

(No Model.)

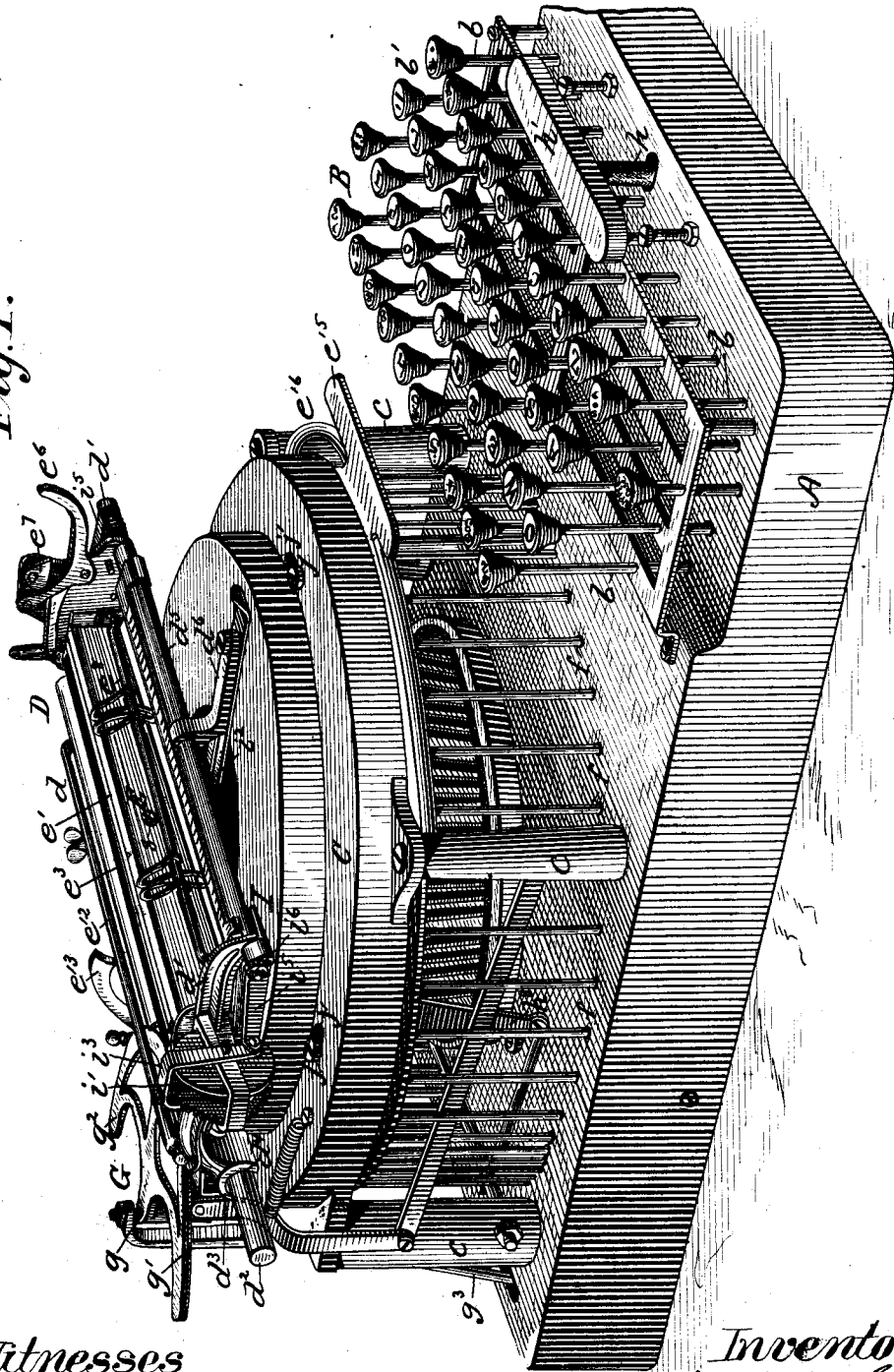
6 Sheets—Sheet 1.

A. W. CASH.
TYPE WRITING MACHINE.

No. 466,600.

Patented Jan. 5, 1892.

Fig. 1.



Witnesses
Harry R. Williams.
Arthur B. Jenkins

Inventor
Arthur Wise Cash
by his attorney *J. H. Hubbard.*

(No Model.)

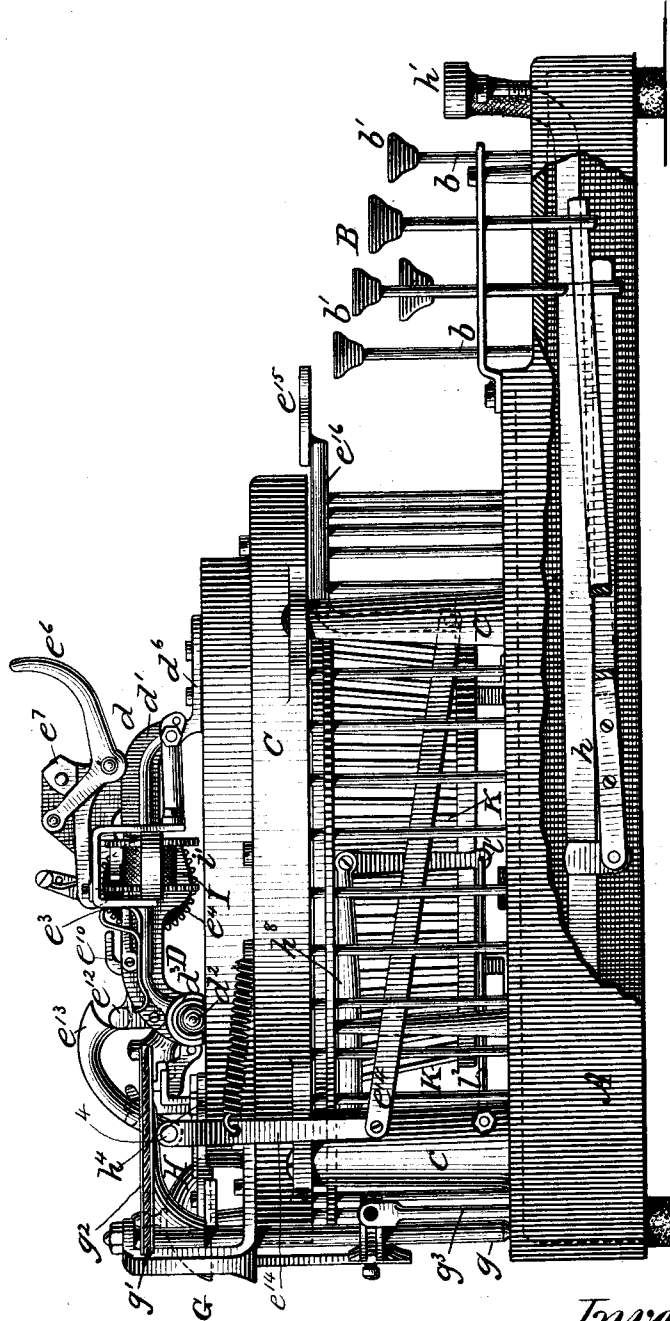
6 Sheets—Sheet 3.

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Fig. 3.



Witnesses
 Harry R. Williams,
 Arthur B. Jenkins.

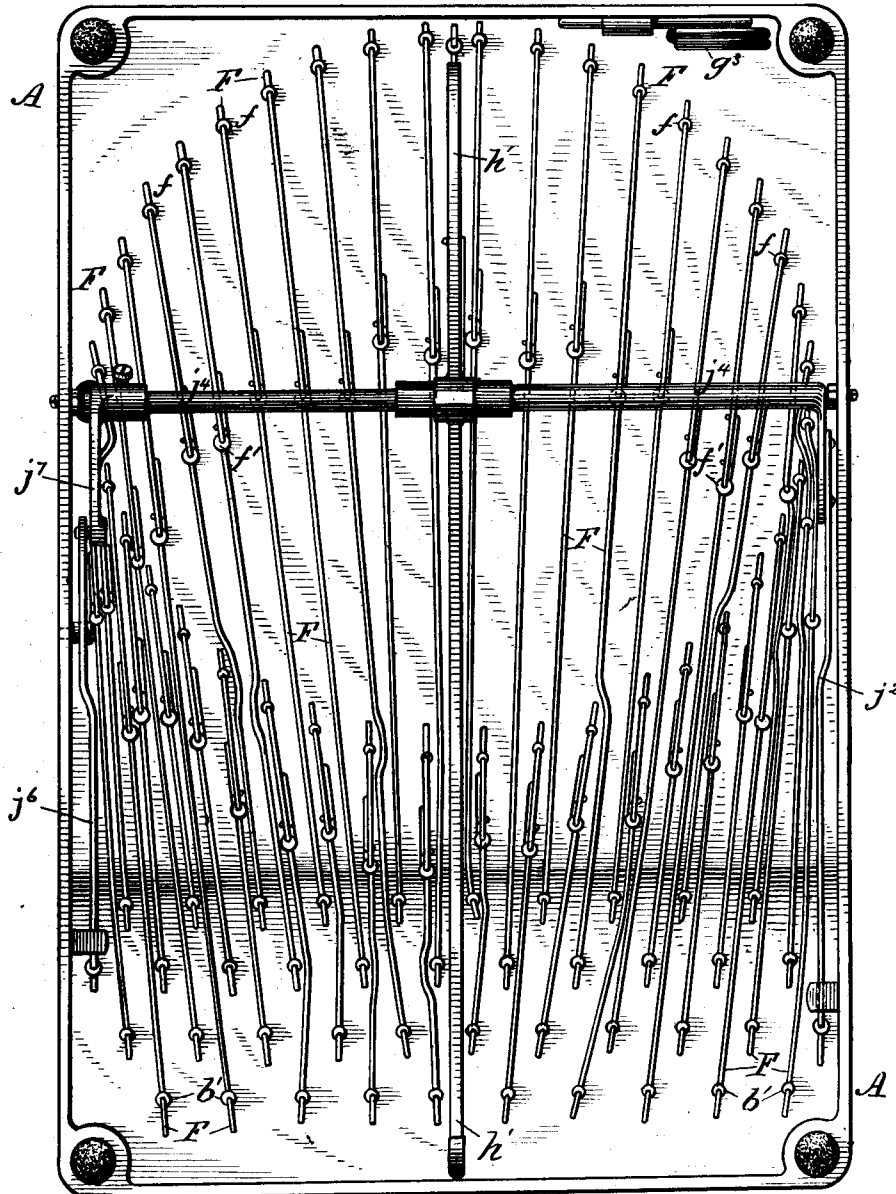
Inventor
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Fig. 4.



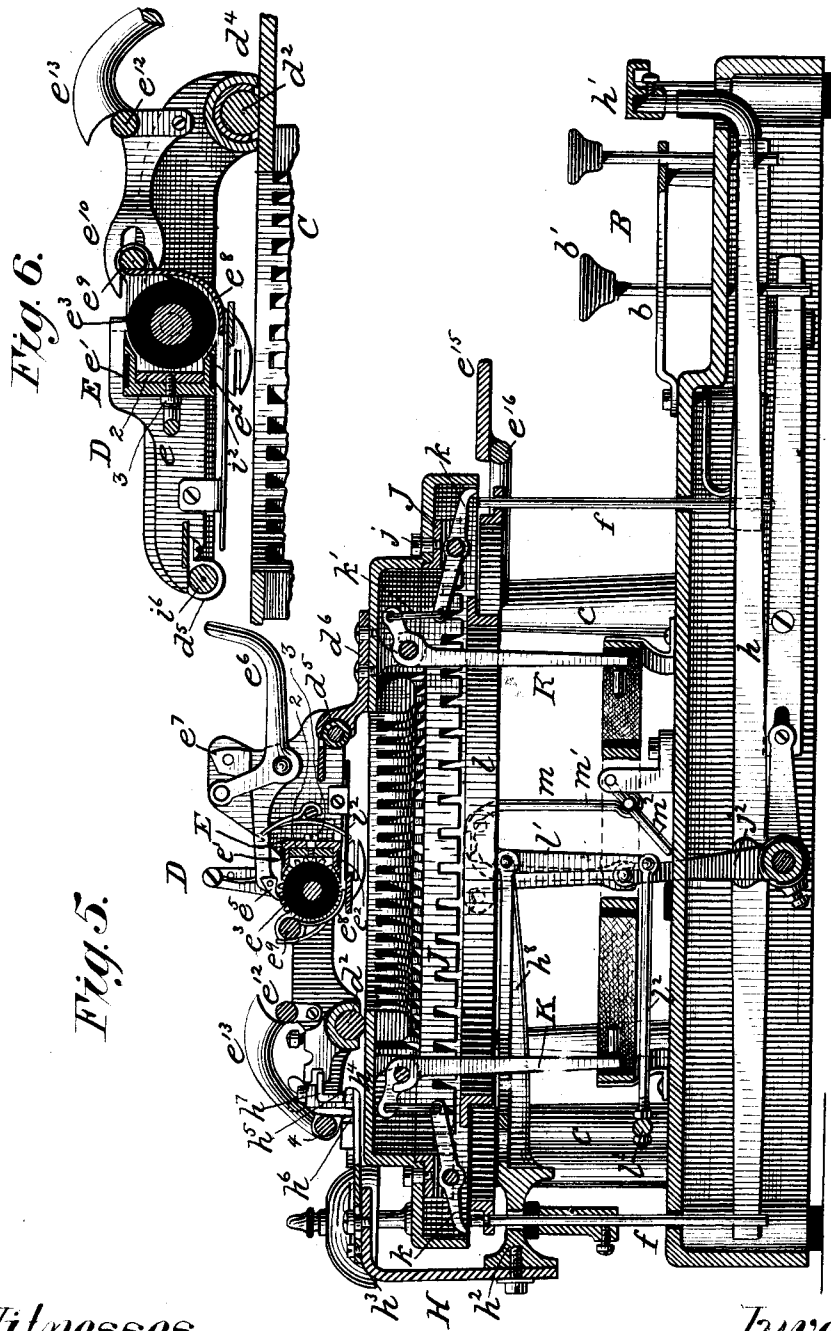
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(No Model.)

6 Sheets—Sheet 6.

A. W. CASH.
TYPE WRITING MACHINE.

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Fig. 7.

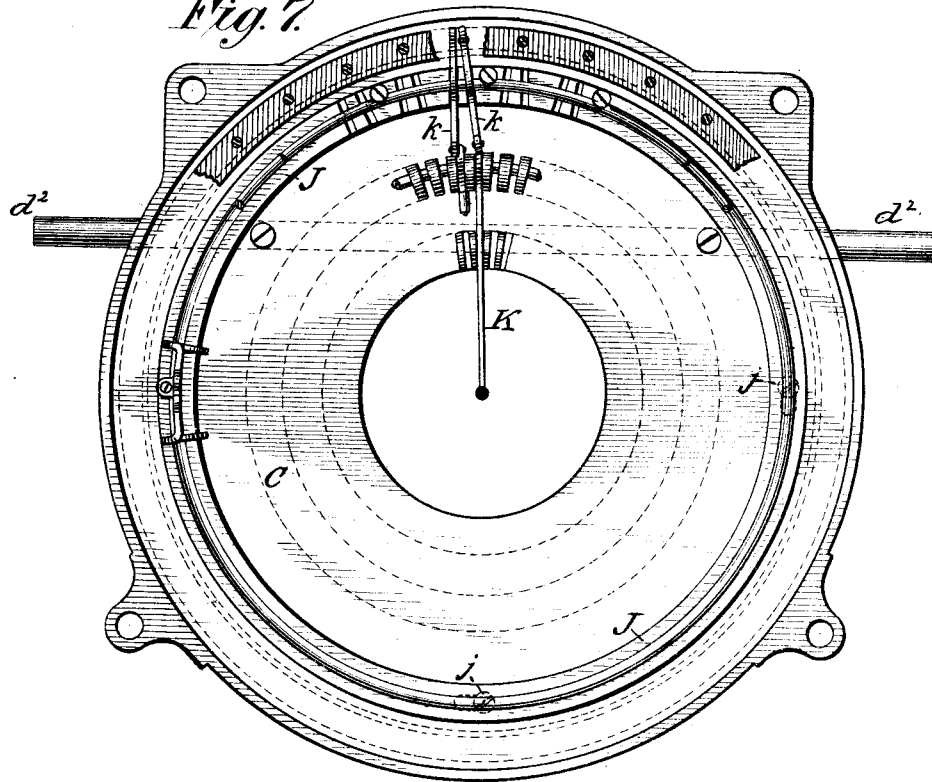


Fig. 8.

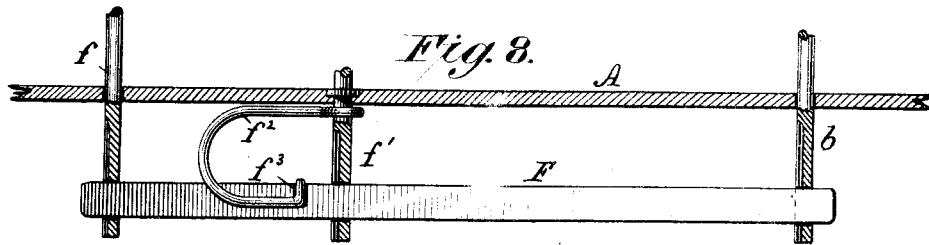
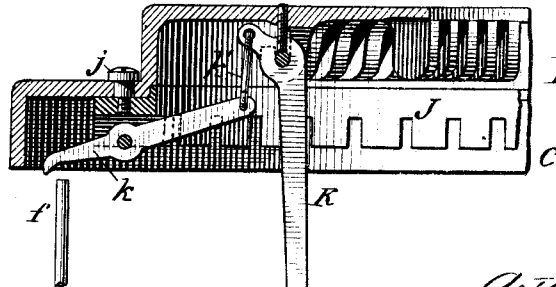


Fig. 9.



Witnesses
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UNITED STATES PATENT OFFICE.

ARTHUR WISE CASH, OF BRIDGEPORT, ASSIGNOR TO THE TYPOGRAPH COMPANY, OF HARTFORD, CONNECTICUT.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 466,800, dated January 5, 1892.

Application filed July 23, 1889. Serial No. 318,454. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR WISE CASH, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Type-Writing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of type-writing machines in which upper and lower case characters are provided upon separate type-bars, and are adapted to be operated by a single set of key-levers and finger keys or pads.

The principle of the invention will be described first and the best mode in which I have contemplated applying that principle then will be set forth, and the parts, improvements, or combinations which I claim as my invention will be particularly pointed out and claimed.

In order that those skilled in the art to which my invention appertains may fully understand the construction and operation of my improved machine, I will describe the same in detail, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective of a type-writing machine constructed in accordance with my invention; Fig. 2, a plan view with a portion of the shifter-plate broken away; Fig. 3, a side elevation, a portion of the base being broken away to show the key-levers within; Fig. 4, a bottom plan showing the arrangement of the key-levers beneath the base; Fig. 5, a central vertical section longitudinal of the machine; Fig. 6, a slightly enlarged transverse section through the roller and platen, the end portion of the carriage and frame appearing in elevation; Fig. 7, a detail bottom plan view of the shifter-plate, with certain of the guide-slots shown and a type-lever thrown upward into its printing position in said slots. In this figure it is deemed unnecessary to show all the guide-slots and all the type-levers, since they are but duplicates of those illustrated; Fig. 8, a detail of one of the key-le-

vers and the connection of said lever at the respective ends thereof; Fig. 9, a detail vertical section showing one of the type-levers and its operating connection.

Like letters and figures of reference denote the same parts in all the figures of the drawings.

A is the bed or frame upon which the operative parts of the machine are mounted.

B is the key-board, located at one end of the frame, and in this key-board are arranged the key-shafts *b*, having the lettered pads *b'*. At the other or rear end of the frame is the circular type-base C, mounted upon standards *c*, which project upwardly from the frame.

The platen-carriage D consists of a frame *d*, having cross-bars *d'*, between which the platen E is journaled.

The key-levers F are pivotally attached to posts *f'* at the under side of the bed A. These key-levers are placed in assembled position by passing them through the slotted fulcrum, the post, and engaging their extremities, respectively, with the slotted lower ends of the key-shafts *b* and the type-lever rods *f*. (See Figs. 4 and 8.)

The carriage-feed mechanism G comprises a spring-actuated shaft *g*, vertically arranged upon the bed behind the type-base, and a cord or wire connected to said spring-actuated shaft, as to one end thereof, and to the carriage, as to the other end. The escapement mechanism H is also arranged at the rear of the key-base, and by means of a spacing-lever *h* is connected with a space-key *h'*, which is preferably arranged at the front of the key-board. The ribbon-feed I is arranged on and is carried by the carriage, and consists of the reels *i'* and the ribbon *i*, which passes from one reel to the other across the bottom of the carriage. Said ribbon is supported at the point of impact in a ribbon-guide *i'*, Fig. 5. The shifter plate or ring J is borne on the type-base in a space or socket surrounding the base, and it is connected by levers to keys arranged in the key-board, the object being to enable the levers to be used at will with upper or lower case type by shifting the ring. The key-levers F are each supported on a stud *f'*; that projects downward

from the under side of the key-base, and each lever is preferably a flat strip of metal, as steel, that passes through a slot in the stud and through slots in the letter-pad shafts *b* and in the type-lever rods *f*. A bent spring *f*² is supported on the stud *f*¹ and thrusts downward against the lever on one side of the fulcrum, the bent end of the spring taking into a notch *f*³ in the upper edge of the key-lever in a manner that prevents it from slipping lengthwise in the supports. The letter-pads *b*¹ are provided with the usual letters and characters, and they are supported on shafts that extend downward through the frame and connected to the key-levers, as shown in the drawings. Each type-lever rod *f* is guided in supports in the frame and in the key-base, and its upper end underlies the outer end of the type-lever *k*, the inner end of the lever being connected by a link *k*¹ with a type-bar *K*. The type-levers are all pivotally supported in the shifter-ring *J*, and they are arranged in pairs, the inner end of each type-lever of the pair being connected to a type-bar, one bearing an upper-case type and the other a lower-case type of the same letter, while the outer ends of the type-levers are arranged close together, (see Fig. 7,) so that while one overlies the upper end of a type-lever rod *f* the other is in position to be moved into line with the rod when the shifter-ring is moved. The type-levers are supported in the shifter-ring somewhat below the upper ends of the pivoted supports of the type-bars in the key-base, and the link of the connection forms a sort of swivel-joint that enables the type-levers to be shifted slightly in horizontal position and to be carried into operative arrangement with the type-lever rod without cramping the lever when the key is operated to print with the type. Any downward pressure upon a letter-pad causes the type-bar bearing that type to be driven sharply against the under side of the ribbon and make an imprint of the type in the usual manner. The guide-rod *d*² is secured across the top of the key-base in the direction in which the carriage is to be moved, and the rear bar *d*³ of the carriage-frame is provided with a lengthwise socket *d*⁴, into which the guide-rod fits in such manner as to hold the carriage in proper position to enable it to move lengthwise only on the guide-rod. The front bar *d*⁵ of the carriage-frame is held in a socket in the bracket *d*⁶ against anything but a lengthwise-sliding movement. The carriage is pulled normally toward the left-hand end of its path of movement by means of the carriage-feed mechanism *G*, a cord *g*¹ forming a flexible connection between the carriage and the curved arm *g*², that is supported on the upper end of the shaft *g*. This shaft bears a grooved pulley or like device, on which is wound a cord fast to it at one end, while the other end of the cord is connected to the upper end of the arm of the carriage-spring *g*³, that is secured to the base of the machine. This platen-

carriage is given a step-by-step movement by means of the escapement mechanism *II*, that is connected to the spacing-lever *h*. A detent-lever *h*² is pivoted to the rear posts *c*, between which it extends across the rear of the machine. This detent-lever *h*² bears an adjustable arm *h*³, that is bent inward toward the carriage-frame and bears the escapement *h*⁴, that is of ordinary construction, consisting of a fixed tooth *h*⁵ and a spring-tooth *h*⁶, that underlies the ratchet-bar *h*⁷, that is pivotally supported on the carriage-frame, from which it extends in position to overlie the escapement device, that by means of the spacing-lever is given a reciprocation across the line of direction of the ratchet-bar. The arms *h*⁸, extending from the detent-lever underneath the key-base, are pivotally connected at diametrically-opposite points to the annular bearer *l*, that underlies all of the type-levers *k* and is in their downward path of movement, so that when either of the type-levers is actuated for the purpose of printing with the type borne on its end the contact of this lever with the upper edge of the bearer *l* depresses it and operates the escapement mechanism through the medium of the detent-lever, to which the bearer is connected. The bearer is also supported on the downturned arms *l*¹, connected to the arms *l*², that project from the rock-shaft *l*³, that is pivoted to the rear posts *c* on the machine. The platen *E* is reversible in the platen-frame *e* and it has a comparatively hard surface *e*¹ and a softer surface *e*², borne on opposite edges of the bar, so that either of these surfaces may be placed so as to back up the paper and receive the impact of the blow in printing. One way of rendering the platen reversible is shown in Figs. 5 and 6, wherein 2 is a fixed bar, which is embraced by the platen and the two connected by a screw or screws 3. By removing the screw or screws the platen may be slipped off the bar 2 and turned upside down and again slipped on the bar and the screw or screws inserted again. Back of this platen the paper-feed roll *e*³ is pivotally supported, its journal having fast to it at one end a ratchet-wheel *e*⁴, that is moved by means of the spring-pawl *e*⁵, borne on the outer end of the jointed feed-lever *e*⁶, that is pivoted to the platen-frame *e*. An adjustable stop device *e*⁷, pivoted to the frame in the path of movement of the feed-lever *e*⁶, determines the extent of return movement of the lever, and thus the degree that the paper-feed roll may be turned, and this forms the means of fixing the distance between the lines of printing. The paper-guide *e*⁸ surrounds the feed-roll in part; but the space immediately over the operative surface of the platen is left free, so that any writing on the surface of the paper can be plainly seen when the platen is lifted. The rod *e*⁹ on the back of the platen-frame lies between the forked ends of the arm *e*¹⁰, projecting from the rock-bar *e*¹², that is pivotally supported on the

platen-carriage and extends across its length, so as to be at all times in contact with the end of the tilting lever e^{13} . The tilting lever e^{13} is pivoted to a fixed part of the machine—
 5 for example, a rock-shaft 4—which may be connected by the jointed rods e^{14} with the tilting pad e^{15} , borne on the outer end of a lever e^{16} in a convenient position just back of the key-board. It will be observed that the
 10 depression of the tilting pad e^{15} , acting through rods e^{14} , rocks the shaft 4, and thus depresses the tilting lever e^{13} , and as said tilting lever is always in contact with the rock-bar e^{12} and
 15 said rock-bar e^{12} will be depressed or rocked toward the platen, causing the forked arm e^{10} to descend and carry with it the rod e^9 and effect, ultimately, the tilting of the platen. By means of this platen-tilting device the paper
 20 written upon can be turned up to view, so as to enable the operator to inspect it for any purpose. The ribbon-reels i' are mounted on opposite sides of the frame and directly opposite each other, so that a ribbon extends be-
 25 tween them across the type-base and overlying the point where each of the types strike in operating the machine. A frame-like lever i^3 is pivoted to the shaft of each reel, and the portion overlying one side of the reel, that is provided with ratchet-teeth, bears a
 30 spring-pawl i^1 , the outer end of which is adapted to engage the teeth. A shifter-rod i^2 is supported in the tubular front part of the frame and bears on its opposite ends arms
 35 i^3 , one arm i^3 being pivotally attached to the lever i^3 appurtenant to the left-hand ribbon-reel in a manner to cause the reel to turn to the right when the shifter-rod moves to the left, while the other arm i^3 on the right-hand
 40 end of this shifter-rod is so connected to the ribbon-reel lever as to cause it to turn the reel toward the left with the movement of the shifter-rod—that is, the left-wise sliding movement of the shifter-rod is adapted to
 45 turn one ribbon-reel to the right, while on the other hand its reverse movement will turn the opposite ribbon-reel to the left. A spring-trip device i^4 is pivoted to the platen-carriage frame and has an arm that extends upward
 50 and under the end of the spring-pawl on the reel in position to lift the latter out of contact with the ratchet-teeth on the reel, so as to prevent the ratchet-feel lever from oper-
 55 ating to move the reel. Such a spring-trip device is connected to both of the ribbon-reels, the object being to throw one reel out of feeding action when the other is in operation. The shifter-bar has an arm i^5 , arranged to make contact with the bracket, fast to the
 60 base that supports the platen-carriage as the latter reaches the right-hand limit of its sliding movement, and such contact of the arm on the shifter-rod with this bracket gives to the ribbon-reel a feeding movement that
 65 winds the ribbon over one reel onto the other, the feeding movement being a slight one for

each contact of the arm of the shifter-rod with the bracket.

In order to decrease the number of letters in the key-board, my within-described ma-
 70 chine is arranged so that two type-bars, one bearing an upper-case and the other a lower-case of a given letter, may operate by a single type-lever, and this is accomplished by providing means—the shifter-ring J and the
 75 mechanism for moving it to a limited extent—so that the end of a type-lever k appurtenant to a lower-case type-bar can be held normally in the path of movement of the type-lever rod j , adapted to be actuated by a certain
 80 key-lever, and the ring can then, by suitable mechanism, be shifted so as to bring the type-lever appurtenant to the upper-case always in alignment to be operated by the same key-lever. The shifter-ring J is sup-
 85 ported on the under side of the type-base by the screws j , that pass downward through slots j' in the key-base, the broadened heads of the screws supporting the ring and the slots allowing it a certain limited rotary slid-
 90 ing movement about the center. An arm j^2 extends downward from the shifter-ring and is pivotally connected to an arm j^3 , that extends upward from the rock-shaft j^1 , that extends across the under side of the bed of the
 95 machine. (See Fig. 4.) Another arm j^4 extends upward from the rock-shaft and is connected to one of the shafts in the key-board, the other end of which supports a finger-pad marked "Upper Case," (see Fig. 2,) and on
 100 the opposite side of the key-board a finger-pad marked "Lower Case" is connected to a lever j^5 , that is fulcrumed on the stud on the bed, and beyond it is connected to another arm j^6 , fast to the rock-shaft. The shifter-
 105 ring may be so held as to normally cause the machine to write wholly with the upper-case letters without shifting the ring or wholly with the lower-case letters by means of the peculiar arrangement of the rock-bar and le-
 110 vers just described and the shifter-spring m . This spring is a bent or curved one having one end m' eccentrically connected to the lever m^2 , while the other end is attached to the arm j^2 , that projects downward from the
 115 shifter-ring. When this spring is arranged in the position shown in Fig. 5 of the drawings, the machine will write normally lower-case and the pad bearing those words will stand at a level considerably below the line
 120 of keys next to it; but when the lever m^2 is thrown over to the opposite side of the fulcrum the spring operates to pull the shifter-ring toward the fulcrum instead of pressing it from it, and the result is that the machine
 125 is set to write upper-case normally, and will write lower-case only by depressing the finger-pad so marked and turning the shifter-ring around temporarily by such depression of the
 130 finger-pad and the movement of the levers and the parts connected therewith. Each key-lever is a strip of flat metal that is read-

ily assembled in the machine by passing it through a slot in the shaft supporting the letter-pad, through the slot in the stud or post in which it is fulcrumed, and through that in the connecting-rod or pitman, the slot in each instance being made by a cut by a circular saw lengthwise of the small round wire of which the parts are made, and then slabbing off one side of the wire near the end and opening the slot. The key-lever is held against any lengthwise sliding movement by the spring, the end of which locks into a notch on the upper edge of the lever, as already described. This construction of these parts enables them to be cheaply made and readily put together or removed from the machine.

By means of the automatic ribbon-feed device the ribbon is fed when the carriage reaches the end of its rightward movement a slight distance, and this secures an economical use of the ribbon.

In the reel-reversing device it is to be noticed that the lever that is thrown out so as to permit the reel on that side to turn bears against the side of the reel, so as to give a slight frictional resistance against unrolling, so that the ribbon is held with the proper tension as it is extended across the carriage.

I claim—

1. In a type-writing machine, the combination, with the types and means for operating the same, of the carriage moving on ways across the machine over the point of impact of the types, a flat surface secured upon said carriage and extending substantially the full length thereof, the ribbon-reels journaled at each end of the carriage and moving therewith, and means, as described, whereby partial rotation is imparted to said reels at the limit of the traversing movement of the carriage, substantially as set forth.

2. In a type-writing machine, the combination, with the types and the means for operating the same, of the carriage and the spring-actuated shaft, segment, and cord whereby it is actuated, of the reversible platen mounted in said carriage and having impact surfaces differing in density, the ribbon-reels journaled upon and movable with said carriage, said ribbon extending along the length of the exposed impact surface, and means, as described, whereby at each complete traverse of the carriage a single limited feeding impulse is imparted to the ribbon relative to the impact surface, substantially as set forth.

3. In a type-writing machine, the combina-

tion, with the type-operating mechanism, the carriage, and the means whereby said carriage receives its proper step-by-step movement, of the paper-feed roller arranged lengthwise of and borne upon the carriage, the ribbon-reels journaled one at each end of said carriage, and the ribbon-feeding mechanism comprising the shifter-bar having a projecting arm adapted to engage a fixed part of the machine at the end of each complete traverse of the carriage, substantially as set forth.

4. In a type-writing machine, the combination, with the types and their operating mechanism, of the carriage and its operating mechanism and escapement, the platen having surfaces of different degrees of density upon opposite sides thereof, said platen detachably secured to the carriage, so as to be reversible therein, the feed-roller journaled in the carriage contiguous to the platen, and the ribbon-reels and ribbon carried upon the carriage, and the ribbon-guide extending beneath the platen and adapted to support the ribbon at the point of impact of the types, substantially as set forth.

5. In a type-writing machine, the combination, with the key-shafts having the lettered pads thereon, the type-lever rods *f*, and the posts *f'*, arranged between the key-shafts and type-lever rods, each of said elements having therein a slot extending in the direction of its length, of the key-levers fulcrumed in the slotted posts *f'* and whose ends engage, respectively, the slots in the key-shafts and the type-lever rods, and springs secured to the fulcrum-posts and engaging the key-levers, and against whose action the depression of the key-shaft is effected, substantially as set forth.

6. In a type-writing machine, the combination, with the key-levers and the keys for operating them, of the annular shifter-ring having hung therein the type-levers, the levers whereby said ring may be shifted upon its base, and the U-shaped spring *m*, secured to the shifter-ring and lever *m'*, respectively, and adapted to operate in either direction, according as it is distended or compressed by its connections, substantially as set forth.

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

ARTHUR WISE CASH.

Witnesses:

S. H. HUBBARD,
H. E. FRENCH.