

No. 827,538.

PATENTED JULY 31, 1906.

G. M. KITZMILLER.
TYPE WRITING MACHINE.
APPLICATION FILED APR. 22, 1905.

4 SHEETS—SHEET 1.

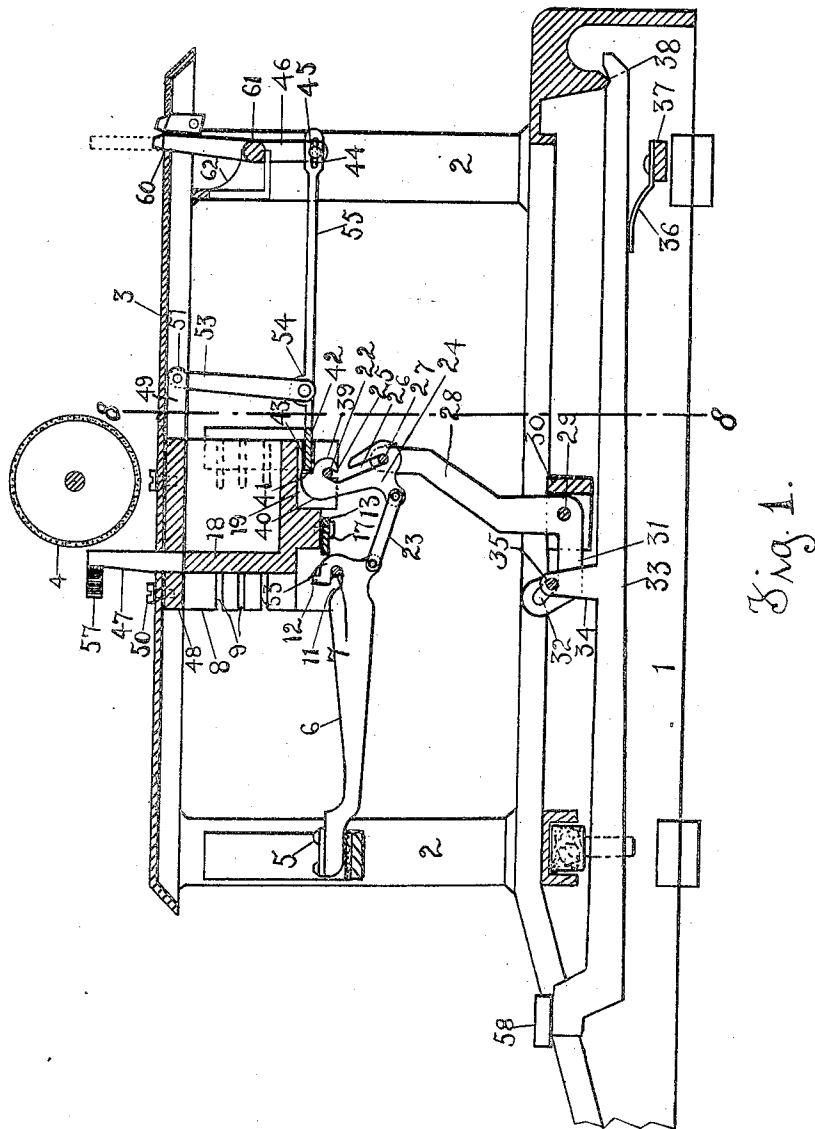


Fig. 1.

WITNESSES:

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INVENTOR.

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4 SHEETS—SHEET 2.

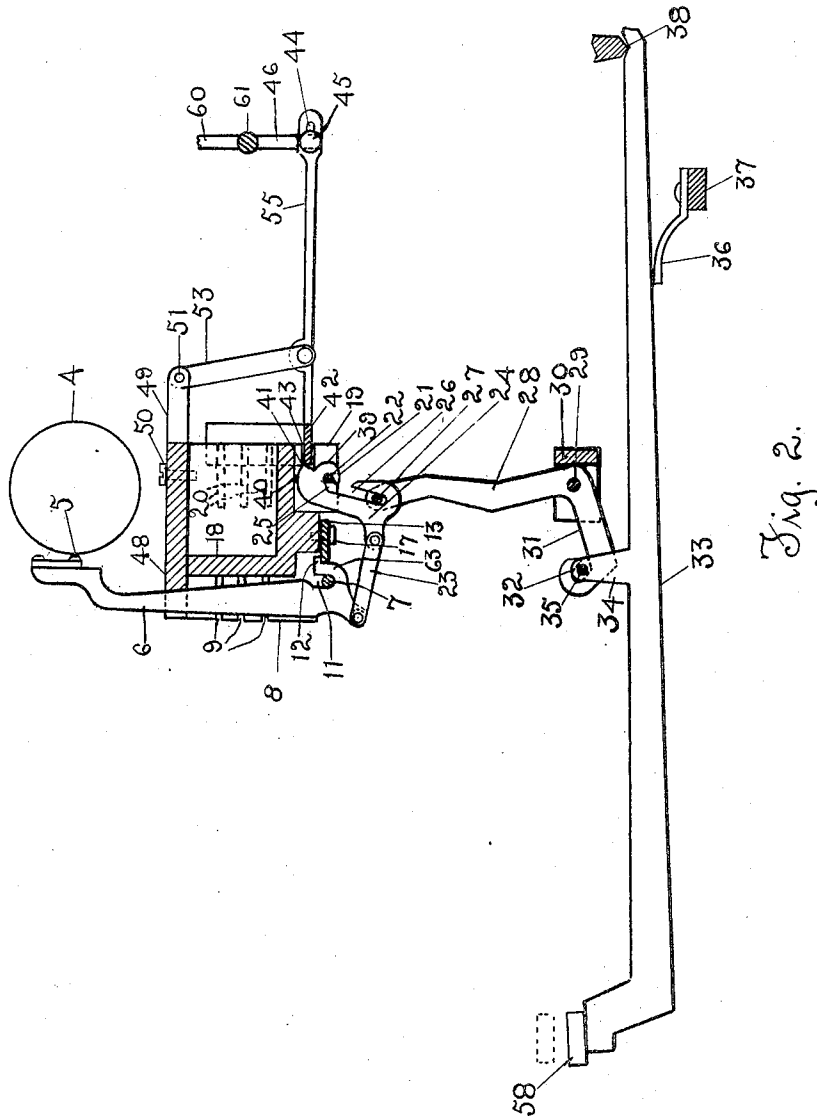


Fig. 2.

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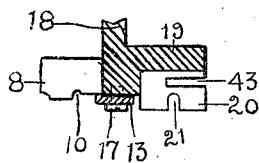
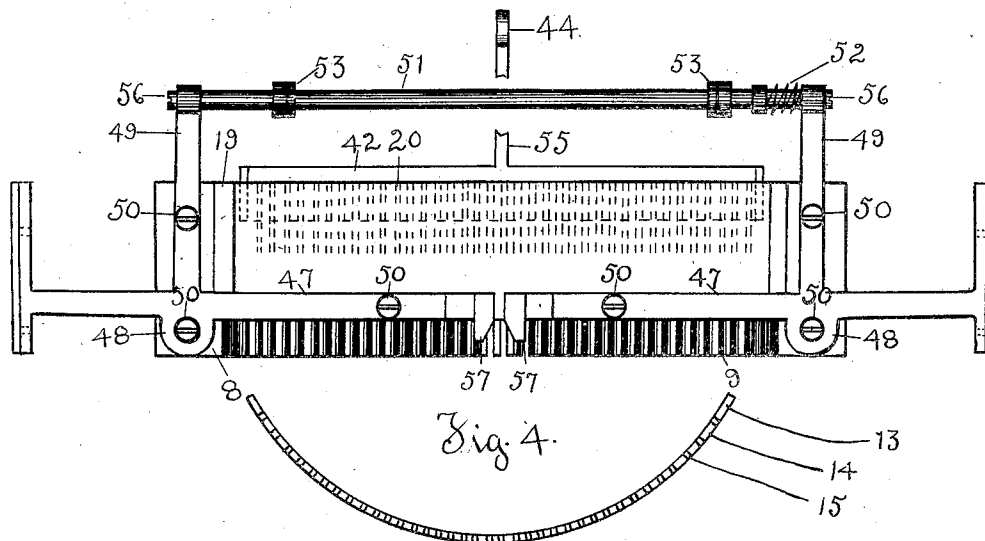
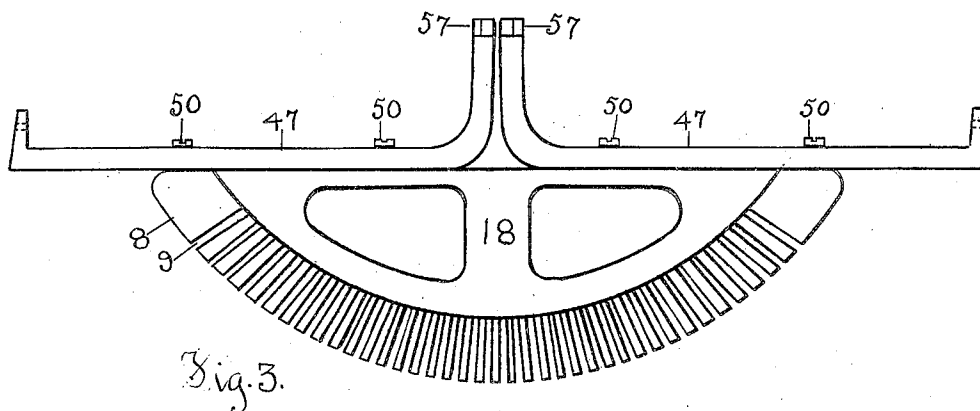


Fig. 5.

Fig. 6.

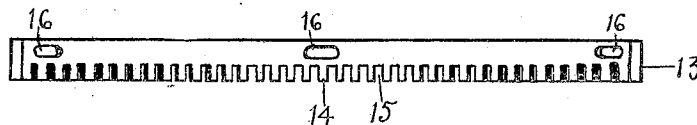


Fig. 7.

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4 SHEETS—SHEET 4.

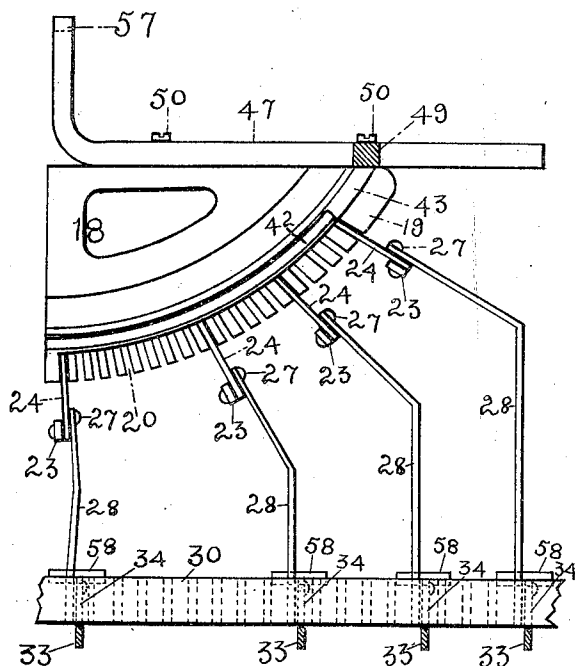


Fig. 8.

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UNITED STATES PATENT OFFICE.

GEORGE M. KITZMILLER, OF NORFOLK, VIRGINIA, ASSIGNOR TO ELECTRIC TYPEWRITER COMPANY OF NORFOLK, INC., OF NORFOLK, VIRGINIA, A CORPORATION OF VIRGINIA.

TYPE-WRITING MACHINE.

No. 827-538.

Specification of Letters Patent.

Patented July 31, 1906.

Application filed April 22, 1905. Serial No. 256,932.

To all whom it may concern:

Be it known that I, GEORGE M. KITZMILLER, a citizen of the United States, and a resident of Norfolk, in the State of Virginia, have
5 invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

10 This invention relates to key-controlling mechanism and coöperative parts of writing-machines.

One of the objects of the invention is to improve the touch of the keys and increase the
15 speed of operation, and another is to minimize the depression or dip of the keys and still maintain a quick and powerful blow of the printing device.

To these and other ends my invention consists in certain combinations of devices, arrangement of parts, and features of construction, all as will be hereinafter fully set forth, and particularly described in the concluding
20 claims.

25 In the accompanying drawings, Figure 1 is a vertical sectional elevation taken longitudinally and about centrally of a front-strike writing-machine embodying my improvement and showing the parts in normal position. Fig. 2 is a skeleton view similar to Fig. 1, but showing the parts in printing position. Fig. 3 is a front elevation showing the type-bar and link-hanger supporting rings and type-bar guide. Fig. 4 is a plan view of same.
30 Fig. 5 is a sectional fragmentary view of the type-bar and link hanger or actuator supporting rings. Fig. 6 is an edge view of the type-bar-retaining plate. Fig. 7 is a plan view of the same. Fig. 8 is a rear sectional elevation
35 showing the manner of connecting the operating or sublevers to the slotted swinging link-hanger.

Similar parts are designated by similar numerals of reference.

40 The framework of the machine comprises a base 1, corner-posts 2, a top-plate 3, over which is suitably mounted a traveling platen 4.

The impressions upon the paper are made by types 5, carried upon the forward ends of rearwardly-striking type-bars 6, whose rear ends are pivotally mounted upon a curved fulcrum-rod 7, fixed in a semicircular support 8, which is provided with radial slots 9, and a peripheral slot 10, the radial slots 9 to

receive the hubs of the type-bars and the slot 55 10 the fulcrum-rod. The type-bars 6 at their point of fulcrum are provided with an open slot 11. The metal above the fulcrum-slot, as shown in Figs. 1 and 2, from the center of the fulcrum-rod, is formed to describe
60 an arc of approximately ninety degrees. At the end of the slot 11 and at right angles thereto there is provided a lug 12. Conforming to the curvature of the semicircular support 8 is attached a retaining-plate 13, 65 provided with teeth 14, Figs. 6 and 7. In normal position, as shown in Figs. 1 and 2, the teeth 14 permit the arc of the type-bar 6 to freely move around the fulcrum-rod 7, while the lug 12 prevents the type-bar 6 from
70 dropping from the fulcrum-rod 7 when in printing position or just returning therefrom. The slots 16, Fig. 7, afford means for moving the retaining-plate 13 in order to remove the type-bars 6, in which event the screws 17 are 75 loosened and the retaining-plate 13 moved so the spaces 15, Fig. 7, will come opposite the arc of the type-bars 6, Figs. 1 and 2, when one or more of the said type-bars may be easily removed without disturbing the ful- 80 crum-rod 7.

The link hangers or actuators 24 are pivotally mounted in the same plane as or in alinement with the type-bars upon a curved fulcrum-rod 22, fixed in a semicircular support or ring 19, which is provided with radial slots 20 to receive the hubs of the hangers or actuators 24 and the slot 21 to receive the fulcrum-rod 22. The semicircular support or ring 8, hereinbefore referred to, and
85 the semicircular support or ring 19 are at right angles to and project or extend out on either side of the web 18 and are integral therewith. The radial slots of the supporting rings 8 and 19 are in line with each other. 95

While I have shown the supporting-rings 8 and 19 and the web 18 as integral parts, I am not confined to that construction, as I may prefer in practice to make one or more
100 of the parts separate.

Pivotally connected to the crank of the type-bars 6 and the hangers or actuators 24 are links 23, the type-bars and hangers being arranged in semicircular series parallel with each other, the hangers and links being 105 to the rear of and in the same plane or in alinement with the type-bars 6. The hangers or actuators 24 are provided with a two-way

or angular slot—that is, the fulcrum-slot 25 and the operating-slot 26 are at different angles to each other, but have a common opening. The slot 25 opening, as it does, into slot 26 affords means for quickly and easily removing the said hangers or actuators 24 without disturbing the fulcrum-rod 22 and also tends to prevent said hangers from lifting while in operation. The slot 26 is for the movement of the hangers 24 by means of the pin 27 in the intermediate or sublever 28, of which there is a series arranged side by side and which vibrate or oscillate on a fulcrum-rod 29 in a slotted transversely-disposed support 30, which may be suitably secured to the base 1 of the machine.

The purpose of forming the slot 26 at an angle, as shown in Figs. 1 and 2, is that at the commencement and near the end of the stroke the maximum leverage is obtained and decreased as the pin 27 of the sublever 28 creeps in the slot 26.

The intermediate or sublevers 28 are upwardly directed and of various lengths, according to their position in the series, each one from the center being bent more or less in one direction or the other, according to its position, to bring its upper end into proper relation with respect to the corresponding link hanger or actuator 24 and to conform to the radius of the semicircle in which the type-bars 6 and link hangers or actuators 24 are fulcrumed.

The levers 28 are provided with arms 31 at right angles thereto, at the end of which are curved projections provided with inwardly-open slots 32 of greater or less angularity, according to the length of the levers 28 and their position in the series, those nearer the center being provided with slots of a greater degree of angularity than those at the ends of the series. The key-levers 33 are fulcrumed, as at 38, arranged in a series, and underlie the levers 28 and are provided with arms 34, which are slidably connected by a pin 35 in the slots 32 of the levers 28.

The link hangers or actuators 24 are provided with curved enlargements 39 and 40, 39 being struck on a larger arc than 40. Where the larger enlargement 39 terminates and the smaller enlargement 40 commences, there is left an offset 41. This offset 41 when the hanger or actuator 24 is moved forward travels rearward and forces the vibrating bar 42, which is seated in the slot 43, rearward. Motion is communicated through the rod 55, which is secured to the vibrating bar 42, to the detent-shaft 46, through the slot 44 and the pin 45. The vibrating bar 42 is curved to suit the curve of the semicircular support 19 and the slot 43.

Mounted on the web 18 are two bars 47, each extending to or near the center of the web and provided with an upset or arm 57 to form a guide for the type-bars 6 when in

printing position. Each of these bars are provided with projections 48 and 49, Fig. 4, for securing them to the semicircular supports 8 and 19 and the web 18 by the screws 50. The projections 49 extend over the semicircular support 19 and are arranged to carry movably mounted the rod 51, depending from which are links 53, which are pivotally connected to a lug 54 on the rod 55, which rod is attached to the vibrating bar 42 at one end and the detent-shaft 46 at the other end, the connection with the shaft 46 being by a slot 44 and a pin 45.

In the operation of my invention the parts coact in the following manner: A depression of the finger-tip 58 of the lever 33 causes the pin 35 in the arm 34 to slide or creep in the slot 32 of the sublever 28, which vibrates or oscillates on its fulcrum-rod 29. The upper end of the said lever 28, moving forward, forces the hanger or actuator 24 through the pin 27 in the slot 26 to likewise move forward, causing the type-bar 6, through the link 23, which is pivotally connected to the crank of the type-bar and to the hanger, to oscillate around the fulcrum-rod 7 until the type-head reaches the printing-point. The hub 63 near the fulcrum-slot of the type-bar 6 is in constant contact with a tooth of the retaining-plate 13, insuring a uniform alignment of the printing on the platen. At its maximum height and when pressure is removed from the key 58 the lug 12 prevents the type-bar from dropping off the fulcrum-rod 7.

It will be obvious that various changes in details of construction and arrangement of parts may be made without departing from the spirit of my invention.

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

1. In a front-strike writing-machine, in combination with a platen, a segmental support, a series of type-bars and a series of hangers pivotally mounted, respectively, in opposite sides of said support, each hanger having a pivotal connection with a type-bar, a series of key-bars, and means operatively connecting each key-bar with a hanger, the points of connection between said means and each hanger and between the latter and its type-bar being wholly to one side of a line drawn through the points of pivotal connection of said hanger and type-bar with the support.

2. In a front-strike writing-machine, in combination with a platen, a segmental support, a series of type-bars and a series of hangers pivotally mounted, respectively, in opposite sides of said support, each type-bar having a pivotal connection with a hanger beneath the said support, a series of key-bars, and means operatively connecting each key-bar with a hanger, the points of connection between said means and each hanger and be-

tween the latter and its type-bar being wholly to one side of a line drawn through the points of pivotal connection of said hanger and type-bar with the support.

3. In a front-strike writing-machine, in combination with a platen, a segmental support, a series of type-bars and a series of hangers fulcrumed, respectively, in opposite sides of said support, each type-bar having a pivotal connection with a hanger and the fulcrum of said type-bars and hangers being substantially in horizontal alinement, a series of key-bars, and means operatively connecting each key-bar with a hanger, the points of connection between said means and each hanger and between the latter and its type-bar being wholly to one side of a line drawn through the points of pivotal connection of said hanger and type-bar with the support.

4. In a front-strike writing-machine, in combination with a platen, a segmental support, a series of type-bars and a series of hangers fulcrumed, respectively, in opposite sides of said support, each type-bar having a pivotal connection with a hanger beneath said support and the fulcrum of said type-bars and hangers being substantially in horizontal alinement, a series of key-bars, and means operatively connecting each key-bar with a hanger, the points of connection between said means and each hanger and between the latter and its type-bar being wholly to one side of a line drawn through the points of pivotal connection of said hanger and type-bar with the support.

5. In a front-strike writing-machine, in combination with a platen, a segmental support, a series of type-bars and a series of hangers fulcrumed, respectively, for swinging movement in opposite sides of said support, each type-bar having a pivotal connection with a hanger beneath said support, a series of key-bars, and means operatively connecting each key-bar with a hanger, the points of connection between said means and each hanger and between the latter and its type-bar being wholly to one side of a line drawn through the points of pivotal connection of said hanger and type-bar with the support.

6. In a front-strike writing-machine, in combination with a platen, a segmental support located substantially directly under the platen, a series of type-bars and a series of hangers pivotally mounted, respectively, in alinement in opposite sides of and pendent from said support, said key-bars being pivotally associated with the hangers at their pendent extremities, a series of key-bars, and means operatively connecting each key-bar with a hanger, the points of connection between said means and each hanger and between the latter and its type-bar being wholly to one side of a line drawn through the points of pivotal connection of said hanger and type-bar with the support.

7. In a front-strike writing-machine, in combination with a platen, a support provided in opposite sides, respectively, with two semicircular series of slots located in substantially the same horizontal plane, a plurality of type-bars fulcrumed in the slots of one series, a plurality of hangers fulcrumed in the slots of the other series and pivotally associated with said type-bars beneath said support, a series of key-bars and means operatively connecting each key-bar with a hanger, the points of connection between said means and each hanger and between the latter and its type-bar being wholly to one side of a line drawn through the points of pivotal connection of said hanger and type-bar with the support.

8. In a front-strike writing-machine, in combination with a platen, a segmental support, a series of type-bars and a series of hangers pivotally mounted, respectively, in opposite sides of and pendent from said support, a series of links located beneath said support and each of which pivotally connects a type-bar and a hanger, a series of key-bars, and means operatively connecting each key-bar with a hanger, the points of connection between said means and each hanger and between the latter and its type-bar being wholly to one side of a line drawn through the points of pivotal connection of said hanger and type-bar with the support.

9. In a front-strike writing-machine, in combination with a platen, a support provided in opposite sides, respectively, with two semicircular series of slots located in substantially the same horizontal plane, a plurality of type-bars fulcrumed in the slots of one series, a plurality of hangers fulcrumed in the slots of the other series, said type-bars and hangers being pendent from said support, a series of links, one of which pivotally connects each type-bar with a hanger at the pendent extremities thereof, a series of key-bars, and means operatively connecting each key-bar with a hanger, the points of connection between said means and each hanger and between the latter and its type-bar being wholly to one side of a line drawn through the points of pivotal connection of said hanger and type-bar with the support.

10. In a front-strike writing-machine, in combination with a platen, a support, a series of pivotally-associated type-bars and hangers fulcrumed in said support, a series of key-levers, and a series of sublevers, each of which is operatively connected with one of said key-levers and has a shiftable pivot connection with one of said hangers.

11. In a front-strike writing-machine, in combination with a platen, a semicircular support, a series of type-bars and a series of hangers fulcrumed in said support, each of said hangers being in the same vertical plane with a type-bar and having a link connection

therewith, a series of key-bars, and a series of sublevers, each of which is operatively connected with a key-bar and has a shiftable pivot connection with a hanger.

5 12. In a front-strike writing-machine, in combination with a platen, a segmental support provided in opposite edges, respectively, with two semicircular series of slots located in substantially the same horizontal plane, a
10 plurality of type-bars fulcrumed in the slots of one series, a plurality of hangers fulcrumed in the slots of the other series, said type-bars and hangers being pendent from the concave side of said support and each hanger
15 being in the same vertical plane as a type-bar and pivotally associated therewith, a series of key-bars, and means operatively connecting each key-bar with a hanger, the points of connection between said means and each
20 hanger and between the latter and its type-bars being wholly to one side of a line drawn through the points of pivotal connection of said hanger and type-bar with the support.

13. In a front-strike writing-machine, a
25 support, a series of type-bars fulcrumed in said support, a series of slotted hangers also fulcrumed in said support and pivotally associated with said type-bars, a series of key-levers, and a series of sublevers, each of which
30 is operatively connected with a key-lever and provided with a pin engaging in the slot of a hanger.

14. In a front-stroke writing-machine, in combination with a platen, a segmental support, a spring-controlled vibrating bar
35 mounted in said support, escapement mechanism adapted to be actuated from said vibrating bar, a series of type-bars fulcrumed in said support, a series of hangers also fulcrumed in said support for swinging movement, and pivotally associated beneath said
40 support with said type-bars, a series of key-levers, means operatively connecting each key-lever with a hanger, and a shoulder on each hanger for engaging said vibrating bar
45 when the hanger is moved by the depression of a key-bar.

15. In a front-strike writing-machine, in combination with a platen, a segmental support provided in opposite edge portions with
50 radial slots, and with a concentrically-arranged slot located in the rear face of said support and cutting said radial slots, a curved vibratory bar mounted in said concentric slot, a plurality of type-bars fulcrumed in the slots at one edge of said support, a plurality of hangers mounted in the slots of the other edge of said support and pivotally associated with said type-bars, a
55 shoulder on each hanger engaging the inner edge of said vibratory bar, a series of key-levers, means operatively connecting each key-lever with a hanger, and escapement mechanism operatively connected with said
60 vibrating bar.

16. In a front-strike writing-machine, in combination with a platen, a support affording two parallel semicircular series of fulcras, a plurality of type-bars mounted on one set of fulcras, a series of hangers provided with
70 angularly-disposed slots and supported in one set of slots on the other set of fulcras, links connecting said hangers and type-bars, key-levers, and sublevers operatively connected with said key-levers and having pins
75 engaging the other set of slots of said hangers.

17. In a front-strike writing-machine, a support, a type-bar pivotally mounted therein, a hanger provided with angularly-disposed slots and fulcrumed through the
80 medium of one of said slots in said support, a link connecting said hanger and type-bar, a pivotally-mounted sublever having on one side of its fulcrum a pin engaging the other slot of said hanger, and on the other side of
85 its fulcrum having an open slot, and a key-bar having a pin engaging in said open slot.

18. In a front-strike writing-machine, in combination with a platen, a semicircular support provided on opposite sides with a
90 series of slots, a pair of curved fulcrum-wires in horizontal alinement associated with said support, a series of type-bars and a series of hangers mounted in the respective sets of slots and on the respective fulcrum-wires,
95 links connecting said hangers and type-bars, a series of key-levers, and a series of sublevers operatively connected to said key-levers, each of said sublevers having a shiftable pivot connection with one of said hangers.
100

19. In a front-strike writing-machine, in combination with a platen, a support, a type-bar fulcrumed in said support, a two-way
105 slotted hanger fulcrumed in one of said slots in said support, a link connecting said hanger and type-bar, a key-lever, a sublever operatively connected to said key-lever and having a pin slidably engaging the other slot of said hanger.

20. In a front-strike writing-machine, in combination with a platen, a support, a type-bar fulcrumed in said support, a two-way
110 slotted hanger fulcrumed in one of said slots in said support, said slots converging to a single opening, a link connecting said hanger and type-bar, a key-lever, and a sublever
115 operatively connected to said key-lever and having a pin slidably engaging the other slot of said hanger.

21. In a front-strike writing-machine, in combination with a platen, a segmental support, a type-bar fulcrumed in one side of said support, a hanger fulcrumed in the other side of said support, a swinging link connecting
120 said type-bar and hanger, a key-lever, and a sublever operatively connected with said key-lever and said hanger.
125

22. In a front-strike writing-machine, in combination with a platen, a support, a type-bar fulcrumed in said support, a hanger also
130

fulcrumed in said support, a swinging link connecting said type-bar and said hanger, a key-lever, and a sublever operatively connected to said key-lever and having a shiftable pivot connection with said hanger.

23. In a front-strike writing-machine, in combination with a platen, a semicircular support, a type-bar and a hanger fulcrumed in said support, a link connecting said type-bar and hanger, a curved vibratory bar associated with said support, an offset on said hanger adapted to engage said vibratory bar, an escapement-detent, a rod connected with said vibratory bar and having a slotted engagement with said detent, means for maintaining said vibratory bar in normal position, a key-lever, and means operatively connecting said key-lever and hanger.

24. In a front-strike writing-machine, in combination with a platen, a support, a series of type-bars having open slots, and fulcrumed in said support through the medium of said slots, hangers pivotally mounted in said support and operatively connected with said type-bars, key-levers, means operatively connecting each key-lever with a hanger, and a slotted plate mounted on said support at the rear of the type-bars and adjustable in the direction of its length to bring the slots in said plate into or out of register with the type-bars.

25. In a front-strike writing-machine, in combination with a platen, a support, type-bars provided with crank-arms and having open slots extending at an angle to said crank-arms, means for fulcruming said type-bars in said support through the medium of said slots, hangers pivotally mounted in said support and operatively connected with the crank-arms of the type-bars, key-bars, means operatively connecting each key-bar with a hanger, a slotted plate mounted on said support at the rear of said type-bars, and means for adjusting said plate in the direction of its length to bring its slots into or out of register with said type-bars.

26. In a front-strike writing-machine, in combination with a platen, a support, a type-bar having an open slot and fulcrumed in said support through the medium of said slot, a projection on said type-bar, a slotted plate mounted on said support at the rear of said type-bar and adjustable in the direction of its length to bring its slot into or out of register with said projection, a key-bar, and means operatively connecting said key-bar and type-bar.

27. In a front-strike writing-machine, in combination with a platen, an escapement, a segmental support, a series of type-bars each of which is provided with an open slot and a curved hub terminating in a lug at an angle to said slot, a fulcrum-rod in said support, means for detachably holding said type-bars in position on the fulcrum-rod, a curved vi-

brating bar mounted in said support and adapted to operate the escapement, a series of hangers mounted in said support and adapted to coact with said vibrating bar, key-levers, and armed sublevers operatively connecting said key-levers and hangers.

28. In a front-strike writing-machine, the combination of a platen, a type-bar and link-hanger support, a series of type-bars each of which is provided with an open fulcrum-slot, a circular hub, and a lug at the end of and at right angles to said slot, a fulcrum-rod engaged by said slots, an adjustable slotted retaining-plate engaging said hubs, lever-operated hangers, and operative connections extending to said type-bars and hangers, substantially as described.

29. In a front-strike writing-machine, in combination with a platen, a type-bar and link-hanger support, a series of type-bars each of which is provided with an open fulcrum-slot, a lug at the end of, and at right angles to said slot, a fulcrum-rod engaged by said slots, means for removably holding said type-bars on said fulcrum-rod, lever-operated hangers, and operative connections extending to said type-bars and hangers.

30. In a type-writing machine, the combination of a platen, a series of segmental supports, a series of rearwardly-striking printing devices, a series of links, a series of angular slotted movable hangers, a series of upwardly-directed sublevers provided with an angular slotted arm, a movable connection between said sublevers and said links, and an armed key-lever operatively connected to said sublever, substantially as described.

31. In a front-strike writing-machine, the combination with a platen, an escapement, a series of slotted segmental supports, a series of type-bars, a series of swinging link-hangers, a circular vibrating or universal bar loosely connected with the said escapement, means operative by the said hangers for moving the said vibrating bar from its seat, a series of upwardly-directed sublevers underlying said type-bars and said hangers, a slotted transversely-disposed support for the said sublevers, and means for vibrating the said sublevers and hangers, substantially as described.

32. In a front-strike writing-machine, the combination with a platen, an escapement, a series of slotted segmental supports, a series of type-bars, a series of angular slotted link-hangers, a circular vibrating or universal bar, a plurality of links pivotally supported on the segmental support and movably supporting said vibrating bar, means on said hangers for moving said vibrating bar, a slot-and-pin connection between said vibrating bar and said escapement, a spring for maintaining said vibrating bar in normal position, a series of upwardly-directed, bent, armed and angular-slotted sublevers connected to the

said slotted link-hangers, a series of armed key-levers underlying and operatively connected to the said sublevers by a pin in the slotted arm, operative connections between
 5 said slotted link-hangers and said type-bars, substantially as described.

33. In a front-strike writing-machine, the combination of a platen, a plurality of segmental supports, a linked type-bar, a fulcrum-rod therefor, means for removing said
 10 type-bar without disturbing its fulcrum-rod, an upwardly-directed lever provided with an angular-slotted arm, a key-lever operatively

connected thereto, an open-slotted member operatively connecting said linked type-bar 15 and said upwardly-directed lever, a vibrating bar, and means for moving said vibrating bar by the said open-slotted member, substantially as described.

Signed at Norfolk, in the county of Norfolk and State of Virginia, this 21st day of April, A. D. 1905.

GEORGE M. KITZMILLER.

Witnesses:

ALEXANDER CALCOTT,
 E. W. BRAY.