

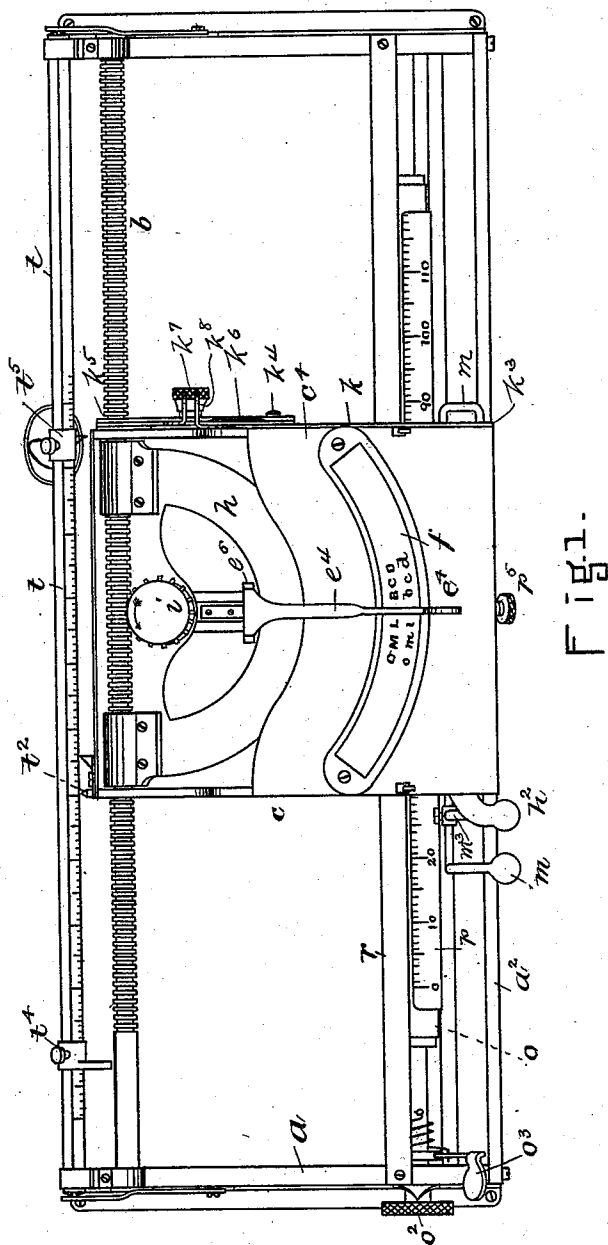
(No Model.)

4 Sheets—Sheet 1.

G. C. TOWLE.
TYPE WRITING MACHINE.

No. 466,270.

Patented Dec. 29, 1891.



WITNESSES.

*Jas. J. Maloney.
 M. E. Hill*

INVENTOR.

*George C. Towle
 by Jos. P. Livermore
 atty.*

(No Model.)

4 Sheets—Sheet 2.

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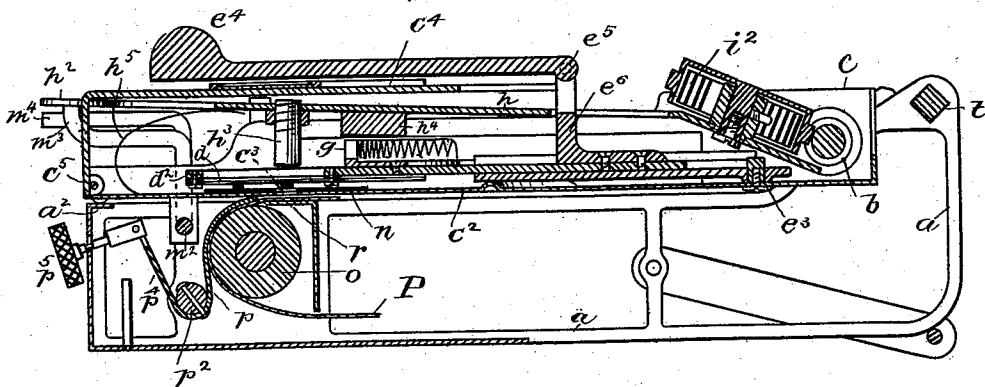
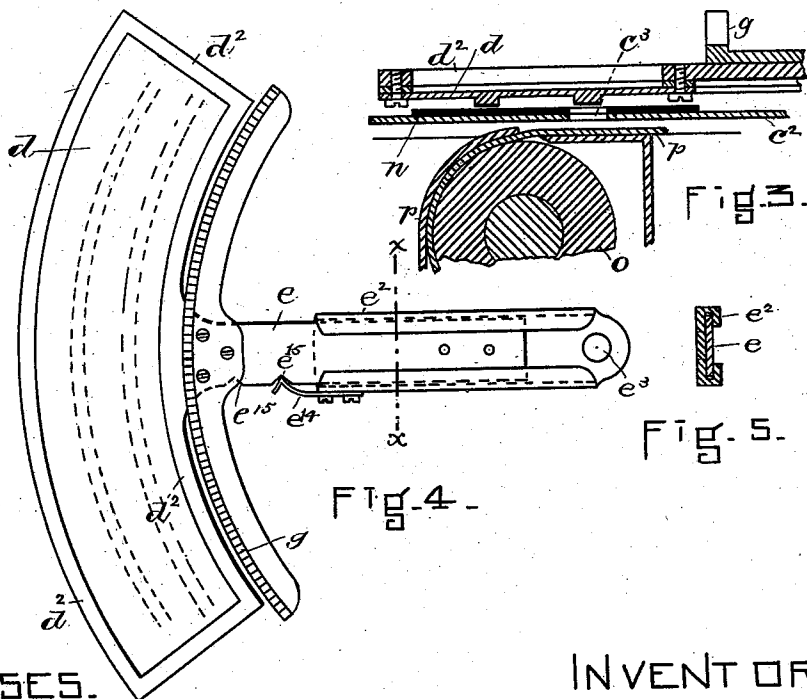


FIG. 2.



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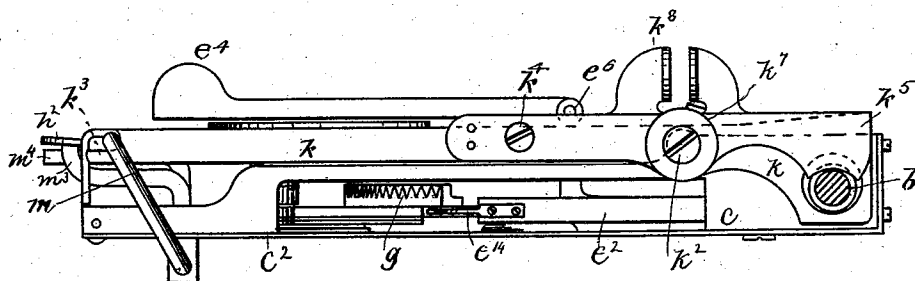
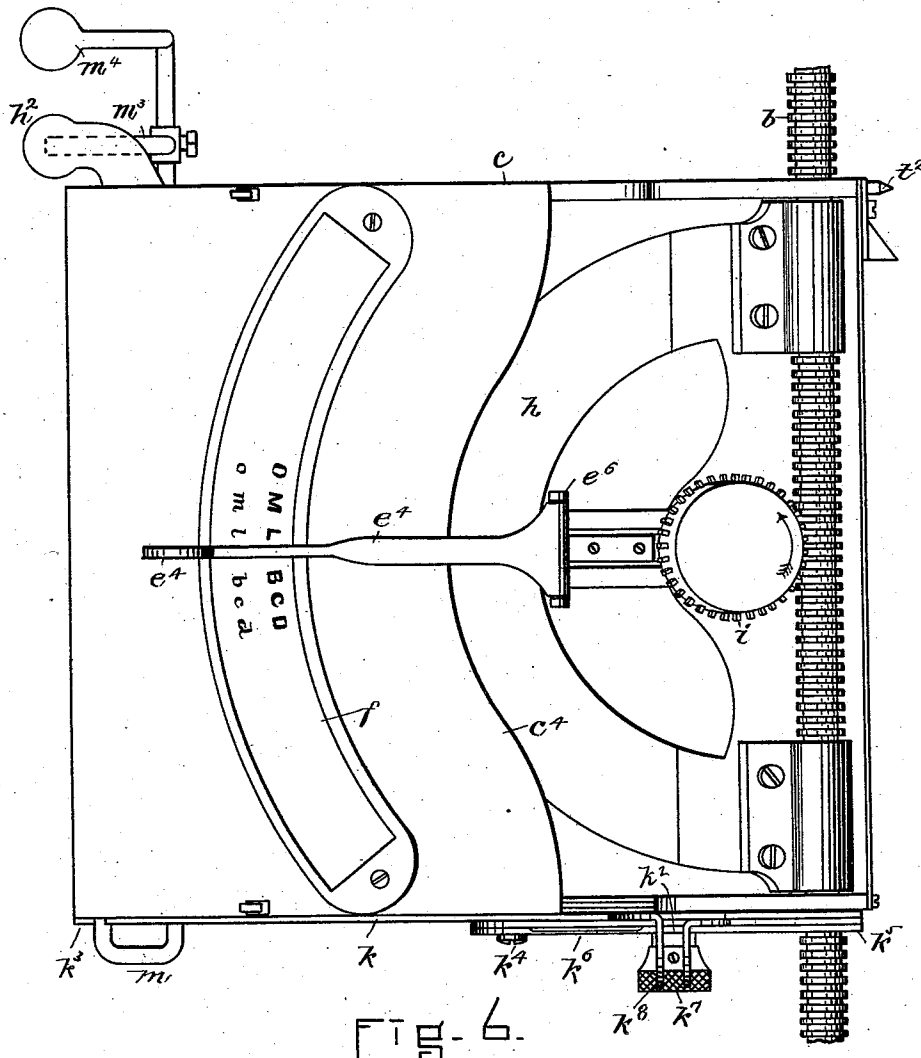
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WITNESSES.

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Fig. 7-

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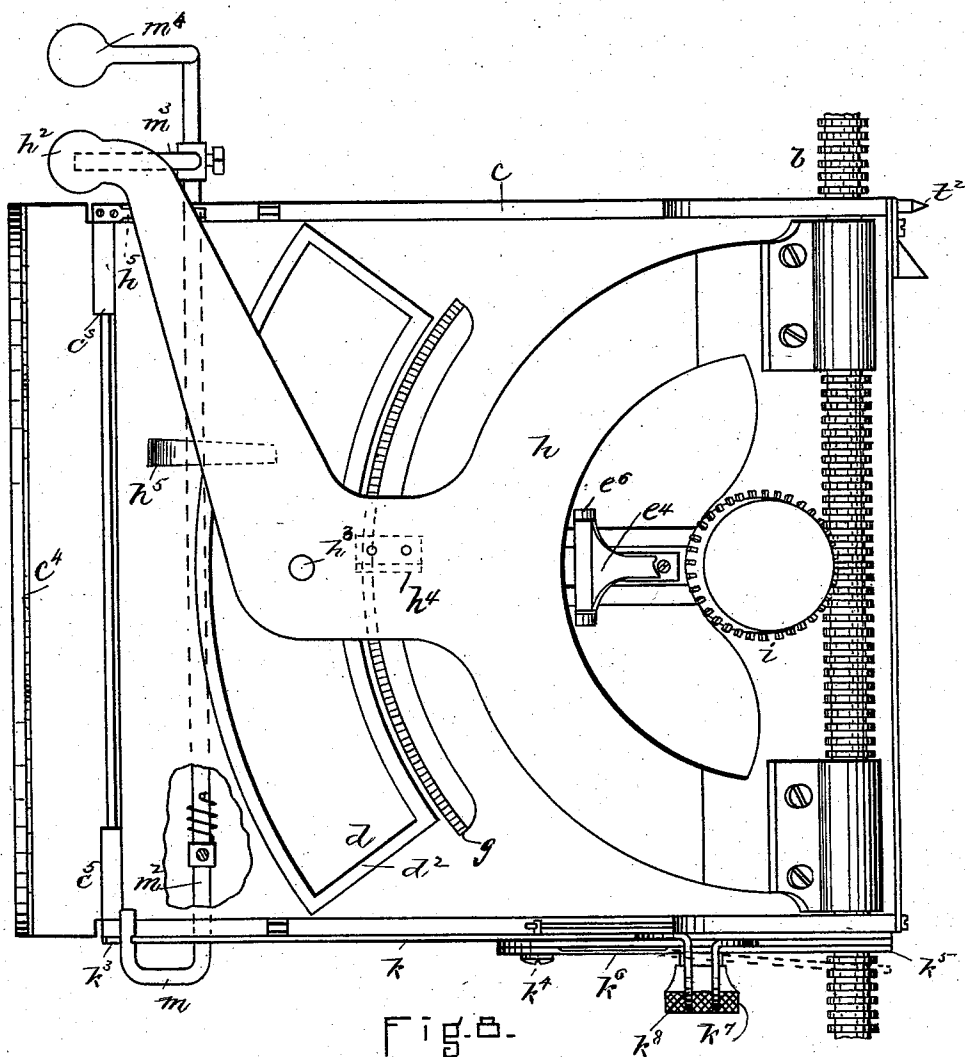
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G. C. TOWLE.
TYPE WRITING MACHINE.

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UNITED STATES PATENT OFFICE.

GEORGE C. TOWLE, OF HYDE PARK, MASSACHUSETTS, ASSIGNOR TO THE
POPE MANUFACTURING COMPANY, OF PORTLAND, MAINE.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 466,270, dated December 29, 1891.

Application filed June 24, 1889. Serial No. 315,403. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. TOWLE, of Hyde Park, county of Norfolk, State of Massachusetts, have invented an Improvement in
5 Type-Writing Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention, relating to type-writing machines, is intended as an improvement on machines of that class in which a flexible type-plate is movable on a carriage or support to bring any desired one of the characters upon it to the point where the imprint is to be
15 made, when an impression-plunger acts upon the type, which has thus been positioned to depress it with relation to the rest of the type-plate against the surface of the paper to be printed on, which is supported below.

20 In the machine represented for the purpose of illustrating this invention the carriage on which the type-plate and impression devices are supported is fed over the surface of the paper after each imprint for the purpose of making the line of printing, and the paper is
25 fed over its supporting-platen below the type-plate for the successive lines of printing; but this arrangement is not essential to the present invention, as the paper-platen and paper might be fed below the type-plate for the line of printing, if preferred. In one type of machines of this class as heretofore made, the type-plate has been supported on a plate
30 which was both movable along the paper to make the line of printing, and was also movable toward and from the paper to make each imprint, the entire plate having a slight movement toward and from the paper, and the character to be printed being moved beyond
40 the face of the rest of the type, so that it alone reached and made its impression upon the paper. In such machines both operations—namely, that of first moving the type-plate to bring the desired character to the
45 printing position and, second, of depressing the type-plate support, so as to cause the character at the printing-point to reach the paper—are performed by one hand of the operator while the other hand is practically unoccupied; and one of the objects of the present

invention is to divide the work between the two hands of the operator, who will thus use one hand to position the type-plate and the other to make the impression, thus enabling the speed of operation to be increased and
55 the fatigue of operating the machine to be greatly diminished.

The invention relates, especially, to the construction of the type-plate and means operated by one hand of the operator for guiding
60 it in its movement to bring each type, as required, to the printing-point, and to the construction of the device operated by the other hand for making the impression and effecting the feed movements of the type relative
65 to the paper, and to other features of construction, which will be hereinafter pointed out.

Figure 1 is a plan view of a type-writing machine embodying this invention; Fig. 2, a
70 transverse vertical section thereof on a larger scale; Fig. 3, a sectional detail of some of the parts represented in Fig. 2 on a larger scale; Fig. 4, a plan view of the type-plate and the arm that carries it in its movement for position-
75 ing the type; Fig. 5, a transverse section of the same on line *x x*; Fig. 6, a plan view of the carriage on which the feed and printing mechanism are supported; Fig. 7, an end elevation thereof, and Fig. 8 a plan view
80 of the carriage represented in Fig. 6 with some of the upper parts removed to show the parts beneath.

The main frame-work *a*, on which the operative parts are supported, may be of usual
85 construction, the said frame-work being stationary during the operation of the machine, although it may be supported on and adjustable with relation to an outer case or bed-plate for the purpose of setting it in the most
90 convenient position for the operator. The said frame is provided at its rear part with a rack *b*, upon which the carriage *c*, that supports the printing mechanism, is journaled or hinged, so that the said carriage may be
95 turned bodily upward on the rack *b* as an axis to afford access to the paper-supporting device below, the said printing-carriage *c* normally resting on a track or ledge *a'* at the front of the frame *a* while the machine is
100

operating, as best shown in Fig. 2, and traveling longitudinally of the frame upon the rack *b* and track *a* as guides. The said carriage *c* is made substantially like a hollow box having a bottom plate *c*², provided with a printing-opening *c*³, through which the type may be forced down upon the paper *P* below said opening, as best shown in Figs. 2 and 3, the said type being shown in this instance as formed on or connected with a flexible plate or diaphragm *d*, connected around its edges with a rigid frame *d*², as best shown in Fig. 4. The said bottom plate of the carriage thus forms a partition interposed between the type above and the paper below to prevent all type except the one directly over the said printing-opening from touching the paper. The said type-plate and its supporting-frame *d*² are sector-shaped, and the type are arranged in two or more curved lines upon said diaphragm, being in this instance represented as in two such curved lines, one of which preferably contains the lower-case letters, conveniently arranged, and the other the upper-case letters, and the remaining characters that it may be desired to print being added to one or both of said lines, as most convenient. The frame *d*² is connected with an arm or shank *e*, movable in a guide *e*², pivoted at *e*³ upon the carriage *c*, the said shank *e* having a sliding or telescopic movement in the guide *e*², as will be understood from Figs. 4 and 5, and the entire device having a pivotal movement around the point *e*³. The sliding movement of the shank *e* is shown as limited by a spring-stop *e*¹⁴ engaging recesses *e*¹⁵ in said arm and so arranged that when said stop is in engagement with one of said recesses a corresponding line of type on the type-plate *d* is concentric with the pivot *e*³ and at the same distance therefrom as the printing-opening *c*³ in the carriage, so that by swinging the said frame around the pivot *e*³ any desired one of the said curved line of type may be brought over the said opening *c*³, which is only large enough to permit one type at a time to pass through or into it. The stop *e*¹⁴ is yielding, so that by slight pressure lengthwise of the shank *e* in the desired direction the said arm may be moved in its guide *e*² to shift the type-plate so as to bring the other line of type over the printing-opening *c*³. If only a single line of type were used, the type-plate shank might itself be pivoted directly on the carriage. Both the sliding movement of the type-plate shank *e* in its guide *e*² and the oscillating movement of said type-plate about the pivot *e*³ are produced by a handle *e*⁴, shown as pivoted at *e*⁵ upon an upright or bracket *e*⁶, rigidly connected with the said shank *e*. The said handle *e*⁴ extends forward over the top of the plate *c*¹ of the printing-carriage, which top plate is provided with a stationary index-plate *f*, (see Figs. 1 and 6,) having characters marked upon it corresponding to the characters on the type-plate and so arranged that

when the arm or handle *e*⁴, that accompanies the type-plate in its movement on the carriage, is opposite a given character on the said index-plate the corresponding character on the type-plate is over the printing-opening *c*³, and hence I designate the said arm or handle *e*⁴ a "finder." Thus the operator manipulating the handle *e*⁴ can by pulling it forward or backward bring any desired row of type in line with the said opening, and then by swinging the said handle may bring the desired one of the type in said row over the said printing-opening, these movements being performed by one hand and being both compounded or performed simultaneously, if required, and it is merely necessary to approximately position the type-plate in the swinging movement, as the final accurate positioning is made in the act of making the imprint, these operations being performed by the following mechanism: The type-plate frame *d*² or its shank *e* has rigidly connected with it a positioning-bar *g*, having on its upper surface notches corresponding in angular position relative to the pivot *e*³ to the different type of each line of type, the said notches being inclined or V-shaped.

The imprint is made by a swinging frame or plate *h*, (best shown in Fig. 8,) hinged upon the rack-bar *b* and extending forward over the type-plate and then laterally outward to a point preferably near the front left-hand end of the printing-carriage *c*, where it is provided with a handle or finger-piece *h*² to be engaged by the hand of the operator, the said handle being so located that it can be conveniently manipulated by the left hand of the operator while the right hand is occupied in moving the handle *e*⁴ or "type-finder," as it may be called. The said frame *h* is provided with a stud or projection *h*³ directly over the printing-opening *c*³ in the bottom of the carriage, and is also provided with a wedge-shaped tooth or projection *h*⁴ directly over the notched positioning-bar *g*. The said impression-frame *h* has no movement relative to the carriage *c*, except a slight pivotal rocking movement on the rack-bar *b*, which forces the stud *h*³ down upon the back of the type-plate *d*, so as to press that one of the type which is above said opening down through said opening and against the surface of the paper below, the bottom plate *c*² of the carriage preventing any but the one type which is over its opening *c*³ from reaching the paper. The projection *h*⁴ enters between adjacent teeth in the positioning-bar *g*, and owing to the inclination of said teeth will bring it and the connected type-plate to exact position as the impression-plate descends and before the type is forced into actual contact with the paper, so that it is merely necessary to position the type-plate by the finder *e*⁴ near enough to cause the projection *h*⁴ to enter the proper notch, or, in other words, to bring the said device *e*⁴ nearer to the character on the

index-plate that it is intended to print than to the character at either side of it. The impression-frame h is raised after the imprint is made by a spring h^5 . (See Figs. 2 and 8.)

5 The invention is shown in this instance as applied to a machine in which the carriage c , supporting the printing mechanism, feeds longitudinally with relation to the paper-support below for the purpose of making the successive imprints in a line on the said paper, the said feed being effected by the following mechanism, (see Figs. 7 and 8:) The carriage c has supported upon it a gear i , meshing with the rack b and acted upon by a spring i^2 , (see Fig. 2,) tending to rotate it in the direction of the arrow upon it, thus tending to cause it to roll along the stationary rack-bar and in such movement to cause the carriage c to travel lengthwise of said rack-bar. Such longitudinal movement of the carriage is, however, resisted and controlled by escapement devices that permit it to move a space equal to that between two or three consecutive teeth or projections of said rack-bar, as preferred, the said escapement mechanism being best shown in Figs. 6 and 7. A lever k is pivoted at k^2 on the side of the carriage c , one end of said lever extending out beneath the rack b and being normally held in such position as not to enter between the teeth or projections of the rack. When, however, the forward end k^3 of the lever is depressed, the rear end enters between two teeth of the rack and prevents movement of the carriage. The said lever also has pivotally connected with it at k^4 a short arm k^5 , that extends over the upper side of the rack b and has a spring portion k^6 tending to cause the end k^5 to spring away from the carriage c in the same direction that the carriage tends to move under the action of the spring i^2 and gear i . The arm k^5 vibrates with the lever k on its pivot k^2 and is so shaped that when the end of the lever k below the rack is in its lowermost position and out of engagement with the rack-teeth the arm k^5 is in engagement with the rack-teeth and thus restrains the carriage from movement along the rack-bar. When, however, the forward end of the lever k is depressed and the rear end rises into engagement with the rack-bar, so as to hold the carriage, the arm k^5 is lifted out of engagement with the rack-bar, and, owing to its spring portion k^6 , its end over the rack-bar springs out from the carriage, as shown in dotted lines, Fig. 8, passing over one or two teeth of the rack-bar, as the case may be, and when the forward end of the lever k^3 is again raised the arm k^5 drops into the space over which it is then standing, and the lever k disengages the rack, so that the carriage is permitted to move until brought up by the arm k^5 in its new position, the spring i^2 , that moves the carriage, being stronger than the spring k^6 , that throws the arm k^5 . The lateral or swinging movement of the arm k^5 is limited by an adjustable stop

k^7 , which permits it to move over one or two teeth of the rack b , according as a shorter or longer feed of the carriage is required. The arm k^5 may be turned on its pivot k^4 on the lever k by means of a handle k^8 , so as to disengage the said arm k^5 from the feed-rack b , while the lever k is also disengaged from it, thus permitting the carriage to be moved in either direction and any desired distance along the said feed-rack.

The feed mechanism thus far described is substantially the same as has been used in machines of this class heretofore, and the present invention, so far as relates to the feed mechanism, consists in the devices that move the lever k up and down on its pivot k^2 to control the feed movements of the carriage, as just described. The forward end k^3 of the lever is engaged by an arm m of a rock-shaft m^2 , having a second arm or projection m^3 in the proper position to be engaged by the impression-frame h when depressed with relation to the carriage to make an imprint, as before described, such depression of the said frame h by its handle h^2 turning the rock-shaft m^2 and thus operating the lever k to effect a feed movement, as has just been described, the said feed taking place in the rise of the lever k and impression-frame h after each imprint has been made, so that the successive imprints are placed side by side or in a line with one another on the paper.

When it is desired to make a feed movement without the corresponding imprint—as, for example, at the end of a word—the lever k must be moved independently of the impression-plate h , and for this purpose the rock-shaft m^2 is provided with an arm m^4 , suitably made to form a handle or finger-piece that is located near the handle h^2 of the impression-plate, so that both handles can be readily operated by two fingers of the left hand of the operator. The inking of the face of the type is shown in this instance as effected by a pad n , supported on the bottom plate c^2 of the carriage and around the printing-opening c^3 therein, so that as the type-plate is moved to bring the different type over the printing-opening the face of the type will pass over the inking-pad and have ink applied thereto.

Access may be had to the printing-pad for the purpose of applying fresh ink thereto by swinging the type-plate to its extreme position, first at one side and then at the other, and the ends of the carriage c are open to permit the end of the type-plate and its frame d^2 and positioning-bar g to pass over or beyond the sides of the carriage in the oscillating movement of the type-plate.

The top plate c^4 of the carriage is hinged to the bottom plate near the front of the machine, as shown at c^5 , so that said top plate may be raised to afford access to the printing-pad or to the type-plate and connected parts, the handle e^4 for moving the type-plate being

turned back on its pivot e^5 to permit the top plate c and printing-frame h to be raised on their respective hinges.

The paper to be printed upon may be supported and moved for the line-to-line feed in any suitable or usual manner. As herein shown, it passes over the surface of a feed-roll o , journaled at its ends in the main frame a and provided with a handle o^2 (see Fig. 1) for turning it to feed the paper forward and also with a ratcheting-dog operated by the handle o^3 to turn it step by step the proper distance for the space between two lines on the paper, such device being substantially the same as in machines of this class heretofore made, and for this reason not requiring to be specifically described herein.

The paper is held in contact with the feed-roll by a plate p , supported on a rock-shaft p^2 therefor in the main frame a and acted upon by a spring tending to force said plate against the paper that lies between it and the roll, as shown in Fig. 2. The said rock-shaft is provided with a spring-arm p^4 and handle p^5 at the front of the machine, by which the plate p may be pulled away from the surface of the roll o to facilitate the introduction of the paper. The paper extends forward from the periphery of the feed-roll o at the termination of the plate p over a platen r , which supports it along the line where the successive imprints are made, the surface of said platen being beneath the printing-opening c^3 in the printing-carriage. The edge of the plate p is graduated, so as to correspond to the successive imprints of a continuous line of printing, as shown in Fig. 1, and a correspondingly-graduated bar t is provided at the rear of the main frame a , co-operating with a pointer t^2 on the printing-carriage c , (see Fig. 1,) the said scales being arranged in the usual manner to indicate the relation between the position of the carriage and the printing-point on the paper. The graduated bar or scale t supports the bell that indicates the approach of the carriage near the end of the line of printing, the said bell being operated in the usual manner and the said bar being provided with adjustable stops t^4 t^5 , that limit the movement of the carriage along the paper in the usual manner.

The machine may be conveniently operated by the operator facing the machine and moving the type-selector e^4 with the right hand and the impression and spacing keys or handles h^2 m^4 by two fingers of the left hand, operating the space-key m^3 alone when a feed movement is to be made without a corresponding imprint, as at the end of a word.

The operations of introducing the paper and setting the paper-carriage at the proper position for beginning a line of printing are substantially the same as in prior machines of this class.

It is obvious that the various details of construction of the machine might be widely varied without departing from the invention,

which relates, mainly, to the type-plate and devices for moving it to bring the different type to the printing-point and for then making the impression and causing the feed of the type relative to the paper, and, so far as these features are concerned, the paper might be fed along beneath the type instead of having the type fed over the paper.

I claim—

1. In a type-writing machine, the combination, with the main frame, a rack therein, and paper-feed mechanism, of a carriage made as a box and pivoted to and longitudinally movable on the rack, a type-plate, its supporting-frame, a guide therefor pivoted in the carriage and movable with it, a finder, as e^4 , connected with the guide, and an impression-frame pivoted to the rack within the carriage and moving with it and having a finger-piece extended laterally beyond the carriage, substantially as described.

2. In a type-writing machine, the combination, with the main frame, a rack therein, and a paper-feed mechanism, of a carriage, a type-plate, a shank connected with said type-plate, a telescopic guide pivoted to the carriage and receiving the shank, a locking device or stop for the shank and guide, and a finder, as e^4 , pivotally connected to the shank and serving to move and adjust the type-plate, substantially as described.

3. In a type-writing machine, the main frame, a rack therein, a paper-feed mechanism, and a carriage pivoted to and movable longitudinally on said rack and made as a box with open sides, a top plate, an index-plate thereon, and a bottom plate separating the type from the paper and having an opening to permit the passage of a single type combined with a type-plate pivoted to the bottom plate of said carriage, a finder, as e^4 , secured to said type-plate and projecting up out of the carriage and over the index-plate, and an impression-plate pivoted to the rack within the carriage and having its handle extended laterally beyond the carriage, substantially as described.

4. In a type-writing machine, the combination, with a main frame, a rack therein, and a paper-feed mechanism, of a carriage pivoted to and movable longitudinally on the rack, a type-plate and means to pivot it within the carriage, a dentated positioning-bar carried by said type-plate, and a pivoted impression-frame constructed with a projection to act upon the type and also with a projection to engage the teeth of the positioning-bar, substantially as and for the purpose described.

5. In a type-writing machine, the combination of a main frame, a rack therein, paper-feed mechanism, a type-carriage, a carriage-propelling mechanism, an impression-frame having a laterally-extended finger-piece, and a carriage-feeding mechanism or escapement consisting of a lever adapted to engage the rack, an elastic arm connected to said lever

and vibrating with it, and a rock-shaft having one end in engagement with said lever and having an arm adapted to be engaged by the finger-piece of the impression-frame and also
5 having a finger-piece of its own for operation independently of the impression-frame, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE C. TOWLE.

Witnesses:

JOS. P. LIVERMORE,
JAS. J. MALONEY.