

J. T. SCHAAFF.  
TYPE WRITING MACHINE.  
APPLICATION FILED MAY 29, 1909.

966,954.

Patented Aug. 9, 1910.

2 SHEETS—SHEET 1.

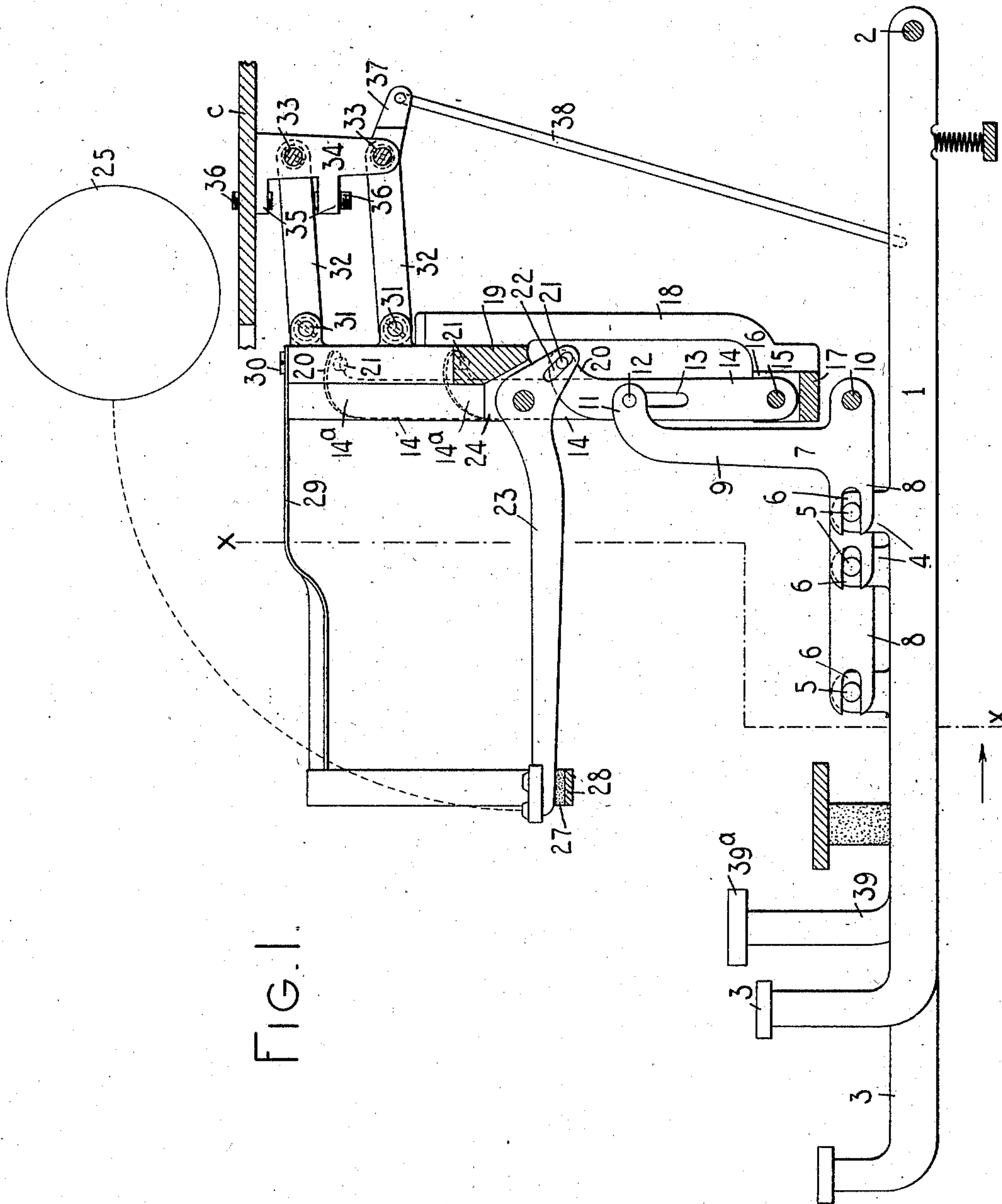


FIG. 1.

WITNESSES:

J. B. Reeves  
Charles E. Smith

INVENTOR.

John T. Schaaff  
By Jacob Selbel  
HIS ATTORNEY

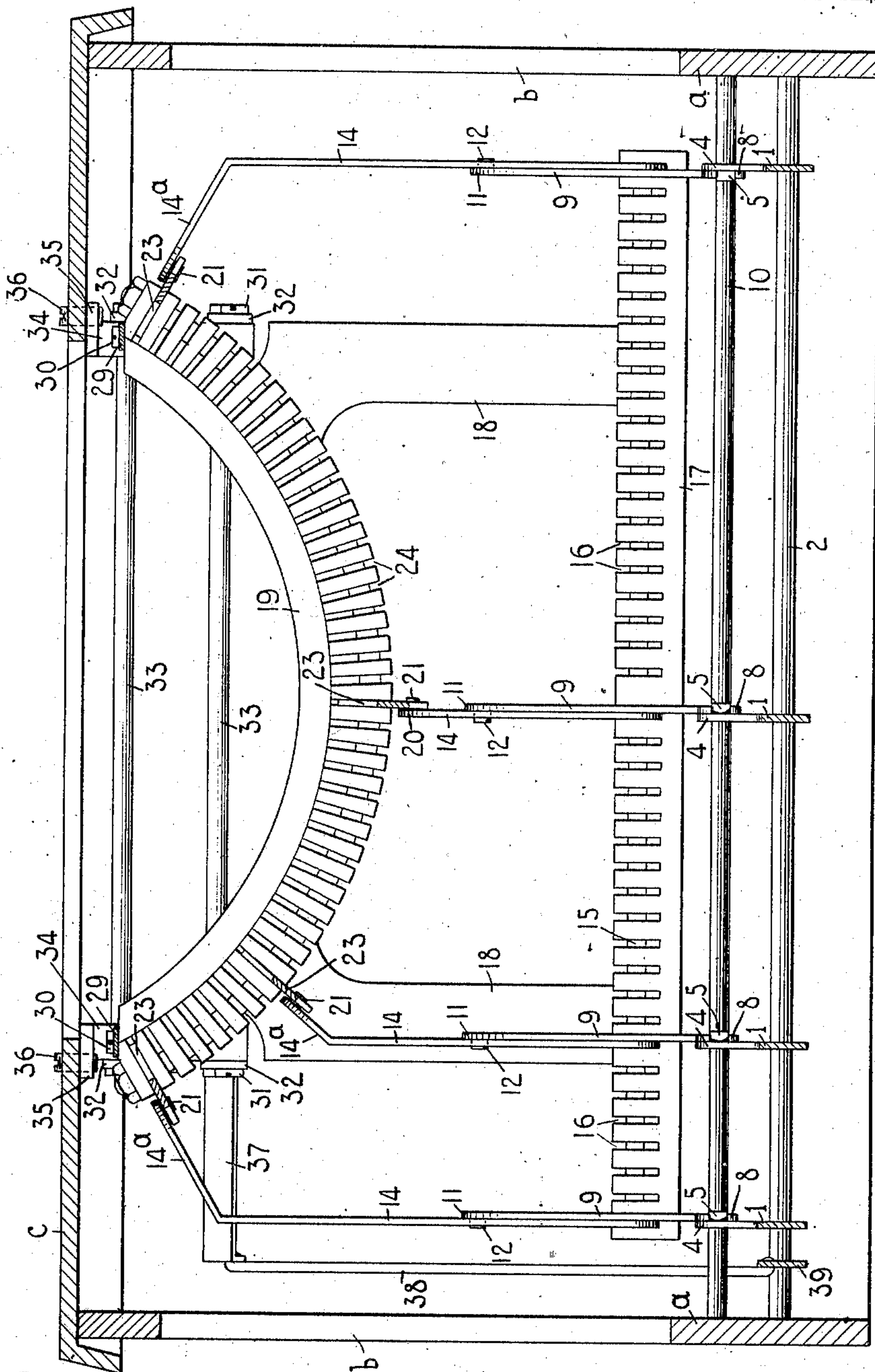
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2 SHEETS—SHEET 2.

FIG. 2.



WITNESSES:

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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.

966,954.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed May 29, 1909. Serial No. 489,228.

*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 comparatively simple and efficient type actions which afford a case shifting movement of the type basket.

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 front to rear sectional view of one form of typewriting machine embodying my invention, a sufficient number of parts of the machine being shown 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  $a$ , corner posts  $b$  and a top plate  $c$ .

Key levers 1 of the second order are fulcrumed in the base  $a$  of the machine on a pivot rod 2 and are provided with finger keys 3 in different banks as indicated in Fig. 1 so that the key levers are of different lengths. Each key lever has an upwardly extending ear 4 with a laterally projecting pin 5 thereon which is received in a substantially horizontal slot 6 formed in an angular sub-lever 7 having a substantially horizontally disposed arm 8 and a substantially vertically disposed arm 9. The sub-levers 7 are all fulcrumed on a pivot rod 10 secured at its ends to the base  $a$  of the machine. The upper ends of the arms 9 of the angular sub-levers are extended rearwardly at 11 where they are provided with laterally projecting pins 12 received in vertically disposed slots 13 of upright sub-levers 14. The upright sub-levers 14 are levers of the third order and are all fulcrumed at their

lower ends on a pivot rod 15 and work in slots 16 in a supporting piece 17 connected by arms 18 with a type bar segment 19. The upper end of each sub-lever 14 is bent rearwardly at 20 where it is provided with a laterally extending pin 21 received in an inclined slot 22 in the heel of the associated type bar 23. The type bars are segmentally arranged and work in slots 24 in the type bar segment and strike upwardly and rearwardly against the front face of a platen 25, diagrammatically shown in Fig. 1, it being understood that the platen is carried by a suitable carriage (not shown) which travels from side to side of the machine above the top plate  $c$ . The forward ends of the type bars are supported on a pad 27 which in turn is supported by a segmental strip 28 secured to the forward ends of forwardly projecting arms 29 secured at their rear ends by screws 30 to the type bar segment. The type bar segment is pivoted at 31 on two sets of parallel links 32 connected to rock shafts 33 mounted to turn in openings in brackets 34 secured to and depending from the top plate  $c$  of the machine. One of these brackets and a pair of associated parallel links 32 are situated near each side of the machine and connect with the type bar segment at one side thereof. Each bracket 34 is provided with forwardly projecting lugs 35 tapped to receive oppositely disposed screw stops 36 with which the uppermost of the pair of associated parallel links cooperate to limit the case shifting movements of the links and the segment to which they are connected. The lowermost of the left-hand set of parallel links 32 is extended outwardly and rearwardly beyond its shaft 33 to form an arm 37 to which a depending link 38 is connected, the lower end of the link 38 being connected to a shift key lever 39 having a shift key 39<sup>a</sup>. It should be understood that the means for effecting the case shift movement of the type bar segment may be varied at will, a conventional form only of the case shifting means being shown.

From a comparison of Figs. 1 and 2 it will be observed that the upright sub-levers 14 vary in length and project at increasing heights from the center to the sides of the system in order to make connection with the segmentally arranged type bars. Moreover, it will be observed that those sub-levers 14



which are situated near the sides of the system are off-set or bent laterally and inwardly at the upper ends thereof as indicated at 14<sup>a</sup> in order to compensate for the difference in width between the keyboard and the system of type bars. It will also be seen that the upright arms 9 of the system of angular sub-levers all extend to the same height and make connection with the sub-levers 14 at a uniform distance from the fulcrum of the latter, and that the effective lever arms 9 are parallel with the sub-levers 14 up to the points where connection is made between the sub-levers 7 and 14. Furthermore, it will be seen that the horizontally disposed arms 8 of the angular levers project varying distances from the fulcrum 10 of the sub-levers 7 and from the fulcrum 2 of the key levers so that the points 5—6 of connection between the angular levers and the key levers are at varying distances from the fulcrum of the key levers and at varying distances from the fulcrum of the angular levers. This manner of connecting the parts is such that compensation is provided for the variation in leverage due to the variation in length of the sub-levers 14 and for the variation in length of the key levers 1.

It will be seen that the pin and slot connections 12—13 between the sub-levers 7 and 14 afford a case shifting movement of the segment to change the case position of the types, the sub-levers 14 at this time being moved with the type bar segment, whereas the sub-levers 7 and key levers are carried by the frame of the machine and remain fixed. Moreover, it will be understood that the construction affords an acceleration of each type bar in its movement toward the printing position, the initial portion of the stroke being under a low leverage which affords an easy and soft touch upon the keys. In the construction as shown the acceleration in the movement of the bar does not occur throughout the entire stroke but does occur throughout a considerable portion thereof and the touch is comparatively light at the beginning of the stroke.

From the foregoing description it will be understood that I provide a simple and efficient type action in which the relative case shifting movement may be effected between the actuating parts of the type action and wherein there is a compensation effected to provide a substantially uniform leverage of the different type actions throughout the system and to provide a uniform dip of the keys throughout the system.

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 shiftable type bar segment, a type bar carried thereby, a key lever, a sub-lever shiftable with said segment and operatively connected with the type bar, a second sub-lever controlled by said key lever, and means for operatively connecting said sub-levers to afford a relative shifting movement between them when the type bar segment is shifted.

2. In a front-strike typewriting machine, the combination of a shiftable type bar segment, a type bar carried thereby, a key lever, an upright sub-lever shiftable with said segment and operatively connected with the type bar, a second sub-lever which is in the form of an angular lever and is controlled by said key lever, and means for operatively connecting said 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 shiftable type bar segment, a type bar carried thereby, a key lever, a sub-lever shiftable with said segment and operatively connected with said type bar, and a second sub-lever controlled by said key lever and connected by a pin and slot connection with said first mentioned sub-lever to afford a relative shifting movement between the sub-levers when the type bar segment is shifted.

4. In a front-strike typewriting machine, the combination of a shiftable type bar segment, a type bar carried thereby, a key lever, an upright sub-lever shiftable with said segment and operatively connected with said type bar, and an angular sub-lever connected by a pin and slot connection with said key lever and connected by a pin and slot connection with said upright sub-lever to afford a relative shifting movement between the sub-levers when the type bar segment is shifted.

5. In a front-strike typewriting machine, the combination of a shiftable type bar segment, an upwardly and rearwardly striking type bar carried thereby, a key lever of the second order, an upright sub-lever of the third order pivoted on and shiftable with said segment and operatively connected with said type bar, and an angular sub-lever pivoted on a fixed portion of the machine and connected by a pin and slot connection with said key lever and connected by a pin and slot connection with said upright sub-lever to afford a relative shifting movement between the 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 series of key levers; and intermediate operative connections between said key levers and type bars, said connections comprising a series of



sub-levers that vary in length, and a second series of sub-levers, one set of the arms of which are of a uniform length and the other set of the arms of which vary in length to provide a uniform leverage throughout the system.

7. 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 key levers; and a series of intermediate operative connections between said key levers and type bars, said connections comprising a series of sub-levers that vary in length, said sub-levers being carried by the type bar segment, a second series of sub-levers, one set of the arms of which are of a uniform length and the other set of the arms of which vary in length to provide a uniform leverage throughout the system, the operative connection between said sub-levers affording a relative shifting movement between them when the type bar segment is shifted.

8. In a front-strike typewriting machine, the combination of a series of key levers; a series of upwardly and rearwardly striking type bars; and a series of intermediate operative connections between said key levers and type bars, said connections comprising a series of sub-levers projecting varying distances from their fulcrums, and a second series of sub-levers operatively connected with said first mentioned sub-levers at a uniform distance from the fulcrums of the first mentioned series of sub-levers and operatively connected to said key levers at varying distances from the fulcrums of the key levers.

9. In a front-strike typewriting machine, the combination of a series of key levers; a series of upwardly and rearwardly striking type bars; a shiftable type bar segment on which the type bars are mounted; and intermediate operative connections between the key levers and type bars, said connections comprising a series of sub-levers projecting varying distances from their fulcrums 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 fulcrums of said first mentioned sub-levers, and operatively connected to said key levers at varying distances from the fulcrums of said key levers, the operative connection between the two series of sub-levers affording a relative shifting movement between said two series of sub-levers when the type bar segment is shifted.

10. In a front-strike typewriting machine, the combination of a shiftable type bar segment, an upwardly and rearwardly striking type bar carried thereby, a key lever of the

second order, an upright sub-lever of the third order pivoted on and shiftable with said segment and operatively connected with the type bar, an angular sub-lever pivoted on a fixed portion of the machine and controlled by said key lever, and means for operatively connecting said sub-levers to afford a relative shifting movement between them when the type bar segment is shifted.

11. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars; a series of key levers that vary in length; and intermediate operative connections between said key levers and type bars, said connections comprising a series of sub-levers of varying length, and a second series of sub-levers operatively connected to the key levers and to the first mentioned series of sub-levers, one set of 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 variation in length of the key levers.

12. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars; a series of key levers that vary in length; and intermediate operative connections between said key levers and type bars, said connections comprising a series of sub-levers that vary in length, and a second series of angular sub-levers having substantially horizontally disposed arms operatively connected to the key levers, and substantially vertically disposed arms operatively connected to the first mentioned series of sub-levers, the substantially vertically disposed arms of the angular 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.

13. 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 and which are 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 and to the first mentioned series of sub-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 variation in length of the key levers, and means for affording a relative shifting movement between said series of sub-levers when the type bar segment is shifted.



14. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly swinging type bars, a shiftable segment on which said type bars are mounted, a series of sub-levers carried by said segment and connected directly to the type bars by pin and slot connections, a second series of sub-levers connected to said first mentioned sub-levers by pin and slot connections which afford relative shifting movements between the two series of sub-levers when the segment is shifted, and key levers to which said second series of sub-levers are connected.

15. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly swinging type bars, a shiftable segment on which said type bars are mounted, a series of sub-levers of the third order carried by said segment and connected directly to the type bars by pin and slot connections, a second series of angular sub-levers connected to said first mentioned sub-levers by pin and slot connections which afford relative movements between the two series of sub-levers when the segment is shifted, and key levers to which the second series of sub-levers is connected by pin and slot connections.

16. In a front-strike typewriting machine, the combination of upwardly and rearwardly swinging type bars, a shiftable segment on which said type bars are mounted, a series of sub-levers of the third order carried by said segment and connected directly to the type bars by pin and slot connections, said sub-levers extending different distances from their fulcrums, a second series of angular sub-levers having upright arms operatively connected to said first mentioned sub-levers to afford relative movements between the two series of sub-levers when the segment is shifted, the upright arms of the angular sub-levers extending a uniform distance from the fulcrums of said angular sub-levers, and key levers to which the other substantially horizontally disposed arms of said angular sub-levers are connected at varying distances from the fulcrums of said angular sub-levers.

17. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly swinging type bars, a shiftable segment on which said type bars are mounted, a series of sub-levers of the third order carried by said segment and connected directly to the type bars by pin and slot connections, said sub-levers extending different distances from their fulcrums and to gradually higher elevations as the sides of the system of type bars are approached, a second series of angular sub-levers having upright arms connected to said first mentioned sub-levers by pin and

slot connections, to afford relative movements between the two series of sub-levers when the segment is shifted, said upright arms of the angular sub-levers extending a uniform distance from the fulcrums of said angular sub-levers, and key levers to which the other substantially horizontally disposed arms of said angular sub-levers are connected at varying distance from the fulcrums of said angular sub-levers.

18. In a front-strike typewriting machine, the combination of a series of upwardly and rearwardly striking type bars; a series of key levers; and intermediate operative connections between said type bars and key levers, said connections comprising a series of upright sub-levers and a series of separately fulcrumed angular sub-levers intermediate the key levers and the upright sub-levers, the angular levers being operatively connected with the upright sub-levers and having one set of their arms substantially parallel with the key levers and having the other set of their arms substantially parallel with the upright sub-levers up to the points of operative connection between the angular and upright sub-levers.

19. 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 types; a series of key levers; and operative connections between said key levers and type bars, said connections comprising a series of upright sub-levers shiftable with said segment, a series of angular sub-levers intermediate the key levers and said upright sub-levers, the angular sub-levers having one set of their arms substantially parallel with the key levers and having the other set of their arms substantially parallel with the upright sub-levers up to the points of operative connection between the angular and upright sub-levers, and means for operatively connecting the two series of sub-levers to afford a relative shifting movement between them when the type bar segment receives a case shifting movement.

20. 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 types, a series of upright sub-levers shiftable with said segment, pin and slot connections between said type bars and 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 up to the points of operative connection between the angular and upright sub-levers, and pin and slot connections between the two series of sub-levers to  
5 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 10 May A. D. 1909.

JOHN T. SCHAAFF.

Witnesses:

CHARLES E. SMITH,  
J. B. DEEVES.