(No Model.)

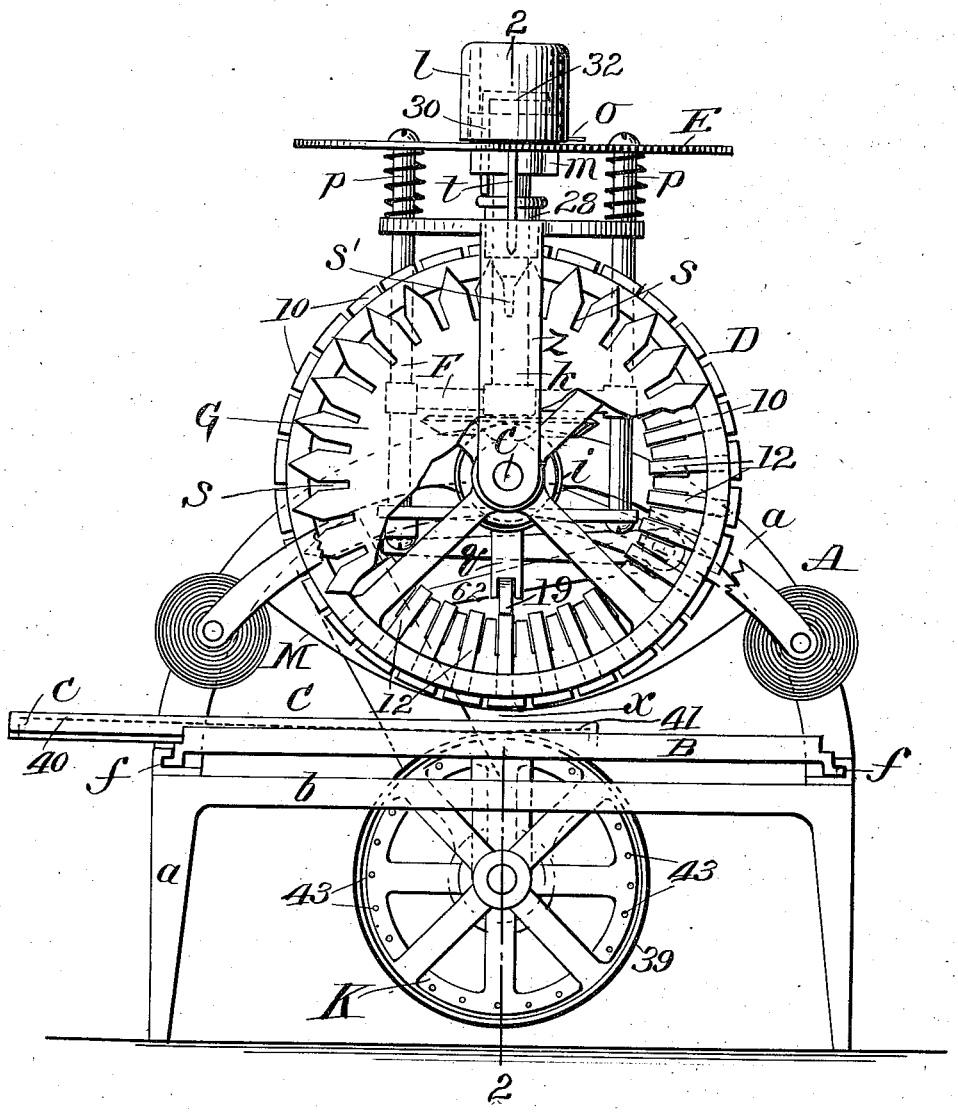
5 Sheets—Sheet 1.

S. C. HURLBUT.

TYPE WRITING MACHINE.

No. 455,719. Patented July 7, 1891.

Fig. 1.



Witnesses:
A. W. Garfield
C. B. Bigelow

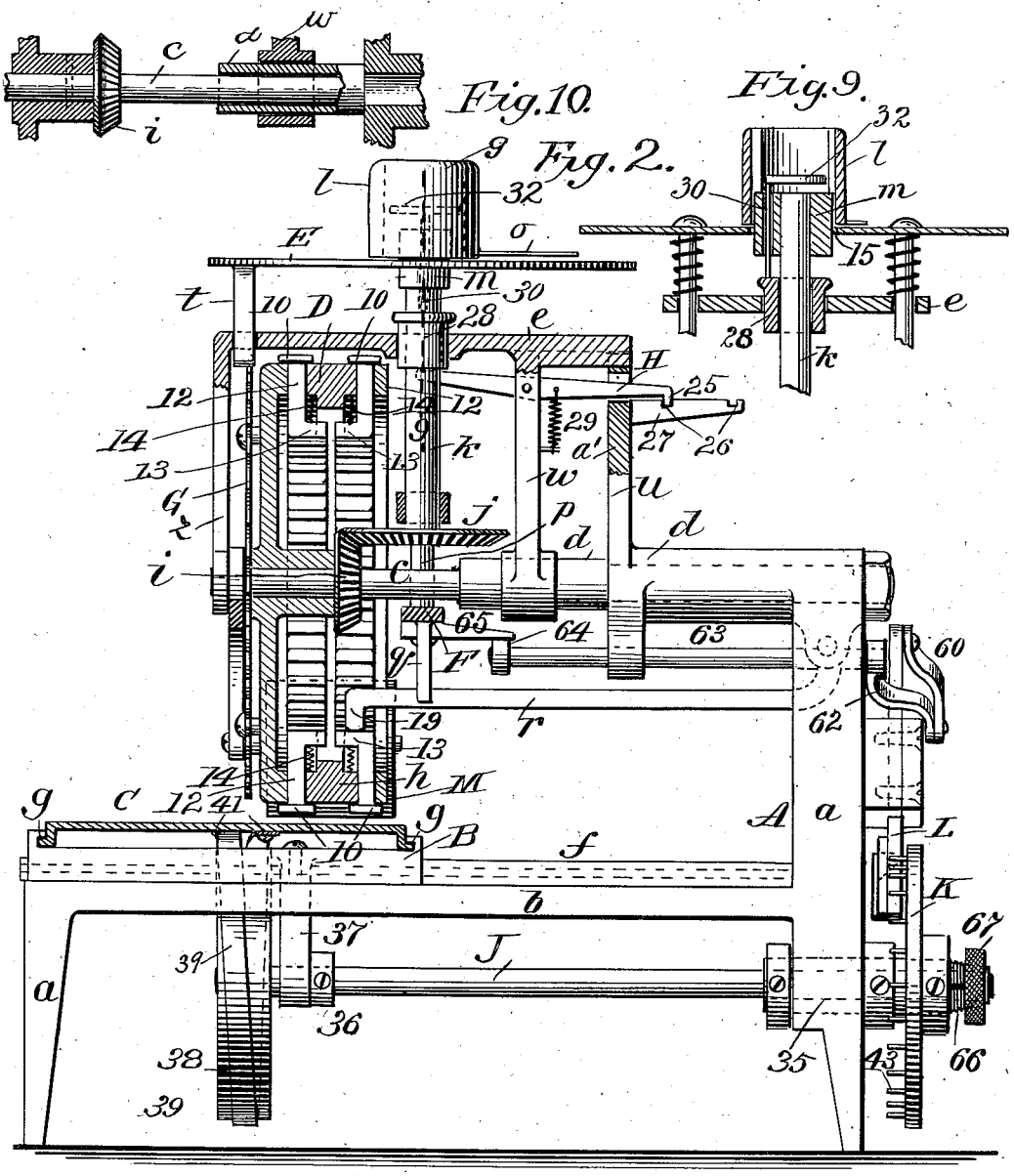
Inventor,
Samuel C. Hurlbut,
by Chapin & Co.
Attys

(No Model.) 5 Sheets—Sheet 2.

S. C. HURLBUT.

TYPE WRITING MACHINE.

No. 455,719. Patented July 7, 1891.



Witnesses:
J. P. Garfield
C. B. Bigelow

Inventor,
Saml. C. Hurlbut,
by Chapin & Co.
Atty's.

(No Model.)

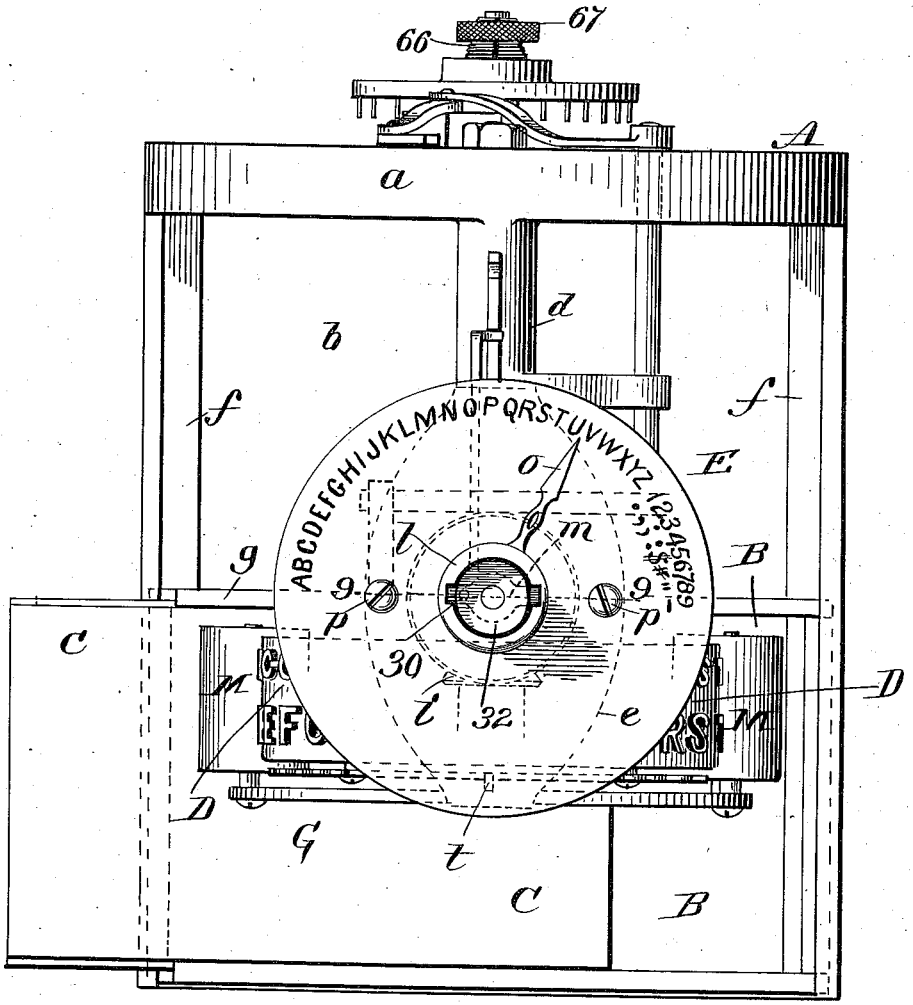
5 Sheets—Sheet 3.

S. C. HURLBUT.

TYPE WRITING MACHINE.

No. 455,719. Patented July 7, 1891.

Fig. 3.



Witnesses:
J. W. Garfield
C. 13, Bigelow.

Inventor:
Saml. C. Hurlbut,
by Chapin & Co.
Atty's

(No Model.)

5 Sheets—Sheet 4.

S. C. HURLBUT.

TYPE WRITING MACHINE.

No. 455,719. Patented July 7, 1891.

Fig. 4.

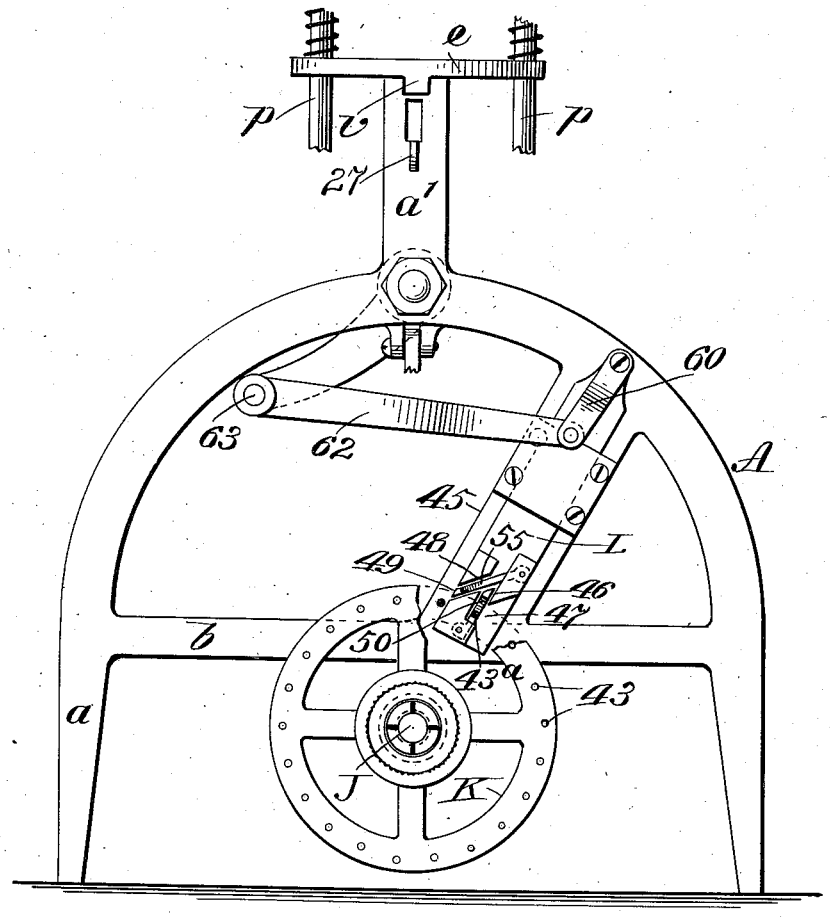
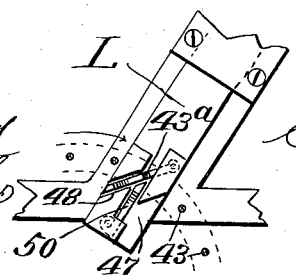


Fig. 5.



Witnesses:
J. L. Garfield
C. B. Briggs

Inventor,
Saml. C. Hurlbut,
by Chapin & Co
Atty's.

(No Model.) 5 Sheets—Sheet 5.

S. C. HURLBUT.

TYPE WRITING MACHINE.

No. 455,719. Patented July 7, 1891.

Fig. 6.

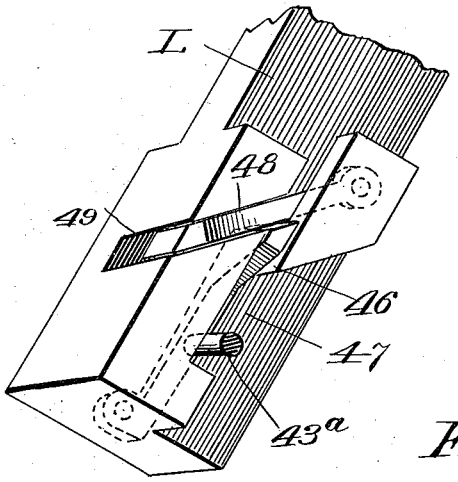


Fig. 7.

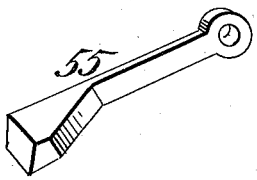
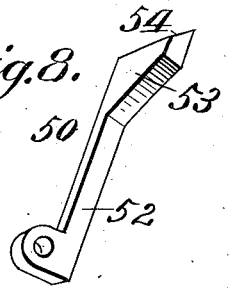


Fig. 8.



Witnesses:
J. W. Caffield
C. B. Bigelow

Inventor,
Saml. C. Hurlbut,
by Chapin & Co
Atty's.

UNITED STATES PATENT OFFICE.

SAMUEL C. HURLBUT, OF ELMWOOD, ASSIGNOR TO WILBUR E. GOODWIN, OF WEST HARTFORD, CONNECTICUT.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 455,719, dated July 7, 1891.

Application filed September 17, 1890. Serial No. 365,277. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL C. HURLBUT, a citizen of the United States, residing at Elmwood, in the county of Hartford and State of Connecticut, have invented new and useful Improvements in Type-Writing Machines, of which the following is a specification.

The object of this invention in type-writers is the production of a machine which is simple and inexpensive, easy of manipulation, and not likely to become deranged or impaired under protracted use; and the invention consists in the construction and combination of parts, substantially as will hereinafter more fully appear, and be set forth in the claims.

Reference is to be had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an elevation at one side of the machine, certain of the parts being broken away for clearer illustration. Fig. 2 is a sectional elevation of the machine, taken on the line 2 2, Fig. 1. Fig. 3 is a plan view. Fig. 4 is an elevation of portions of the machine as seen at the side opposite that shown in Fig. 1. Fig. 5 is a view in elevation of some of the parts shown in Fig. 4, but occupying different positions as ensues in the operation of the machine; and Figs. 6, 7, and 8 are enlarged perspective views of portions of the propulsion devices for the machine, shown in elevation in Figs. 4 and 5, and which will be hereinafter more fully described. Fig. 9 is a vertical sectional view of a portion of the machine, taken centrally thereof on the plane indicated by line 9 9 in Figs. 2 and 3. Fig. 10 is a sectional view in illustration of a certain construction hereinafter referred to.

The frame A of the machine is to be of any suitable form and design to most efficiently support the operative mechanism, and, as shown, comprises legs or standards *a a*, horizontal bed *b*, and a horizontal bearing *d* for the horizontal shaft *c*, which is rotatable in said bearing, and from which horizontal bearing *d* the elevated platform *e* is supported. The bed *b* has parallel ways *f f*, extending from front to rear thereof, on which a carriage B is movable, said carriage in turn having ways *g* therein at right angles to the ways *f*, in which latter ways slides a carriage C, which constitutes the platen, and slightly above said platen is the normal position of an under peripheral portion of the type-drum D, which is mounted on said shaft *c*, to rotate therewith.

The type-drum D embodies the rim *h*, in which two sets of type are arranged, an upper-case set circularly arranged around one side of the rim, and a lower-case set also circularly arranged around the rim at its other side. Similar or corresponding characters of the upper and lower case sets are paired with each other—that is, the type bearing a capital is in a line on the rim parallel with the axis thereof which passes through the type bearing the same letter in the lower-case style of type, while the numerals may be paired with punctuation-marks or other characters which it is desirable to have comprised within the printing capacity of the machine. Each type of both the upper and lower case sets is radially movable on and with relation to the rim of the drum, each of said types consisting of a head 10, bearing the impression-face of the respective character, a spindle portion 12, and a foot or lug 13 on its inner extremity, between which and the inner periphery of the rim is applied a spring 14 for maintaining the said type in its innermost disposition shown. The shaft *c*, on which the drum is mounted, has a beveled gear *i* thereon, with which engages the bevel-gear *j* on the vertical shaft *k*, which is mounted to rotate, but is fixed against vertical movement.

There is a dial E at the upper end portion of the shaft *k*, above which is a handle-knob *l*, and said knob is freely movable vertically with relation to the said shaft, the downward movement of the knob forcing downwardly the said dial, (which is constrained against rotation,) although there is between the knob and the shaft such an engagement that as the knob is turned a corresponding rotational movement will be also imparted to the shaft. The construction last referred to is particularly illustrated in the sectional view, Fig. 9, and, as shown, on the upper end of the shaft *k* is keyed or otherwise secured a block *m*,

which forms in substance a splined connection between the knob *l*, which is hollow, and the shaft *k*. The dial is necessarily centrally apertured, as at 15, whereby as the knob is rotated, and with it the block *m*, a portion of the depth or thickness of which is normally in the plane of the dial, there will be no tendency to rotate the dial, or by the dial there will be no obstruction to the rotation of the knob, block, and shaft. The dial has a representation of characters thereon corresponding to or in the same succession as those on the type-drum, all so that as the knob is turned and the index-pointer *o* is opposite a certain character on the dial the corresponding character on the drum is at the lowermost or printing position—that is, in a line projected vertically through the axis of the drum.

It will be noticed, Fig. 1, that the dial E is carried on the upper ends of the vertical posts *p p* of a frame F, which is vertically movable relatively to the drum and the platform *e*, being guided in vertical bearings of the latter, and after the knob and shaft have been turned, rotating the drum to present the proper character at the printing position, the knob and dial are then pressed downwardly, the said frame F in its downward movement effecting the impact of the selected type against the platen or paper or card thereon through the bearing by the downward projection *q* of the frame F upon the lever *r*, pivoted on the frame A, to swing in a vertical plane, and normally standing by a vertically-offset extension 19 at its end opposite the pivot, just above the surface of the top of the type of one of the pair thereof which is in the printing position. There is fixed on the rotatable shaft *c*, carrying the type-drum, a plate G, having radial slots *s* therein, with particular ones, of which a centering or locking post *t*, vertically fixed on and extending below the dial, engages at each depression with the upper portion of the mechanism described for effecting the printing, and said slots *s* are in arrangement relative to the movable type, substantially as shown in Fig. 1—that is, there is a slot *s* for each type pair comprised in the drum—and the working-slot for each type is across the drum therefrom in a plane projected through the center of the type and the drum-axis. Thus for the type in the printing position, *x* *s'* is then the drum-centering slot. The outer walls of said slots near the borders of the plate are in V arrangement, as shown, whereby the adjustment of the drum may be more readily insured.

Assuming that the drum and other parts movable therewith are in the positions shown in Figs. 2 and 3 for printing from the lower-case set of type and it is desired to imprint by certain type of the upper-case series, the same is performed and permitted as and through mechanism next described and explained.

The elevated platform *e* is supported on the post or upright *a'*, upwardly extended from the said sleeve-bearing *d*, the said platform being movably guided horizontally in the direction of the axis of said sleeve-bearing *d*, the under portion of the platform being formed ribbed, as shown in Fig. 4 at *v*, to fit in the way *u*, and said platform is further supported and guided by the engagement of its hanger *w* with the exterior of said sleeve-bearing *d*, upon which the said hanger fits to slide, and the said platform is further supported and steadied by the hanger *z*, in the lower extremity of which the outer end of the shaft *c* is supported.

H represents a latch-lever intermediately pivotally hung under the platform upon the hanger *w*, at the outer end of which it is provided with a latching-lug 25, which takes into one or the other of two notches 26 of a member 27 of the upright *a'*, while the inner end of said lever H lies under and supports a sleeve 28, which loosely encircles the vertical shaft *k*, and which also is free to move vertically with relation to the platform *e*. The lever H is held in its latching engagement with the member 27 and to support the said sleeve 28 by the spring 29, Fig. 2. A spindle 30 plays loosely through a vertical hole therefor in the block *m*, before mentioned, and is provided at its upper end with a key or finger-piece 32, which is within the hollow knob *l*, the opening in said knob extending to the top thereof. By pressing downwardly on the finger-key 32 the same is caused to force the sleeve 28 downwardly and depress the adjacent end of the lever H, the other end of said lever swinging out of latch with one of the notches of the member 27, and the force being suitably applied in the direction of the axis of shaft *c*, the platform *e*, with the shaft *k*, and the drum-shaft and drum, and the frame *f*, with the dial and handle-knob, may be all bodily moved horizontally for a distance corresponding to that between the centers of the upper and lower case type series, the shaft *c* telescoping within the sleeve-bearing *d*, and under the operation above described the hammer-extension 19 of the lever *r* occupies a working position then over a type aligned for printing of the series of the other case.

The mechanism for insuring a step-by-step movement of the platen at each depression of the printing or type-operating mechanism, as above described, will be now set forth.

There is horizontally mounted under the bed, parallel with the shaft *c*, a shaft J, which is adapted to move longitudinally in one of its bearings 35, which is on the frame A, the other bearing 36 for supporting said shaft being constituted by a hanger 37, secured on the carriage B. Upon the inner end of said shaft J is secured a barrel 38, which is encircled by the tension-strap 39, the extremities 40 and 41 of which are extended and secured to different ends of the platen C, so that any motion of the shaft J will impart

through the medium of said barrel and strap a movement of the platen at right angles to the axis of the shaft J. There is in substance upon the outer portion of said shaft a disk K, having in regular and circular arrangement on and extending from the face thereof the series of pins 43. L represents a plate which is adapted to slide in ways 45 on the end of the frame A for a reciprocating motion radially with relation to the axis of the said shaft J and disk K thereon. The said plate has within its front side a way 46, which is in a radial line drawn from the axis of shaft J through one of the pins 43 adjacent said plate L, one side of said way being open, as shown at 47, to permit the admission thereinto of the pins 43 one after the other, and there is another way 48 in the face of said plate L, which with relation to the normal position of said plate (shown in Fig. 4) extends from a point 49 on the edge of said plate, which is adjacent the circle of arrangement of the pins 43 angularly with relation to and merges into the said radial way 46. A pawl 50 (shown in detail in Fig. 8) lies within the said way 46, and comprises a spring-shank 52, by which the pawl is secured to the base of i s way inside of the circle of arrangement of the pins 43, and outside of said circle of arrangement said pawl is inclined forwardly relative to the depth of its way, as at 53, and also has its end inclined, as at 54, to conform with one side wall of the angularly-disposed way 48. There is lying in and along the said way 48 a similarly-formed pawl 55, having a spring-shank, and each of said pawls at its enlarged and working extremity is normally sprung outwardly some little distance from the base of the way within which it is located, this relation being particularly seen in Fig. 6. Now it will be plain that if a particular pin of the series 43 is to be brought opposite the spring-shank of the pawl 50, as indicated by 43^a, Figs. 4 and 6, and the plate L is forced radially toward the center of the disk K a suitable distance, and the proximity of the end of said pin with the said pawl is such that an impingement between the pin and pawl is had, the pawl as it moves downwardly with the plate L will be forced inwardly until its end 54 has passed below the said pin, when the pawl will spring outwardly again to act as a detent against the passage of said way 46 back again over the pin, the pin then standing in line with the angular way 48, as indicated in Fig. 5. On the then upward movement of the plate L the side of the way 48 acts as an inclined plane against the pin 43^a, and by the time the plate L has resumed its normal position the said pin on the disk has been moved a distance equal to that between a pair of said pins, and the one next behind the pin 43^a has now been brought into the line of the said way 46 to be acted upon on the next depression of said plate L, as has already been described. The reciprocatory motion of the said plate L is through the connection of the link 60, which is secured at its upper end with the radial arm or lever 62, which is affixed on a rock-shaft 63, and which receives its rock through the engagement with the radial arm 64 thereof of a foot 65, which is secured at the lower portion of the said vertically-movable frame F.

The bearing for the shaft J, which is supported in the frame A in order that said shaft may at times have an axial movement and without altering the position of the disk K, consists of a sleeve, on the outside of which the hub of the disk K is keyed, and axially outside of said hub said sleeve is kerfed or slitted, whereby it is capable as to such extremity of a radial deflection, and such extremity being tapered and externally screw-threaded, as at 66, and receiving the tightening-nut 67, the engagement between the shaft and sleeve may be freed at will, when on moving the shaft axially the bed B will be correspondingly moved, carrying therewith the platen in a direction across the printing-line thereof, and thus the spacing between lines of printing may be readily effected without moving the paper or card on the platen. I have indicated in the drawings at M an inking-ribbon and supporting appliances therefor properly in relation to the face of the type. Other inking contrivances may be substituted for this, however, if desired.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a type-writing machine, the combination, with a horizontal and movable platen, of a horizontal shaft mounted thereabove having a gear thereon, and a type-drum provided with a series of radially-movable type, and also having the platen G, provided with the radial slots *s*, a rotatable shaft vertically mounted, having a gear thereon in engagement with said drum-shaft gear, a frame F, vertically movable and spring-supported, having at its upper portion the indicating-dial E, with relation to which said vertical shaft has a rotation and with relation to which shaft said dial has a vertical movement, a post *t*, and appliances in engagement with and extended from the lower portion of said frame and adapted to force the movable type which is adjacent the platen against the latter, substantially as and for the purpose set forth.

2. In a type-writing machine, in combination, a platen, and a horizontal shaft thereabove, and a bearing therefor in which said shaft rotates and is axially movable, a type-drum fixed on said shaft, provided with two series of radially-movable type, substantially as described, the part *e*, adapted to have a movement parallel with the axis of said shaft, a vertical shaft having a bearing for rotation in said part *e* and geared to said drum-shaft, a frame vertically movable with relation to said drum being guided upon said part *e*, a

swinging lever *r*, having by its one extremity permanently a position over the movable type which is adjacent the platen and in the printing-line and with which said vertically-movable frame has an engagement, all whereby, through the turning of said shaft, the drum may be rotated to present the desired type adjacent the platen, and whereby, on the proper movement of said part *e*, the drum-carrying shaft and drum, said vertical shaft, and said vertically-movable frame may be all bodily moved in the direction of the said drum-shaft, so that the type of the upper or lower case series may be brought opposite the printing-line of the platen, substantially as described.

3. In a type-writing machine, the combination of the horizontal shaft *c* and the sleeve-bearing *d* therefor, the drum on said shaft *c*, having on its periphery two opposing series of type, a vertical shaft *k*, geared to the drum-shaft, and a horizontal part or platform *e*, in which said vertical shaft has a bearing and in an extension of which said drum-shaft also has a bearing, said part *e* being movable in the direction of said drum-shaft, and a latch for confining said part *e* against movement, substantially as and for the purpose set forth.

4. In a type-writing machine, in combination, the drum-shaft *c* and sleeve-bearing *d* therefor, the drum on said shaft having on its periphery two opposing series of type, a vertical shaft *k*, geared to the drum-shaft, and a horizontal part or platform *e*, in which said vertical shaft has a bearing and in an extension of which a portion of said drum-shaft also has a bearing, said part *e* being movable parallel with the axis of the drum-shaft, a latch-lever for confining said part *e* against movement, an arm of which lies adjacent to said shaft *k*, under the platform *e*, a key or finger-piece vertically guided with relation to the upper portion of said shaft, and a sleeve surrounding said shaft above and resting on said latch-lever arm, on the upper end of which sleeve the downward extension of said finger-piece bears, substantially as and for the purpose described.

5. In a type-writing machine, in combination, a suitable stationary frame and a platen, a drum-shaft *c* and a slide-bearing therefor, a drum on said shaft, having on its periphery two opposing series of radially-movable type, a vertical shaft *k*, geared to the drum-shaft, and a horizontal part or platform *e*, through which said vertical shaft projects and in an extension of which a portion of said drum-shaft also has an engagement and bearing, said part *e* being movable parallel with the axis of the drum-shaft, the arm 27 on the frame, having the separated notches 26 26, the levers H, pivoted on the said part *e*, by one arm adapted to latch into one of said notches and by the other arm to lie under said part *e* adjacent said shaft and to support a sleeve 28, which loosely surrounds said shaft and is vertically movable independently thereof, the frame E, spring-supported from said part *e*, having at its upper portion the indicating-dial, and said frame adapted on its depression to insure the impact of one of the type which is adjacent the platen thereagainst, the block *m*, fixed to the upper extremity of said shaft *k*, and the key or finger-piece 32, having a spindle-like portion which loosely plays vertically through said block and is adapted to bear on said sleeve, the hollow knob surrounding and having an engagement with said shaft and block, whereby one may not be rotated on the other, but whereby said knob is movable along said shaft, substantially as described, and for the purpose set forth.

6. In a type-writing machine, in combination, a suitable frame having a bed thereon, the carriage B, movably guided across said bed, and the platen C, movably guided along said carriage, the shaft J, having a bearing-support in the frame of the machine and also bearing for rotation in, but against endwise movement on, a hanger 37, which forms a part of said carriage, the barrel on said shaft, and the strap encircling same and engaging the platen, as described, the said shaft being adapted to have an endwise motion in its bearing in the frame, for the purpose set forth.

7. In a type-writing machine, in combination, a suitable frame having the bed thereon and the carriage B movable across the same and provided with a hanger 37, the sleeve rotatable in the said frame and having its outer extremity kerfed or slitted, whereby it is rendered capable of a radial deflection, the same being externally tapered and screw-threaded and having the nut thereon, the shaft J, bearing for rotation, but against endwise movement on, said hanger 37 and extended through the said sleeve and adapted on the turning of said nut to move as one therewith, being then held against endwise movement thereon, for the purpose set forth.

8. In a feed-movement for a type-writer, a shaft or part to be rotated embodying a wheel or disk K, having a circularly-arranged series of pins 43, combined with an element or plate, as L, adapted to have a movement substantially radial to the axis of said wheel and in a plane adjacent that in which said pins are arranged, and having in its side a way or groove 46, having therein a spring-pawl 50, and another way or groove 48, which is angularly arranged with relation to the said way 46, substantially as described.

9. In a feed-movement for a type-writer, a shaft or part to be rotated embodying a wheel or disk K, having a circularly-arranged series of pins 43, combined with an element or plate, as L, adapted to have a movement substantially radial to the axis of said wheel and in a plane adjacent that in which said pins are arranged, and having in its side a way or groove 46, with the spring-pawl 50

therein, and another way or groove 48, which is angularly arranged with relation to the said way 46, and provided therewith with another spring-pawl 55, all arranged for operation substantially as described.

10. The combination, with the platen movably guided with relation to the bed of the machine, of the shaft J, mounted for rotation under said bed and having an engagement with said platen, and having mounted thereon the wheel K, provided with the circularly-arranged series of pins 43, a drum mounted above said platen, having the series of radially-movable type in peripheral arrangement, mechanism for securing and regulating the rotation of said type-drum, a frame vertically movable and adapted on its depression to insure the impact of one of said type against the platen, an element or plate, as L, adapted to have a movement substantially radial to the axis of said wheel K, and in which are formed the ways or grooves 46 and 48, substantially as shown, the former having therein the spring-pawl 50, and connections interposed between said type-actuated frame and said plate L, whereby on the movements of the former the said plate will be reciprocated for the action set forth.

SAMUEL C. HURLBUT.

Witnesses:
WM. S. BELLOWS,
J. D. GARFIELD.