

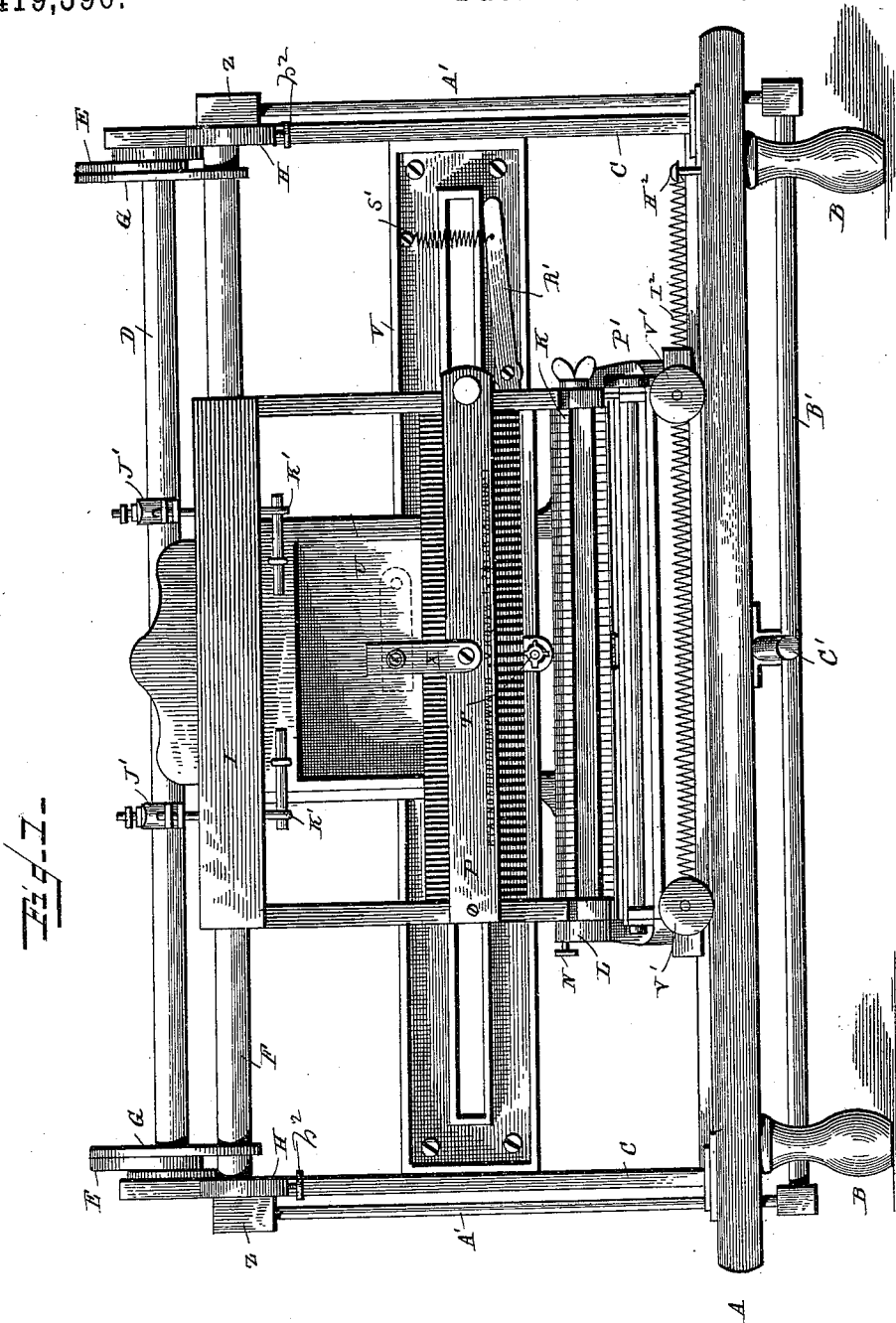
(No Model.)

5 Sheets—Sheet 1.

T. D. WORRALL.
TYPE WRITING MACHINE.

No. 419,396.

Patented Jan. 14, 1890.



WITNESSES
Edwin L. Jewell,
A. C. Hartmann

INVENTOR
T. D. Worrall

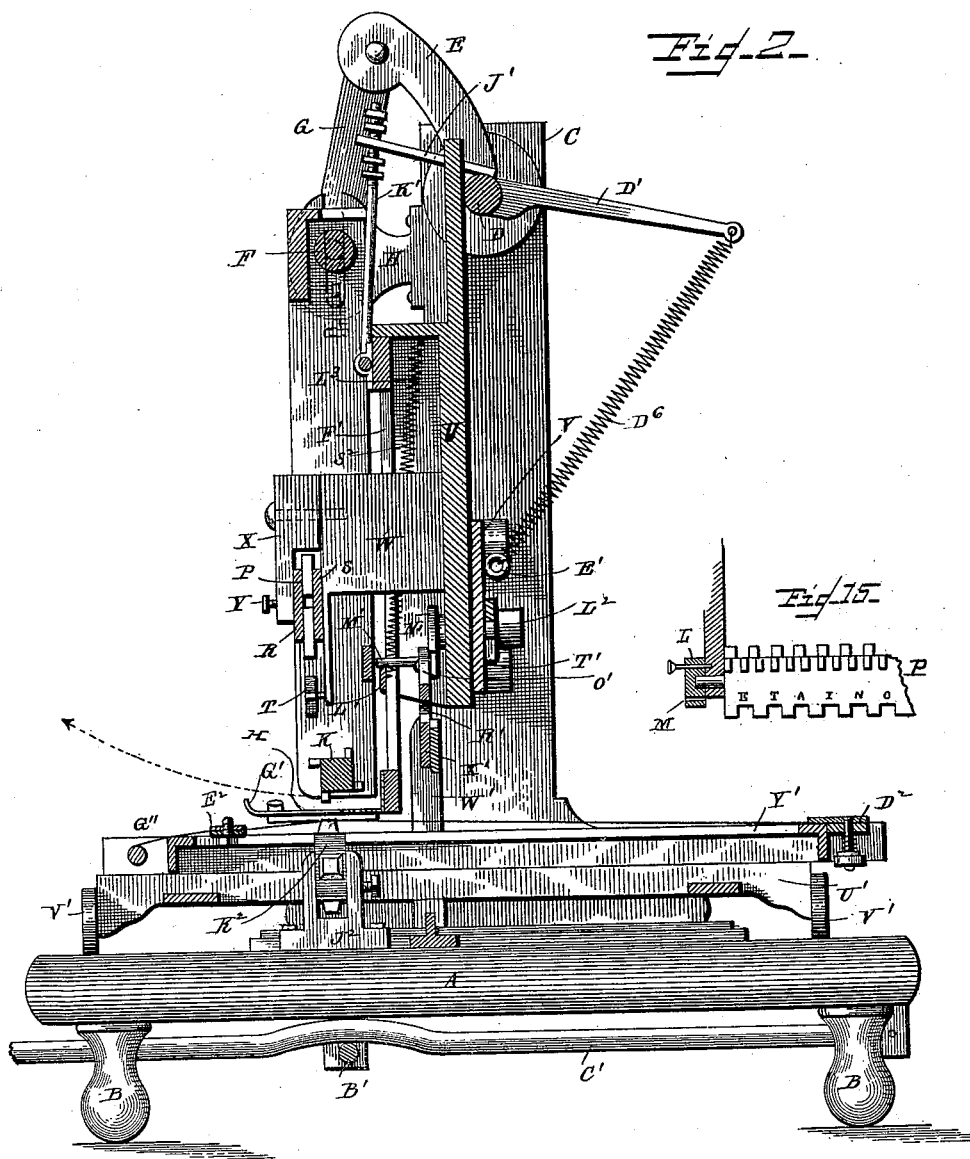
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5 Sheets—Sheet 2.

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WITNESSES

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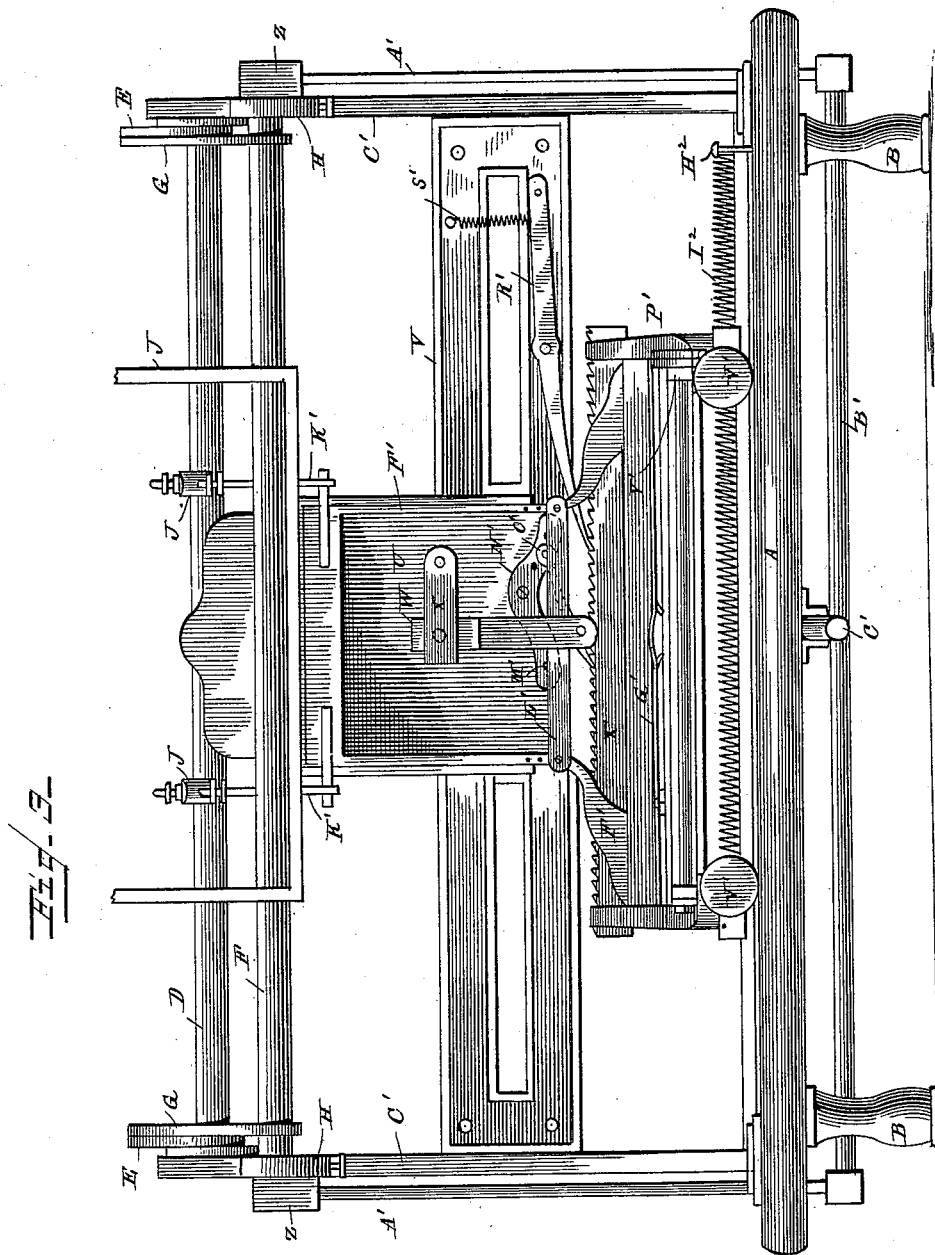
(No Model.)

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WITNESSES

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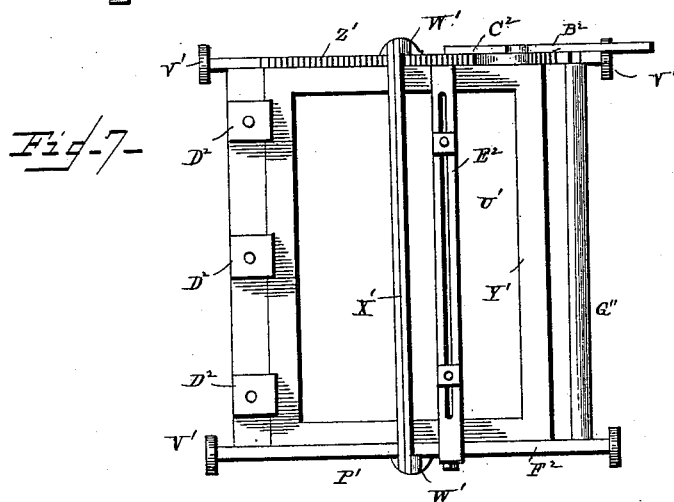
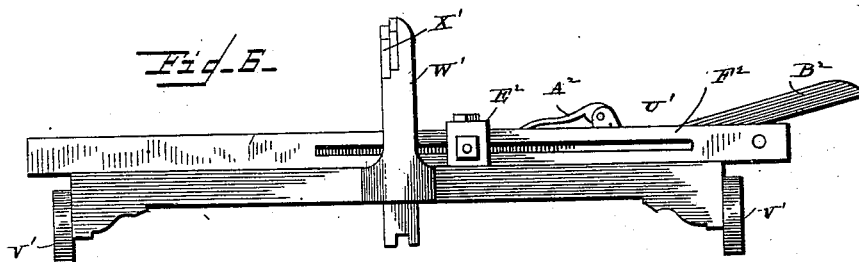
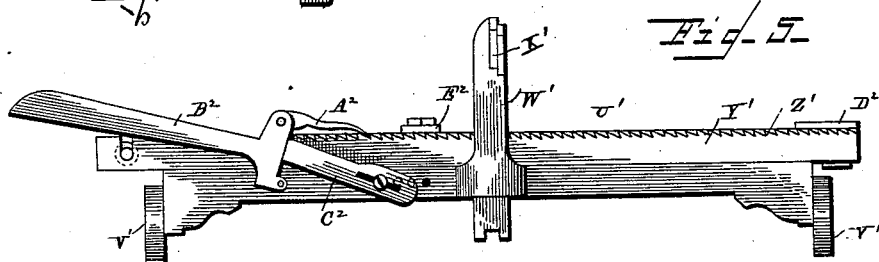
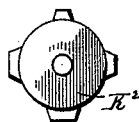
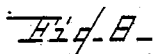
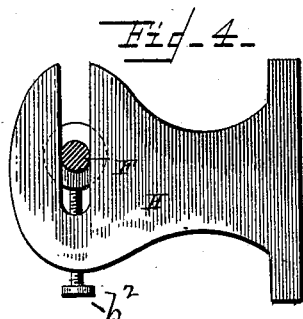
INVENTOR

T. D. Worrall

5 Sheets—Sheet 4.

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INVENTOR

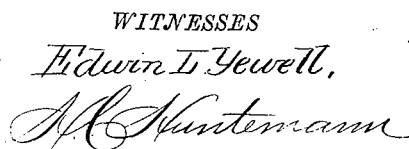
Edwin T. Yewell,
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Ed Storrall

5 Sheets—Sheet 5.

No. 419,396.

Patented Jan. 14, 1890.



INVENTOR

John Storrally

UNITED STATES PATENT OFFICE.

THOMAS D. WORRALL, OF LYNN, MASSACHUSETTS.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 419,396, dated January 14, 1890.

Application filed November 12, 1886. Serial No. 218,731. (No model.)

To all whom it may concern:

Be it known that I, THOMAS D. WORRALL, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to certain improvements in type-writers; and it has for its objects to provide a type-writer of simple construction, easy to operate either by hand or foot power, and also suitable for making heavy impressions, such as used in engraving, &c. These objects I attain by the means illustrated in the accompanying drawings.

Figure 1 represents a front elevation; Fig. 2, a transverse sectional view; Fig. 3, a front elevation showing the type-carriage elevated and broken away; Fig. 4, a detail view of one of the brackets in which the rod on which is suspended the type-carriage is guided and held in position; Fig. 5, a side elevation of the paper-holding carriage; Fig. 6, the opposite side thereof; Fig. 7, a top view of the same; Fig. 8, a detail of the impression-bed; Fig. 9, a detail of the ink-pad-holding device; Fig. 10, a detail of one of the slides for same; Fig. 11, a detail of the pawl-pivot-holding device; Fig. 12, a detail of the device for holding the type-holder in position; Fig. 13, a front view of said device; Fig. 14, a view of one of the pawl-pivots. Fig. 15 is a front view of a portion of the resister or spacing plate or roller.

The letter A indicates the base of the machine, provided with suitable legs B, and has fixed upon it at opposite sides the standards C, in the top of which is mounted a rock-shaft D. On this rock-shaft is secured at each side the arms E, which connect to a shaft or rod F by means of the links G. This shaft is guided and held in position by the brackets H at each side of the machine, and being secured to the standards C, and on the same rod or shaft is pivoted the type-carriage T, which is free to move either up or down and to slide back and forth from one side of the machine to the other. The brackets H are provided with slots for the reception of the rod F, and in the bottom of said slots are placed the set-

screws b^2 , on which the rod F rests, and by which the rod and the type-carrying frame are adjusted in a vertical direction.

The type-carriage consists of a frame T, pivoted at one side to the rod or shaft F, and in the other is journaled the type-holder K, having at one end a disk or wheel L, provided with apertures M, in which fits a pin N, for the purpose hereinafter described.

Just above the type-holder on the type-carriage is situated a toothed or slotted register-plate P, the teeth of which are graduated to suit any required type, and may be so constructed that it can be turned so as to bring into operation the slots or teeth needed to correspond with the type to be used. This plate can be directly slotted or toothed; but, as shown in the drawings, I employ two plates B and S, between which are secured quads and spaces divided by pieces of steel or brass or other suitable material made longer than the quads or spaces, so as to form the necessary interstices; or this registering device may be made as a cylinder and provided with any number of the slotted or toothed edges and accomplish the same purpose, the cylinder to revolve and work in the same manner as the type-holder, as shown in Figs. 12, 13, and 15. The plate is lettered directly over each slot therein to correspond with the letter or character in the type-holder below, so that when depressed upon the centering-wheel T, to be hereinafter described, the letter directly under the slot is brought to an exact printing-center.

U indicates a plate secured to cross-piece V of the main frame, and directly in the center between the two standards the aforesaid plate has an extension W secured to it, on which is a depending arm carrying the centering pin or wheel T. Either can be used, and when pins are used different sizes are inserted to correspond to the slots in the registering plate or device; but when a wheel is used it is constructed of cogs of different sizes around its periphery and can be turned to suit the different-sized slots in said registering-plate.

On the extension W of the plate U and at the top thereof is pivoted an arm Y, provided with a set-screw Y', which, in connection with

the depending arm carrying the centering pin or wheel, serves to guide the register-plate and type-carriage as it travels to and fro and keeps said plate and type-holder at all times in exact distance over the centering pin or wheel, causing always a perfect interlineation—i. e., the register-plate and the type-holder being made true, and the type once properly aligned, the guides V W, above spoken of, will necessarily bring each letter into line, and the printing will be perfectly straight. The arm X can be turned upon its pivot out of the way when it is necessary to elevate the type-carriage, and the set-screw therein is for the purpose of holding the register-plate and type-carriage securely in position, but leaving sufficient space for the former to slide back and forth, thus preventing any forward motion, which might otherwise cause imperfect lines in printing.

The rod F, at its ends and outside of the brackets, is provided with nuts Z, in which are secured rods A', extending down through the base and connecting by means of similar nuts to a cross-rod B', which extends the entire length of the machine. Pivoted to the rear of the base and extending forward is a rod C', which rests upon the rod B', before described, and when it is depressed it operates the type-carriage, causing the type to print. This can be operated by the hand, or a treadle can be attached to the end of the rod C' to facilitate the operation by the foot. This is where greater power is needed than ordinary writing, as in manifolding, stencil-cutting, engraving, or other heavy work.

In the center and at the rear of the rock-shaft D is an arm D', and at the back of the machine, on the cross-piece thereof, is a loop E'. To these I attach a spring or springs D⁶, which have action upon the type-carriage, holding it in its normal position. This action is done by the recoil of the springs after depressing the type-carriage to print a letter.

Seated in suitable ways in that part of the frame lettered U, and adapted to slide vertically therein, is a frame F', carrying at its lower edge a pan G', constructed of a thin piece of steel or brass or other suitable material, said pan projecting completely under the type-holder. Directly in the center of the pan is a slot H', located above the impression pin or bed.

The opening in the metal pan which holds the inking-pads is provided with spring lips or projections a⁴, adapted to receive and hold the removable plate a⁵, and also to hold the paper down on each side of the impression point or pin, said plate being provided with a slot a⁶, through which the type pass to impinge on the paper to be printed. This provides for the printing of the one letter directly over the slot, the balance being covered and prevented from printing by the pan. Several of these removable plates a⁵ are kept on hand, each having slots of different widths to correspond to the size of the type

being used, so that only enough paper is exposed to receive the impression of the type at the impression-point.

In the pan and at each side of the slot I provide inking-pads I', made of any suitable material, so that every time I print a letter or character the balance of the type are taking ink, by which means I secure abundant distribution of ink on the face of the type.

It must be obvious that in order to get a free movement of the type backward and forward over the inking-pads there must be a difference in the movements of the pan or pad-holder and type-carriage, it being necessary that the type-holder should leave the pads in order to secure the free movement back and forth while changing the position of the letters so as to bring them consecutively to the printing-center. I meet this object as follows: J' J' are two arms on the rock-shaft D, connecting to the pad-holding frame by the rods K' K', which project a less distance forward than the arms which operate the type-carriage. These arms being shorter, it follows that they would not, when in motion, travel so far; hence the type-carriage would rise faster and higher than the pad-holder, thus securing a free movement without dragging on the pads. The rods K' are pivotally connected to the pad-holding frame and pass up through apertures in the arms J'. They are screw-threaded and held in position by nuts. This is for the purpose of regulating the throw of the pad-holder to correspond with the throw of the type-carriage, so that when the single type is printing the balance is at the same time inking. To further help the raising of the pad-holder, I provide springs L³, attached thereto and to the main frame. A cross-bar L' is adjustably secured to the pad-holding frame, and may be placed in different positions. This bar operates on a pin M', secured to a pivoted arm N', on which is pivoted the pawl O' for operating the paper-carriage P'. The pawl O' operates upon a rock-bar connected to the paper-carriage, as also does a retaining-pawl R', pivoted to the cross-piece of the main frame, and is held in position by means of a spring S'. The pivots of the retaining-pawl and of the pivoted arm N' extend through to the back of the frame, and are held in position by means of hooks T', which fit into grooves in said pivots. The arm N' also contains, besides the pawl, a series of perforations for the adjustment of the said pawl, and the pad-holding frame also contains perforations for the adjustment of the cross-bar L', both to regulate the throw of the type-carriage.

The paper-carriage P' consists of a rectangular frame U', mounted on wheels V', which roll upon the base of the machine, said frame having between the front and rear thereof brackets W', to which is attached the rack-bar X'; or a double or triple rack-bar may be used to move the carriage to space

the letters laterally. The lower extremities of the above-named brackets are grooved, adapted to fit over and slide upon a T-rail fastened to the base. This is for the purpose of guiding the paper-carriage, and insures a perfectly-straight line when printing.

Sliding in suitable ways in the paper-carriage is the paper-holding frame Y', which slides at right angles to the line of the type. This frame has attached to one side a rack-bar Z', which is operated by a pawl A², pivoted to a lever B², which is pivoted to the paper-carriage. An adjustable stop C² is situated in rear of the lever, and is attached to the paper-carriage also, and held in position by a screw or bolt passing through an elongated slot therein for the adjustment.

The above-described arrangement is for the purpose of spacing the distance between lines, and the width of said space is regulated by the adjustable stop by either moving it backward or forward. The lever coming in contact with it stops the throw of the paper-frame.

At the rear of the paper-frame are the paper-holders D², consisting of a small plate attached to a threaded bolt, which passes through the frame, and on the under side of the frame is provided with springs and a nut for tightening or loosening, as desired. At the front and on the top of the paper-frame is a movable slotted plate or bar E'', in the slot of which are adjustably secured fasteners similar to those described at the rear of the frame. The slotted bar itself extends the width of the frame, and at one side has a downward projection provided with a pin, which slides in a slot of a plate F'', secured to the side of the frame. This bar and attachments and those at the rear are for holding the paper to be printed upon. The adjustable slotted bar is regulated back and forth to suit the size of paper used.

Before putting the paper in place I cover the entire paper-frame with a covering of suitable material—such as linen or cotton—and it is held in place by a rod G'', journaled between the sides of the frame, and by the fasteners D² at the rear.

It is evident that I provide arrangements suitable for any size paper, may it be long or short, wide or narrow.

Attached to the under side of the paper-carriage is a recoil-spring I'', which at each release of the driving-pawl brings and holds the carriage against the retaining-pawl while the letter is being printed. At each end of the line both pawls are lifted out of mesh with the teeth in the rack, and the recoil of the spring brings back the carriage for a new line.

Directly under the centering-pin and secured to the base of the machine is removably secured a bifurcated bracket J². Between the arms is journaled an impression pin or wheel K'', (in the drawings is shown a wheel,) having four distinct impression pins

or beds thereon, varied in size according to the size of type used, the top of the pin being slightly larger than the type to be used in connection therewith, and the said top is constructed of any suitable material, such as rubber. The wheel is held securely in position and prevented from turning by a set-screw passing through the side of the brackets and pressing against the wheel itself, and when the paper is secured on the carriage and the impression pin or bed is in place the top of the pin only touches the paper and the paper slides freely back and forth thereon. The rising in the paper thus made by the pin prevents a blurring of letters, as it would should the pin only be under the paper without pressing.

In regard to spacing in my invention, by changing the position of the pawl or pawl-bar, elevating or depressing the cross-bar, or shortening or lengthening the rods that connect the pad-holding frame with the slotted arms, I can cause the driving-pawl to move a greater or less distance, and thus take two or more teeth at pleasure, thus giving irregular spacing to suit the different widths of letters in the same or different fonts of type.

As before stated, to accommodate different sizes of type I make the slots or perforations large enough for the largest and then provide slides of different sizes made out of thin steel or other material, which fit over the slots in the plate, and in which I cut slots to correspond with the width of any-sized type I may use, changing these at pleasure with the change of type. The plates are lettered to correspond with the type in the type-holder, each letter or character being over the slot directly over the corresponding letter or character in the type-holder, as also before stated, so that when depressed upon the cogs or teeth of the centering-wheel the letter directly under the opening or slot is brought to an exact printing-center.

For regular spacing I change the pawl from fine to coarse toothed ratchet-bars, or the reverse, in the following way: The pivots of the pawls are provided with grooves L'', and said pivots work loosely in their bearings, so that they can be easily pushed through one way or the other at pleasure, carrying with them the pawls which are secured thereto, the grooves being the same distance apart as the rack-bars are wide, and after changing they are held in that position by the hooks before described.

With the description of the mechanism of my type-writing machine its operation will be readily understood to be as follows: The type-carriage moving to and fro on the rod F and carrying the type-holder and the register-rack being in position, the operator brings the interstice bearing a given letter directly over the tooth or cog of the centering-wheel. Then by depressing the type-carriage, either by hand or foot, the corresponding letter in the type-holder is pressed downward through

the slot in the pad-holder, or that of one of the slides on the paper held firmly up by the impression or bed-pin or wheel, and the impression is made and the letter printed. In this act of depression all letters but the one in use are brought down upon the inking-pads arranged at either side of the slot, and are thus inked simultaneously with the printing. It will be seen that I do not strike with an impression-key upward through the blanket or paper against the type, but the impression is made by the downward movement of the type onto a fixed bed-pin or wheel over which the paper moves. By the recoil or return movement the pawl is moved so as to push forward the paper-carriage step by step to feed the paper, said pawl being lifted by the cross-bar and springs. At the end of a line the pawls are lifted by hand, and by the recoil of the spring the paper-carriage is brought back for a new line.

The cross-bar to lift the pawls may be attached to the type-carriage or the pad-holding frame with equal facility.

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

1. The type-carriage carrying one or more fonts of type, operating in a lateral and direct vertical movement over the impression-point, as set forth.

2. In a type-writing machine, a type-registering device having a series of teeth of varying widths to correspond to type of varying size carried by the type-holder, said registering device being adapted to be turned or adjusted to bring into use any-sized rack to correspond with the type in use in the type-holder.

3. In a type-writing-machine, a centering-wheel having cogs or teeth of different size, in combination with an adjustable registering plate or roller having slots or teeth of different size to correspond with the teeth of the centering-wheel, as set forth.

4. In a type-writing machine, a movable wheel having a series of impression-surfaces,

in combination with an adjustable register, an adjustable centering-wheel, and a type-holder carrying a series of fonts of type, substantially as set forth.

5. In a type-writing machine, the combination of a type-carrying frame having a vertical and longitudinal motion with respect to the impression-bed, with the plate U, extension W, arm X, and set-screw Y.

6. In a type-writing machine, the type-carrying frame to slide on the bar F, in combination with the rock-shaft D, links G, arms E and D', and spring F', whereby the type-frame is raised after each impression, as set forth.

7. In a type-writing machine, the rock-shaft D, provided with the arms J' J', in combination with the pad-holding frame and inking-pad, as set forth.

8. In a type-writing machine, the pan for holding the inking-pads, provided with an aperture H', in combination with the removable slides a³, as and for the purpose set forth.

9. The combination, with the pad-holder and the frame to which it is attached, of the links passing through arms connected with the rock-shaft, said links being provided with nuts, for the purpose herein set forth.

10. The lever N', provided with a pin M' and pawl O', in combination with the frame F', adjustable bar L', carried by said pawl, and rack-bar X', whereby the spacing of the letters is regulated, as set forth.

11. The rock-shaft and means, substantially as described, for operating the same, said rock-shaft having two sets of arms, one set being longer than the other, for operating the type-carriage and pad-holder, in combination with the type-holder and pad-carrier, as set forth.

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

THOMAS D. WORRALL.

Witnesses:

FRED E. BAKER,
JAMES B. SILSBEE.