

(No Model.)

A. DAVIDSON.
TYPE WRITING MACHINE.

No. 487,047.

Patented Nov. 29, 1892.

Fig. 1.

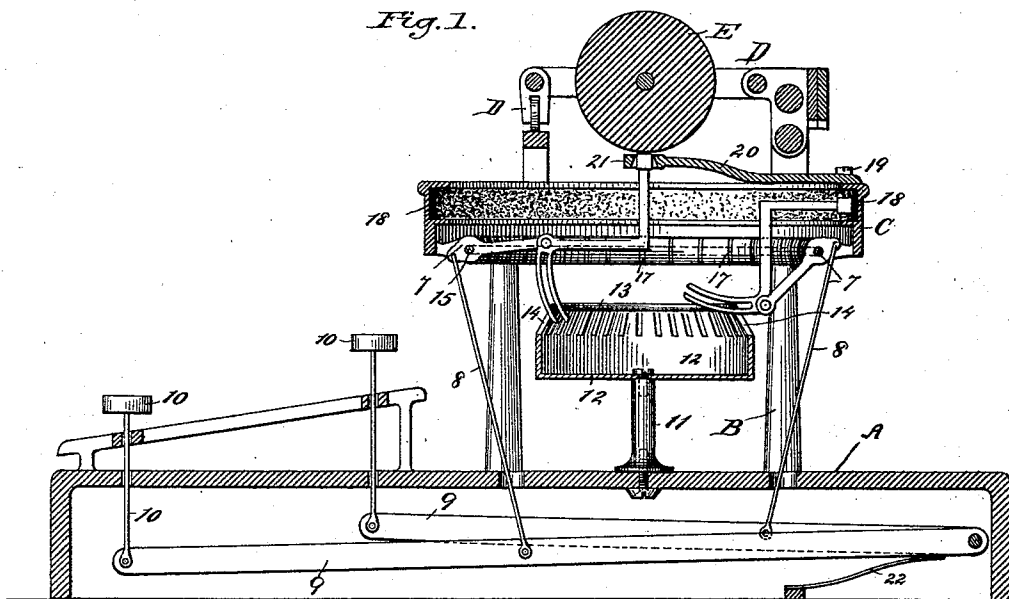


Fig. 2.

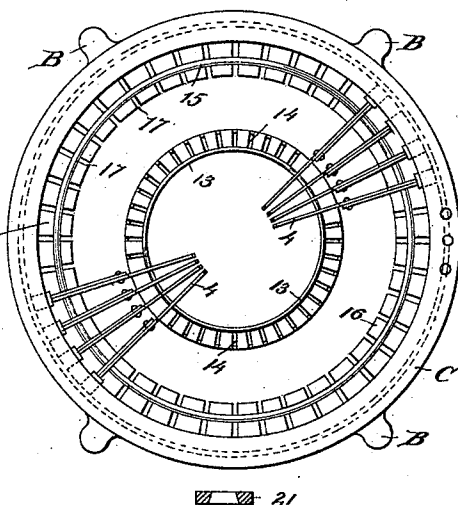
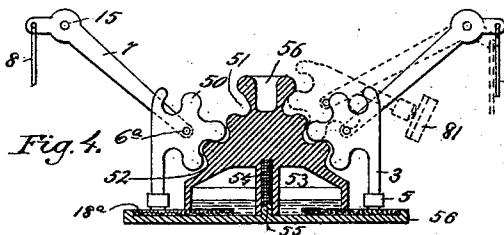
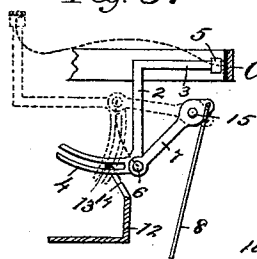


Fig. 5.



Attest:

Andrew Steyer
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Fig. 4.

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UNITED STATES PATENT OFFICE.

ALEXANDER DAVIDSON, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO
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TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 487,047, dated November 29, 1892.

Application filed April 3, 1888. Serial No. 269,445. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER DAVIDSON, a citizen of the United States, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates more particularly to the type movement or action in that class of type-writers known as "bar-machines"—that is to say, machines in which the type employed are individually mounted upon a series of independent unit-bars, levers, or carriers and which are adapted to be separately and arbitrarily moved to a common printing-point through suitable mechanism connected with the finger-keys of the machine.

The main objects of my invention are to produce a simple, small, cheap, and fast type-writing machine and one in which the type shall be self-inking and the alignment of the printing accurate and not liable to become imperfect from wear.

To these main ends and objects my invention consists in the several features of construction and combinations of parts herein-after more fully described, and particularly pointed out in the appended claims.

In the drawings which accompany this specification and form a part thereof, Figure 1 is a vertical section of a type-writing machine embodying my improvements. Fig. 2 is a top or plan view thereof with the carriage center guide and base removed. Fig. 3 is a detail view to more clearly show the type action, and Fig. 4 is a vertical section illustrating a modification of my invention.

In the several views the same parts will be found designated by the same letters and numerals of reference.

A represents the base or bed plate of the machine, upon which four posts or pillars B are secured to properly support the type-ring or top plate C and the other parts to be presently referred to.

D represents the paper-carriage, which may be of any desired construction, and E the paper-platen or impression-roller mounted therein.

The construction and operation of carriage

and platen being well known and in common use, no detailed description thereof appears to be necessary.

Each type bar or carrier shown in Figs. 1, 2, and 3 consists of an arm 2, an arm 3 at an angle thereto, and a slotted cam-like arm 4, also at an angle to the arm 2, but projecting in a direction opposite to that of the arm 3. Upon the arm 3 is formed or mounted the printing-type 5. At the junction of the arms 2 and 4 the type-carrier is pivoted by a pin 6 to the inner end of an actuating-lever 7. To the outer arm, preferably, of said lever is attached a connecting-link 8, whose lower end is preferably fastened to a key-lever 9, provided at its forward end with a finger-key 10. Upon the bed-plate is secured a center post 11, which is provided with a chamber 12, that tapers inward at its upper end and is there provided with a ring or annular bearing 13 and a series of radial slots or openings 14. The bifurcated arms or tail-pieces 4 of the type-carriers work upon this ring and within these slots, as shown and as hereinafter more fully set forth.

15 represents a fulcrum-ring for all of the actuating-levers 7. This ring is secured in a horizontally-arranged groove formed in a circular plate or lever support 16, that is provided with radial slots 17, within which the levers 7 operate and by the walls of which said levers are guided and prevented from moving laterally.

In practice I first thread or string the fulcrum-ring 15 through the eyes or journal-bearings of the levers 7 (to the inner arms of which the type-carriers have been previously attached) and then set said ring within the horizontal groove, at the same time directing the series of levers within the radial slots 17 and arranging the bifurcated tail-pieces 4 astraddle the pivotal support or ring 13, all as illustrated; but the levers may be otherwise mounted or arranged.

18 designates a circular inking-pad fitted, preferably, within the type-ring, top plate, or printing-chamber C and surrounding the printing-type. This pad may be made of felt, plush, silk, or other material, and may be supplied with ink in any desired manner. In the normal position of the radially-arranged type-

carriers the type-faces rest against the inking-pad.

Upon the top plate or printing-chamber C is secured by means of screws 19 an arm or bracket 20, which extends inwardly and is formed or provided with a type-guide 21 at the center or impression point of the machine. This guide preferably consists of a flaring opening, which is adapted to receive the type and direct them against the impression-surface (the paper upon the platen) in a manner to secure perfect alignment in the printing.

In the operation of the machine the depression of a finger-key will serve to move the type with which it is connected from the inking-pad to the impression-surface and effect the printing of its character thereupon. As the finger-key is depressed the inner end of the lever 7 is lifted, the type-carrier is vibrated about the pivotal support 13, and simultaneously therewith thrown in toward the center of the machine. The bifurcated tail-piece 4, being long and curved somewhat like a cam-slot and moving over the fixed fulcrum or support 13 under the influence of the lever 7, vibrating in a true arc, is gradually turned partially around and the type-bearing arm made integral therewith caused to travel in an irregular but predetermined path from the inking-pad to the printing-point, as shown more particular by the full and dotted lines at Fig. 3. Upon releasing the finger-key the parts all return to their first positions, preferably by the action of a universal spring, which I do not show; but in lieu thereof a separate spring, as 22, may be arranged under each key-lever, as in prior machines.

The illustration at Fig. 1 shows one type-carrier in its normal position and one in its printing position. The type-face in the former is shown as resting against the inking-pad and in the latter as passing through the center guide and being directed to the printing-point.

The machine is so constructed, it will be understood, that the type-carriers are returned to their normal positions with sufficient force to cause the type to strike perpendicularly against the circular inking-pad and receive a proper supply of ink therefrom.

In the modification shown at Fig. 4 the type-carrier is provided at its rear end or extension with teeth to form a rack 50, which meshes or engages with a rack 51, formed on a center piece or pivotal support 52, which is hollowed out on its under side, as at 53, and provided with a central stem 54, interiorly threaded, to be screwed upon a threaded post 55, projecting upwardly from a base-plate 56, upon which is secured a circular inking-pad 18^a.

The chamber 54 is designed to serve as a receptacle for the ink, which may be supplied through an opening in the center piece or in some other way. The pad extending within the ink-receptacle will by capillary attraction take up the ink and feed it out to those portions of the pad against which the

type come in contact, so that the type may ink themselves on their return to normal position.

The rack 51 is made or formed, preferably, by three horizontal concentric rings or ridges of different diameters, the smaller one being at the top of the support, at which point the latter is made with a depression 56, into which the rearmost or uppermost tooth of the rack on the type-carrier enters when the type is brought to the printing-point. The type-carrier is pivoted to the inner end of the lever 7 at 6^a, and when the lever is vibrated upwardly the carrier is caused to rotate or creep up the rack 51 and at the same time turn about its pivotal connection with said lever, as indicated by the dotted lines at Fig. 4. When the lever shall have been vibrated to the proper extent, the type-face will have been turned from the inking-pad, passed through the center guide 21, and made an impression upon the paper on the platen. Upon releasing the force applied to vibrate the lever the latter will of course descend, and the type-carrier then run down the rack 51 and turn about its pivotal connection with said lever in an opposite direction until the type shall strike perpendicularly against the inking-pad. In this modification the levers 7 and the type-carriers are all to radiate from the center piece 52 after the manner illustrated in Figs. 1 and 2. This construction (shown at Fig. 4) will not be specifically claimed in this case. It is incorporated herewith more especially to show that the principles involved in my invention are capable of embodiment in machines differing somewhat in detail construction.

I have applied my improvement to many different constructions of machines and know that a great number of changes may be made without departing from the spirit thereof.

Although I prefer to use a center guide, (as by which the best result may be obtained,) the same may, however, so far as some of my improvements are concerned, be omitted from the machine.

The circular inking-pad is preferably formed of a single length of material, but may be made up in sections joined or separated.

The inking-pad may be arranged either as shown at Fig. 1 or Fig. 4 or at any point in the curve described by the type as it descends from the platen, in which event, of course, the type-carriers are constructed and arranged accordingly. For instance, the inking-pad may be arranged as shown at 81 in Fig. 4 and the normal positions of the type-carrier and lever arranged to be those represented by the dotted lines at said figure. To obtain the best results in inking and printing, the type should strike at right angles or perpendicularly to the inking-pad and to the paper or printing-surface, and I have so organized my machines that this desideratum is secured; but so far as other features of my invention are concerned the inking-pad may be omitted entirely (although I prefer to use it) and the

type arranged to print through an inked ribbon, as in the well-known machines at present in use.

The lever 7 and the type-carrier may be actuated by any suitable means. I have shown only one means; but there are many others which may be employed and which will be readily suggested to the minds of those skilled in the art.

In lieu of the key-levers 9 some other connection between the finger-keys and the connecting-rods may be used—such, for instance, as shown in the application of Frank A. Young, Serial No. 253,523, filed October 27, 1887. Instead of vibrating the levers 7 upwardly by pulling down on their outer shorter arms, as shown, this movement may be effected by attaching the connecting-rods in advance of the fulcrum of the levers and pushing the same up, to do which it is only necessary to change the key-levers from the second order shown to levers of the first order.

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

1. In a type-writing machine, the combination of a platen, an inking-surface, and a series of type-carriers, each of the carriers being adapted to move between the inking-surface and the paper on the platen and impress the type against the inking-surface at the end of its movement in one direction and against the paper at the end of its movement in the other direction.

2. In a type-writing machine, the combination of a platen, a curved inking-surface, and a series of intermediate type-carriers which travel between the two and present the type perpendicularly to both.

3. In a type-writing machine, the combination of a platen, an annular stationary inking-surface, and a series of type-carriers whose type-faces travel first radially from the pad toward the center of the machine and then perpendicularly toward the platen.

4. In a type-writing machine, in combination with a series of type-carriers arranged in a circle, an annular exteriorly-arranged inking-surface.

5. In a type-writing machine, in combination with a central type-guide and a circular inking-surface, an intermediately-arranged type-carrier.

6. In a type-writing machine, the combination of a central type-guide, a type-carrier, and an inking-surface exterior to the type-carrier in the normal position of the latter.

7. In a type-writing machine, the combination of a series of actuating-levers, a series of connecting-rods therefor, a series of type-carriers pivoted each at the inner end of one of the said levers, and a pivotal support for one part of each of said type-carriers and arranged within the series of actuating-levers.

8. In a type-writing machine, the combination of a series of actuating-levers, a series of connecting-rods therefor, a series of type-carriers pivoted one to each of said actuating-

levers and having each a slotted tail-piece extending radially inward, and a pivotal support arranged within the series of actuating-levers for said tail-pieces.

9. In a type-writing machine, the combination of a series of radially-arranged actuating-levers and a series of radially-arranged angular type-carriers pivotally supported each at one point upon one of said levers and pivotally supported each at another point independent of said lever and nearer the center of the machine, whereby the type is caused to turn and change its direction while being moved to and from the printing-point.

10. In a type-writing machine, in combination with a lever and a type-guide, a type-carrier pivoted to the lever and pivotally supported at a point beyond said lever.

11. In a type-writing machine, the combination of a series of radially-arranged actuating-levers, a series of radially-arranged type-carriers, each of which is pivoted to one of said levers, and means, substantially as described, within the series of actuating-levers for turning said carriers about their pivotal connections with said levers and for causing the type ends of said carriers to travel first radially toward the center of the machine and then axially thereof.

12. In a type-writing machine, in combination with a central type-guide, a lever and a type-carrier connected to said lever and provided with a pivotally-supported tail-piece or extension projecting in a direction opposite to that of the type.

13. In a type-writing machine, in combination with an operating-lever, a type-carrier provided with a curved slotted tail-piece and a stationary pivotal support for the latter.

14. In a type-writing machine, in combination with a series of radiating operating-levers, a series of radiating type-carriers, each of which is pivoted to one of said levers and provided with a pivotally-supported tail-piece or extension projecting in a direction opposite to that of the type.

15. In a type-writing machine, in combination with a series of radiating operating-levers, a series of radiating type-carriers, each of which is pivoted to one of said levers and provided with a tail-piece or extension, and a pivotal circular support or fulcrum-ring, as 13, for the tail-pieces or extensions of said carriers.

16. In a type-writing machine, in combination with a series of radiating operating-levers, a series of radiating type-carriers, each of which is pivoted to one of said levers and provided with a tail-piece or extension, and a chamber, as 12, provided with a pivotal support or fulcrum-ring, as 13, and with a slotted periphery for the tail-pieces or extensions of said carriers.

17. In a type-writing machine, a top plate or type-ring supporting a series of actuating-levers and provided with a circular inking-pad and a series of vertically-arranged radi-

ating type-carriers within said pad, pivoted to said actuating-levers to be independently and arbitrarily moved therefrom to the printing-point.

5 18. In a type-writing machine, a type-carrier consisting of an arm 2, a type-bearing arm 3 at right angles thereto, and a slotted extension 4, projecting in a direction opposite to that of the arm 3.

10 19. In a type-writing machine, a type bar or lever provided with a moving fulcrum, in combination with an actuating key-lever, the interposed arm or lever, and the link.

15 20. In a type-writing machine, the combination of a centrally-arranged fulcrum-support, a concentric and exteriorly-arranged fulcrum-support, a series of actuating-levers radiating inwardly therefrom, and a series of type-carriers pivotally connected to said centrally-arranged fulcrum-support and to said
20 series of radially-arranged actuating-levers.

21. In a type-writing machine, the combination of a series of inwardly-radiating pivoted actuating-levers, a platen above said
25 actuating-levers, a circular inking-surface above said actuating-levers and between them and the platen, a centrally-arranged fulcrum-support, and a series of type-carriers, each connected to the free end of one of said actuating-levers and to said fulcrum-support.
30

22. In a type-writing machine, the combination, with an inking-surface and a platen above the same, of an angular type-carrier, an actuating-lever to which said type-carrier
35 is pivoted at one point, and a pivotal support for the type-carrier at another point, whereby the type is given substantially a quarter-turn as it is moved from the inking-surface to the platen.

40 23. In a type-writing machine, the combination of a platen, a tubular inking-pad arranged beneath the platen, the axis of said pad being in line with the printing-point, a series of radially-arranged type-carriers, and
45 two series of pivotal points for said carriers beneath said inking-pad, the type normally resting around the inner surface of said tubular pad and in moving to print first traveling radially inward and then axially to the
50 platen.

24. In a type-writing machine, a vertically-arranged type-carrier adapted to move radially inward and then axially, substantially as shown, and to change the path of the type-face in moving to and from the printing-point.

25. In a type-writing machine, the combination of an inking-pad, a platen, and a series of vertically-arranged type-carriers having their type-faces flaring or radiating outwardly
60 and resting against said pad in their normal positions and adapted each to move radially inward and then to the printing-point along an axial line common to all of said carriers.

26. In a type-writing machine, the combination of a type-ring, a series of actuating-levers depending therefrom, a circular inking-pad upon said type-ring, and a series of vertically-arranged type-carriers jointed to
65 said actuating-levers and pivotally supported independent of said levers and arranged so that their types stand always above said levers and type-ring and against the inking-pad supported thereby.
70

27. In a type-writing machine, the combination of a platen and a series of vertically-arranged type-carriers having radially-arranged type-arms adapted each to move first
75 in substantially a horizontal direction to a point opposite the impression-surface and then in a direction substantially at right angles to its first path and perpendicular to the impression-surface.
80

28. In a type-writing machine, the combination of an actuating-lever, a type-carrier
85 pivoted between its ends to said lever and pivotally supported at another point on the opposite side of the arc of vibration of the pivot connecting the type-carrier and actuating-lever, whereby the type-carrier is turned about
90 its pivotal connection with the actuating-lever during and by the vibration of said lever and the type-face reversed or inverted.

Signed at New York city, in the county of New York and State of New York, this 16th
95 day of March, A. D. 1888.

ALEX. DAVIDSON.

Witnesses:

M. LAYDEN,
JACOB FELBEL.