

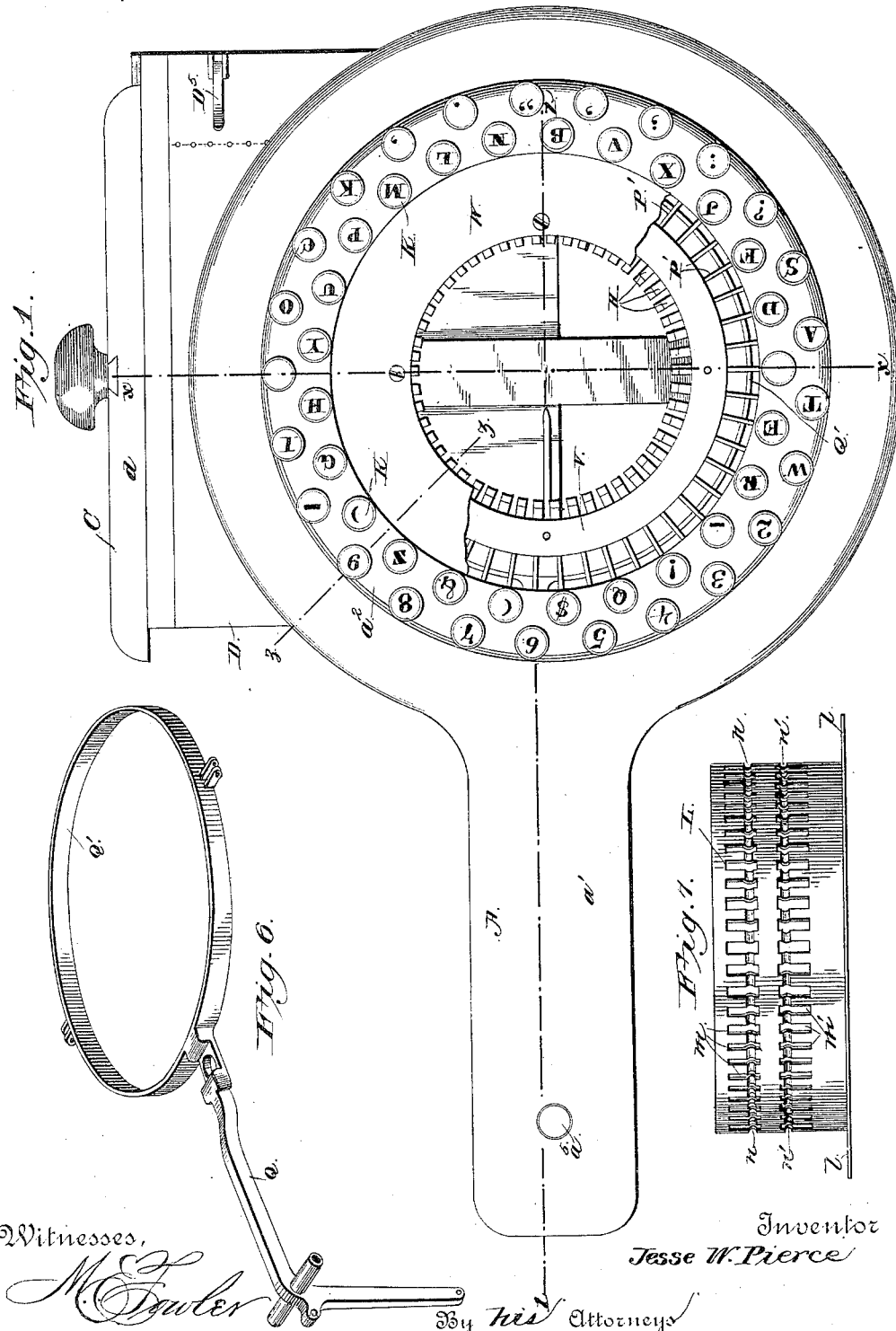
(No Model.)

5 Sheets—Sheet 1.

J. W. PIERCE.  
TYPE WRITING MACHINE.

No. 419,217.

Patented Jan. 14, 1890.



Witnesses,

*M. Fowler*  
*C. E. Doyle*

By *his* Attorneys

Inventor  
*Jesse W. Pierce*

*C. H. Snowdon*

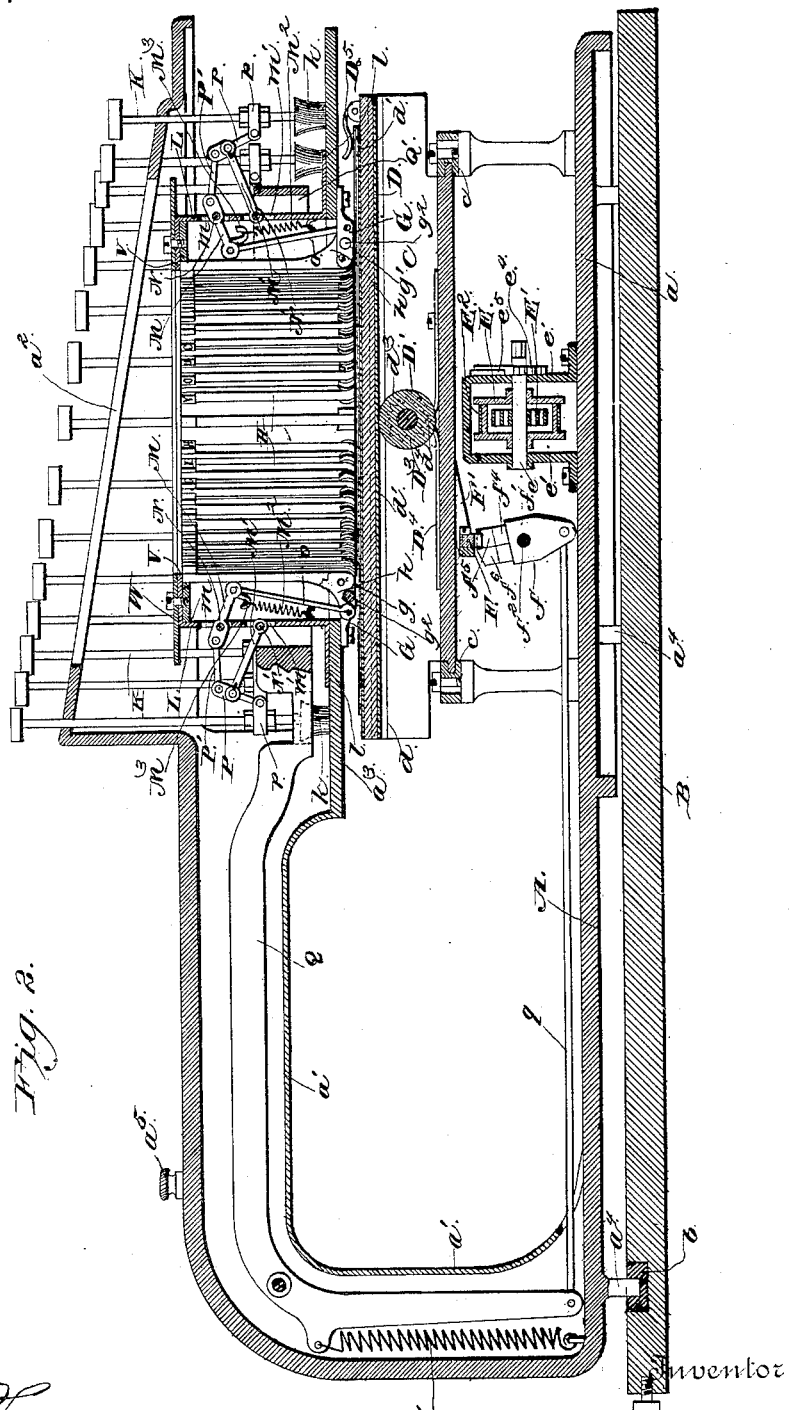
(No Model.)

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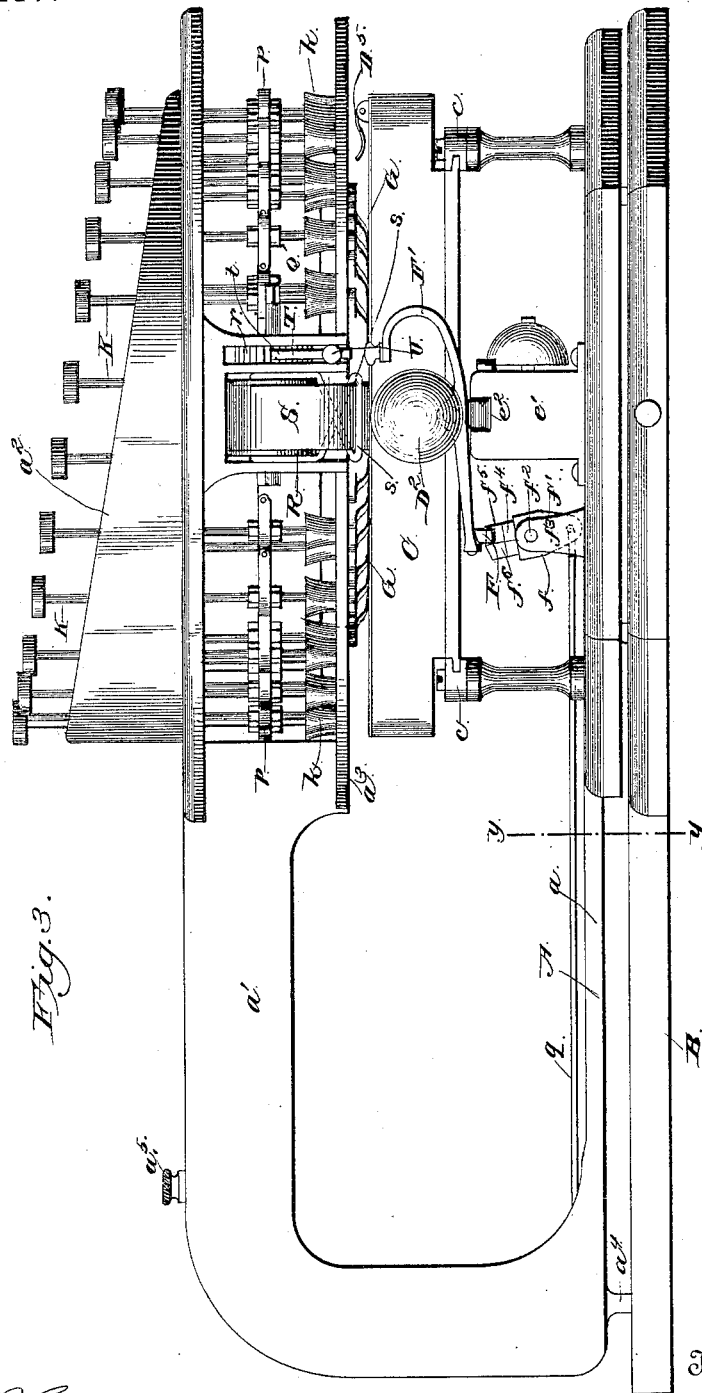
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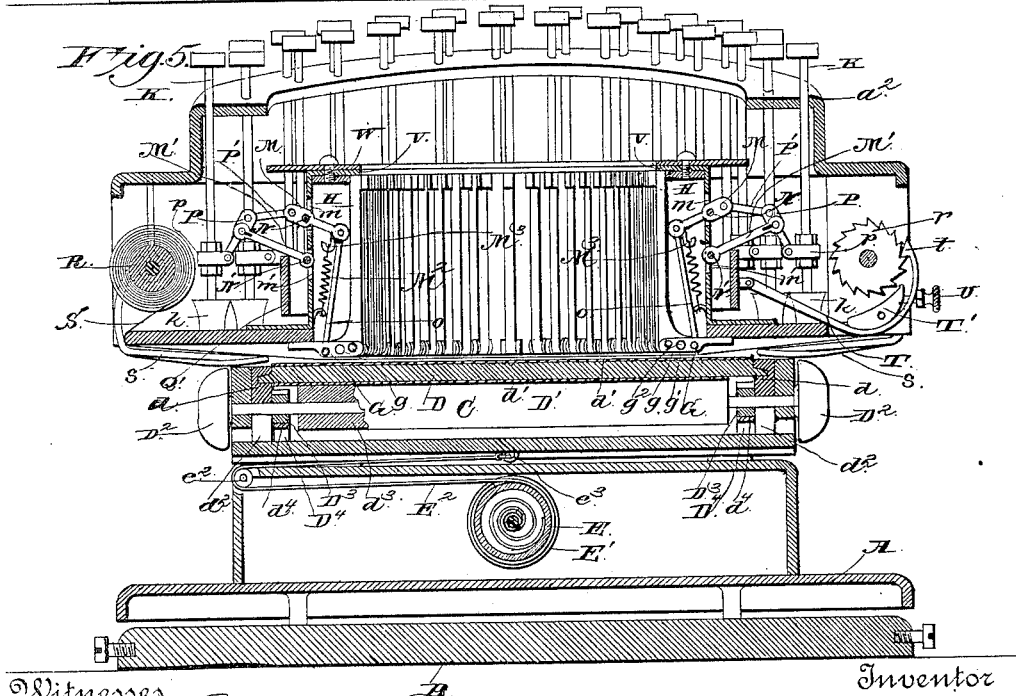
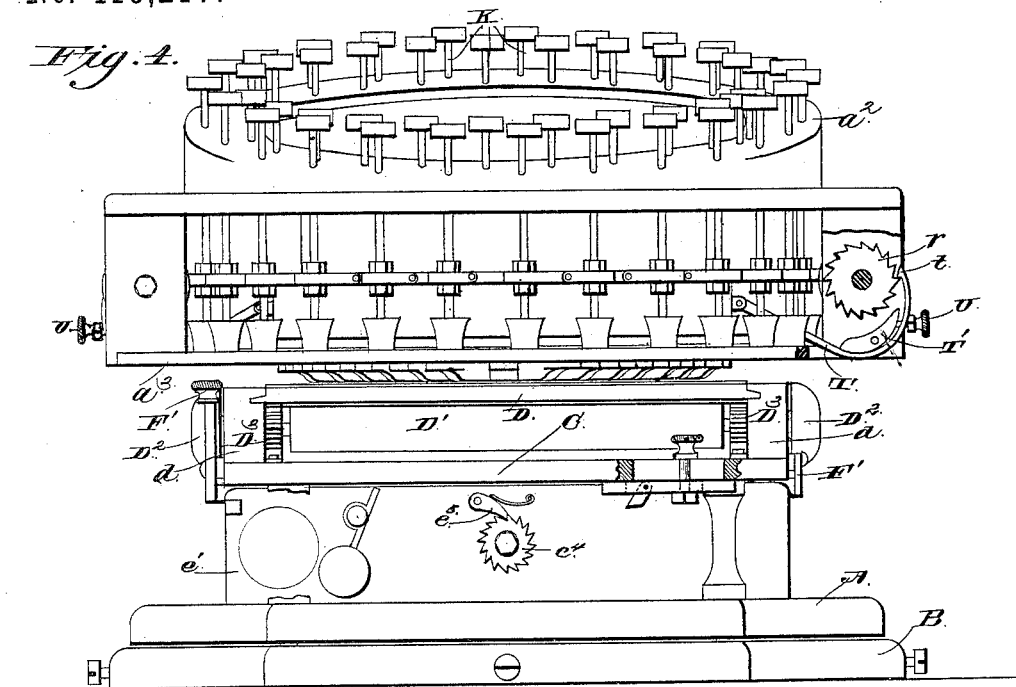
(No Model.)

5 Sheets—Sheet 4.

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## Witnesses

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(No Model.)

5 Sheets—Sheet 5.

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Fig. 8.

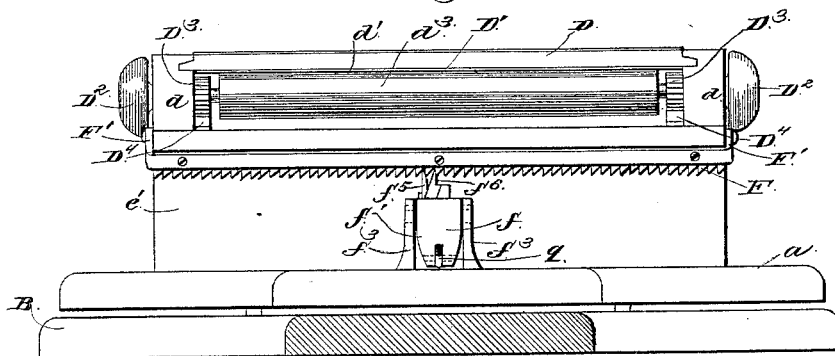


Fig. 9.

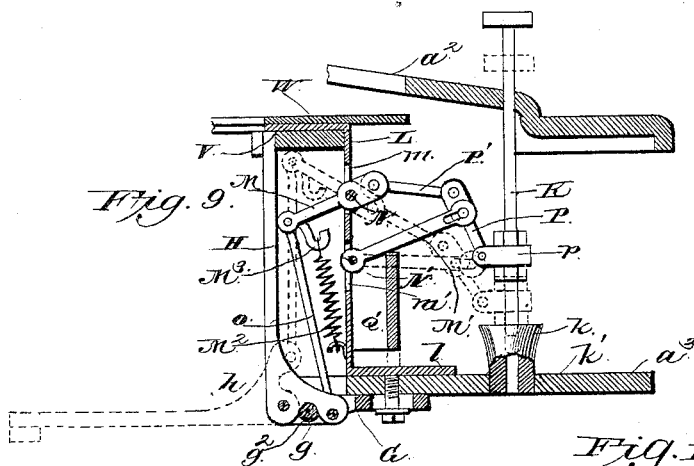


Fig. 10.

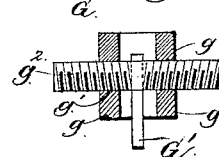


Fig. 11.

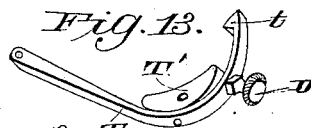
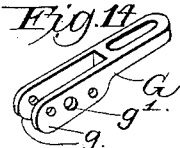
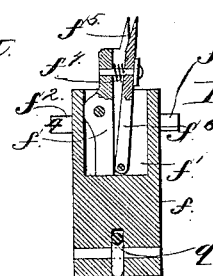


Fig. 12.



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# UNITED STATES PATENT OFFICE.

JESSE W. PIERCE, OF BELTON, TEXAS.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 419,217, dated January 14, 1890.

Application filed July 6, 1888. Serial No. 279,165. (No model.)

*To all whom it may concern:*

Be it known that I, JESSE W. PIERCE, a citizen of the United States, residing at Belton, in the county of Bell and State of Texas, have invented new and useful Improvements in Type-Writing Machines, of which the following is a specification.

The invention relates to improvements in type-writers; and it consists in a certain novel construction and combination of devices, fully set forth hereinafter in connection with the drawings, and specifically pointed out in the appended claims.

An object of the invention is to provide means whereby a number of sheets of paper may be inserted at one time and removed successively after each page is written, thereby obviating the necessity of removing the completed sheet and replacing it by a new one at the end of each page.

A further object of the invention is to provide improved means for feeding the paper, whereby the latter is kept flat, so that the type strikes on a flat surface.

A further object of the invention is to provide improved means for automatically operating the carriage as the keys are depressed, whereby more perfect spacing is attained.

A further object of the invention is to provide improved means for operating the type-bars, whereby the necessary motion thereof is accomplished by a very slight depression of the keys, and also by a slight pressure thereon.

A further object is to provide means whereby the jar and sound caused by the operation of the type-bars are deadened to render the machine comparatively noiseless.

These objects are attained in the machine illustrated in the accompanying drawings, wherein—

Figure 1 is a top plan view. Fig. 2 is a longitudinal central sectional view, line 1 1, Fig. 1. Fig. 3 is a side view. Fig. 4 is a front view. Fig. 5 is a transverse section on the line *x x* of Fig. 1. Fig. 6 is a detail perspective view of the spacing-lever. Fig. 7 is a similar view of the supporting-cylinder for the operating means for the type-bars. Fig. 8 is a transverse sectional view on the line *y y* of Fig. 3 to show the spacing mechanism.

Fig. 9 is a detail sectional view on the line *z z* of Fig. 1 to show the operating mechanism for the type-bars. Fig. 10 is a detail sectional view to show the adjusting means for the type-bar hangers. Fig. 11 is a detail sectional view of the spacing-pawl. Fig. 12 is a detail view of one of the type-bars to illustrate the manner of arranging the filling. Fig. 13 is a detail perspective view of one of the detents for the ink-ribbon spools, and Fig. 14 is a detail perspective of one of the type-bar hangers.

Referring by letter to the drawings, A designates the main supporting-frame of the machine, which consists of the base-plate *a* and the hollow supporting-arm *a'*, having the annular key-plate *a<sup>2</sup>* and the annular supporting-plate *a<sup>3</sup>* arranged on its front end. The base-plate is provided on its under side with depending standards or pins *a<sup>4</sup>*, which are stepped at their lower ends in rubber-lined sockets *b b* in the base-board B, whereby the jar or resonance which is caused in the supporting-frame by the operation thereof is prevented from being communicated to the base-board, and thence to the table or stand on which the type-writer rests.

C designates the carriage, which is mounted in guides or ways *c c*, arranged above the base-plate on suitable supports, whereby the carriage is capable of a lateral sliding movement, and in guides or ways *d d* on the said carriage is mounted the feed-plate D, having its upper and lower sides covered with the rubber sheets *d'*. This feed-plate is capable of a longitudinal sliding movement independent of the movement of the carriage, and it is controlled by the feed-roll D', which is mounted transversely under the plate in vertical slots *d<sup>2</sup> d<sup>2</sup>* in opposite sides of the carriage. The extremities of the roll beyond the sides of the carriage are provided with the knobs or handles D<sup>2</sup> D<sup>2</sup>, whereby it may be turned by hand, and within the carriage the said roll is provided with the spur-wheels D<sup>3</sup> D<sup>3</sup>, which are engaged, respectively, by projections *d<sup>4</sup> d<sup>4</sup>* on the leaf-springs D<sup>4</sup> D<sup>4</sup>. These springs press upward and normally hold the roller in contact with the under side of the feed-plate, and also hold the roller from rotary movement, and when one of the knobs or handles D<sup>2</sup> is

turned the said projections on the springs slip from one tooth of the spur-wheels to the next. The body  $d^3$  of the feed-roll is preferably of rubber, and therefore (as it bears tightly against the rubber-covered under side of the feed-plate) when the feed-roll is turned the feed-plate will be moved either forward or backward. Small pressure-springs  $D^5$   $D^5$  are arranged near the front end of the feed-plate, under which may be engaged the lower edge of the sheet of paper or other material which is to receive the impressions of the type, and it will be seen that instead of engaging a single sheet under the said springs a dozen or more sheets may be arranged thereunder and removed successively as they are completed; or a tablet containing twenty, twenty-five, or even fifty sheets may be engaged at one edge under the pressure-springs, and as the sheets are completed they may be torn off without removing the tablet from the feed-plate.

The tension device for the carriage consists of a barrel or drum E, mounted on a shaft or spindle, which is mounted in bearings in a suitable support  $e'$ , and within the barrel or drum is arranged a spiral spring  $E'$ , which is adapted to rotate the same to wind thereon the ribbon  $E^2$ , which passes around a pulley  $e^2$  at one end of the carriage-support, and is attached at its extremity to an eye  $e^3$  on the under side of the carriage. The end of the shaft or spindle  $e$  is provided with a ratchet-wheel  $e^4$ , which is engaged by a pawl  $e^5$ , whereby when the shaft or spindle is turned (for which purpose it is provided with a squared end adapted to be engaged by a key or wrench) the spring is tightened and the ribbon is strained, whereby when the carriage is released at intervals it is automatically drawn toward the left of the operator.

The spacing device for the carriage consists of a rack-bar F, which is affixed at its ends to the ends of the releasing-levers  $F'$   $F'$ , mounted, respectively, on opposite ends of the carriage, and the swinging pawl  $f$ , which is mounted on the base-plate under the carriage and is adapted to engage the said rack-bar. The said pawl consists of the box  $f'$ , which is provided with lateral trunnions  $f^2$ , mounted in bearings in suitable supports  $f^3$ , and the tooth-frame  $f^4$ , secured within the said box and provided with the rigid tooth  $f^5$  and the movable spring-actuated tooth  $f^6$ . The rigid tooth  $f^5$  is normally in engagement with the rack-bar, while the movable tooth, which is normally held by its spring  $f^7$  out of alignment with the rigid tooth, is arranged in rear of the rack-bar. When the lower end of the swinging box is drawn rearwardly by means which will be hereinafter described, the movable tooth is engaged in the next tooth to that engaged by the rigid tooth. The tension device, then acting upon the carriage, draws it toward the left until the movable tooth is in alignment with the rigid tooth, and when the lower end of the swinging box is allowed to

resume its normal position by releasing the key the rigid tooth will engage the tooth of the rack-bar just released by the movable tooth, and the movable tooth will again spring out of alignment with the rigid tooth and assume a position opposite the next tooth of the rack-bar.

When it is desired to move the carriage to the right, the releasing-levers are depressed, thereby raising the rack-bar out of engagement with the pawl.

G G represent type-bar hangers, which are affixed to the under side of the annular supporting-plate  $a^3$  at its inner edge, and they consist of the sides  $g$   $g$ , provided with registering tapped apertures  $g'$   $g'$ , in which are mounted the right and left screw-threaded bolts  $g^2$ , whereby the said sides may be drawn toward each other or separated by turning the said bolts. These bolts are adapted to be turned by means of a small rod, (shown in Fig. 10 at  $G'$ ), which is inserted in a transverse aperture therein between the sides of the hanger.

The type-bars H H are pivoted at their lower ends in the hangers G G and are adapted to fit snugly between the sides thereof, and the offsets  $h$   $h$  at the lower ends of the type-bars are adapted to rest on the adjusting-bolts  $g^2$  when the type-bars are in their normal or vertical position. It will be seen that as the journals of the type-bars wear the lost motion is taken up by tightening the bolts  $g^2$ . In the present application, however, I make no claim to the type-bar hanger, as it forms an element of a separate application for patent on an improved type-writer embodying the same general principles of operation and arrangement as the machine forming the subject-matter of the present application. Said separate application was filed October 9, 1889, Serial No. 326,442.

K K represent the key-rods, which are arranged in a circular series around the central opening of the annular plate  $a^3$ , and the lower ends of these rods are mounted in sockets or cups  $k$   $k$ , which are fitted in openings  $k'$  in the supporting-plate  $a^3$ . The lower ends of the key-rods fit snugly in the bores of these sockets or cups, and as they register respectively with the bearings in the annular plate  $a^3$  the rods are guided vertically at both their upper and lower ends, and are thereby held from lateral play.

L represents a supporting-cylinder, which is arranged concentric with the key-rods, and is provided with an upper and lower series of vertical slots or openings  $m$  and  $m'$ , which are intersected at their centers by the peripheral grooves  $n$  and  $n'$ , respectively. This cylinder is provided at its lower edge with a peripheral horizontal flange  $l$ , which is secured to the supporting-plate  $a^3$ . Wires N and N' are arranged, respectively, in the grooves  $n$   $n'$ , and on the wire N are mounted the levers M, which operate in the slots or openings  $m$   $m$ , and are connected at their outer ends to

the lower ends of the type-bars by the connecting-rods O. Vertically-adjustable ears *p* are arranged on the key-rods, between which are pivoted the lower ends of operating-arms P P, which are connected to the outer ends of the levers M M by the links P' P'. Swinging arms M' M' are mounted on the wire N' in the lower slots or openings *n'*, and the outer ends of the said arms are connected to intermediate points of the operating-arms P P. When a key-rod is depressed, the operating-arm is drawn down, thereby moving the swinging arm from its normal inclined position, as shown in full lines in Fig. 9, to a horizontal position, (shown in dotted lines in the said figure.) The outer end of the lever M is drawn down, thereby elevating its inner end, as shown in dotted lines in the above-mentioned figure, and the type-bar is thrown forcibly down to the horizontal position, thereby causing the type on its free end to come in contact with the paper or other material which is arranged over the center of the feed-plate. When the key is released, the various parts are returned to their normal position, as shown in full lines in Fig. 9, by the coiled spring M<sup>2</sup>, which is connected to a hook M<sup>3</sup> on the inner end of the lever M.

Q designates the spacing-lever located in the hollow supporting-arm *a'*, which is pivoted at an intermediate point, and is connected at its lower end to the lower end of the pawl *f* by means of the connecting-rod *g*; and *g'* represents a coiled contractile spring, which is connected to the lever and normally holds its front or free end raised in the position shown in the drawings, Figs. 2 and 3.

The free end of the spacing-lever is provided with a circular spacing-bar Q', which surrounds the supporting-cylinder L, and is in contact at its upper edge with the swinging arms M' M', whereby when a key is depressed and the swinging arm connected thereto is swung down at its outer end the said spacing-bar is also depressed, the spacing-lever is operated, and the rack-bar connected to the carriage is allowed to move one tooth in the manner hereinbefore described.

R R represent spools, which are arranged, respectively, at opposite sides of the supporting-frame, and on the spools are wound the opposite ends of the inking-ribbon S, which passes under the supporting-plate *a*<sup>3</sup>, and is supported just above the surface of the paper on the feed-plate by the wire supports *s*, which also extend under the said plate *a*<sup>3</sup>. These spools are provided with ratchet wheels or disks *r r*, which are engaged by detents *t t* on the outer ends of the spring-levers T T, which levers are attached at intermediate points to the pivoted blocks T' T', and are attached at their inner ends to the spacing-bar Q'. The free ends of these levers are normally held away from the ratchet-disks, and the detents *t t* are drawn into engagement with the disks by the thumb-screws U U, which pass through the outer ends of

the levers and engage the pivoted blocks T'. These blocks T' are pivoted at their centers to the supporting-frame, and the levers are secured to the under sides of the blocks. These blocks provide bearings for the inner ends of the set-screws, so that when they are turned they will cause the ends of the levers to act in the desired manner, and they also serve as guides for the levers.

When the ribbon is wound on the left-hand spool and it is desired to move the same toward the right, the lever adjacent to the right spool is engaged therewith and the lever adjacent to the left spool is disengaged, and therefore when the spacing-bar is depressed the right lever will be swung down at its inner end and swung up at its outer end sufficiently to engage the tooth above that previously engaged, whereby when the spacing-bar resumes its normal position the outer end of the lever will be drawn down, and will therefore turn the spool slightly. Thus the spool is turned a notch for each depression of the spacing-lever. When the inking-ribbon has been wound on the right spool and it is desired to have it move in the opposite direction, the right lever is disengaged and the left lever engaged, as will be readily understood.

From the foregoing description it will be observed that the paper which is arranged flat on the feed-plate passes laterally under the inking-ribbon, and as the keys are depressed they strike down on the upper side of the said ribbon, and therefore make the desired impression on the paper. At the end of each line the feed-plate is moved by turning one of the knobs or handles D<sup>2</sup> and the carriage is returned to its first position, as shown in Fig. 1 of the drawings.

The upper edge of the supporting-cylinder L is provided with an inward-extending flange V, which overhangs the upper ends of the type-bars when they are in their normal positions, and to the under side of this flange is affixed a cushion of rubber, leather, felt, or other elastic or soft material, against which the upper ends of the type-bars strike as they resume their normal positions, whereby all noise is avoided. An annular cap-plate W is secured to the upper side of the flange V to cover the operating mechanism and protect the same from dust, &c.

It will be observed that the various contacting parts of the machine are carefully padded or protected to prevent noise during their operation; also, the upper side of the feed-plate is provided with a rubber sheet, whereby the impact of the type-bars is deadened; also, the hollow type-bars are provided with a filling of rubber, cork, leather, or similar material, as shown in Fig. 12 of the drawings, whereby the ring or resonance usually accompanying a stroke of the same is deadened.

Various advantages are derived from the construction and arrangement of parts herein



described, among which are the following: Owing to the fact that the type-bars strike vertically downward, the force of gravity is utilized instead of being overcome, as in the Caligraph and Remington, and therefore less force is necessary to depress the keys.

Owing to the circular arrangement of the keys and the operating means connected thereto the work may be viewed at all times without removing the hands from the machine or stopping the work. A number of sheets of paper may be arranged on the machine at one time, thereby obviating the necessity of inserting a sheet at the completion of each page. The page is arranged on the feed-plate flat, and therefore either thick or thin paper may be used with equal facility, as no rolling thereof is necessary. The arrangement of levers and arms for connecting the key-rods to the type-bars is such as to reduce the stroke or vertical movement of the key-rods to a minimum, at the same time giving sufficient power to properly operate the type-bars and other devices connected therewith.

I am aware that it is not new to mount the type-bars upon transverse bolts in the hanger, whereby as the bearings become worn the sides of the hanger may be drawn toward each other; but it will be seen that when an ordinary bolt is employed the adjustment draws the side of the hanger adjacent to the nut inward, but does not move the other side, and therefore the type-bars are liable to be drawn out of alignment; but when a double bolt is employed, as shown in my machine, both sides of the hanger are drawn inward equally, thereby preserving the alignment.

When the pivoting-wires  $N N'$  become worn, they may be readily removed and others substituted therefor, as it is simply necessary to pass the wire through the bearings of the levers  $M$  or the swinging arms  $M'$  and extend the wire around the cylinder, and when the bearings in the said levers or arms become enlarged by continued wear thicker wires may be substituted, thereby tightening the joints and preventing lost motion.

In order to enable a copy-holder to be arranged in front of the operator in such a position that it may be seen simply by raising the eyes without glancing to either the right or left, I have arranged a set-screw  $a^5$  on the supporting-arm  $a'$ , which may be engaged in a suitable notch or opening in the said holder.

Having thus described the construction and operation of my improved type-writing machine, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a type-writer, the hollow type-bars provided with a filling of rubber, felt, leather, or other non-resinous material, substantially as specified.

2. In a type-writer, the feed-plate, the type-bars, the spacing-bar adapted to be depressed by the mechanism that operates the type-bars, the spools  $R R$ , provided with suitable ratchet-disks, and the ribbon wound on the

spools and passing over the feed-plate, the spring-levers  $T T$ , mounted on the pivoted blocks  $T' T'$  and connected to the said spacing-bar, and provided with detents  $t t$  to engage the ratchet-disks, and the set-screws  $U U$ , passing through the outer ends of the said levers and engaging the blocks, whereby the detents  $t t$  may be engaged with the ratchet-disks or disengaged therefrom, substantially as and for the purpose specified.

3. In a type-writer, the combination, with the type-bars arranged in a circular series, and the circular spacing-bar surrounding the said series, of the vertically-moving key-rods, the levers  $M M$ , connected at their inner ends to the type-bars, the operating-arms  $P P$ , pivoted to the key-rods and connected at their inner ends to the outer ends of the levers  $M M$ , and the swinging arms  $M' M'$ , adapted to depress the space-bar when the keys are depressed, substantially as specified.

4. In a type-writer, the combination, with the type-bars and the spacing-bar surrounding the same, of the vertically-adjustable ears  $p p$  on the key-rods, the levers  $M M$ , connected at their inner ends to the type-bars, the contractile springs  $M^2$ , connected to the said levers, the operating-arms  $P P$ , mounted between the ears  $p p$  and connected to the outer ends of the levers  $M M$ , and the swinging arms  $M' M'$ , connected at their outer ends to intermediate points of the operating-arms and arranged over the spacing-bar, whereby when the key-rods are depressed the spacing-bar is depressed, substantially as specified.

5. In a type-writer, the combination, with the vertically-disposed type-bars arranged in a circular series, of the vertical supporting-cylinder arranged concentrically around the said series and provided with a series of slots or openings  $m m$ , and the peripheral groove  $n$ , intersecting said slots, the wire  $N$ , arranged in the said groove, the levers  $M$ , mounted on the wire  $N$  and in the said openings or slots and connected at their inner ends to the type-bars, and the vertically-disposed key-rods arranged concentrically around the supporting-cylinder and connected to the outer ends of the said levers, substantially as specified.

6. In a type-writer, the combination, with the type-bars, the spring-actuated levers  $M M$ , and the connecting-rods  $O O$  between the inner ends of the levers and the type-bars, of the key-rods mounted at their upper ends in suitable bearings, and the sockets or cups  $k k$ , provided with bores registering with the said bearings and adapted to receive the lower ends of the key-rods, and said key-rods being connected to the levers  $M M$  by means substantially as hereinbefore described.

7. In a type-writer, the combination, with the carriage provided with a suitable tension device and carrying a rack-bar  $F$ , of the swinging pawl  $f$ , comprising the box  $f'$ , provided with trunnions mounted in suitable bearings, the tooth-frame inclosed within the

said box and provided with a rigid tooth  $f^5$ , and the spring-actuated tooth  $f^6$ , arranged adjacent to the said rigid tooth, and the spring-actuated spacing-lever connected to the said swinging pawl and adapted to be depressed by the operation of the keys, substantially as specified.

8. The combination, with the frame having the arm  $a'$ , of the carriage mounted on the frame and carrying a rack-bar, the spacing-pawls mounted on the frame and engaging the rack-bar, the spacing-lever  $Q$ , pivoted within the arm  $a'$  and adapted to be operated by the keys which act on the type-bars, the connecting-rod  $q$ , connecting said lever to the pawl, and the spring  $q'$ , secured to said lever and to the frame, as set forth.

9. The combination of the frame having a

circular front portion, the supporting-cylinder  $L$ , secured to the said circular front portion of the frame, the type-bars arranged concentrically within said cylinder, the vertically-disposed keys arranged concentrically around the cylinder, and the levers extending through the wall of the cylinder and fulcrumed thereon, and having their opposite ends connected, respectively, with the type-bars and the keys, as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JESSE W. PIERCE.

Witnesses:

E. G. SIGGERS,

R. J. MARSHALL, Jr.