

Jan. 12 , 1926.

1,569,244

J. WALDHEIM
TYPEWRITING MACHINE
 Filed Feb. 16, 1923

Fig. 1.

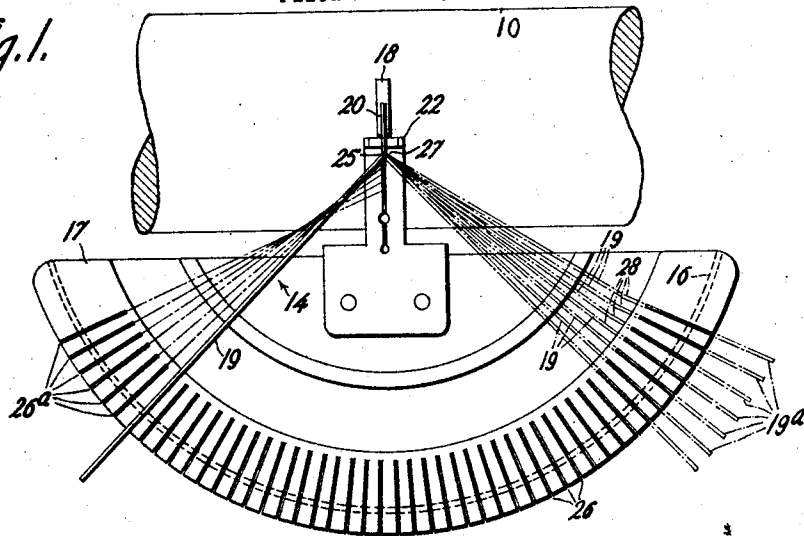


Fig. 2.

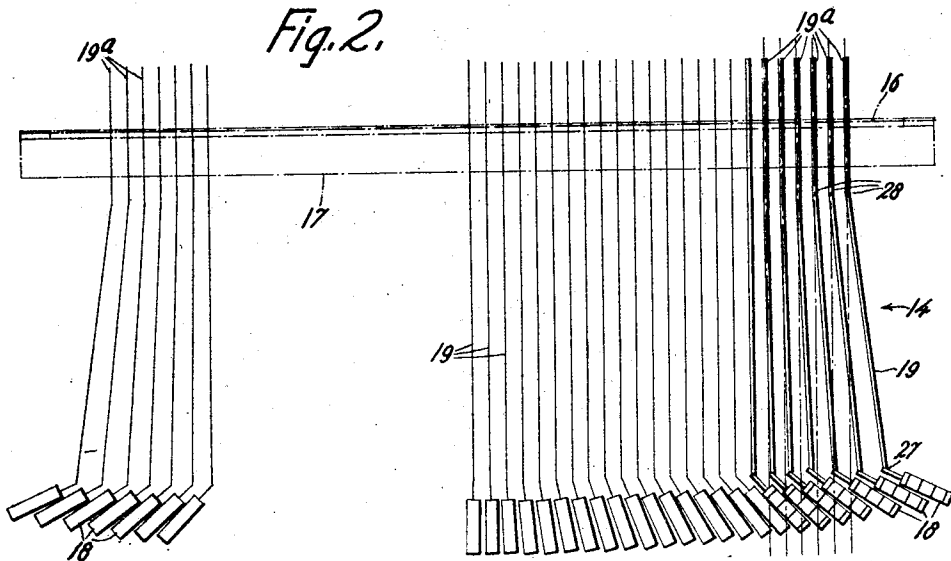
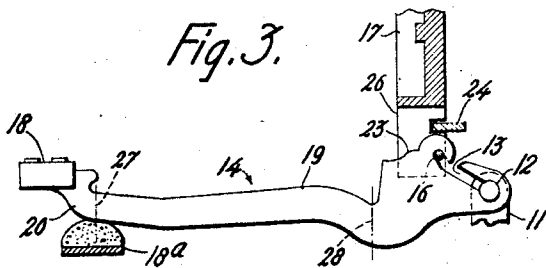


Fig. 3.



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Patented Jan. 12, 1926.

1,569,244

UNITED STATES PATENT OFFICE.

JOHN WALDHEIM, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO UNDERWOOD TYPE-WRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPEWRITING MACHINE.

Application filed February 16, 1923. Serial No. 619,394.

To all whom it may concern:

Be it known that I, JOHN WALDHEIM, a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Typewriting Machines, of which the following is a specification.

This invention relates to front-strike typewriting machines, and more particularly to the arrangement of the type-bars thereof and the type-segment whereon the type-bars are pivoted and whereby they are guided in their operative movements between normal and printing positions; and has for its principal object to increase the number of types which may be efficiently employed, or conversely, to reduce the space required for a given number of type-bars on the type-bar segment, without necessitating a general rearrangement and redesigning of the type-action. The invention is illustrated in connection with an Underwood typewriter.

In typewriting machines of this kind, the type-bars are fulcrumed at spaced points along an arcuate fulcrum wire which extends within and near the periphery of a type-bar segment having slots for guiding the type-bars in their operative movements. Each type-bar has a body-portion just long enough to swing to the center of the segment and a head-portion at the outer end of the body-portion and arranged at an angle to the body-portion such that the type will occupy a vertical position when at the printing point. The sharpness of the angles formed by the head and body portions of the type-bars increases progressively from the type-bars which are centrally located, to the extreme outer type-bars of the set, and consequently the amount of space required by the type-heads in their normal positions upon their support increases progressively from the middle outward, the increase being quite marked among the extreme outer type-heads. Type-bar segments have heretofore been slotted to guide all of the type-bars in planes perpendicular to the plane of writing, and the planes of these slots have converged radially to a common intersecting line, the position of which line is the position of the bend of the head from the body of the bar when the bar is in printing position. Where this

plan is followed, the slots in the segment are necessarily spaced apart amounts corresponding to the space required by the respective type-heads in normal position. This has a decided limiting effect upon the capacity of the segment.

In effecting the object of the present invention, the slots for the type-bars in the segment, instead of being cut in planes all converging to a common intersecting line, are, as to any desired number thereof at each side of the center of the segment, cut in planes which diverge by progressively increasing angles from such former common intersecting line; and the bars, beyond the segment, are bent from the planes of the slots at such angles as to redirect the bars to a point common to all, at or near the printing point. The area of the sector described by the planes of the end slots is reduced, with a corresponding increase in the fanning effect of the type-bars towards the pad position.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a view, in front elevation, of the platen, and segment-plate on which the type-bars are pivoted; one of the bars being shown in printing position.

Figure 2 is a developed plan view, showing a part of the types and type-bars in their normal position.

Figure 3 is a view, in cross-sectional side elevation, through the segment-plate, showing the mounting of one of the bars thereon.

The typewriting machine comprises a movable carriage, not shown, in which is mounted a platen 10. The usual keys, not shown, operate key-levers, not shown, to cause bell-cranks 11, through studs 12 carried thereby and slots 13 in type-bars 14, to swing the type-bars around a fulcrum-wire 16, upon which they are pivotally supported in a type-bar segment 17, to carry the type-blocks 18 from normal positions, upon a segmental support or basket 18^a, upward and rearward to strike against the front face of the platen. Each type-bar 14 comprises a body-portion 19, which swings to the center of the segment, and a head-portion 20, on which the type-block is mounted, and which is guided to the printing point by a type-guide 22. Shoulders 23 on the type-bars actuate a universal bar 24 in the

course of the upward swinging movement, and thereby operate the escapement mechanism, not shown, which controls the letter-feed movements of the carriage.

5 As shown in Figure 1, the bars strike radially to a common point 25, from which point the free, type-block-bearing ends of the bars are offset at 27, so that each and every type-block, in the printing position
10 of the bar, is vertically disposed. The pivots of the bars are, however, pitched along the segment-plate at increasing angular distances to either side of the printing point, and, consequently, the amount of angular
15 offset of the type-block from the bar proper increases as either side of the bank of bars is approached. This is clearly shown in Figure 2. It will be noted from an inspection of Figure 2 that, in order to accommo-
20 date the type-blocks in their normal position of rest, and to provide ample clearance, each from those adjacent thereto, the blocks are pitched progressively farther apart as the sides of the bank of bars are approached.
25 Heretofore, as above stated, this increasing pitch distance apart of the blocks in their position of rest has necessitated an increase in the pitch distances apart of the pivots of the bars on the segment, from the center of
30 the latter to either side thereof.

In the present structure, as heretofore in the art, the slots 26 which guide the bars at and near their pivots in the segment plate, are cut in planes, all of which are vertical
35 to the printing plane, that is, to a plane vertical at the front of the platen. Also, as heretofore in the art, the planes of the more centrally located slots, which form a central group, converge to the common intersecting
40 point or line 25. Referring, however, to the left-hand portion of Figure 1, it will be noted that, toward either end of the segment, certain of the slots 26^a, which form end groups, are not in planes which include the point 25;
45 but that, beginning with a slot some distance removed from the end of the segment, they are in planes which intersect a vertical plane perpendicular to the platen at the printing point, below the point 25, and that
50 the distance of such intersection below the point 25 progressively increases until such intersection of the plane of the end slot is found to be considerably to one side or below the point 25. In other words, as the
55 ends of the segment are approached, the planes of the slots 26^a diverge more and more from those imaginary planes which, as in the case of the more centrally located type-bars, would include the pivots of the bars
60 and the common center point 25.

In order that the length of the type-bars between the type-faces and fulcrum-wire may be uniform for all the bars, and in order that the angle of the offset may be deter-
65 mined solely by the angle at which the pivot

of the bar is set to one or the other side of the printing point, the bars which lie in the slots 26^a are bent, as at 28, between the segment-plate and their free ends. The bends 28 of the bars are such as to direct the free
70 ends of the bars, as shown in Figure 1, to the common point 25; and, as the planes of the slots 26^a cut farther and farther below the point 25, approaching the ends of the segment, the bends 28 are correspondingly
75 increased in amplitude.

It will be seen, by an inspection of Figure 2, that the bodies 19 of the central group of type-bars extend forwardly at right angles to the segment 17, and that the portions 19^a
80 of the end groups of type-bars also extend forwardly at right angles to the segment to the bends 28, from which bends the bodies 19 of said type-bars diverge to the bends 27 which are disposed at varying distances to
85 one side of the planes in which the portions 19^a of the type-bars are disposed.

It will be understood that it is desirable to bend the type-bars of the end groups at 28 divergingly from the planes in which
90 the portions 19^a lie to avoid undue interference of adjacent type-bars when one is advancing toward the printing point while another is receding from the printing point. In practice, the blanks of the type-bars are
95 alike, and the head 20 that carries the type-block is made a little long, to project through the end of the adjusted type-block. These blanks are flattened and bent in a forming-die to their final angular form.
100 The type-block is gaged and soldered to the head-section 20, and any portion of the bar that projects through is ground off flush with the end of the type-block. Thus a
105 complete type-bar system may be assembled from uniform type-bar blanks, and any slight variation in the linear length of the bar, due to the angular formations there-
in, is corrected by the gaging of the type to be soldered thereto, and all the bars from
110 their type-faces to the fulcrum-wire must be of uniform length.

By equally spacing the type-bars in the type-bar segment, they may be arranged in more condensed relation than practiced
115 heretofore, so that in the present machine forty-six type-bars occupy substantially the same angular space (120°) of the type-bar segment that is usually filled up with forty-two type-bars. The condensed arrangement
120 of the type-bars is such that at least three type-blocks lie outside of or beyond a plane which is perpendicular to the segment and which extends through the portion of the extreme end type-bar which is nearest to
125 the segment. The equal spacing of the type-bars in the segment also greatly simplifies the operation and reduces the cost of machining the slots in said segment, since the cutting tool is relatively shifted with refer-
130

ence to the segment always through the same angular distance to the next slot, instead of a varying distance as heretofore. The relative shifting of the cutting tool is around a common center for all of the type-bars of the middle group, containing most of the type-bars; it being not necessary to change the angle of the cutting tool with reference to the segment except for the comparatively few type-bars included in the two end groups.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In a typewriting machine, the combination with a platen, of a system of about forty-six type-bars printing at a common point against said platen, a type-bar segment, and a curved wire on said segment to support said type-bars and form their pivots, said segment having equally spaced slots occupying about 120°, in which slots the type-bars are arranged, the type-bars being bent at their forward ends at increasing angular distances from their bodies, type-blocks on the ends of the type-bars, the rear ends of all of the type-bars being perpendicular to the type-bar segment, the type-bars being divided into three groups, namely, a main middle group, which comprises nearly all of the type-bars, and two side groups, each of which comprises comparatively few type-bars, the bodies of the type-bars of the middle group being straight so that the spacing of the type-bars of said middle group, at their bent ends, corresponds with their spacing at the segment, the spacing of the type-bars of each side group varying at their bent ends from the spacing at the segment, a type-bar basket, the type-bars of each side group being bent in front of the segment, so that the bodies of said last-named type-bars fan outwardly towards their bent forward ends, the extent of fanning of each extreme bar being sufficient to provide space for three type-blocks in the type-bar basket beyond the extended plane of that portion of the last-named type-bar which is perpendicular to the type-bar segment.

2. In a typewriting machine, the combination with a platen, of a system of type-bars printing at a common point against said platen, a type-bar segment on which the type-bars are pivotally supported, the pivots being at right angles to said type-bars, all of the pivots lying in a single plane, and a type-block on each type-bar, the type-blocks being arranged at increasing angular distances on the type-bars, from the middle towards each side of the system, which causes the system of type-blocks to occupy substantially more space than the type-bars occupy in the segment, the type-bars being equally spaced in the type-bar segment and extending perpendicularly from said segment, a few of said bars at the sides of the system being bent at a point near the segment to fan outwardly towards their respective type-blocks, the space occupied by the type-blocks exceeding the space occupied by the type-bars at the segment by an amount which permits at least three type-blocks to lie outside of a plane perpendicular to the segment and extending through the perpendicular part of the extreme side type-bar.

3. In a typewriting machine, the combination with a platen, of a series of about forty-six type-bars printing at a common point against said platen, said type-bars occupying an angular space of about 120°, a segment to support said type-bars, said type-bars being of equal length, permitting the use therefor of blanks of uniform size, and being equally spaced in said segment, said type-bars being divided into three groups, namely, a middle group, including nearly all of the type-bars, and two side groups, and a type-bar basket, the type-bars of the middle group extending perpendicularly from the type-bar segment to the type-bar basket, the type-bars of each side group extending perpendicularly from the segment at their rear ends to a plane in front of the segment, from which plane the type-bars of said side groups extend forwardly to the basket and fan outwardly from each other, so as to be spread at their forward ends to provide clearance for their respective types.

JOHN WALDHEIM.