(No Model.) 4 Sheets—Sheet 1.

G. W. N. YOST.

TYPE WRITING MACHINE.

No. 452,421. Patented May 19, 1891.

Fig. 1.

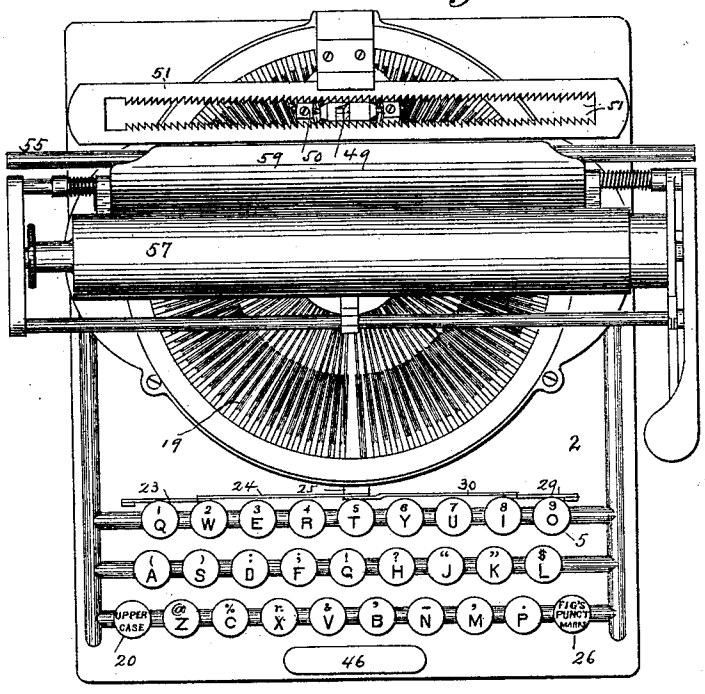


Fig. 6.

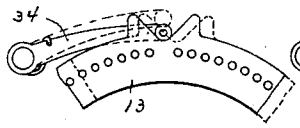


Fig. 7.

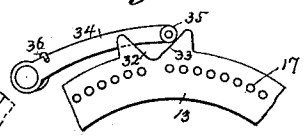
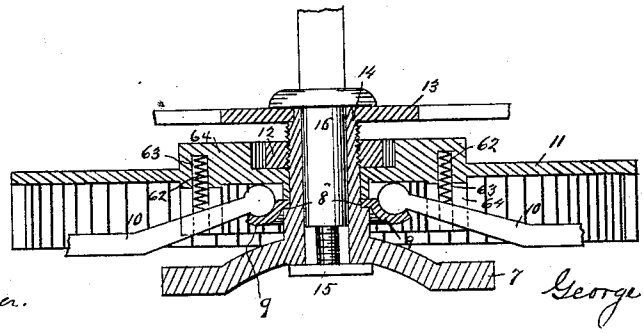


Fig. 10.



Attest:

Andrew Wolfinger.

Martin Snyder

Inventor:

George W. N. Yost

By Jacob Felbel

Atty:

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

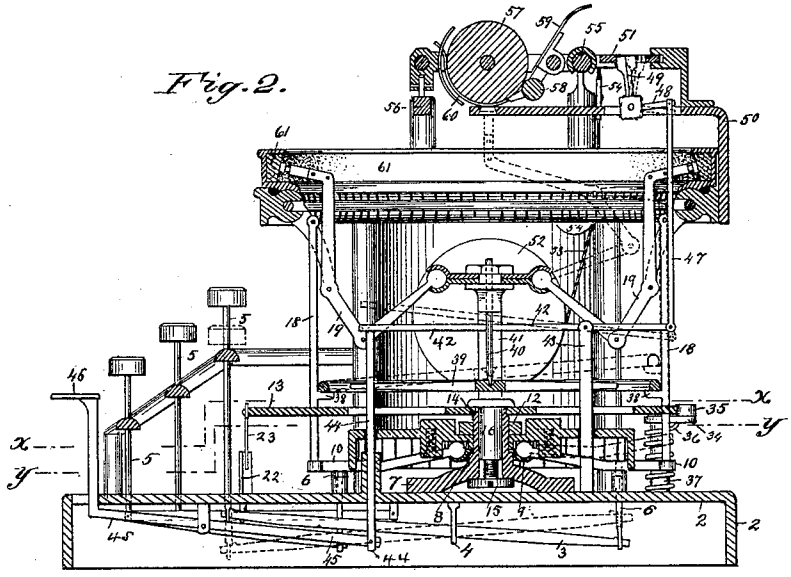
(No Model.) 4 Sheets—Sheet 2.

G. W. N. YOST.

TYPE WRITING MACHINE.

No. 452,421. Patented May 19, 1891.

Fig. 2.



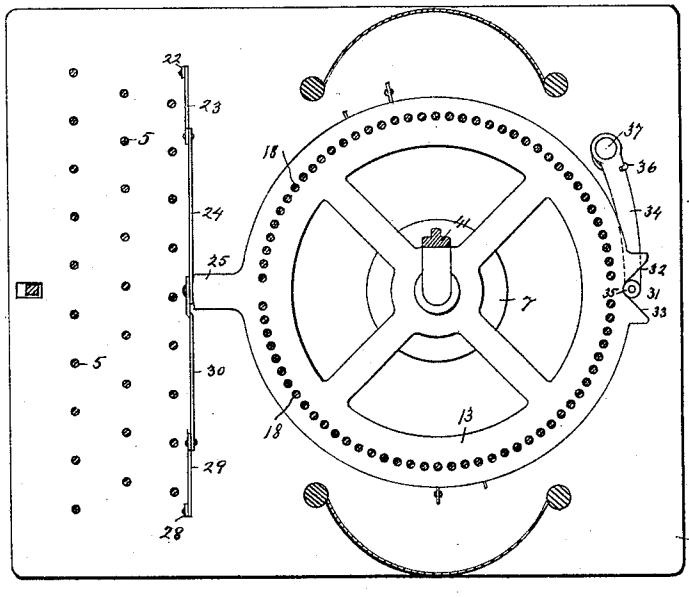


Fig. 3.

Attest:
Frederick Smith
Martin Frayden

Inventor:
George W. N. Yost
By Jacob Felbel
Atty:

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON D. C.

(No Model.) 4 Sheets—Sheet 3.

G. W. N. YOST.

TYPE WRITING MACHINE.

No. 452,421. Patented May 19, 1891.

Fig. 4.

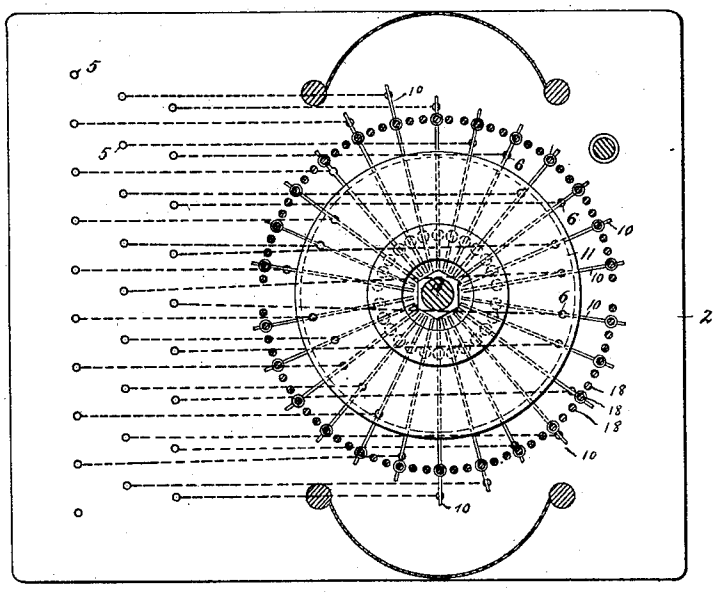
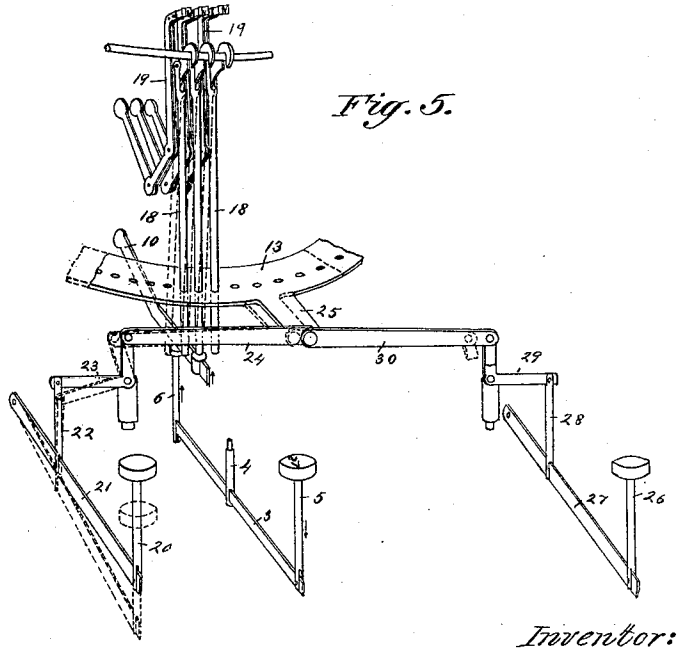


Fig. 5.



Attest:
Andrew Steiger.
Martin Snyder

Inventor:
George W. N. Yost
By Jacob Felbel
Atty:

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 4 Sheets—Sheet 4.

G. W. N. YOST.

TYPE WRITING MACHINE.

No. 452,421. Patented May 19, 1891.

Fig. 8.

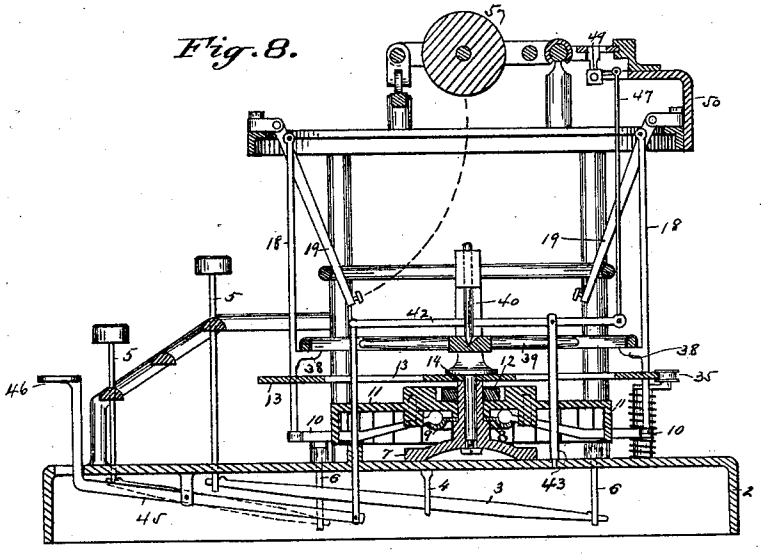
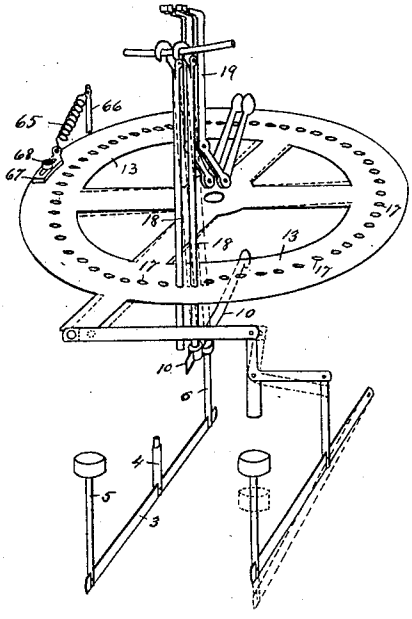


Fig. 9.



Attest:

Andrew W. Steiger.

Martin Snyder

Inventor:

George W. N. Yost

By Jacob Felbel

Atty:

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE W. N. YOST, OF NEW YORK, N. Y., ASSIGNOR TO THE YOST WRITING MACHINE COMPANY, OF SAME PLACE.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 452,421, dated May 19, 1891.

Application filed October 18, 1889. Serial No. 327,423. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. N. YOST, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention has for its main objects the production of a simple, cheap, and effective type-writing machine of the kind known as "shift-machines;" and it consists in the features of construction and combinations of devices hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a plan view of a type-writing machine embodying my improvements. Fig. 2 is a central vertical section of the same. Fig. 3 is a horizontal section on the line *x x* of Fig. 2. Fig. 4 is a similar section on the line *y y* of Fig. 2. Fig. 5 is a detail perspective view illustrating the shifting mechanism. Fig. 6 is a detail plan of the shift-ring and the retaining and returning devices. Fig. 7 is a similar view with the parts in a shifted position. Fig. 8 is a central vertical section showing the invention embodied in a machine of somewhat different construction as to the type-movement. Fig. 9 represents in perspective a modification of my invention. Fig. 10 is an enlarged detail view of the central stand or support, &c.

In the several views the same part will be found designated by the same numeral of reference.

2 represents the bed-plate; 3, the key-levers; 4, the key-lever fulcrum-posts, and 5 the finger-keys. The rear end of each key-lever is provided with a stem or lifter 6, which is preferably jointed thereto, and which, extending above the base-plate, terminates in a head or enlargement.

Mounted upon the bed-plate is a stand or support 7, formed with a circular shoulder 8 for supporting the bearing or fulcrum ring 9 of the lifting or sub-levers 10, and for also supporting the sub lever guide-ring 11, which is placed on top of the sub-lever fulcrum-ring 9. The stand 7 is made hollow or tubular centrally and is threaded exteriorly at its upper end to receive a nut 12, which operates to clamp the fulcrum-ring 9 and the sub-lever guide-ring 11 firmly upon the stand or support. The lifting sub-levers 10 radiate from their fulcrum-ring 9 to points directly over and slightly beyond the lifters 6, and are preferably formed with heads or enlargements.

13 designates a shift-wheel or circular plate mounted centrally upon a shoulder 14, formed on the stand or support 7 and held in place by a bolt or screw 15 and a nut 16. The shift-wheel is provided with perforations 17, which are arranged in a circle near its perimeter. Through these perforations or openings pass the lower ends of the vertical connecting-rods 18, which actuate the type-carriers 19. With each type-carrier is associated a connecting-rod. The type-carriers are arranged in a circle, likewise the connecting-rods.

In the machine illustrated in all the views excepting Fig. 9 there are seventy-eight type-carriers, seventy-eight connecting-rods, twenty-six sub-levers, and twenty-six key-levers. The connecting-rods are arranged in groups or periods of three—that is to say, three connecting-rods and type-carriers are controlled by one key-lever and one sub-lever. Each sub-lever stands normally beneath the middle connecting-rod of each group with the extremity of said connecting-rod terminating close to or immediately above it. The shift-ring is designed to be oscillated to vibrate or swing the lower ends of the pendent connecting-rods, so that the first and third of each group may be brought in line or register with the radiating sub or lifting levers 10. There are provided two shift-keys, one for moving the shift-ring and the lower ends of the series of connecting-rods to the left (or in the direction of the hands of a clock) and the other for shifting these devices to the right of their normal positions.

20 designates the shift-key for moving the shift-ring and the lower ends of the connecting-rods to the left. This key or finger-piece is connected to a lever 21, to which is attached

a link 22, whose upper end is connected to one end of a bell-crank or bent lever 23. A rod 24 is connected at one end to the inner end of the bell-crank and at its other end to an arm 25, projecting forwardly from the shift-ring. The key for moving the shift-ring and the lower ends of the connecting-rods to the right is designated by the numeral 26, and is connected to a lever 27, provided with a link 28, extending up through the bed-plate, like the link 22. To the upper end of the link 28 is attached one arm of a bell-crank 29, whose opposite arm is pivoted to one end of a rod 30, which at its other end is connected to the arm 25 of the shift-ring. The rear portion of the shift ring or plate is formed with a V-shaped notch 31, providing inclined walls or cams 32 and 33. Into this notch or recess plays the free end of a lever 34, provided with an anti-friction roller 35. A spring 36, attached at one end to a post 37, affixed to the bed-plate, and at its other end to the lever 34, is provided to keep said lever in operative engagement with the shift-wheel and to return the same and its connections to their normal positions after actuation of either shift-key.

Preferably the connecting-rods are all provided with inwardly-projecting lugs or fingers 38, for supporting and operating the circular universal bar 39. The hub or center of the universal bar or ring is provided with a conical depression, into which is stepped the lower conical end of a vertical spindle 40, which slides in a bearing formed in an arm or extension 41 of the stand or support 7. Through a slot in this spindle passes a horizontally-arranged lever 42, which is fulcrumed on a post 43, rising from the bed-plate. The front end of this lever rests upon or is connected to the upper end of a vertical rod 44, which is connected at its lower end beneath the bed-plate to the space-key lever 45, having a suitable key or finger-piece, as 46. The rear end of the lever 42 is connected by a link 47 to a rocker-arm 48, projecting rearwardly from an oscillatory holder or trunnion, which carries the feed-dogs 49 for the paper-carriage. The trunnion or dog-holder is supported by an arm or bracket 50, and the dogs are adapted to co-operate with the duplex rack 51, attached to the paper-carriage, in a manner to effect a step-by-step feed of the carriage under the influence of its driving mechanism, which is here represented as consisting of a spring-drum 52 and a cord or chain 53, attached at one end to the spring-drum and at the other to the right-hand end of the paper-carriage. Pulleys 54 are provided for giving the proper direction to the cord or flexible connection 53. The paper-carriage is adapted to travel on ways or supports 55 56, and is provided with a platen 57, a feed-roller 58, a paper-table 59, and paper-guides 60, all in about the usual manner.

The machine shown at Figs. 1 and 2 is adapted to print directly from an inking pad or ring 61, while that illustrated at Fig. 8 is designed to print through the customary inking ribbon or band.

In printing from a pad, jointed type-carriers are employed, as shown at Figs. 1 and 2, while in printing through a ribbon simple or plain bars provided with type are used, as seen at Fig. 8. The dotted lines at Fig. 2 show the action of the jointed type-carrier when moving the type-face from the inking-pad to the printing-point. The dotted line at Fig. 8 shows the path of the type-face of the unjointed or rigid type bar or lever in moving to the impression-point to print through the usual ribbon. (Not shown.) In the use of either form of type-carrier the type is moved to the impression-point (or the paper on the platen) by an upward push or movement of its associated connecting-rod 18.

The type-movement, (exclusive of the connecting-rods, the paper-carriage, the escapement-feed, the universal bar, &c.,) however, forms no part of my present invention.

The middle connecting-rod of each group is preferably attached to a lower-case type-carrier. The right-hand connecting-rod of each group is connected to an upper-case type-carrier and the left-hand connecting-rod of each group to a type-carrier bearing a numeral, punctuation-mark, or sign. In the normal position of the shift-ring the middle or second connecting-rod of each group is adapted to be lifted to move a lower-case type to the printing-point. When the ring is shifted to the left and held, the right-hand or third connecting-rod of each group is adapted to be lifted to move an upper-case or capital letter to the printing-point. When the ring is shifted to the right and held, the left-hand or first connecting-rod of each group is adapted to be actuated to move a numeral or punctuation-mark or sign to the impression-point. The three connecting-rods of each group are operated by one key-lever and its associated lifting or sub lever. In writing with lower-case letters the shift-ring remains in its normal position. If it be desired to print an upper-case letter, the finger-key 20 is depressed, thus forcing down the lever 21 and link 22 and oscillating the shift-ring to the left slightly through the intermediate bell-crank 23 and rod or pitman 24. As the shift-ring is turned in this direction the lower ends of all the connecting-rods 18 are shifted or moved in the same direction sufficient to bring the pendent end of the right-hand or third connecting-rod of each group over or in line with the lifting-lever 10, which controls it. In this position of the shift-ring and connecting-rods an upper-case letter may be printed. If now any of the finger-keys 5 be depressed, the key-lever 3 will be actuated and the stem 6 elevated. As the stem 6 rises, the lifting-lever 10 is raised at its outer end, and the connecting-rod 18 is forced up to drive or throw the type-carrier to the platen. If it be desired to print a numeral, punctuation-mark, or

sign, the finger-key 26 is depressed and the shift-ring moved slightly toward the right by means of the key-lever 27, the link 28, the bell-crank 29, and rod or pitman 30. When the ring is thus shifted, the lower pendent ends of the connecting-rods are all swung with it in the same direction, and the left-hand or first connecting-rod of each group is brought over to coincide or connect with its respective lifting-lever. While the ring is held in this shifted position, if any of the finger-keys 5 be operated the key-lever 3, the stem 6, the lifting-lever 10, and the connecting-rod 18 will be actuated as before, and a type-carrier bearing a numeral or other sign will be driven or moved to the paper-platen. In order to have the lifting-levers when at rest occupy at all times their proper positions and in order to prevent any lateral movement of these levers when in action, the slotted guide-ring 11 is provided. The spring-actuated lever or arm 34 presses toward the axis of the shift-ring and serves to hold the latter firmly in position when the lower-case letters are being operated. When the shift-key 20 is actuated, the inclined wall 32 forces out a slight distance the free end of the lever 34, as shown by the dotted lines at Fig. 6, and when the shift-key 26 is operated the inclined wall 33 similarly affects said lever, as indicated in full lines at Fig. 7. The movement of the lever 34 being effected against the tension or stress of the spring 36, said spring will consequently return the lever, the shift-ring, the connecting-rods, and the devices intermediate the shift-ring and the shift-key as soon as the pressure or force upon the latter is removed.

Preferably each lifting-lever 10 is provided with a small spring, as 62, to insure its return after having been vibrated. This spring is inserted in a housing 63, formed in an annulus 64 in the guide-ring 11, and bears upon said lever near its fulcrum end, the annulus being slotted radially for the passage or accommodation and guidance of the lifting-lever.

The material difference in construction between the machine shown at Fig. 8 and that shown at Fig. 1 is in the form of the type-movement. The operation of the two machines so far as the shifting mechanism is concerned is substantially the same.

In the modification shown at Fig. 9 I have shown my invention adapted to a single-shift machine, or one in which the shift-ring and pendent ends of the connecting-rods move only to one side of the normal position and return. Referring to this figure, it will be seen that the connecting-rods are arranged in groups or pairs of two. In a machine of this construction there must be provided half as many lifting-levers and key-levers and finger-keys as there are connecting-rods and type-carriers—that is to say, if there are seventy-eight type-carriers there must be seventy-eight connecting-rods, thirty-nine lifting or sub levers, thirty-nine key-levers, and thirty-nine finger-keys.

As will be seen, the devices for shifting the lower ends of the connecting-rods are constructed and operated substantially like the devices employed in the double-shift machine. In lieu of the holding and returning lever 34, however, I may employ a spiral spring 65, fastened at one end to a fixed arm or post 66 and at the other end to a slotted plate 67, adjustable by a set-screw 68 upon the shift-ring. The universal bar 39 is adapted to be lifted by any of the connecting-rods, as illustrated by the dotted lines at Fig. 2, to lift the spindle 40 and the lever 42, and thus actuate the feed-dogs to allow the carriage to be moved toward the left one notch at a time under the influence of its spring propelling or driving mechanism. That portion of the universal bar or ring opposite the portion being lifted bears upon its supporting-finger 38 and causes it to act as a fulcrum for the universal bar during the lifting of the connecting-rod and the movement of the type-carrier to the platen. When it is desired to space between words, &c., the space-key is operated to lift the link 44 and the lever 45 to vibrate the feed-dogs without actuating the lifting-levers, the shift-ring, the connecting-rods, the universal bar, or the type-carriers.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a type-writing machine, the combination, with a series of type-carriers, of a series of pendent connecting-rods, a ring or plate for shifting the free ends of said connecting-rods, a series of key-levers, and a series of lifting-levers arranged between the key-levers and the connecting-rods, substantially as set forth.

2. In a type-writing machine, the combination, with a series of type-carriers, of a series of pendent connecting-rods, a ring or plate for shifting the free ends of said connecting-rods, a series of key-levers, each provided at its rear end with a stem or lifter, and a series of lifting-levers, substantially as set forth.

3. In a type-writing machine, the combination, with a series of type-carriers, of a series of pendent connecting-rods, a ring or plate for shifting the free ends of said connecting-rods, means, substantially as described, for moving said ring or plate, and with it the free ends of said connecting-rods, a series of lifting-levers, and a series of key-levers, substantially as described.

4. In a type-writing machine, the combination, with a series of type-carriers, of a series of pendent connecting-rods, a ring or plate for shifting the free ends of said connecting-rods, a shift-key, a key-lever, a stem, a bell-crank, and a pitman, substantially as described.

5. In a type-writing machine, the combination, with a series of type-carriers, of a series of pendent connecting-rods, a ring or plate for shifting the free ends of said connecting-

rods, and a spring-actuated lever for holding the ring or plate in its normal position, pivoted independently of the ring or plate, and pressing toward the axis of rotation thereof, substantially as described.

6. In a type-writing machine, the combination, with a series of type-carriers, of a series of pendent connecting-rods, a shift ring or plate having a notch or recess, and a spring-actuated lever for returning said ring or plate to its normal position, pivoted independently of the ring or plate, and pressing toward the axis of rotation thereof, substantially as described.

7. In a type-writing machine, the combination, with a series of type-carriers, of a series of pendent connecting-rods the same in number as the type-carriers, a shift ring or plate, a series of lifting-levers less in number than the connecting-rods and type-carriers, and a series of key-levers the same in number as the lifting-levers, substantially as described.

8. In a type-writing machine, the combination, with a series of type-carriers and a series of pendent connecting-rods alike in number, of a shift ring or plate, a series of lifting-levers arranged so that each one controls three connecting-rods and type-carriers, and means, substantially as described, for actuating said lifting-levers, substantially as set forth.

9. In a type-writing machine, the combination, with a series of type-carriers and a series of pendent connecting-rods arranged in groups of three, of a shift ring or plate, a series of lifting-levers arranged to normally operate the middle connecting-rod of each group, and means, substantially as described, for moving the shift ring or plate to bring either the first or the last connecting-rod of each group to a position to be operated upon by said lifting-levers, substantially as described.

10. In a type-writing machine, the combination, with a series of type-carriers and a series of pendent connecting-rods, of a shift ring or plate, a series of radiating lifting-levers adapted to control two or more of said connecting-rods and type-carriers, and a series of key-levers adapted to actuate said lifting-levers, substantially as set forth.

11. In a type-writing machine, the combination, with a series of type-carriers and a series of pendent connecting-rods, of a shift ring or plate, a series of radiating lifting-levers, a guide ring or plate for said lifting-levers, and a series of key-levers, substantially as set forth.

12. In a type-writing machine, the combination of a series of type-carriers arranged in a circle, a series of vertical connecting-rods arranged in a circle, a shift-ring within the circle formed by the connecting-rods and connected to the free ends of said rods, a series of radiating lifting-levers beneath the free ends of said connecting-rods, and a series of key-levers extending to said lifting-levers and adapted to elevate the same, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 15th day of May, A. D. 1889.

GEORGE W. N. YOST.

Witnesses:
EDWIN C. DUSENBURY,
JACOB FELBEL.