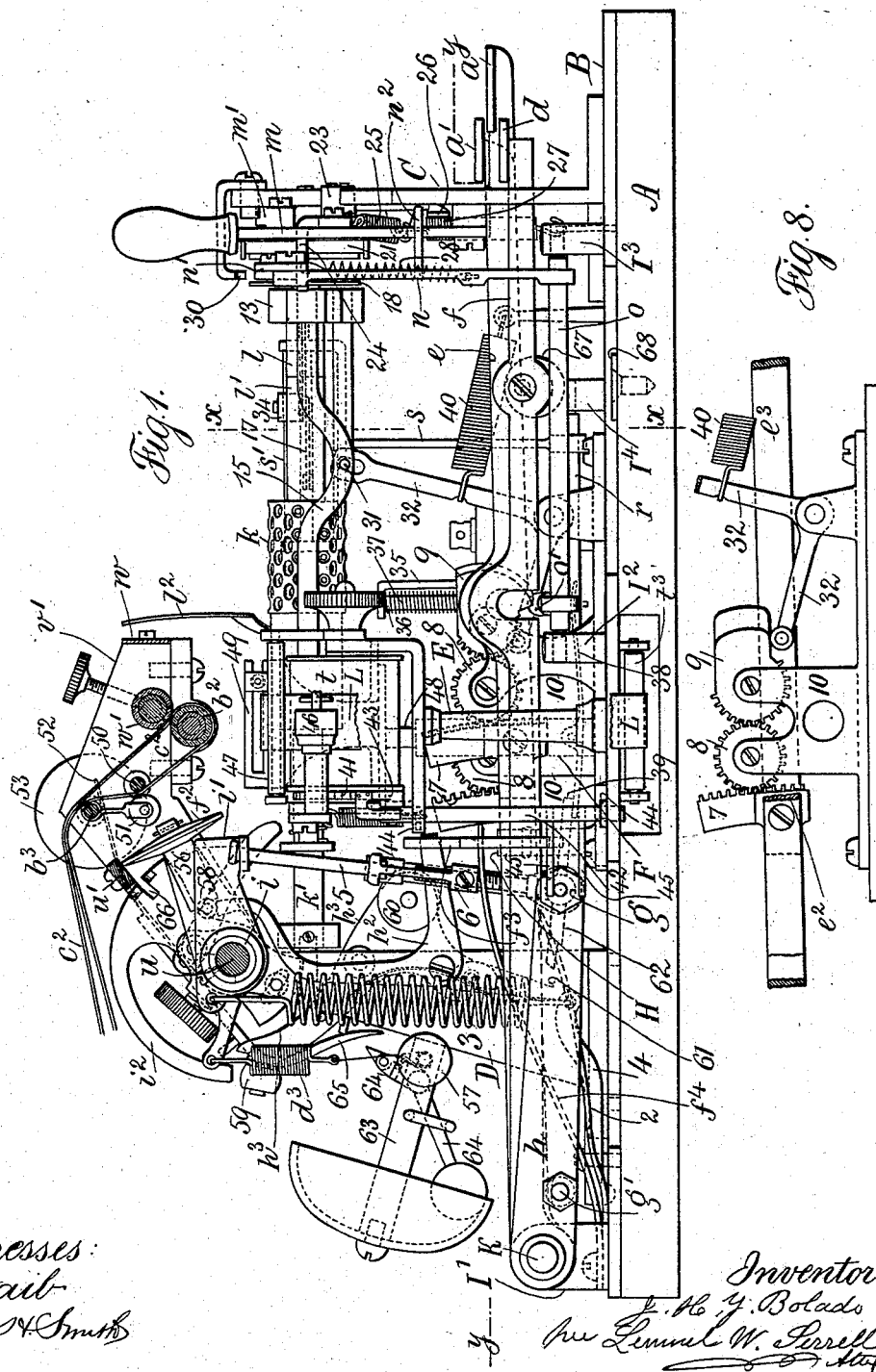
(No Model.)

5 Sheets—Sheet 1.

J. HERRAN Y BOLADO.
TYPE WRITING MACHINE.

No. 524,816.

Patented Aug. 21, 1894.



Witnesses:
J. Stait
Charles V. Smith

Inventor:
J. H. y. Bolado
per Lemuel W. Perrell

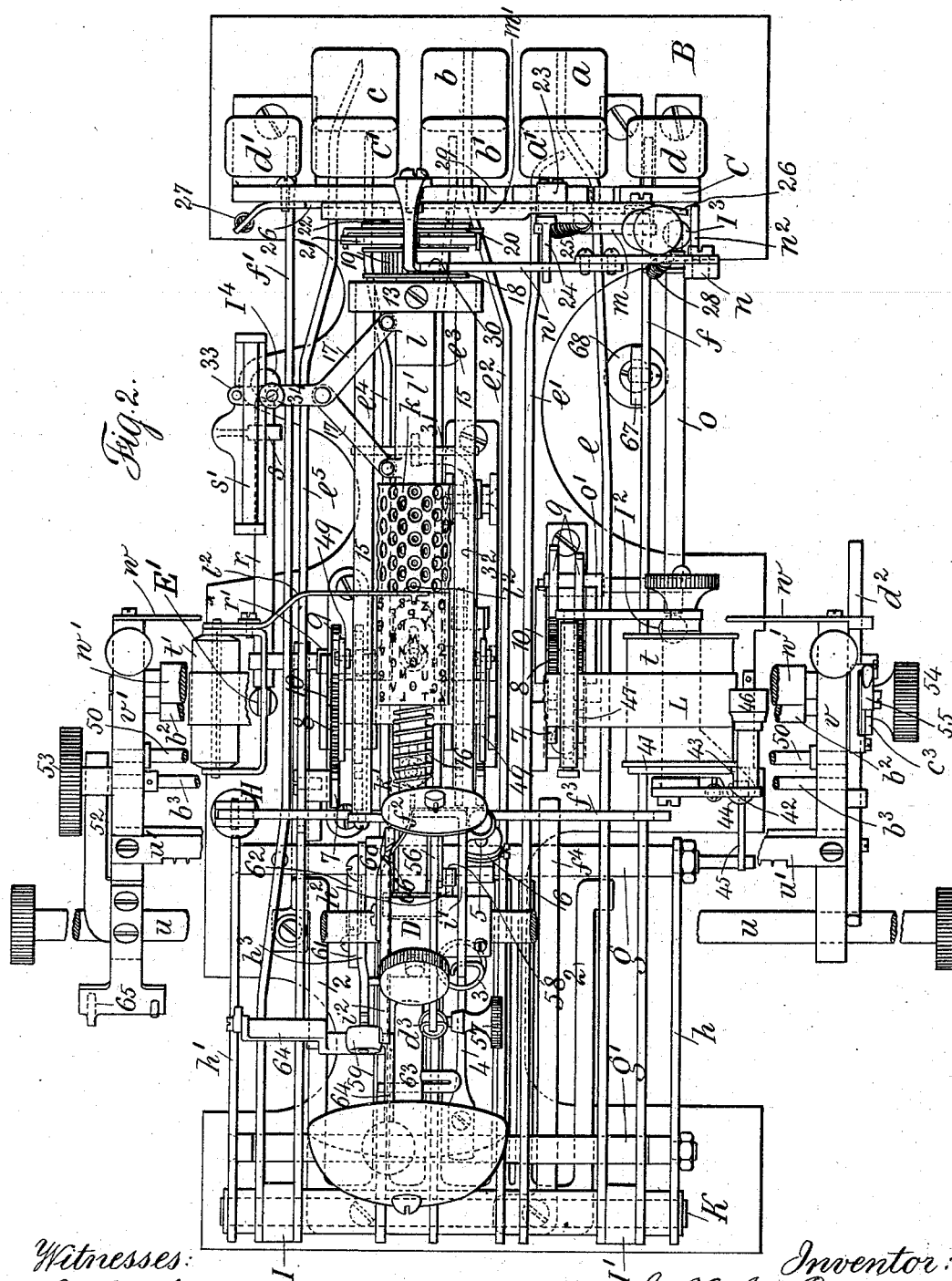
(No Model.)

5 Sheets—Sheet 2.

J. HERRAN Y BOLADO.
TYPE WRITING MACHINE.

No. 524,816.

Patented Aug. 21, 1894.



Witnesses:
J. Stail
cho H. Smith

Inventor:
J. H. Bolado
Per Lemuel W. Perrell

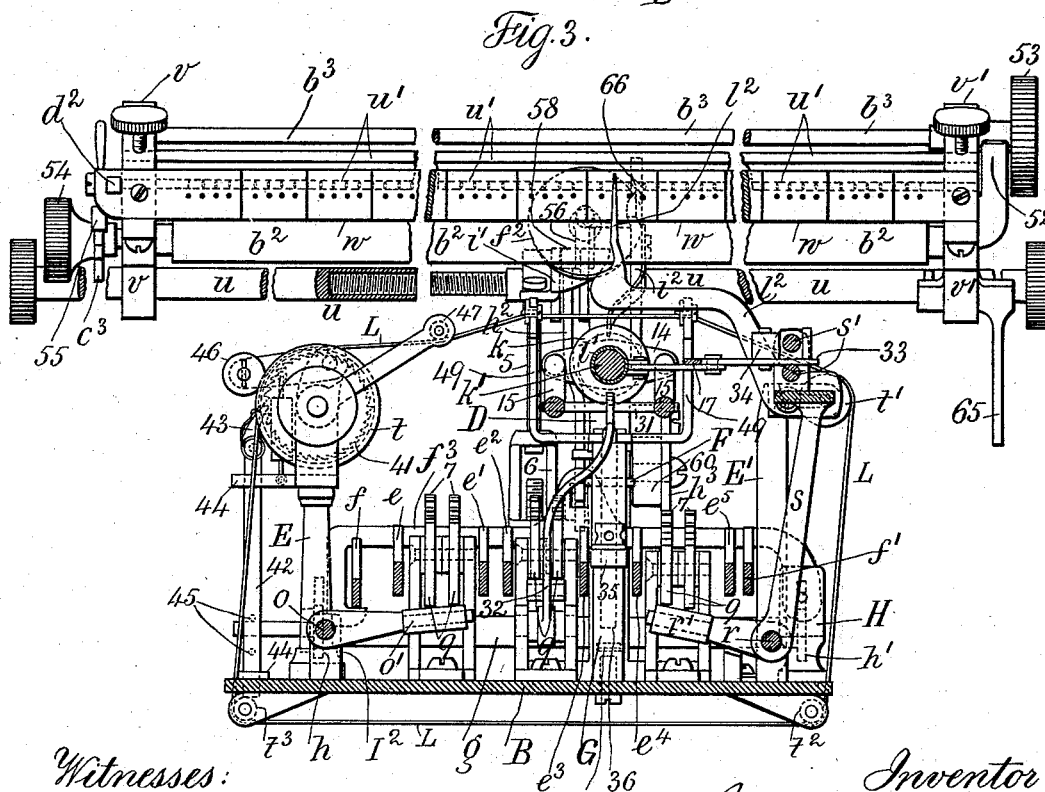
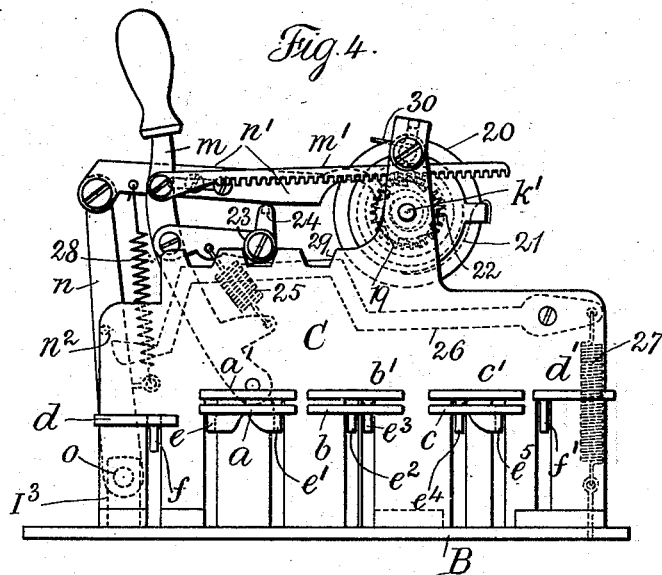
(No Model.)

5 Sheets—Sheet 3.

J. HERRAN Y BOLADO.
TYPE WRITING MACHINE.

No. 524,816.

Patented Aug. 21, 1894.



Witnesses:
J. Stair
Charles Smith

Inventor.
J. H. Y. Bolado
Per Lemuel W. Perill

(No Model.)

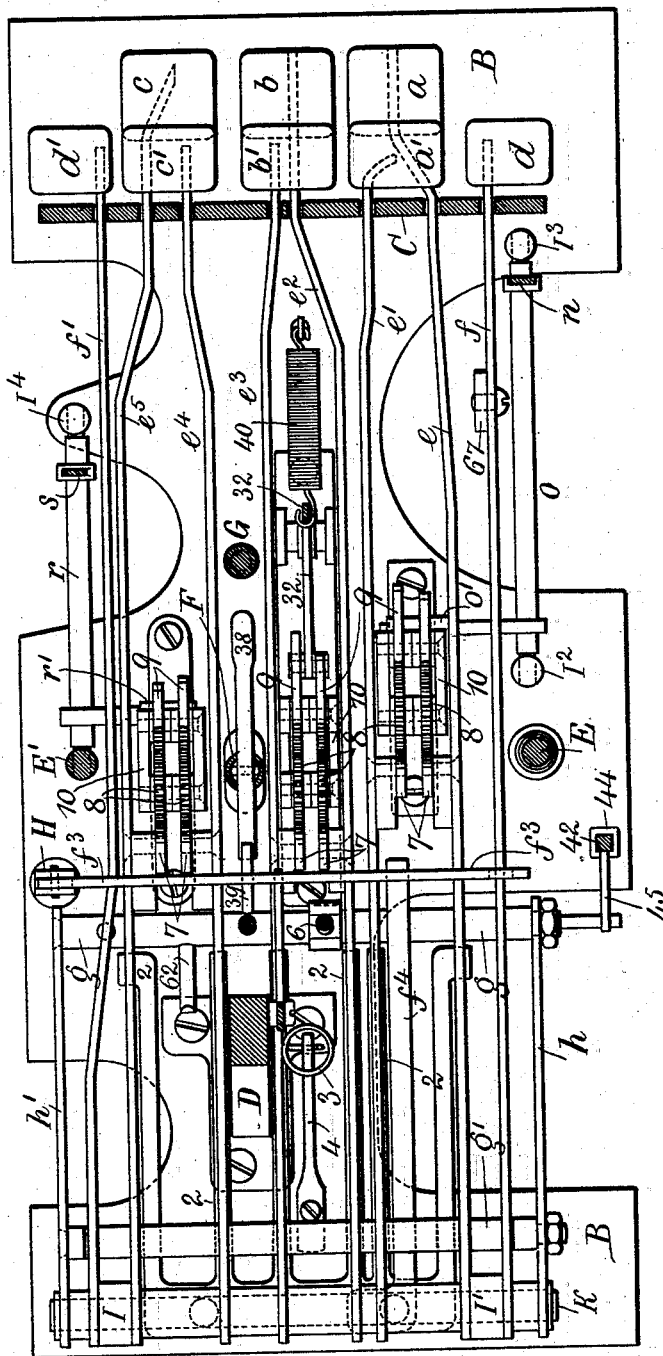
5 Sheets—Sheet 4.

J. HERRAN Y BOLADO.
TYPE WRITING MACHINE.

No. 524,816.

Patented Aug. 21, 1894.

Fig. 5.



Witnesses:
J. Strick
Chas. N. Smith

Inventor:
J. H. Y. Bolado
per Lemuel W. Ferrell

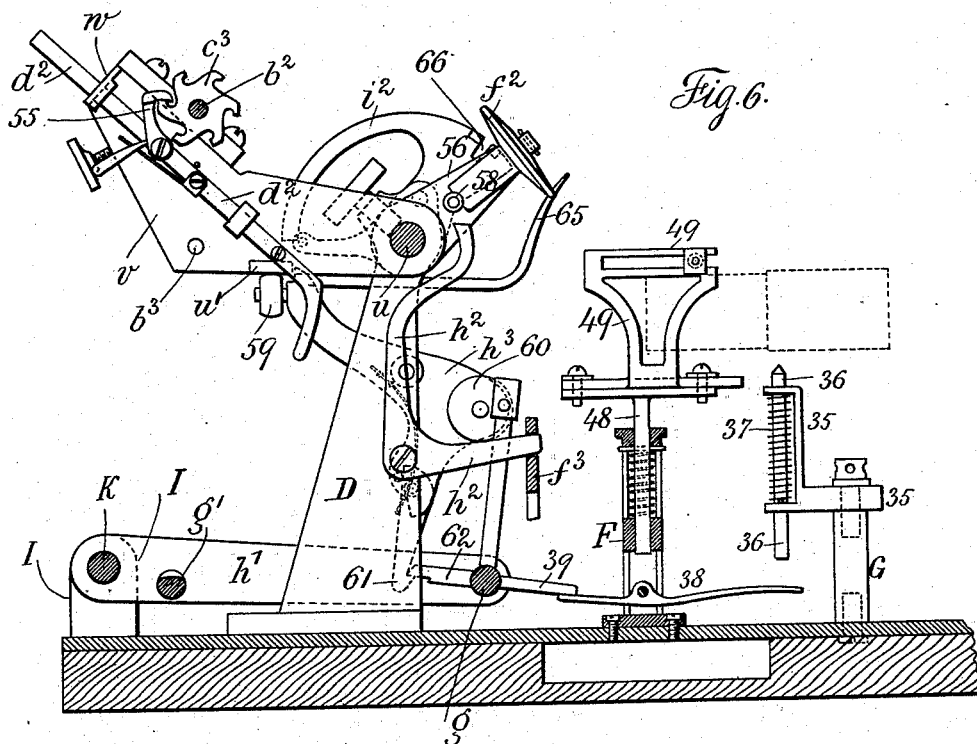
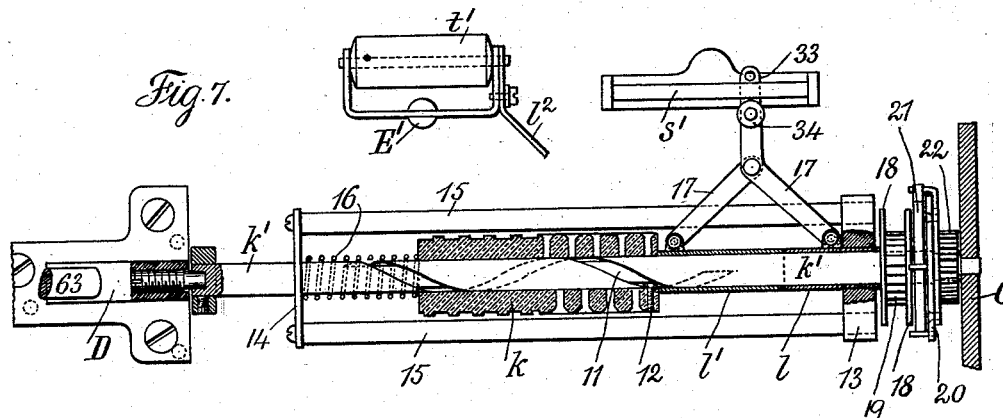
(No Model.)

5 Sheets—Sheet 5.

J. HERRAN Y BOLADO.
TYPE WRITING MACHINE.

No. 524,816.

Patented Aug. 21, 1894.



Witnesses:
J. Stait
Chas. N. Smith.

Inventor:
J. H. Y. Bolado
Lemuel W. Ferrell

UNITED STATES PATENT OFFICE.

JOSÉ HERRAN Y BOLADO, OF AGUAS CALIENTES, MEXICO.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 524,816, dated August 21, 1894.

Application filed August 19, 1893. Serial No. 483,591. (No model.)

To all whom it may concern:

Be it known that I, JOSÉ HERRAN Y BOLADO, a citizen of the Republic of Mexico, residing at Aguas Calientes, Mexico, have invented a new and useful Improvement in Type-Writing Machines; and the following is declared to be a full, clear, and exact description of the same.

My present invention is designed as an improvement upon the device shown and described in my Letters Patent, dated October 17, 1893, No. 506,816.

My present invention adapts the general features of the aforesaid invention to a machine using an ordinary sheet of paper to be printed upon and which is operated and conveyed on a traveling carriage, and in my present invention I employ more positive and efficient mechanism for carrying out the general features of my former machine.

In my present invention I employ a revolving longitudinally movable cylinder upon the surface of which the type characters are formed, and this cylinder is provided with perforations agreeing in number and arrangement with the type characters. This cylinder is moved along endwise and rotated on its supporting shaft to the extent predetermined according to the type character to be brought into position, and this is accomplished by various mechanical devices hereinafter more fully described.

I employ a minimum number of keys arranged in groups of two or more to be operated simultaneously or singly, so as to bring into place for printing the desired type character, and I employ a traveling carriage for the sheet of paper upon which the impression is given and suitable mechanism operated by the depression of the keys to impart a step by step feeding movement to said carriage. I also employ an inking ribbon passing through suitable guides across the face of the type cylinder and to which I prefer to impart a progressive step by step movement with and by each depression of the keys. This inking ribbon I prefer to be an endless band.

The mechanism for carrying out the aforesaid operations is hereinafter more particularly described.

In the drawings, Figure 1 is a side elevation of my improved typewriter with the traveling carriage in cross section. Fig. 2 is a

plan of the same with the central portion of the traveling carriage removed. Fig. 3 is a cross section approximately at the line $\alpha\alpha$ of Fig. 1 looking toward the traveling carriage. Fig. 4 is a front elevation showing the keys and the devices for shifting from one case of type characters to another. Fig. 5 is a sectional plan at approximately the line $\alpha\alpha$ of Fig. 1. Fig. 6 is a view illustrating the manner of locking the mechanism when the carriage is thrown back. Fig. 7 is a sectional plan of the type cylinder and the devices connected therewith, and Fig. 8 is a detached elevation illustrating the rack pinion and cam movement.

A suitable support A carries the frame plate B of the machine and to which the typewriter mechanism is connected. There is a vertical slotted front plate C, a main standard D, standards E E' F G and H and pivot lugs I I' I² I³ and I⁴, all connected to and rising from the said plate B to carry parts of the mechanism.

The finger keys are shown in groups of two, viz. $a\ a' - b\ b' - c\ c'$, and they are connected to levers $e\ e'\ e^2\ e^3\ e^4$ and e^5 that pass through the slotted plates C and extend through the machine and are pivoted at their back ends to a shaft K in the bearing lugs I I'.

The auxiliary keys $d\ d'$ come at each side of the aforesaid groups of keys and they are connected to auxiliary shafts $f\ f'$ also passing through the plate C and back to the shaft K to which they are pivoted. The bars $g\ g'$ pass across beneath the aforesaid groups of levers and are connected at their ends to the short levers $h\ h'$ also pivoted on the shaft K.

Each of the levers $e\ e'\ e^2\ e^3\ e^4$ and e^5 has a plate spring 2 fastened to the plate B, said springs serving to maintain the said levers and the finger keys carried thereby in an elevated position with the levers bearing against the plate C at the upper ends of their slots, see Fig. 4.

The main standard D carries at its upper end a bearing sleeve i and a crank arm i' pivoted on said sleeve. A helical spring 3 is connected at one end to the crank arm i' and at its other end to an arm 4 secured to the plate B. Passing through an eye on the outer end of the crank arm i' is a rod 5 to which is connected a turn buckle 6 having an eye at its lower end through which the bar g passes, and this spring 3 serves thus to hold up the

bars $g g'$ and short levers $h h'$; the upward movement is determined by the bars $g g'$ coming up against the under side of the aforesaid levers connected to the finger keys.

5 Each of the levers $e e'$, $e^2 e^3$ and $e^4 e^5$ has connected rigidly to it a vertically disposed rack 7; each rack 7 meshes with a pinion 8 and each pinion in turn with a segmental toothed cam 9. The racks 7, pinions 8 and
10 cams 9 are in pairs between the grouped levers $e e'$, $e^2 e^3$ and $e^4 e^5$, the pinions 8 and cams 9 being upon short shafts in suitable bearing frames 10 connected to the plate B. The racks 7 and pinions 8 agree in size, but the
15 operative surfaces of the cams in each pair do not agree, the one having a greater reach than the other for the reasons hereinafter set forth. These cams 9 operate rocking levers for imparting to the type cylinder rotary and
20 longitudinal movements for bringing the type characters into position to be printed.

The type cylinder is represented at k and the same is longitudinally movable along and can be rotated with the shaft k' . The type
25 cylinder has type characters upon one portion of its surface and holes in the surfaces of the other portion which agree in number, position and arrangement with the type characters. The shaft k' is pivoted at one end in
30 the standard D and at the other end in the plate C. This shaft k' is spirally grooved at 11 and there is a pin 12 in the type cylinder passing into and engaging the groove 11. The shaft k' passes through the head 13 and
35 plate 14 and the longitudinal rods 15 connect the said head and plate. Sleeves $l l'$ surround the shaft k' , the sleeve l being connected to the head 13 and the sleeve l' coming between it and the end of the cylinder k , and a helical
40 spring 16 surrounds the shaft k' between the plate 14 and the end of the cylinder. Links 17 connect the sleeves $l l'$ together and pivotally to an arm hereinafter more fully described.

45 I employ disks 18 and an intermediate ratchet 19 secured to the shaft k' , also a disk 20 and pinion 22 connected together and loose on said shaft and a coil spring 21 like a watch spring, one end of which is secured to the disk
50 20 and the other end to the shaft k' .

A hand lever m is pivoted to the plate C and to it is pivoted a rack m' engaging the pinion 22. This hand lever has a pivoted arm and roller 23 and integral finger bar 24 and
55 a spring 25 acts to hold the roller 23 against the edge of the plate C and in one at a time of the notches in its upper edge.

A lever n is pivoted to a rock shaft o in the standards $I^2 I^3$ and to the upper end of
60 this lever is pivoted a pawl arm n' whose extreme end engages the teeth of the ratchet 19. This pawl arm n' has a spring 28 and finger 30 to keep it down in place. The other end of the rock shaft o carries a bar and roller o^8
65 which come beneath the edges of the pair of cams 9 between the levers $e e'$. The lever n is made with a pin n^2 and upon the back of

the plate C is pivoted a lever 26 of peculiar form and whose upper end bears against the under side of the roller 23. A spring 27 connects the short arm of the lever to the bed of
70 the machine and acts to elevate said lever. If the roller 23 should rest on the upper edge of the plate C instead of in one of the notches 29, the lever 26 is raised and its end comes in
75 the path of the pin n^2 and prevents the movement of the lever n and its pawl n' .

The rods 15 are curved downwardly as shown and a pivot pin 31 passes through both rods. The bell crank lever 32 is pivoted to
80 the plate B and the pivot pin 31 passes through its upper slotted end, and there are rollers on the other end of said lever that come beneath the pair of cams 9 between the group of levers
85 $e^2 e^3$ and a spring 40 connected to the lever 32 and to a standard serves to draw backwardly on said lever.

The rock shaft r is pivoted in the standards I^4 and E' and it carries a bar and roller r' that come beneath the pair of cams 9 between
90 the group of levers $e^4 e^5$. An arm s is connected to and rises from the rock shaft r and carries a frame at its upper end in which are parallel rods s' one above the other. An arm 33 passes between the rods s' and is provided
95 with a roller 34 coming at one side of the upper rod s' and a pin coming at the opposite side, and the arm 33 is connected to one of the links 17 or formed as a continuation of one of said links. The standard G carries a
100 frame 35 through the arms of which a vertically placed and pointed bar 36 moves, and said bar is surrounded by a helical spring 37. The standard F is hollow and slotted and in the lower part thereof is a pivoted arm 38
105 one end of which comes beneath the bar 36, and the other end beneath a finger 39 on the bar g .

The type cylinder and its attendant mechanism heretofore described operates as follows:—The keys $a b$ and c effect a minimum
110 amount of movement and the keys $a' b' c'$ a maximum amount of movement. The keys $a b$ and c may be operated singly, but the depression of the key a' depresses a ; b' depresses b ; and c' depresses c . These keys
115 may be operated in groups to impress the desired type characters, and an illustration of such grouping is shown in my application for Letters Patent herein referred to. The depression of the keys $a a'$ and their levers $e e'$
120 operates the rack 7, pinions 8 and cams 9. To depress the roller and bar o' , turn the rock shaft o , move the lever n and pawl n' , ratchet 19 and rotate the shaft k' and type
125 cylinder k ; the key a' gives about twice the rotary movement to the cylinder that is imparted by the key a . This movement strains the spring 21 the position of which is maintained by the pinion 22 and rack m' , and
130 when the pressure is released the said spring causes a rotation of the parts to a normal position. As either lever e or e' is depressed it carries down the levers h , bar g and finger 39

and this swings the arm 38 and imparts an upward movement to the bar 36, the point of which enters a hole in the type cylinder *k* at the end of the stroke and holds the same while the paper is impressed with the desired letter and also acts to correct the alignment. The depression of the keys *b b'* and their levers *e² e³* operates their racks 7, pinions 8, cams 9, swinging the bell crank lever 32 and through the pin 31 longitudinally moves the arms 15, head 13, plate 14, sleeves *l l'*, links 17 and arm 33 and type cylinder *k* and simultaneously rotates the type cylinder by means of its pin 12 and the spiral groove 11. The depression of the key *b'* causes the increased movement to the aforesaid parts because of its larger cam 9, and the spring 40 returns or draws back these parts to the place of beginning. The depression of the keys *c c'* and their levers *e⁴ e⁵* operates their racks 7, pinions 8, cams 9, depressing the bar and roller *r'*, swinging the rock shaft *r* and moving the arm *s* and its frame and rods *s'* and arm 33 inward toward the center of the machine. This movement tends to spread the links 17 and because the sleeve *l* and head 13 are now stationary to move along the sleeve *l'* and type cylinder *k*, compressing the spring 16 and simultaneously rotating the type cylinder *k*. The spring 16 returns the parts to a normal condition when released and in all cases the aforesaid keys and their levers are raised by the action of their springs 2 assisted by the spring 3, crank arm *i'*, rod 5 and connections to the bar *g*. Each depression of one of the keys and levers operates the arm 38 to raise the bar 36 in a hole in the type cylinder *k* in the manner and for the purpose hereinbefore set forth.

The office of the hand lever *m*, rack *m'*, arm and roller 23, spring 25 and notches 29 is to change the type case, or in other words, to turn the type cylinder from capitals to small letters or from small letters to figures and characters or from any one of these to any other one. This is done by swinging the hand lever and bringing the roller into one of the notches 29 where it is held by the spring 25, and simultaneously by the movement of the rack *m'* rotating the pinion 22 and with it the spring 21, ratchet 19, disks 18, shaft *k'* and type cylinder *k*, the finger 24 on the bar 23 as the roller passes over from one notch 29 to the other raising the pawl *n'* against the action of the spring 28 so as to permit the ratchet 19 to rotate. As the roller drops into a notch 29 the spring 28 draws down the pawl *n'* into engagement with the teeth of the ratchet 19. Should the roller 23 accidentally rest upon the upper edge of the plate C and not in a notch 29 the spring 27 raises the arm 26 so that its extreme and free end comes in the path of the pin *n³* and the movement of the mechanism is arrested.

The inking ribbon is preferably an endless band passing around the machine and over the type characters of the cylinder *k* and the

following mechanism is provided to carry said ribbon.

The standard E has a U arm at its upper end carrying the inking and feed roller *t*; the standard E' carries a guideroller *t'* and brackets on the inner side of the plate B carry guide rollers *t² t³*, and the inking ribbon passes around these rollers. On the shaft of the inking and feed roller *t* is a ratchet 41 and on the upper end of the bar 42 is a spring pawl 43 operating said ratchet. This bar 42 is guided in ways 44 and is provided with pins 45 coming at each side of the projecting end of the shaft *g*, so that as the shaft *g* rises and falls it acts upon these pins 45, imparting a vertical movement to the bar 42 that effects the movement of the pawl 43 and by a step by step movement rotates the inking and feed roller *t* and imparts a movement to the ribbon L. The roller 46 bears upon the inking ribbon and causes it to take up ink from the roller *t*, and the arm 47 bears upon the ribbon and acts to take up the slack.

The hollow standard F receives a vertically moving rod 48 which carries a U-shaped piece 49 whose upper ends are made as guides for the ribbon L, and a helical spring within said standard is so constructed that the parts are held in an elevated position.

The carriage for carrying the sheet of paper to be printed upon is composed of the following parts: The rod or bar *u* passes through and is supported by the standard D, and said rod may be separable as shown in Fig. 3 for convenience in packing and transportation. The ends *v v'* are connected by the tooth feed rack *u'* and indicator plate *w*, which latter extends across the front of the carriage, and also by the bar 50. The feed and impression roller *b²*, the guide roller *w'* and the bar *b³* all extend across the carriage and the rollers *b²* and *w'* are practically in contact, the sheet of paper *c²* passing around beneath the roller *b²* and between the rollers *b²* and *w'*. The bar *b³* carries a roller 51 pressing the sheet against the bar 50, and a spring 52 bears against a flattened side of the hub of the finger button 53 on the end of the bar *b³* to give the desired pressure. On the end of the roller *b²* there is a toothed wheel *c³* and finger button 54 and a pawl 55 on a sliding bar *d²* is to be operated to rotate the roller *b²*, or the said roller may be operated by the button 54 in either direction upon elevating the pawl 55 by the arm connected thereto. In the position shown in Fig. 1 the carriage is in position for work and it is supported by the roller *f²* upon which bears the rack *u'*. The roller *f²* is pivoted upon an arm 56 around the sleeve *i* of the standard D and the rear end of this arm 56 has connected to it a helical spring *d³* which is fastened to and strained by the finger bar 57. The arm 56 rests normally on the outer end of the crank arm *i'* and the carriage is held up by said crank arm and the spring 3. A bar *f³* is pivoted to the standard H and said bar extends through the machine across

the levers of the keys, and its outer end has a downward extension and hook that comes under the lever f , and the central part of this bar f^3 has an upward extension with a mortise to receive the end of the bell crank lever h^2 (see Fig. 6) and the upper end of this lever comes beneath a roller 58 on the arm 56 and the office of this lever h^2 will be hereinafter set forth. A spring f^4 serves to keep the bar f^3 in an elevated position and to return it thereto after being depressed and released.

A lever h^3 is pivoted to the standard D and this lever h^3 has a roller 59 at its upper end, a weight 60 at the other side of and below the pivot, and a hook 61 at its extreme lower end, and when the carriage is thrown back, as shown in Fig. 6, the feed rack u' rests upon the roller 59 and swings the lever carrying the hook 61 forward so that it comes beneath the end of the arm 62 which is upon the shaft g , and as all the levers of the keys and auxiliary keys come above this shaft it will be apparent that these levers are locked and cannot be depressed accidentally or at all until the carriage is returned, or turned over, into a normal position.

The standard D carries an arm 63 to which is connected a bell. A trip lever 64 carrying a striker to sound the bell at the end movement of the carriage is connected to the said arm 63, and a finger 65 connected to the end v' of the carriage operates the said trip lever at each extreme movement of the said carriage in one direction. A segment plate i^2 is connected to the bearing sleeve i of the standard D and the periphery of said plate i^2 passes through between two of the teeth of the feed rack u' , and the forward end of this plate i^2 is slotted at 66 and beveled in opposite directions to form two oppositely placed inclines or teeth. These inclines act upon the teeth of the rack u' with the downward and upward movement of the carriage to feed along the carriage with a step by step movement which is equal to one tooth at a time or its equivalent one letter. The segment plate i^2 acts to prevent the longitudinal movement of the carriage at all points except when thrown completely back and resting upon the roller 59, and while resting upon the roller the carriage can be moved freely along any desired amount in either direction before being turned back to a normal position. In this latter position with the feed rack u' resting upon the roller 59 the weight of the carriage presses upon and swings the lever h^3 on its pivot, raising the weight 60 and pressing the hook 61 beneath the end of the arm 62, which arm is upon the cross bar g . This locks the parts so that any attempt to accidentally press down one of the keys is resisted because this bar g upon which rest all the levers of the keys is held by the hook 61 and finger 62.

A disk 67 is connected eccentrically by a screw to the key lever f , and the lower edge of said disk comes below the lower edge of

the said lever and there is a plate 68 secured to the bed plate or support. This disk 67 when adjusted eccentrically forms a stop to the downward movement of the lever f by coming against the plate 68.

The office of the keys $d d'$ is to feed along the carriage by a step by step motion through the intervention of the levers $f f'$, cross bar g , rod 5, crank arm i' and roller f^2 , the extent of movement being so governed that the paper in the carriage does not quite come down to the type of the cylinder k , and this movement is assisted because the upper end of the bell crank lever h^2 is not moved entirely out from under the roller 58, therefore the carriage is prevented from dropping its entire distance.

In the depression of the keys $a a' b b'$ and $c c'$ their levers $e e' e^2 e^3 e^4 e^5$ are depressed to a slightly greater extent than the levers $f f'$. In this operation the cross bar g , rod 5, crank arm i' and roller f^2 are also operated together with the bell crank lever h^2 to drop the carriage, but the moment that the upper end of the said lever h^2 passes away from beneath the roller 58 the arm 56 is freed and the carriage which it supported is given a final drop to give the impression of the type cylinder upon the paper. The depression of the keys $d d'$ and their levers $f f'$ also effects another operation, viz., that of moving along the inking ribbon by a step by step motion imparted by the end of the bar g operating the pins 45, the vertically moving bar 42 and spring pawl 43 and ratchet 41.

A pointer arm l^2 is connected to the standard E' and extends up to the front of the numbered indicator plate w on the front of the type carriage, and said arm is set to point to a number which will be found to correspond to a number on the upper face of the feed rack u' at the tooth notch of the rack through which extends the segment plate i^2 , and these numbers are in unison with the feed of the carriage.

When the carriage is slightly raised the lower end of the segment plate is visible and it will be found to align with a letter or character impressed upon the sheet of paper, and by further raising the carriage the number of this character will be visible on the face of the feed rack u' . When it is desired to correct a letter the carriage is quickly swung back, moved along and swung forward along the segment plate upon the numbered notch of the desired number, and in all cases the numbers of the feed rack u' and indicator plate w agree.

I claim as my invention—

1. In a type-writing machine the combination with the finger keys and their pivoted levers, and the type cylinder of the racks 7 upon said levers, the pinions 8, operated by said racks, the segmental toothed cams 9, operated by the pinions 8, supports for the pinions 8 and cams 9, and mechanism substantially as specified and operated by said cams

9. for imparting a longitudinal motion to the type cylinder, substantially as set forth.

2. In a typewriting machine the combination with the finger keys and their pivoted levers and the movable type cylinder having perforations therein, of the bar *g*, the finger 39 projecting from said bar, the pivoted arm 38 engaged by the finger 39, the vertically moving pointed bar 36 actuated by the arm 38 and aforesaid parts and entering the said perforations of the type cylinder, and the spring 37 for retracting the bar 36, substantially as and for the purposes set forth.

3. In a typewriting machine the combination with the movable type cylinder, of the finger keys *a a'*, their pivoted levers *e e'*, the rock shaft *o*, bar and roller *o'* connected to the rock shaft, the lever *n* upon the shaft *o*, a pawl *n'*, the ratchet 19 engaged by the pawl, and mechanism operated by the levers *e e'* to depress the bar and roller *o'* in operating and rotating the type cylinder, substantially as set forth.

4. In a typewriting machine the combination with the movable type cylinder, of the finger keys *a a'*, their pivoted levers *e e'*, the shaft *k'* carrying the type cylinder and the ratchet 19, disks 18 and 20 upon said shaft, the pawl *n'* engaging the ratchet 19 and the spring 28 for holding down said pawl, and mechanism substantially as specified for operating the said pawl *n'* and rotating the type cylinder by the depression of the levers and keys, substantially as set forth.

5. In a typewriting machine the combination with the front plate *C* having notches 29, of the hand lever *m* preferably pivoted thereto, the arm and roller 23 connected to the hand lever, the spring 25 for holding down the arm and roller 23, the lever 26 bearing on the under side of said roller, and the spring 27 therefor, the lever *n* having a pin *n²* and the operating pawl *n'* whereby the movement of the parts can be arrested, substantially as and for the purposes set forth.

6. In a typewriting machine the combination with the movable type cylinder and its shaft and the front plate *C* having notches 29, of the hand lever *m* preferably pivoted to the said plate, the arm and roller 23 and finger bar 24 pivoted to the hand lever, their retractile spring 25, the rack *m'* also pivoted to the hand lever, and mechanism operated thereby for rotating the said type cylinder and its shaft and changing the case as the roller is placed in the aforesaid notches, substantially as set forth.

7. In a typewriting machine the combination with the movable type cylinder and its shaft *k'* and the front plate *C* having notches 29, of the pinion 22, the disks 18 and 20, the spring 21 upon the type cylinder shaft, the rack *m'* and the hand lever *m* for operating the said rack, a finger bar and mechanism operated thereby for releasing the shaft *k'*, and a roller for entering the notches 29 as the

case of the type cylinder is changed, substantially as and for the purposes set forth.

8. In a typewriting machine the combination with the movable type cylinder *k* having a pin 12 and the shaft *k'* passing through said cylinder and spirally grooved for the pin 12, of the finger keys *b b'*, their pivoted levers *e²* and springs, the racks 7 upon said levers, the pinions 8 and segmental cams 9 operated by said racks 7, and mechanism operated by said parts for moving along and simultaneously rotating the type cylinder, substantially as set forth.

9. In a typewriting machine the combination with the movable type cylinder *k* and its shaft, of the finger keys in groups of two, their pivoted levers and the springs therefor, the racks 7 upon said levers, the pinions 8 and segmental toothed cams 9 also in groups of two between and operated by said pairs of pivoted levers and their racks, one cam in each pair being larger and of greater reach than the other, and mechanism operated by said cams for effecting the movement of the type cylinder whereby the depression of one key of each group effects a greater movement than the depression of the other, substantially as set forth.

10. In a typewriting machine the combination with the movable type cylinder *k* having a pin 12 and the shaft *k'* spirally grooved for the pin 12 and upon which shaft the type cylinder is mounted, of the head 13, plate 14, connecting rods 15 forming a frame upon the shaft *k'* and around the type cylinder, the sleeves *l l'* and spring 16 upon the said shaft *k'*, the pivot pin 31 connected to the rods 15, the bell crank lever 32, spring 40 for operating the pin 31, and mechanism operated by the depression of the keys for actuating said parts, substantially as set forth.

11. In a type-writing machine the combination with the longitudinally movable type cylinder *k* and its rotatable shaft *k'*, of a frame around the type cylinder and moving thereby longitudinally of its shaft, a bell crank lever connected to said frame and the retracting spring for actuating the said lever and frame in one direction, the group of finger keys *b. b'* and their pivoted levers, and mechanism operated thereby for actuating the said bell crank lever and longitudinally moving the said frame and type cylinder in the other direction against the action of the spring, substantially as set forth.

12. In a typewriting machine the combination with the movable type cylinder and its shaft, of the finger keys *c c'*, their pivoted levers *e⁴ e⁵* and the springs therefor, the racks 7 secured to said levers, the pinions 8 and cams 9, the rock shaft *r*, bar and roller *r'* and the arm *s* operated by said cams 9, and mechanism operated by the arm *s* for moving the type cylinder longitudinally of its shaft, substantially as set forth.

13. In a typewriting machine the combina-

tion with the movable type cylinder and its shaft, the finger keys c c' and their pivoted levers e^1 e^5 , the arm and frame s and mechanism for moving said arm s forward and backward, of the sleeves l' upon the type cylinder shaft, the links 17 connected together and to said sleeves, the arm 34 and the roller and pin thereon, and the parallel rods s' connected to the said arm and frame s for operating the links and sleeves and forming a guide for the roller and pin, substantially as and for the purposes set forth.

14. In a typewriting machine the combination with the inking ribbon and its inking and guide rollers, of the auxiliary finger keys d d' , their pivoted levers f f' and the springs therefor, the bar g operated by said levers, the bar 42 moving vertically and the pawl 43 connected thereto, the ratchet 41 operated by said pawl, and pins 45 moved by the bar g for feeding along the inking ribbon, substantially as set forth.

15. In a typewriting machine the combination with the carriage for the sheet of paper, of the auxiliary finger keys d d' , their pivoted levers f f' , the bar g and its short pivoted levers h h' and the springs therefor and whose movement is effected by the levers f f' , and mechanism operated by the bar g for permitting the carriage to drop and effect the impression upon the paper, substantially as set forth.

16. In a typewriting machine the combination with the finger keys and their pivoted levers and the carriage for the sheet of paper and its feed rack u' , of the weighted lever h^3 , its roller 59 upon which the type carriage rests, the hook 61 upon the lever h^3 and arm 62 engaged by the pivoted levers whereby the depression of the finger keys and operation of the mechanism are prevented, substantially as specified.

17. In a typewriting machine the combination with the finger key operating mechanism, of the carriage for the sheet of paper and its feed rack u' , the roller f^2 upon which the feed rack rests, the pivoted arm 56 carrying the roller f^2 , the crank arm i' upon whose end the arm 56 rests, its sleeve i and the spring 3 and the rod 5 connecting the said arm i' with the finger key mechanism, substantially as set forth.

18. In a typewriting machine the combination with the finger key operating mechanism, of the carriage for the sheet of paper and its feed rack u' , the roller f^2 upon which the feed rack rests in supporting the carriage, the pivoted arm 56 carrying the roller f^2 and its spring d^3 , the crank arm i' , its sleeve i and spring 3 therefor, the rod 5 connecting the said arm i' with the finger key mechanism, the roller 58 on the arm 56, the bell crank lever h^2 and bar f^3 , substantially as and for the purposes set forth.

19. In a typewriting machine the combination with the finger key operating mechanism,

of the carriage for the sheet of paper and its feed rack u' , the standard D, the segment plate i^3 and its sleeve mounted upon said standard, the segment plate being slotted at 66 and beveled in opposite directions to form two oppositely placed inclines or teeth to act upon the feed rack u' in imparting a progressive feed to the carriage as the same is moved vertically, substantially as set forth.

20. In a typewriting machine the combination with the carriage for the sheet of paper, the inking ribbon and its rollers, of the hollow standard F, its rod 48 and spring, and the U-shaped piece 49 connected to the rod 48 and having guides at the upper ends thereof for the type ribbon, substantially as set forth.

21. In a typewriting machine the combination with the finger keys and their pivoted levers and the movable type cylinder having perforations therein; of a bar actuated by the downward movement of the finger keys, a finger projecting from said bar, a spring actuated vertically moving pointer bar adapted to enter the perforations in the type cylinder, and means for operating the same by the aforesaid finger, substantially as and for the purposes set forth.

22. In a typewriting machine the combination with the movable type cylinder and its shaft and the front plate C having notches 29; of the hand lever m , a spring actuated arm and roller 23, a finger bar connected to said hand lever, the rack m' pivoted to the hand lever, and mechanism operated thereby for rotating the said type cylinder and its shaft and changing the case as the roller is placed in the aforesaid notches, substantially as set forth.

23. In a typewriting machine the combination with the movable type cylinder and its shaft k' and the front plate C having notches 29; of the pinion 22, the spring 21 upon the type cylinder shaft and means for holding the same in place, the rack n' , and the hand lever m for operating said rack, and mechanism substantially as set forth for retaining the same in the desired position, substantially as and for the purposes set forth.

24. In a type-writing machine the combination with the rotatable type cylinder k , and its shaft k' , of a frame extending around the type cylinder, means for maintaining the type cylinder in position in relation to the frame, groups of finger keys and their pivoted levers, and mechanism operated thereby for actuating the said frame for moving it and the type cylinder together longitudinally of the shaft k' , in either direction, substantially as set forth.

Signed by me this 6th day of May, A. D. 1893.

JOSÉ HERRAN Y BOLADO.

Witnesses:

JUVENTINO DELA FORRE,
JOSÉ M. MEDINA.