No. 735,090. PATENTED AUG. 4, 1903.

J. J. GREEN.

TYPE WRITING MACHINE.

APPLICATION FILED JUNE 12, 1902.

NO MODEL.

Fig. 1.

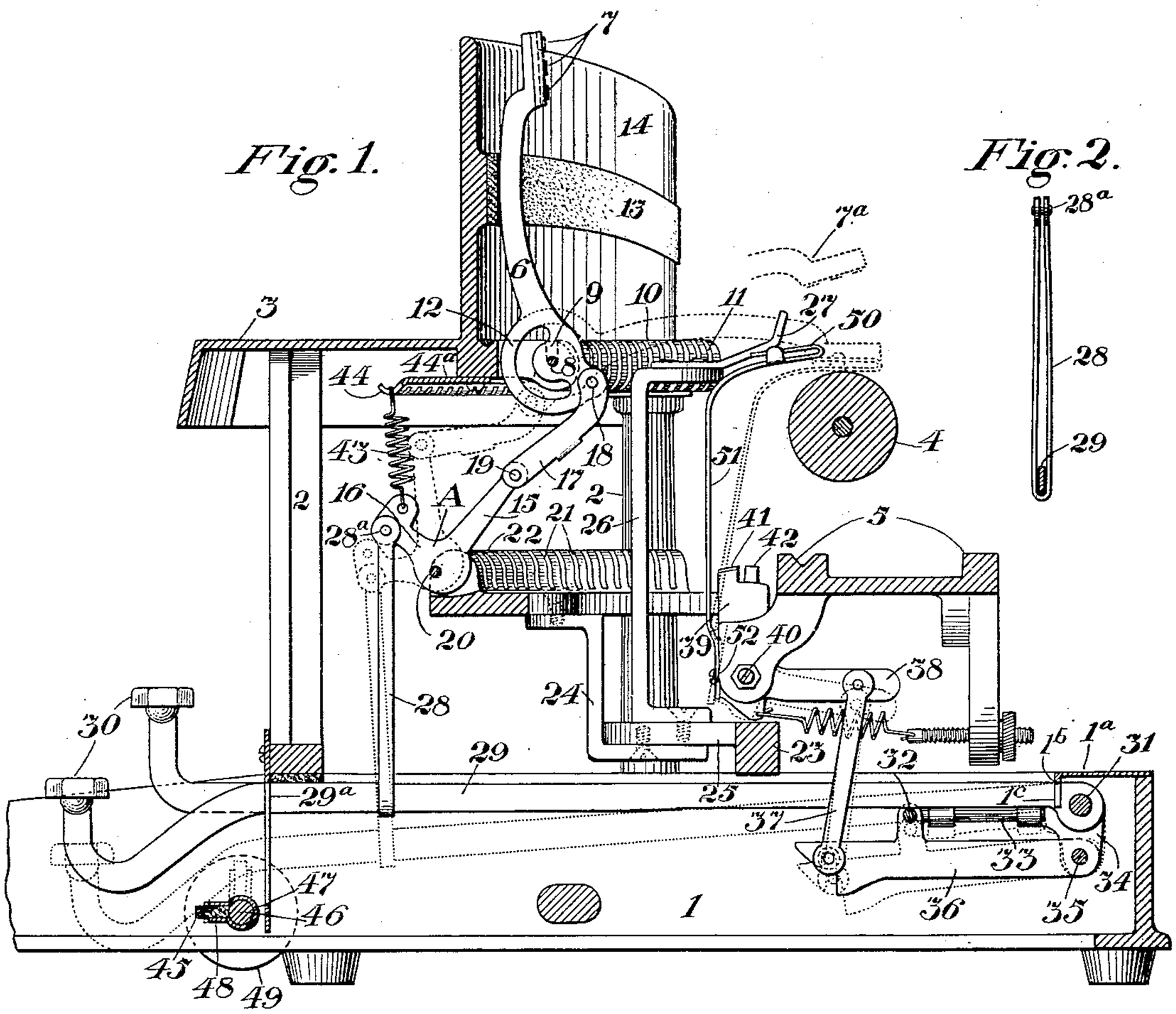
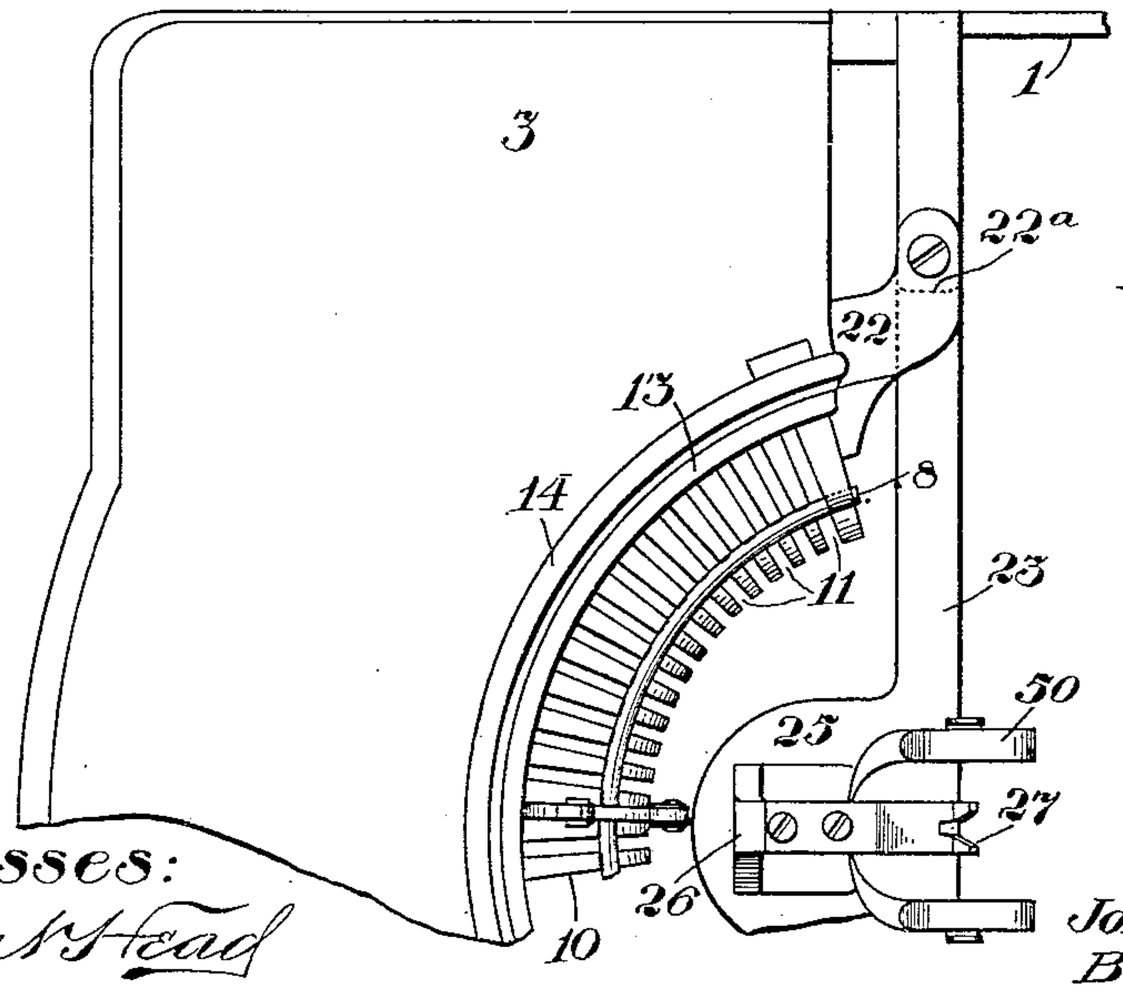


Fig. 2.

Fig. 3.



Witnesses:
Robert Stead
B. C. Stickney

Inventor:
John Jay Green,
By his Attorney,
F. A. Richards.

No. 735,090. Patented August 4, 1903.

UNITED STATES PATENT OFFICE.

JOHN JAY GREEN, OF BOONTON, NEW JERSEY.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 735,090, dated August 4, 1903.

Application filed June 12, 1902. Serial No. 111,249. (No model.)

To all whom it may concern:

Be it known that I, JOHN JAY GREEN, a citizen of the United States, residing in Boonton, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to writing-machines, and especially to those of the top-strike variety; and its objects are to improve the touch of the keys, to provide means for throwing into action at will a stop for arresting the keys before the types strike the platen, so as to prevent undue or irregular indentation of the paper by the types, and also to improve the connection between the keys and the type-bars.

In the drawings forming a part of this specification, Figure 1 is a longitudinal sectional elevation of a top-strike writing-machine embodying my improvements. Fig. 2 is an edge view of an improved connecting-rod, showing its relation to the key-lever; and Fig. 3 is a partial plan of the machine.

In the several views similar parts are designated by similar characters.

The frame of the machine may comprise a rectangular base 1, carrying corner-posts 2, which support a top plate 3. A platen 4 is mounted on a carriage, (not shown,) which runs upon ways 5, carried upon the framework. A series of rearwardly and downwardly striking type-bars 6, each provided with a plurality of types 7, is pivoted upon a fulcrum-wire 8, mounted in a curved slot 9, formed in a horizontal segment 10, the latter having radial slots 11 for receiving the hubs of type-bars and said hubs preferably having forwardly of their pivots a sector portion 12, which works in slots 11 and steady the type-bars. The latter normally rest against a pad 13, carried upon the rear or inner side of a curved plate 14, rising from the top plate, and the plane of the fulcrum-wire 8 being substantially horizontal the type-bars are in consequence disposed about a vertical axis, although the terms "vertical" and "horizontal" as used in the specification and claims are relative and connote the disposition of the series of key-levers, which in the position in which the machine is ordinarily used and operated is horizontal.

The type-bars are actuated by radial bell-cranks A, each consisting of an upwardly and rearwardly extending arm 15 and a forwardly-extending arm 16, the former being connected by a link 17 to the type-bar at 18, the point of connection of arm 15 to the link being designated as 19. Said bell-cranks A are mounted at their lower ends upon a curved fulcrum-wire 20, preferably concentric with the type-bar fulcrum-wire 9, and work in slots 21, formed in a fixed horizontal segment 22, arranged below the type-bar segment 10 and having a considerably larger radius. Said segment 22 may be suitably supported at its ends, as by standards 22^a, carried by a transverse bar 23, mounted upon the base, and may also be supported midway of its ends by a bracket 24 to a forwardly-extending lug 25, midway of said bar 23. Said lug may also carry an upright 26, having at its upper end a type-bar guide 27.

The short arms 16 of the bell-cranks A are connected by suspended links 28 to substantially parallel key-levers 29 of the second order, said levers bearing at their forward ends keys 30 and at their rear ends being pivoted to a transverse fulcrum-rod 31, which is mounted at its ends on the side walls of the base.

It will be noted that the key-levers being parallel and the bell-crank levers radial each of the former is in general disposed at an angle to the plane of the radial bell-crank lever connected to it, although obviously this may not be the case with the particular key lever or levers which happens to lie in line with the printing-point.

Each of the links 28 is formed in a long strip and folded about midway of its length and is caught, stirrup-like, beneath the key-lever, as illustrated at Figs. 1 and 2. The upper end of the segment forks the bell-crank A and is pivoted thereto at 28^a. This permits of ready assembling or disassembling, since after the bell-cranks and links are put in place the key-levers may be inserted through the loops.

The rear part of the base is provided with

a cover-plate 1^a, whose forward edge is bent down at 1^b and slotted at 1^c to form a guide-comb for the rear end of the levers, while the forward ends of the levers are provided with the usual guide-comb 29^a.

A universal bar 32 extends beneath the key-levers and is mounted by arms 33 upon the fulcrum-rod 31, the universal-bar frame also comprising elbows 34 upon the arms 33, said elbows being connected by a tie-rod 35. About midway the rods 32 and 35 are connected by a brace 36, which by means of a vertical link 37 is connected to the rearwardly-extending arm 38 of a dog-rocker 39, the latter being pivoted at 40 upon the frame and carrying a detent 41 and feeding-dog 42, whereby the latter feeding movements of the carriage are controlled.

In operation a key 30 is depressed and the key-lever is swung downwardly about the fulcrum 31, and through the link 28 the arm 16 of the bell-crank A is pulled down and the other arm 15 thereof is drawn forwardly, causing the link 17 to pull the type-bar down to print, all as shown in dotted lines. Upon release of the key from pressure the several parts are returned to normal position by a draw-spring 43, the lower end whereof is hooked to the arm 16 and the upper end whereof engages one of a circular series of hooks or teeth 44, carried upon the forward edge of a segmental comb 44^a, secured upon the under surface of the type-segment 10.

Normally the pivot-points 18, 19, and 20 are nearly in line, whence it follows that the initial leverage of the bell-crank A, and hence of the finger-key 30, upon the type-bar is very great, so that the latter is started in motion gently, thereby softening the touch of the keys. While the movement is continuous, the leverage decreases and the relative movement of the type-bar increases, so that the stroke of the key is not unduly deep. It is also noted that the system of key-levers 29 is considerably wider than the system of type-bars 6, but of about the same width as that of the intermediate system of bell-cranks A, so that said key-levers may be connected to said bell-cranks by substantially vertical links 28, while the bell-cranks, being radially arranged and working in substantially vertical planes, have uniform direct-acting connections to the type-bars, as illustrated. Thus movement is transmitted from the key to the type-bars without liability of side strains or binding of any of the parts in their bearings or guides, and hence freedom of action and durability are secured.

Extending across the machine beneath the forward ends of the key-levers is a padded stop 45, mounted upon a rock-shaft 46 and common to all the keys. A longitudinal tubular casing 47 clasps said shaft and is extended to form a pair of opposite ribs or plates 48, between which the pad 45 is held. The shaft is provided with a button 49, preferably outside of the base, whereby the shaft may be turned at will from a horizontal position of disuse (illustrated in full lines) to a vertical position of use, (indicated in dotted lines.) In the latter position said pad intercepts the key-levers at about the time the types reach the position indicated at 7^a in dotted lines or just before the completion of the printing-strokes. The type-bars complete the strokes by inertia and rebound from the platen. By means of this improvement undue indentation of the paper by the types is prevented and uniformity of impressions is assured, while the speed of operation is increased.

A ribbon-guide 50 may be carried by a stem 51, fixed at 52 to the dog-rocker, so as to vibrate to and from the printing-point at each impression.

I claim—

1. In a type-writing machine, the combination with a system of type-bars radially disposed about a vertical axis and each pivoted to swing about a substantially horizontal axis, of a system of radially-disposed levers, one for each of the type-bars, pivoted beneath said type-bars to also swing about substantially horizontal axes, a system of links connecting the radially-disposed type-bars with their respective radially-disposed levers, a system of key-levers located beneath said radially-disposed levers each key-lever being in general disposed at an angle to the plane of its said radially-disposed lever, and a system of links extending from said key-levers to said radially-disposed levers.

2. In a type-writing machine, the combination with a system of downwardly and rearwardly striking type-bars radially disposed about a vertical axis and each pivoted to swing about a substantially horizontal axis, of a system of radially-disposed levers pivoted beneath said type-bars to also swing about substantially horizontal axes, a system of links connecting said levers to said type-bars, a system of substantially parallel key-levers extending beneath said radially-disposed levers, and a system of links extending from said key-levers to said radial levers.

3. In a type-writing machine, the combination with a system of downwardly and rearwardly striking type-bars radially disposed about a vertical axis and pivoted upon a segment in a curve the plane of which is substantially horizontal, of a larger segment mounted beneath said type-bar segment and substantially concentric therewith, a series of bell-cranks pivoted in said larger segment, links connecting said bell-cranks to said type-bars, and key-operated devices comprising substantially parallel levers also connected to said bell-cranks for vibrating them.

4. In a type-writing machine, the combination with a system of downwardly and rearwardly striking type-bars radially disposed about a vertical axis and pivoted upon a segment in a curve the plane of which is sub-

stantially horizontal, of a larger segment mounted beneath said type-bar segment and substantially concentric therewith, a series of bell-cranks pivoted upon said larger segment, links connecting said bell-cranks to said type-bars, a system of substantially parallel horizonal key-levers of the second order arranged beneath said bell-cranks and links connecting said key-levers to said bell-cranks.

5. In a type-writing machine, the combination with a system of downwardly and rearwardly striking radial type-bars pivoted in a curve upon a segment forwardly of the printing-point, of a larger segment mounted beneath said type-bar segment and substantially concentric therewith, a series of bell-cranks pivoted in said larger segment, links connecting said bell-cranks to said type-bars, key-operated devices comprising substantially parallel levers also connected to said bell-cranks for vibrating them, a segmental comb attached to said segment, and a series of draw-springs extending upwardly from said bell-cranks and caught upon the teeth of said comb.

6. In a type-writing machine, the combination with a series of type-bars radially disposed about a vertical axis, of a series of radially-disposed levers each disposed in the plane of its respective type-bar, links connecting said levers to said type-bars, and key-operated devices connected to said levers, said levers and links normally forming substantially closed toggles.

7. In a type-writing machine, the combination with a series of type-bars radially disposed about a vertical axis, of radial levers each disposed in the plane of its respective type-bar and having an arm which extends toward its type-bar, a series of links extending from said arms to said type-bars, said links and arms forming substantially closed toggles, and a series of key-levers connected to said radial levers.

8. In a type-writing machine, the combination with a series of type-bars radially disposed about a vertical axis, of radial levers each disposed in the plane of its respective type-bar and having an arm which extends toward its type-bar, a series of links extending from said arms to said type-bars, said links and arms normally forming substantially closed toggles, and a series of substantially parallel key-levers connected to said radial levers.

9. In a type-writing machine, the combination with a series of radial type-bars and a series of radial levers, said type-bars being pivoted in an arc and said levers being pivoted in an arc of materially larger radius than said type-bar arc, radial links connecting said levers to said type-bars, and a series of keys connected to said levers; said levers and links normally forming substantially closed toggles which extend diagonally from said lever-pivots to the points of attachment of said links to said type-bars.

10. In a type-writing machine, the combination with a system of rearwardly and downwardly striking radial type-bars pivoted in a curve forwardly of the printing-point, of a system of radial levers pivoted in a curve beneath said type-bars and connected thereto, a system of key-levers extending rearwardly beneath said levers, said system of radial levers being substantially equal in width to said system of key-levers, and a system of vertical links extending from said key-levers to said radial levers; said type-bars being connected to radial levers by means of devices which automatically decrease the leverage of the keys upon the type-bars during the printing strokes.

11. In a type-writing machine, the combination with a system of downwardly and rearwardly striking radial type-bars pivoted in a curve forwardly of the printing-point, of a system of radial levers pivoted in a curve beneath said type-bars, a system of radial links connecting said levers to said type-bars, a system of key-levers extending rearwardly beneath said levers, said system of radial levers being substantially equal in width to said system of key-levers, and a system of links extending from said key-levers to said radial levers; said levers being connected to said type-bars by means of links, and said links and levers normally forming substantially closed toggles.

12. In a type-writing machine, the combination with a system of rearwardly and downwardly striking radial type-bars pivoted in a curve upon a segment forwardly of the printing-point, of a segment of larger radius mounted beneath said type-bar segment and substantially concentric therewith, a series of bell-cranks pivoted in said larger segment, links connecting said bell-cranks to said type-bars, and a key-operated device also connected to said bell-cranks for vibrating them; said levers being connected to said type-bars by means of links, and said links and levers normally forming substantially closed toggles.

13. In a type-writing machine, the combination with a system of rearwardly and downwardly striking radial type-bars pivoted in a curve upon a segment forwardly of the printing-point, of a segment of larger radius mounted beneath said type-bar segment and substantially concentric therewith, a series of bell-cranks pivoted in said larger segment, said levers being connected to said type-bars by means of links, and said links and levers normally forming substantially closed toggles, a system of substantially parallel horizontal key-levers of the second order arranged beneath said bell-cranks, and links connecting said key-levers to said bell-cranks.

14. In a type-writing machine, the combination with a system of rearwardly and downwardly striking radial type-bars pivoted in a

curve upon a segment forwardly of the printing-point, of a segment of larger radius mounted beneath said type-bar segment and substantially concentric therewith, a series of bell-cranks pivoted in said larger segment, said levers being connected to said type-bars by means of links, and said links and levers normally forming substantially closed toggles, key-operated devices also connected to said bell-cranks for vibrating them and a series of springs connected to said bell-cranks.

15. In a type-writing machine, the combination of a series of rearwardly and downwardly striking radial type-bars pivoted in an arc in a substantially horizontal plane forwardly of the printing-point; a series of bell-cranks pivoted in a larger arc in a substantially horizontal plane below the type-bars; said bell-cranks comprising upwardly and rearwardly extending arms and forwardly-extending arms, the latter being connected by upwardly and rearwardly extending links to said type-bars; substantially parallel key-levers extending rearwardly beneath said bell-cranks; and links extending upwardly from said key-levers to said bell-cranks.

16. In a type-writing machine, the combination of a series of rearwardly and downwardly striking radial type-bars pivoted in an arc in a substantially horizontal plane forwardly of the printing-point; a series of bell-cranks pivoted in a larger arc in a substantially horizontal plane below the type-bars; said bell-cranks comprising upwardly and rearwardly extending arms and forwardly-extending arms, the latter being connected by upwardly and rearwardly extending links to said type-bars; substantially parallel key-levers extending rearwardly beneath said bell-cranks; links extending upwardly from said key-levers to said bell-cranks; and an upwardly-extending draw-spring connected to the forwardly-extending arm of each of said bell-cranks.

17. In a type-writing machine, the combination with a type-bar and a key-operated actuating device adapted to move in unison for a portion of the printing movement and to thereupon permit the type-bar to independently continue its movement, of a stop for limiting the movement of the key-operated device and thereby permit the type-bar to continue its printing movement, and means for throwing said stop into and out of operative position at will.

18. In a type-writing machine, the combination with a series of type-bars and a series of key-operated actuating devices adapted to move in unison for a portion of the printing movements and to thereupon permit the type-bars to independently continue their movements, of a cushioned stop common to said key-operated devices for limiting the movement of said devices and thereby permit the type-bars to continue their printing movements, and means for throwing said stop into and out of operative position at will.

19. In a type-writing machine, the combination with a key and a type-bar connected thereto and adapted to continue its printing stroke after the key has finished its corresponding stroke, of a stop for said key and means for throwing said stop into and out of operative position at will, said stop when in operative position arresting the key just before the completion of the printing stroke of the type.

20. In a type-writing machine, the combination with a series of type-bars and a series of key-operated actuating devices adapted to move in unison for a portion of the printing movements and to thereupon permit the type-bars to independently continue their movements, of a stop extending transversely of said devices for limiting the movements thereof, thereby permitting the type-bars to continue their printing movements, and means for throwing said stop into and out of operative position at will.

21. In a type-writing machine, the combination with a series of type-bars and a series of key-levers, of a loop connection between each such lever and its connected type-bar in the bight of which the lever is seated to thereby permit the type-bar to continue its printing movement after the lever has been arrested, and a stop extending transversely of said levers and arresting the same just before the completion of the printing strokes.

22. In a type-writing machine, the combination with a series of type-bars and a series of key-levers, of a loop connection between each such lever and its connected type-bar in the bight of which the lever is seated to thereby permit the type-bar to continue its printing movement after the lever has been arrested, a stop extending transversely of said levers and arresting the same just before the completion of the printing strokes, and means for throwing said stop into and out of operative position at will.

23. In a type-writing machine, the combination with a series of type-bars and a series of key-levers, of a loop connection between each lever and its connected type-bar in the bight of which the lever is seated to thereby permit the type-bar to continue its printing movement after the lever has been arrested, a stop extending transversely of said key-levers and in position to arrest the same just before the completion of the printing strokes of the type-bars, and a finger-piece for turning said stop.

24. The combination with a key-lever of a type-bar, a stop for limiting the printing movement of the key-lever, an angle-lever for transmitting motion from the key-lever to the type-bar, a link pivoted at one end of the type-bar and at the opposite end to the angle-lever, a connecting-rod extending between said angle-lever and the key-lever and permitting the continuation of the printing movement of the type-bar when the key-lever shall have been arrested by said stop, said

angle-lever, link and connecting-rod being so organized that the fulcrum of said angle-lever and the pivotal connections of said link deflect to a greater and greater extent from a straight line in proportion as the key-lever is depressed.

25. The combination with a key-lever of a type-bar, a stop for limiting the printing movement of the key-lever, an angle-lever for transmitting motion from the key-lever to the type-bar, a link pivoted at one end to the type-bar and at the opposite end to the angle-lever, a connecting-rod having a loop through the bight of which said key-lever extends, to thereby permit the continuation of the printing movement of the type-bar when the key-lever shall have been arrested by said stop, said angle-lever, link and connecting-rod being so organized that the fulcrum of said angle-lever and the pivotal connections of said link deflect to a greater and greater extent from a straight line in proportion as the key-lever is depressed.

JOHN JAY GREEN.

Witnesses:
B. C. STICKNEY,
FRED. J. DOLE.