966,955.

J. T. SCHAAFF.

TYPE WRITING MACHINE.

APPLICATION FILED MAY 29, 1909.

Patented Aug. 9, 1910.

2 SHEETS—SHEET 1.

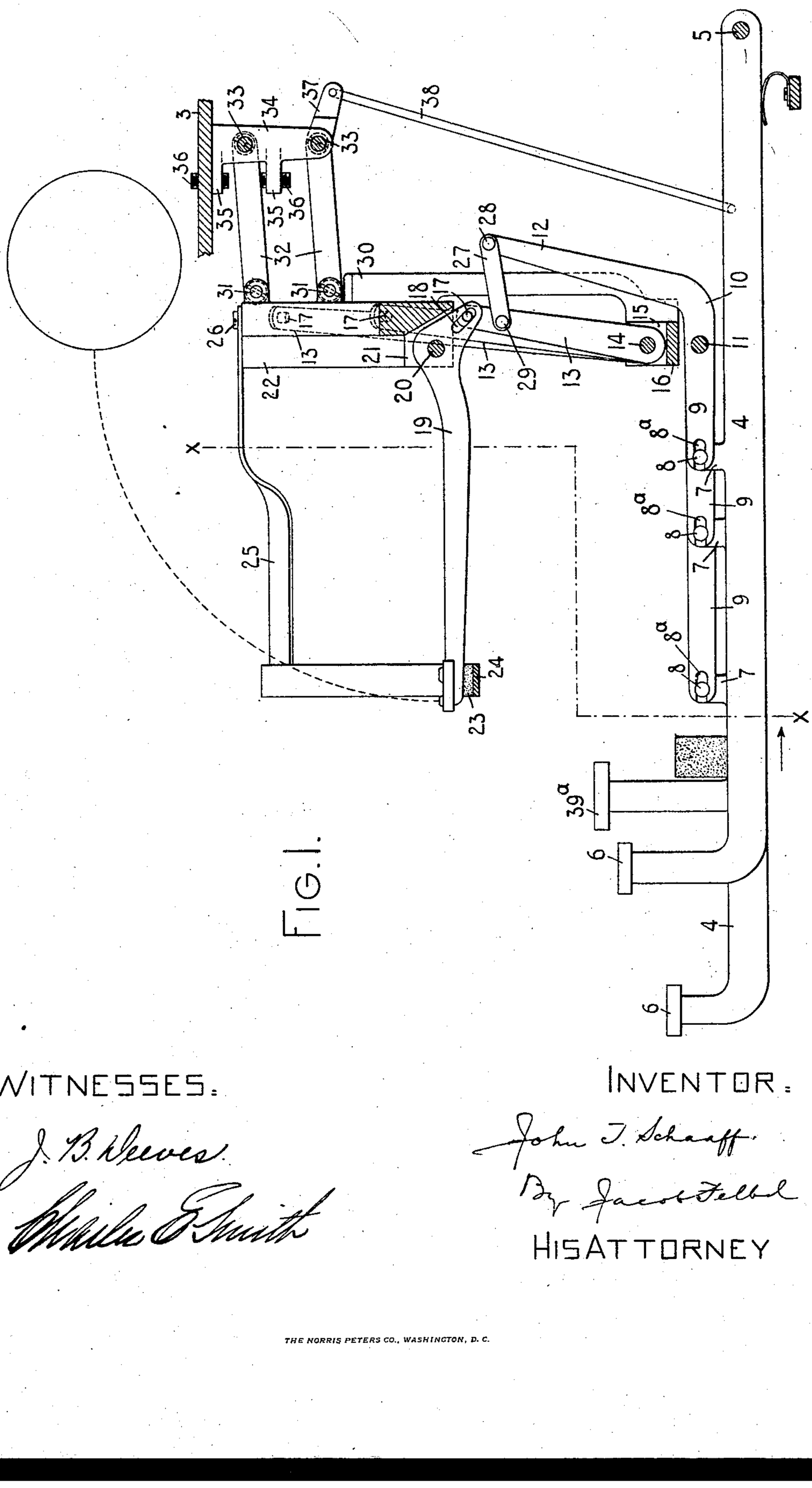

FIG. 1.

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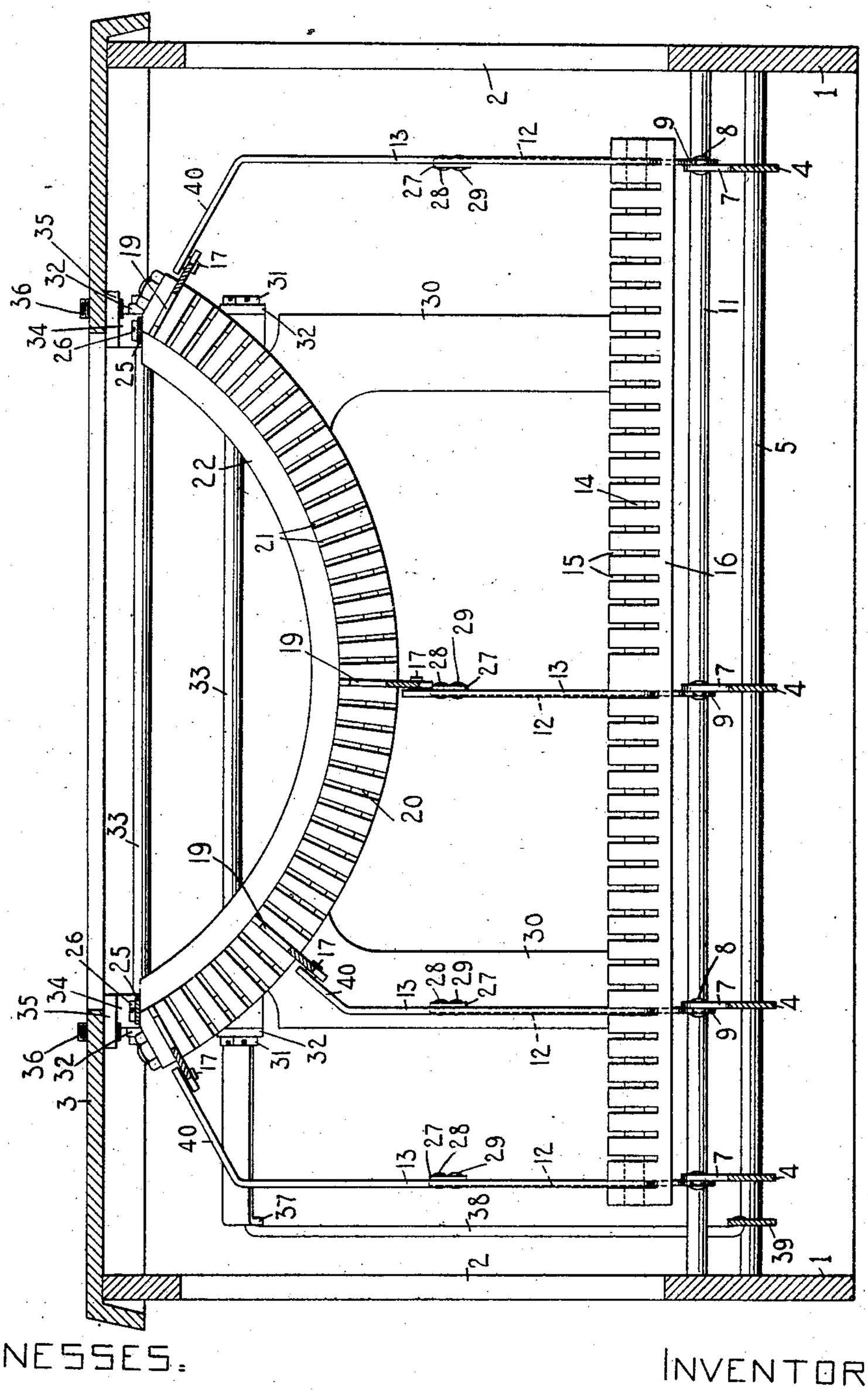
2 SHEETS—SHEET 2.

FIG. 2.



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UNITED STATES PATENT OFFICE.

JOHN T. SCHAAFF, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

966,955. Specification of Letters Patent. **Patented Aug. 9, 1910.**

Application filed May 29, 1909. Serial No. 499,229.

To all whom it may concern:

Be it known that I, JOHN T. SCHAAFF, citizen of the United States, and resident of Washington, in the District of Columbia, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more particularly to type actions.

The main object of my invention is to provide a comparatively simple and efficient type action which affords a case shifting movement of the type bars.

To the above and other ends which will hereinafter appear, my invention consists in the features of construction, arrangements of parts and combinations of devices to be hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings wherein like reference characters indicate corresponding parts in the various views, Figure 1 is a vertical central fore and aft sectional view showing a sufficient number of parts of a typewriting machine to illustrate my invention in its embodiment therein. Fig. 2 is a vertical transverse sectional view of the same taken on the line *x*—*x* of Fig. 1 and looking in the direction of the arrow at said line.

The frame of the machine comprises a base 1, corner posts 2 and a top plate 3. Key levers 4 of the second order are fulcrumed on a pivot rod 5 secured at its ends to the base of the machine. The key levers are provided with finger keys 6 arranged in different banks so that the key levers vary in length. Each key lever is provided with an upwardly extending ear 7 provided with a laterally projecting pin 8 received in a slot 8ª in a forwardly extending arm 9 of an angular sub-lever 10. The sub-levers 10 are all pivoted on a pivot rod 11 secured at its ends to the base of the machine. The arms 9 of the angular sub-levers extend substantially horizontally and parallel with the key levers 4. It will be observed that the arms 9 of the angular levers extend forwardly at different distances from the pivot rod 11 and make connection with the key levers at varying distances from the pivot rod 5 of the key levers and at varying distances from the pivot rod 11 of the angular levers. Upright arms 12 are formed on the angular levers and extend upwardly and rearwardly in the rear of the system of type bars. A series of upright sub-levers 13 of the third order is pivoted on a pivot rod 14, the sub-levers working in slots 15 in a support 16. Each upright sub-lever 13 has a laterally projecting pin 17 at the upper end thereof which is received in an inclined slot 18 in the heel of the associated type bar 19. The type bars are segmentally arranged and are pivoted on a pivot wire 20 and work in segmentally arranged slots 21 of a type bar segment 22. The forward ends of the type bars are supported on a pad 23 which in turn is supported by a segmental strip 24 secured to the forward ends of arms 25 which project forwardly from the type bar segment and are secured thereto by screws 26.

The sub-levers 10 and 13 are connected by push links 27 each pivoted at its rear end to the upper end of the upright arm 12 of an angular sub-lever as indicated at 28, the forward end of the link being pivotally connected to the associated sub-lever 13 as indicated at 29. The support 16 for the series of sub-levers 13 is connected to the type bar segment by arms 30. The type bar segment itself is pivotally connected at 31 to two pairs of parallel shift links 32 connected to rock shafts 33 mounted to turn on brackets 34 secured to the top plate of the machine. Each bracket 34 has forwardly projecting lugs or arms 35 tapped to receive screw stops 36 with which the uppermost link 32 of the associated set coöperates to limit the shifting movements of the links and the type bar segment connected therewith. The lowermost link 32 of the left-hand set is provided with a rearwardly and outwardly extending arm 37 pivotally connected to a depending link 38. The link 38 is connected to a shift key lever 39 pivoted on the pivot rod 5 and provided with a shift key 39ª.

From a comparison of Figs. 1 and 2 it will be seen that the upright sub-levers 13 extend to different heights from their pivot rod 11 to make connection with the segmentally arranged type bars; and that the sub-levers 13 near the sides of the machine are bent inwardly at their upper ends as indicated at 40 to make connection with the type bars and to compensate for the difference in width of the key-board and the system of type bars. It will also be seen that the arms 12 of the

angular sub-levers are parallel or substantially parallel with the sub-levers 13 up to the points where operative connection is made between the two series of sub-levers. The upright arms 12 of the angular sub-levers all project to the same height and make connection through links 27 with the sub-levers 13 at the same height throughout the system.

The construction and arrangement of the parts described are such that the variation in the lengths of the sub-levers 13 and the variation in the lengths of the key levers 4 are compensated for and a uniform leverage is provided throughout the system and the keys throughout the system receive a uniform "dip."

Certain of the features disclosed herein are claimed broadly in a companion application Serial No. 499,228 filed of even date herewith, the claims in the present case being restricted to features not disclosed in said other application.

Various changes may be made without departing from the spirit and scope of my invention.

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

1. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a series of sub-levers that vary in length, a series of key levers, a second set of sub-levers, one set of the arms of which are of uniform length and the other set of the arms of which vary in length to provide a uniform leverage throughout the system, and links connecting said series of sub-levers.

2. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a shiftable type bar segment on which said type bars are mounted, a series of sub-levers that vary in length, said sub-levers being carried by the type bar segment, a series of key levers, a second series of sub-levers, one set of the arms of which are of uniform length and the other set of the arms of which vary in length to provide a uniform leverage throughout the system, and links for operatively connecting said series of sub-levers to afford a relative shifting movement between them when the type bar segment is shifted.

3. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a shiftable type bar segment on which said type bars are mounted, a series of sub-levers projecting varying distances from the fulcrum thereof and carried by said shiftable type bar segment, a second series of sub-levers operatively connected with the first mentioned sub-levers at a uniform distance from the fulcrum thereof and operatively connected to said key levers at varying distances from the fulcrum of the key levers, and links connecting said series of sub-levers for affording a relative shifting movement between the two series of sub-levers when the type bar segment is shifted.

4. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a shiftable type bar segment on which said type bars are mounted, a series of sub-levers that vary in length, said sub-levers being carried by the type bar segment, a series of key levers, a second series of sub-levers, one set of the arms of which are of uniform length and the other set of arms of which vary in length to provide a uniform leverage throughout the system, and links for operatively connecting said series of sub-levers to afford a relative shifting movement between them when the type bar segment is shifted.

5. In a front-strike typewriting machine, the combination of upwardly and rearwardly striking type bars, a shiftable type bar segment on which said type bars are mounted, a series of sub-levers projecting varying distances from the fulcrum thereof and carried by said shiftable type bar segment, a second series of sub-levers operatively connected with said first mentioned sub-levers at a uniform distance from the fulcrum thereof and operatively connected to said key levers at varying distances from the fulcrums of the key levers, and links connecting said series of sub-levers and affording a relative shifting movement between the two series of sub-levers when the type bar segment is shifted.

6. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a shiftable type bar segment, a system of sub-levers that vary in length, said sub-levers being operatively connected with the type bars and shiftable with the type bar segment, a series of key levers that vary in length, a second series of sub-levers operatively connected to the key levers, one set of the arms of the second series of sub-levers being of uniform length and the other set of arms varying in length according to the variation in length of the first mentioned series of sub-levers and according to the variations in length of the key levers, and links which connect the two series of sub-levers and afford a relative shifting movement between said sub-levers when the type bar segment is shifted.

7. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a shiftable type bar segment, a series of sub-levers that vary in length, said sub-levers being operatively connected with the type bars and shiftable with the type bar segment, a series of key levers that vary in length, a second series of angular sub-levers having substantially horizontally disposed arms opera-

tively connected to the key levers and having substantially vertically disposed arms, the substantially vertically disposed set of arms of the angular sub-levers being of uniform length and the substantially horizontally disposed arms varying in length according to the variation in length of the first mentioned series of sub-levers and according to the variation in length of the key levers, and links which connect the vertically disposed arms of the second series of sub-levers with the sub-levers of the first mentioned series and afford a relative shifting movement between said series of sub-levers when the type bar segment is shifted.

8. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a type bar segment shiftable to change the case position of the type, a series of upright sub-levers shiftable with said segment, pin and slot connections between said type bars and the sub-levers, a series of key levers, a series of angular sub-levers intermediate the key levers and said upright sub-levers, the angular levers having one set of their arms substantially parallel with and connected to the key levers by pin and slot connections and having the other set of their arms substantially parallel with the upright sub-levers to the points of operative connection between the angular and upright sub-levers, and links between the two series of sub-levers to afford a relative case shifting movement between them when the type bar segment is shifted.

Signed at the borough of Manhattan, city of New York, in the county of New York, and State of New York, this 28th day of May A. D. 1909.

JOHN T. SCHAAFF.

Witnesses:

CHARLES E. SMITH,

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