

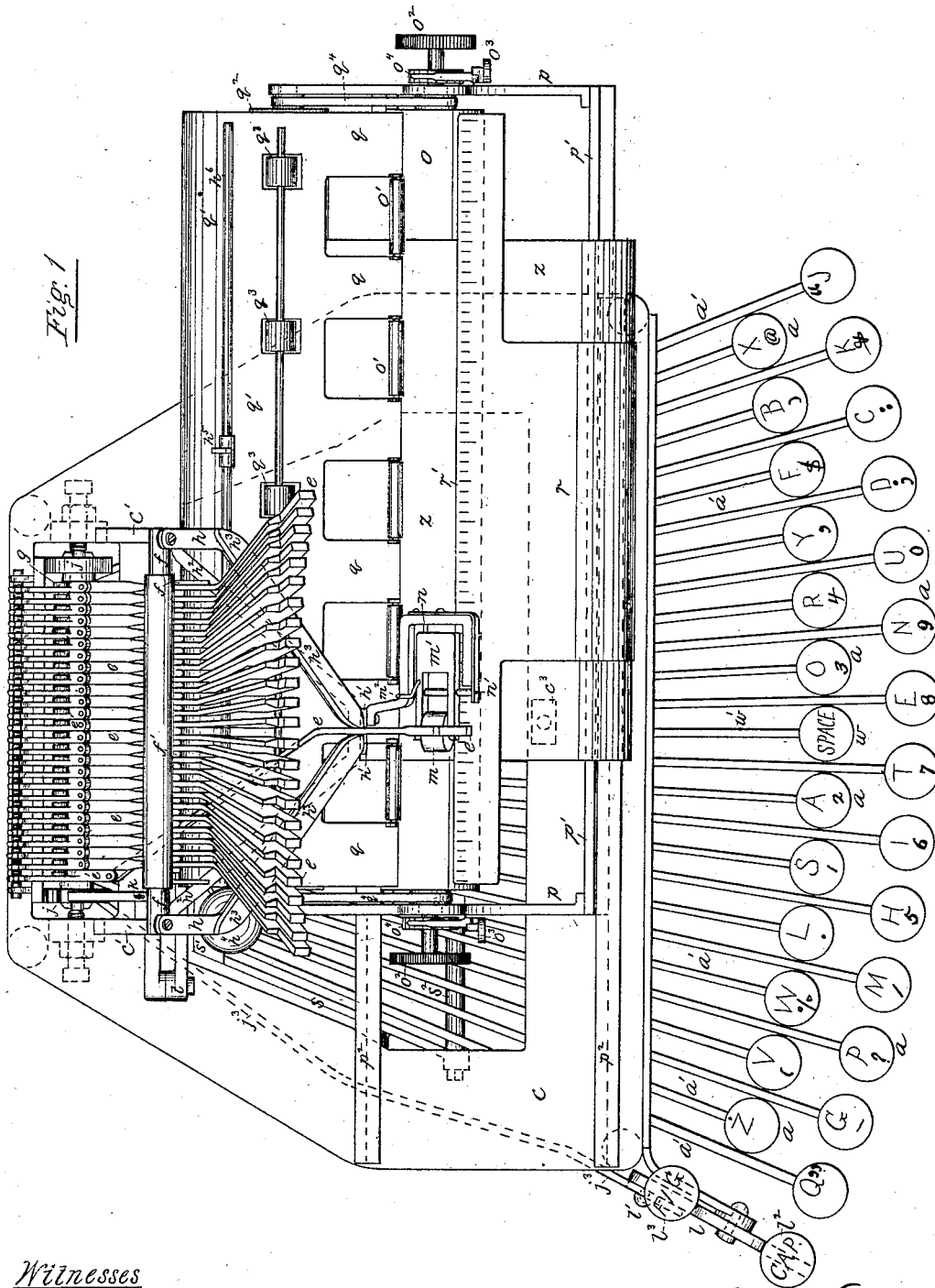
(No Model.)

4 Sheets—Sheet 1.

E. FITCH.
TYPE WRITING MACHINE.

No. 345,836.

Patented July 20, 1886.



Witnesses

H. D. Williams.

Chas L Watson

Eugene Fitch

Inventor

per Inventor
Alfred Sherlock
Atty

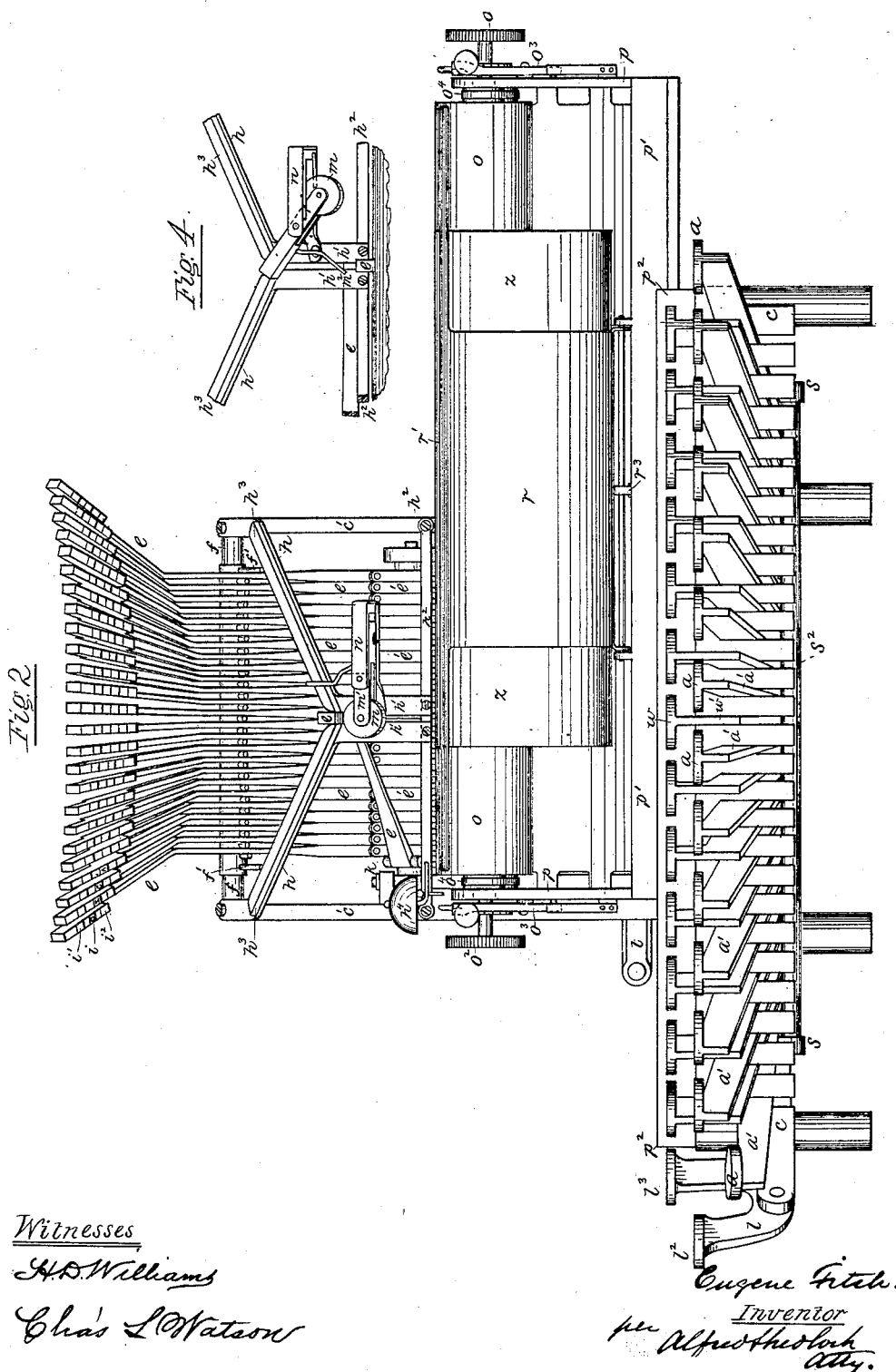
(No Model.)

4 Sheets—Sheet 2.

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H. D. Williams

Chas. L. Watson

Eugene Fitch.

Inventor

per Alfred H. Cook
Att'y.

(No Model.)

4 Sheets—Sheet 3.

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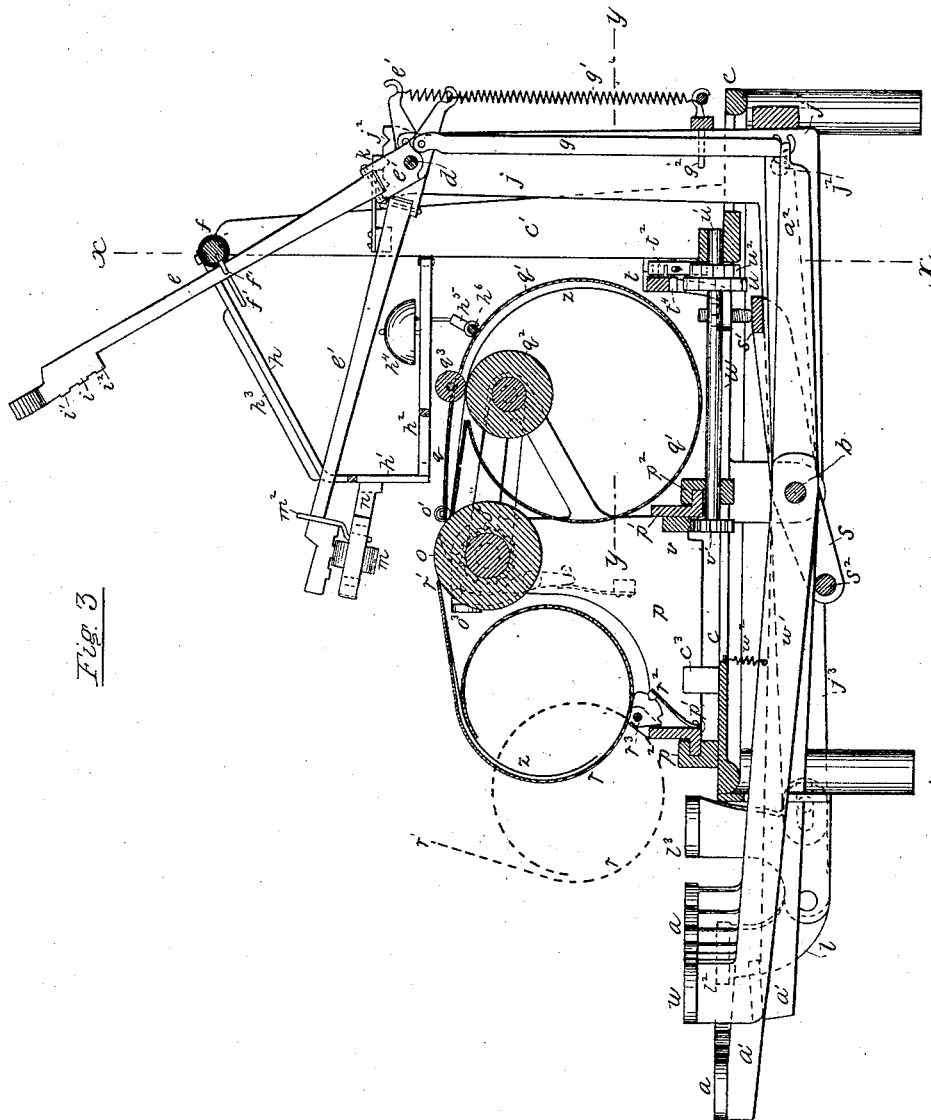


Fig. 3

Witnesses

H. D. Williams

Chas. L. Watson

Inventor

Emery Fitch

per Alfred Sheddock
Atty.

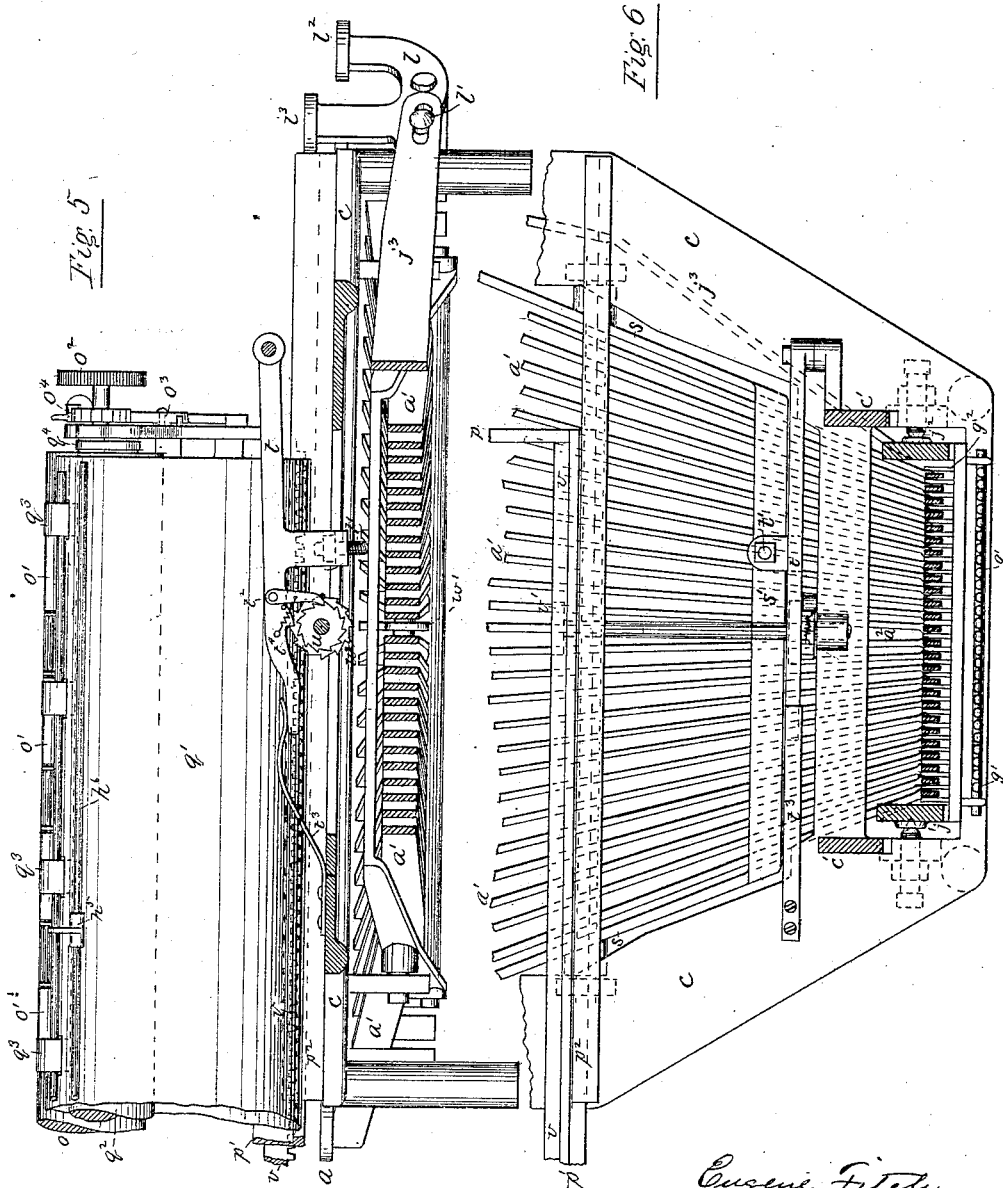
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4 Sheets—Sheet 4.

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Alfred H. Lock
Att'y.

UNITED STATES PATENT OFFICE.

EUGENE FITCH, OF DES MOINES, IOWA.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 345,836, dated July 20, 1886.

Application filed January 13, 1886. Serial No. 188,397. (No model.)

To all whom it may concern:

Be it known that I, EUGENE FITCH, a citizen of the United States, residing at Des Moines, Polk county, State of Iowa, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to type-writing machines; and it consists of a series of type-carrying arms arranged in one plane, fitted and held on a common axis of rotation, and provided with lateral hinge-joints between their axis and their ends, the successive arms from the center to the end arms having an increasing lateral bend. The platen or paper-feeding roller is located in front of the type-arms, and a series of key-bars supported on a shaft below the platen or paper-feeding roller, connected at their rear ends to the lower hinge part of the type-arms, and provided at their front ends with finger-pieces located in front of the paper-feeding roller. The type are so secured to the free ends of the type-arms as to strike, face down, onto the paper held on or controlled by the feed-roller, so that each letter or character as printed is clearly in view, as in ordinary manual writing. The type-arms as they descend are, by means of stationary side guides, directed toward the center of the machine, and the type on their ends caused to strike at one point or position of impression. Each type-arm is provided with two or more letter or character type arranged longitudinally thereon; and to cause them all to strike in one place the shaft or common axis on which the type-arms rock is carried by a pivoted frame provided with a finger-piece at the side of the machine, and by the manipulation of which the said shaft is moved toward or from the point of impression. The face of the type is supplied with ink from an ink-roller held in a pivoted frame and normally located in the path of the type as they descend. Each type after receiving ink from the roller pushes it sidewise just before the impression is made, and the type-arm as it ascends brings the ink-roller into normal position by striking a rod projecting from the pivoted frame in which the ink-roller is held. The paper-controlling roller is held in a carriage fitted to slide laterally on the main frame

of the machine, and actuated by means of a feed mechanism embracing a ratchet-wheel operated by a pawl pivoted to a spring-acting lever. This lever is raised by the type-keys, and also by an independent spacing-key. The pawl is moved clear of the ratchet-wheel when the space-key is depressed to its limit, and the carriage is then released and freely movable in either direction.

My said invention will be fully understood by reference now being had to the accompanying drawings, in which—

Figure 1, Sheet 1, is a plan view. Fig. 2, Sheet 2, is a front elevation. Fig. 3, Sheet 3, is a vertical central section. Fig. 4, Sheet 2, is a detached front elevation of the guides, type-arm, and inking device. Fig. 5, Sheet 4, is a part vertical section on the line $x x$, Fig. 3, looking toward the front of the machine; and Fig. 6, Sheet 4, is a part horizontal section taken on line $y y$, Fig. 3.

The keys $a a$ are arranged in two curvilinear rows, the inner row being in a higher plane than the outer row. The key-bars $a' a'$, forming a part of the keys, or to which the keys are attached, are all supported and rock upon the shaft b , extending laterally through the main frame c , and their rear ends, $a^2 a^2$, are in one plane.

In the front of the frame c a series of slots are formed in which the front ends of the key-bars $a' a'$ are held free to move vertically. The type are carried at the ends of arms fitted to rock on the shaft d , but without end-play, and each arm is composed of two pieces, e and e' , connected together by a hinge-joint, so that the parts e , to which the type are attached, are free to move laterally relatively to the parts $e' e'$, through which the shaft d passes, thus allowing the type, when the arms are depressed, to strike at one position of impression, the arms having varying bends sidewise, to cause the type to occupy a central position when pressed down on the paper. The arms are in one plane when in normal positions, as shown at Fig. 3, resting against the stop-bar f , which is provided with guide-pins f' , and supported by the standards $e' e'$. The lower parts of the arms e , where they are hinged to the parts e' , are made to fit close together when in normal position, each one acting as a guide to those

adjoining, to direct them into their proper places between two of the guide-pins f' of the stop-bar f , when they are raised after having been depressed. Links $g g$ connect the inner ends, a^2 , of the key-bars a to the parts $e' e'$ of the type-arms, thereby causing the arms to be moved down when the keys a are depressed, the reverse action being imparted to the arms or keys by the springs $g' g'$, connected to the parts $e' e'$ and a suitable part of the frame. The links $g g$ are permanently pivoted to the parts e' of the type-arms; but the key-bars at a^2 have a hooked connection to their lower ends, so that the key-bars may be easily put in place by hooking them over the ends of the links, placing their front ends in the slots in the front of the frame, and then passing the shaft b through all of them. The links $g g$ are guided, and the rear ends of the key-bars held in place, by the pins $g^2 g^2$, Figs. 3 and 6.

As a means for guiding the type on the ends of the laterally-hinged arms $e e$ to a common point or position of impression, two directing-bars, $h h$, are arranged in front of the type-arms by being fastened to the standards $c' c'$, projecting upwardly from the main frame. These directing-bars $h h$ incline toward the center of the machine and downwardly, their front ends, $h' h'$, being bent vertically parallel, and between them the type-arms slide, and are guided laterally until they reach the vertical parts $h' h'$, and are then guided vertically down toward the paper before the type make impressions. The extreme lower ends of the parts $h' h'$ join the bracing-frame h^2 , also connected to the standards $c' c'$.

To lessen the noise due to the type-arms striking the directing-bars $h h$, said bars are faced with strips of a non-resonant material—as, for instance, vulcanite—as shown at $h^3 h^3$; and to further provide for this I propose to place elastic or pliable washers between the junctures of the directing-bars $h h$ and bracing-frame h^2 , with the standards $c' c'$. The stop-bar f may also be covered with a non-resonant material.

One of the principal features of my invention is the method by which two or more sets of letters or characters are printed by means of one set of keys and connected set of pivoted type-arms. This is carried out by placing on the end of each of the type-arms $e e$ one type of each of the sets of letters or characters it is desired to employ. Three of such sets are shown in the drawings, the central type, i , printing the small letters, the outer type, i' , the capitals, and the inner type, i'' , the numerals, punctuation-marks, and other characters. These type, as before mentioned, strike face down on the upper surface of the paper, which is carried and controlled by mechanism hereinafter described, so that each letter is printed in full view of the operator.

To cause all the sets of characters to print on one line, the shaft d , which carries the type-arms $e e'$, is so controlled and held as to occupy as many fixed positions in relation to the

line of printing as there are sets of type to print from—in this case three. To accomplish this, the shaft d is held in the upper ends of the arms j of the frame j' , pivoted at j^2 to the main frame c . The center of oscillation of the pivots j^2 is located as nearly as possible in line with the ends a^2 of the key-bars, to which the type-operating links $g g$ are attached, so that a minimum amount of motion is imparted to the type-arms $e e'$ when the shaft d is moved from one position to another. Said shaft, with the frame j' , is held in any of the three positions by means of the spring-catch k , secured to one of the standards c' , falling into the notches k' , formed in the upper surface of one of the arms j . This spring-catch k is adjustable on the standard c' , to provide means for correctly setting the type to strike at the right position on the platen. To operate this frame j' , a lever, l , is pivoted on a projection at the front of the main frame c , and has a pin, l' , which fits into a slot formed in the end of the arm j^3 , connected to or forming a part of the oscillating frame j' , and this lever l is provided with keys $l^2 l^2$, arranged, respectively, in line with the outer and inner rows of type-keys a when the shaft d is in its middle position and the central small letter-type, i , are being printed from. By pressing on the key l^2 the capital letters, and by pressing on the key l^2 the numerical and character type, are brought into position to be printed from.

As an improvement in the method of inking the type in this class of type-writing machines, the ink is applied to the face of the type, and from thence transferred to the paper, as in ordinary letter-press printing, instead of the type striking the impression through an ink-ribbon. A small ink-roller, m , held in the pivoted frame m' , is located directly in the path of the descending type when its type-arm e is passing down between the vertical parts $h' h'$ of the type-directing guides $h h$, so that the type strikes fairly on the top of the ink-roller m , as shown at Figs. 1, 2, and 3, is thereby inked, and then pushes the roller out of its path by causing its holding-frame m' to rock on its pivoted connection in its supporting-frame n , which is attached to the front of the guides h' . The ink-roller m remains out of the path of the type, in the position shown at Fig. 4, during the impression; but, as the type-arm moves up, is again brought into active position by the type-arm e striking the rod m^2 , projecting from the frame m' . The frame m' , in the upward position of the roller, is stopped by coming in contact with a part of the supporting-frame n , and at such point of contact is placed a non-resonant plug or washer to deaden the noise due to the working of this part of the machine. The ink-roller holding-frame m is held in its supporting-frame n by means of a spring-bearing, n' , thus admitting of the ready removal of the roller to be freshly supplied with ink, or the substitution of another roller supplied with a different-colored ink. The ink-roller occu-

pies a definite position over the point of impression, and is of such length as to ink only the one of the three type of each arm, according to the position occupied by the shaft *d*.

5 The mechanism for holding and controlling the paper *Z* consists of the cylindrical platen or roller *o*, having bearings in the frame *p*, which is provided with guide-pieces *p'* *p'*, fitted to slide in the transverse guides *p''* *p''*, attached to the main frame *c*. The cylindrical
10 platen or roller *o* acts as a feed for the paper for line-spacing, the paper being gripped between it and the small rollers *o'* *o'*, which are carried by the elastic supports *q* *q*, forming a
15 part of the cylindrical paper-receiver *q'*, attached to the laterally-sliding frame *p*, just behind the roller *o*. As the paper *z* passes from the rollers *o* *o'*, it slides freely, and is rolled up in the receiver *q'*, and to insure this
20 rolling up of the paper without its offering resistance I propose, when thought necessary, to apply a roller, *q''*, to the interior of the receiver, and small rollers *q'''* *q'''*, having bearings
25 on and projecting through the top of the receiver, which is sufficiently elastic to cause said small rollers *q'''* *q'''* to bear with a yielding pressure on the roller *q''*, and the paper *z*, as it passes from the cylindrical platen or roller
30 *o* and rollers *o'*, is gripped by the rollers *q''* *q''*, which are caused to rotate uniformly by the small belts *q''*, connecting the rollers *o* and *q''*. To rotate these rollers in starting the paper or for line-spacing, the ends of the shaft
35 of the roller *o* are provided with milled heads *o''* *o''*; and for accurate spacing small spring-acting levers *o'''* *o'''*, pivoted to the frame *p* and provided with pawls which catch into the teeth of the ratchet-wheels *o''* *o''*, secured to the
40 ends of the roller *o*, when the levers *o'''* are depressed, may be used.

To provide means for properly presenting the paper to the roller *o*, and holding it clear of the keys *a* *a*, a split cylindrical paper-holder, *r*, is attached to the frame *p* in front of the
45 roller *o*, by being pivoted thereto at its under side. Its free end *r'* is held against or in close proximity to the roller *o*, to guide the paper smoothly thereto, by means of the spring *r''*, which catches into a notch in the sector *r''*, secured to the shaft of the holder; and another
50 notch is formed in this sector, into which the spring catches to hold the holder away from the roller in the position shown by the dotted lines, Fig. 3, to admit of the paper *z* being
55 readily placed in the machine, which is done by allowing the edge of the paper to project a sufficient distance beyond or outside the free edge *r'* of the holder *r*, so that said edge of the paper will be gripped by the rollers *o* *o'* when
60 the holder *r* is moved into position toward the roller *o*. The cylindrical holder *r* is cut away at the ends to permit of the lateral adjustment of the paper therein, and a scale (shown in Fig. 1) may be marked on its free edge *r'*, to
65 assist in setting the paper, and also to act as a guide for the lateral adjustment or setting of

the paper-controlling device in relation to the guides *h'*, down which the type descend.

The spacing of the letters in the line of printing is performed through the medium of
70 the frame *s*, fitted to work on the shaft *b*, outside the key-bars *a'* *a'*, and extending by the part *s'* over the top of the rear end of the bars *a'* *a'*, and by the part *s''* under the bars *a'* *a'* in front of the shaft *b*, each bar *a'*, as it is de-
75 pressed by its key *a*, actuating said frame *s* by carrying the part *s''* down with it.

Located over the part *s'* of the frame *s* is the lever *t*, pivoted at one end to a projection from one of the standards *c'*, and having an
80 adjustable contact-screw, *t'*, against the bottom end of which the part *s'* of the frame *s* bears. This lever *t* carries a pawl, *t''*, arranged to catch into one of the teeth of the ratchet-wheel *u*, and partly rotate the wheel when the
85 lever *t* is pressed down by the spring *t''*, bearing on its upper surface after the lever has been raised up by the frame *s'*.

Motion is imparted to the paper-carrying frame *p* through the medium of the rack *v*, at-
90 tached to it, and the pinion *v'*, secured to the shaft *u'*, to which shaft the ratchet-wheel *u* is secured, said shaft having bearings in the frame *c*.

To prevent the frame *p* from moving be-
95 yond the desired distance for the proper spacing of the letters, which is determined by the number of teeth in the ratchet-wheel *u* and the pinion *v*, the stop *t'*, attached to or forming part of the lever *t*, is so arranged that
100 when the lever *t* is depressed it falls in front of one of the teeth of the stop-ratchet wheel *u''*, secured to the shaft *u'*, whose teeth are placed reversely to those of the feed-ratchet
105 *u*. This same feeding or spacing mechanism is utilized to move the paper laterally for word-spacing by the bar *w'*, fitted on the central part of the shaft *b*, coming in contact with the bar *s''* of the frame *s*, when it
110 is depressed, which is done by the key *w* on its outer end, conveniently placed in the center of the inner row of keys, *a*. The spring *w''* holds this bar and key up when the spacing mechanism is actuated by any of the keys *a* *a*.
115 Upon pressing down the key *w* to its full extent the pawl *t''* and stop *t'* are moved up clear of their respective ratchet-wheels, leaving the paper-carrying frame *p* free to be
120 moved in either direction laterally. The lateral movement of the frame *p* is limited by the stop-block *c''*, projecting from or attached to the main frame *c*, against which the ends of the frame *p* strike.

The bell *h'*, attached to the bracing-frame *h''*, is rung by the stud *h''*, adjustably clamped on
125 the wire or rod *h''*, secured on the top of the paper-receiver *q*.

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

1. In combination, a series of type-carrying arms arranged in one plane, having a com-
130

mon axis of rotation and provided with hinge-joints between their axis and their ends, the successive arms from the center to the end arms having an increasing lateral bend, substantially as set forth.

2. A series of type-arms composed of two pieces laterally hinged together, the parts so hinged being placed and held in juxtaposition on a shaft passing through one of the sets of pieces, the sides of the laterally-moving arms or parts to which the type are attached acting as guides to cause an operated arm to resume its normal position in the common plane, substantially as set forth.

3. In combination, a series of laterally-hinged type-arms arranged in an upwardly-inclined plane and pivoted in juxtaposition on a common shaft, and type secured to their free ends, an impression platen or roller located in front of the type-arms, directing-guides located in front of the type-arms, to cause the type to strike in one position of impression, and a stop-bar provided with guide-pins, between which the type-arms are held in one plane and from which the type-arms are entirely clear before they come in contact with the directing-guides, substantially as set forth.

4. In combination, a series of arms carrying type at their ends, having a common axis of rotation and provided with hinge-joints between their axis and their ends, a series of bars provided with keys or finger-pieces and held on one shaft, and links connecting the rear ends of the key-bars to the pivoted parts of the type-arms, substantially as set forth.

5. In combination, a series of arms carrying type at their ends, having a common axis of rotation and provided with hinge-joints between their axis and their ends, a series of bars provided with keys or finger-pieces and held on one shaft, links connecting the rear ends of the key-bars to the pivoted parts of the type-arms, and a series of connecting springs for raising and holding the type into normal position, substantially as set forth.

6. The combination, with a series of laterally-hinged type-arms pivoted on a common shaft, and a number of type secured to their free ends, and an impression platen or roller, of movable bearings constructed and operated to move the common shaft on which the type-arms are pivoted, so as to cause all the type to strike on one line, substantially as set forth.

7. In a type-writing machine, in combination, a series of arms pivoted on a common horizontal shaft and provided with type on their free ends, arranged and operated to cause the type to strike face down on the upper exposed surface of the paper, directing-guides located in front of the arms, inclined downwardly toward the center, with their ends arranged vertically parallel, between which the type-arms pass, and an ink-roller held in a pivoted frame and located in front of the vertical parallel ends of the directing-guides, so

as to be struck by a descending type and be moved out of the path of the same, substantially as set forth.

8. In a type-writing machine, in combination, a series of arms pivoted on a common horizontal shaft and provided with type on their free ends, arranged and operated to cause the type to strike face down on the upper exposed surface of the paper, directing-guides located in front of the arms, inclined downwardly toward the center, with their ends arranged vertically parallel, between which the type-arms pass, an ink-roller held in a pivoted frame and located in front of the vertical parallel ends of the directing-guides, so as to be struck by a descending type and be moved out of the path of the same, and an arm or rod projecting from the pivoted ink-roller frame and extending over the type-arm in its path when the ink-roller has been moved out of the path of the type, substantially as set forth.

9. In combination, a series of laterally-hinged type-arms pivoted on a common shaft and a number of type secured to their free ends, an impression platen or roller, movable bearings constructed and operated to move the common shaft on which the type-arms are pivoted, so as to cause all the type to strike on one line, and an ink-roller held in a pivoted frame in the path of the type, said roller being of such a length as to be struck by one type only, substantially as set forth.

10. In a type-writing machine, the combination, with a platen or paper holding and feeding roller, of a cylindrical paper-holder located in front of the platen or roller, pivoted to the roller-frame and held in either of two positions by means of a spring-catch, in one position with its free edge in juxtaposition to the roller to guide the paper thereto, and in the other position with its free edge away from the roller, substantially as set forth.

11. In a type-writing machine, the combination, with a platen or paper holding and feeding roller, of a cylindrical paper-receiver located behind the roller and a set of small rollers having spring-bearings on or attached to the free edge of the paper-receiver and resting on the holding and feeding roller with a yielding pressure, substantially as set forth.

12. In a type-writing machine, the combination, with a platen or paper holding and feeding roller, of a cylindrical paper-receiver located behind the roller and a set of small rollers having spring-bearings on or attached to the free edge of the paper-receiver and resting on the holding and feeding roller with a yielding pressure, a roller located in the cylindrical paper-receiver connected to and receiving motion from the holding and feeding roller, and rollers having bearings in the upper part of the cylindrical paper-receiver in contact with the interior roller, substantially as set forth.

13. The combination, with the space-key, of the ratchet-wheel of the carriage-feed mechan-

ism, the lever carrying an actuating and a
detent pawl, and the frame for lifting said
lever, the whole constructed and arranged,
substantially as described, so that when the
5 space-key is depressed to its limit the carriage
will be released and freely movable in either
direction.

14. In combination, a laterally-moving pa-
per holding and controlling frame, a shaft at
10 right angles thereto, a pinion on the shaft,
working in a rack on the laterally-moving
frame, a ratchet-wheel on the shaft, a pawl
pivoted on a lever and actuating the ratchet-

wheel, to cause the frame to feed forward, a
ratchet-wheel with its teeth reversed, and a 15
projection on the lever catching therein to
limit the movement of the frame, and means
for giving an up and down movement to the
lever, substantially as set forth.

In testimony whereof I have hereunto set 20
my hand at New York, county and State of
New York, this 12th day of January, 1886.

EUGENE FITCH.

Witnesses:

H. D. WILLIAMS,
CHAS. L. WATSON.