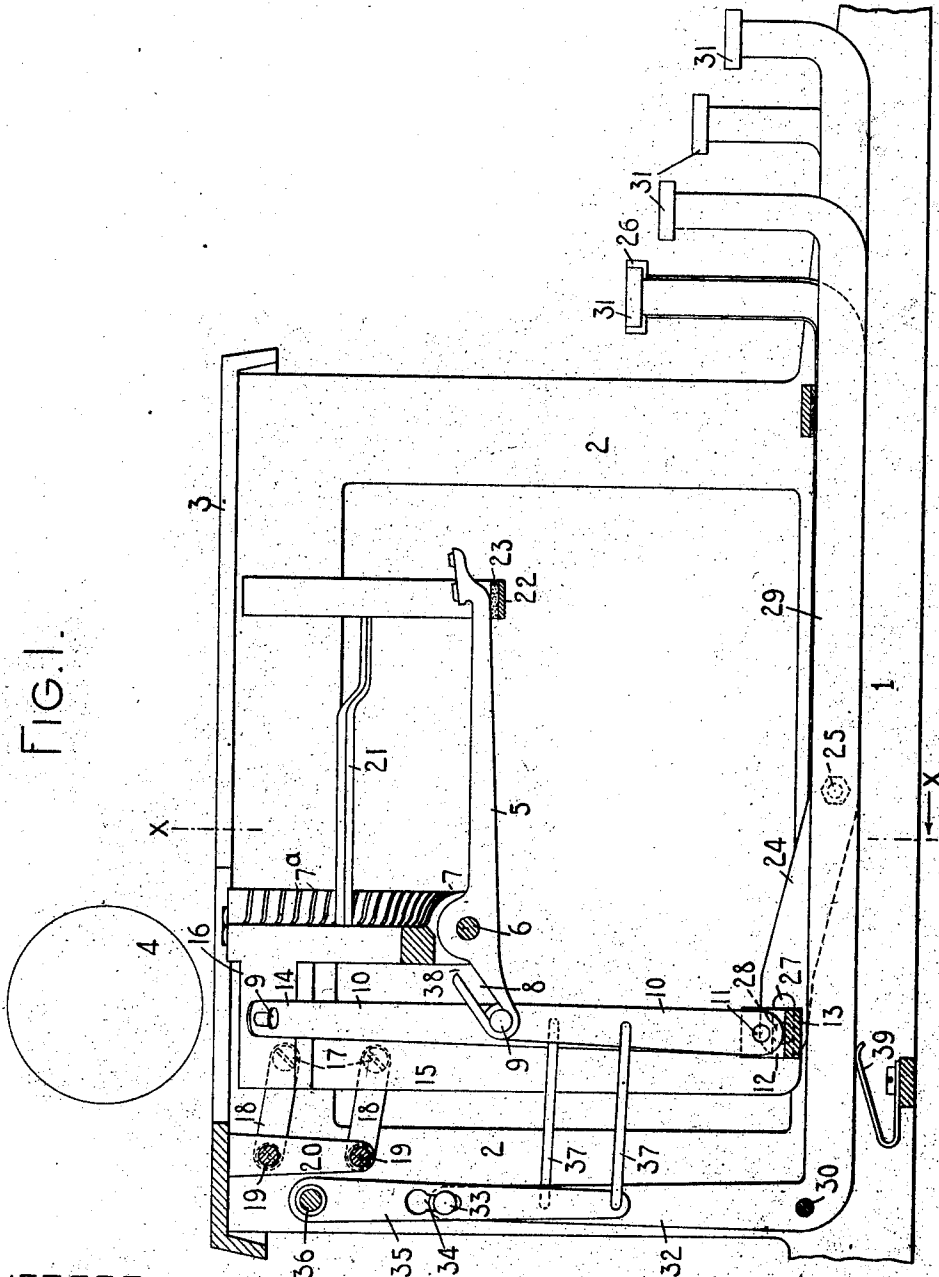


966,957.

J. T. SCHAAFF.
TYPE WRITING MACHINE.
APPLICATION FILED JULY 2, 1909.

Patented Aug. 9, 1910.

3 SHEETS—SHEET 1.



WITNESSES:

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Charles Smith

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HIS ATTORNEY

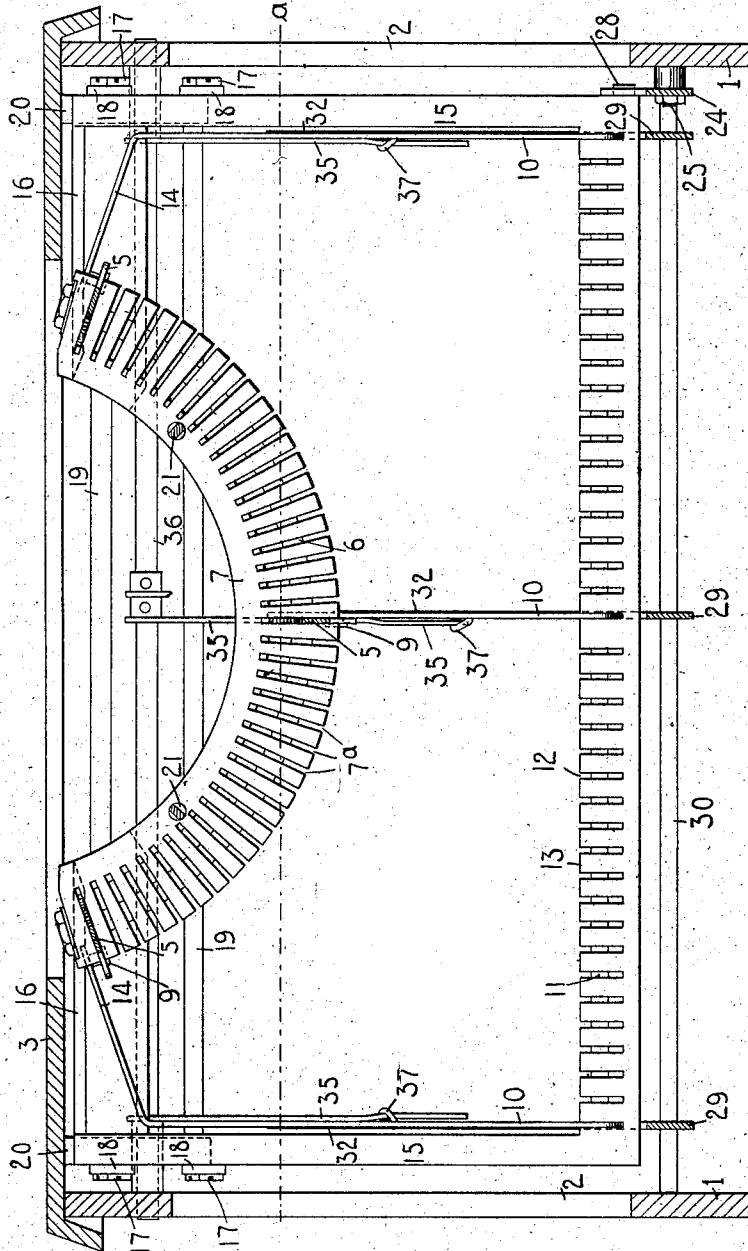
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3 SHEETS—SHEET 2.

FIG. 2.



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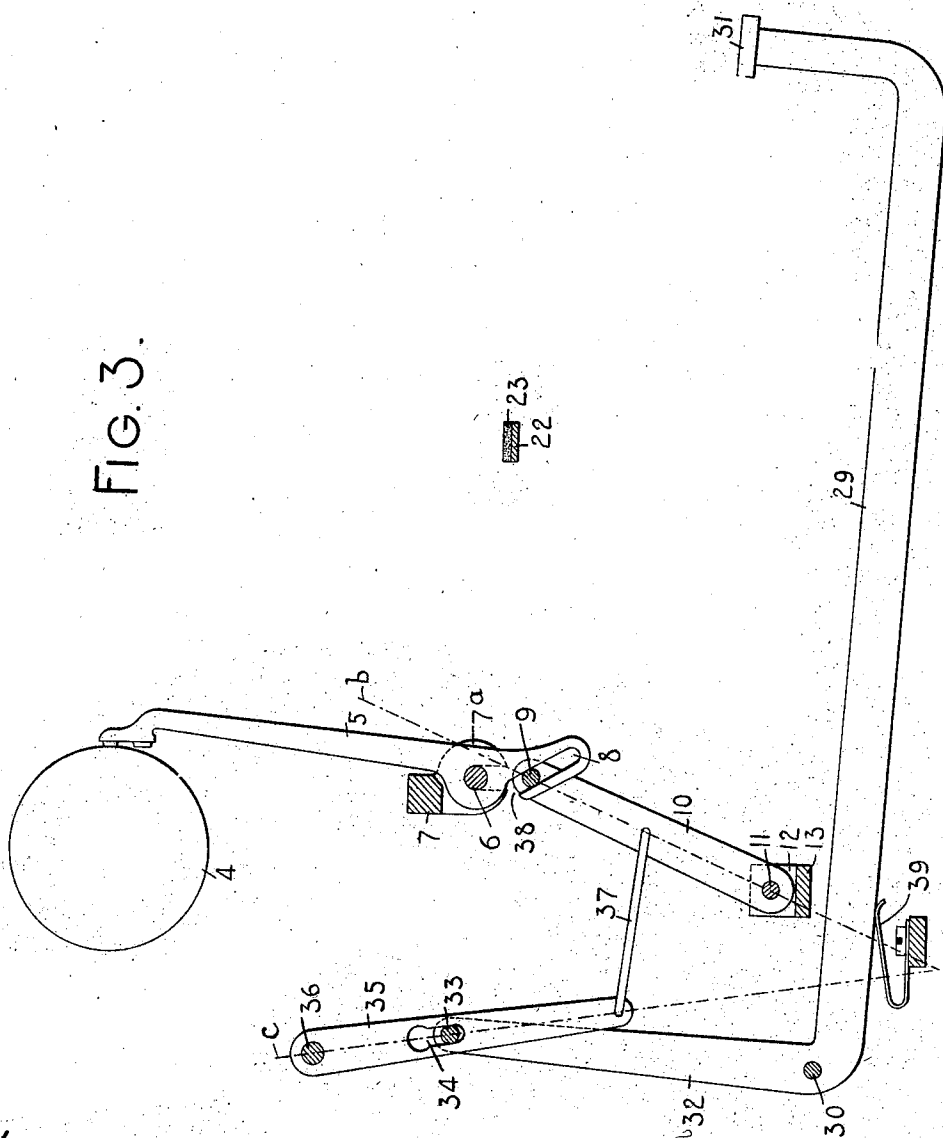
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3 SHEETS—SHEET 3.

FIG. 3.



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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

966,957.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed July 2, 1909. Serial No. 505,555.

To all whom it may concern:

Be it known that I, JOHN T. SCHAAFF, citizen of the United States, and resident of Washington, 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.

10 The main object of said invention is to provide a comparatively simple and efficient type action in which the type basket may receive a case shifting movement.

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.

20 In the accompanying drawings, Figure 1 is a fragmentary vertical central fore and aft sectional view of sufficient number of parts of the typewriting machine to illustrate my invention in its embodiment therein. Fig. 2 is a transverse sectional view of the same, the section being taken on the line $x-x$ of Fig. 1 and looking in the direction of the arrow at said line. Fig. 3 is a diagrammatic side elevation of one of the center type actions, the parts being shown in the positions they assume when the type bar is in the printing position.

I have shown my invention embodied in a front-strike machine, although it should be understood that from certain aspects of my invention features thereof may be embodied in other styles of typewriting machines. Moreover, from certain aspects of my invention it is not essential that features of the invention be embodied in a shifting basket typewriting machine.

35 The frame of the machine comprises a base 1, corner posts 2 and a top plate 3. A cylindrical platen 4, diagrammatically shown in the drawings, is mounted in a suitable carriage (not shown) which travels across the top plate from side to side of the machine. Type bars 5 are segmentally arranged and are mounted on a pivot wire 6 and work in segmental slots 7^a in a type bar segment 7. The type bars are mounted to swing upwardly and rearwardly to the printing position, as shown in Fig. 3. The

tail or heel of each type bar is provided with an inclined slot or cut-out 8 through which projects a headed pin 9 which extends laterally from an upright sub-lever 10 of the third order pivoted at its lower end on a pivot wire 11 and received in a kerf or guide slot 12 in a bar 13. The sub-levers are of varying lengths from the center to the sides of the system and terminate at their upper ends in an arc which corresponds to the arc in which the type bars are arranged. Thus from an inspection of Fig. 2 it will be seen that the sub-levers 10 at and near the center of the machine are upright straight sub-levers throughout their lengths and are connected in the manner described with their respective type bars. The sub-levers 10 near the sides of the machine are bent inwardly at their upper ends, as indicated at 14, to compensate for the difference in width between the system of key levers and the system of type bars.

75 The cross bar 13 constitutes a portion of a frame provided with upright side members 15 connected at their upper ends to rearwardly extending arms 16 on the type bar segment so that the bar 13 which supports the fulcrum 11 of the system of sub-levers 10 is rigidly connected to the type bar segment to be moved therewith as will hereinafter more clearly appear. The upright arms 15 are pivotally connected by shouldered pivot screws 17 to forwardly extending parallel crank arms or links 18 which extend forwardly from and are fixed to parallel rock shafts 19 supported in bearings in depending lugs 20 so as to afford a vertical shifting movement of the type bar segment and the system of sub-levers 10. Rods or arms 21 are secured to the type bar segment and project forwardly therefrom and support a segmental strip 22 sheathed with the pad 23 to support the forward ends of the type bars. A shift key lever 24 is pivoted to the right-hand side in the base of the machine, as indicated at 25. The forward arm of this lever carries a shift key 26 and the rear arm of the lever is bifurcated at 27 for cooperation with a pin 28 projecting laterally from the bar 13. A depression of the shift key is therefore effective to shift the frame comprising the cross bar 13 which carries the system of sub-levers 10 and the

type bar segment upwardly around the parallel links or arms 18 to change the case position of the types relatively to the platen 4.

Angular key levers 29 are pivoted on a pivot rod 30 which extends from side to side of the machine and is secured at its ends in the base of the machine. These angular key levers are provided with horizontally disposed arms which extend forwardly different distances and are bent upwardly at their forward ends where they are provided with finger keys 31. The angular key levers are also formed with upright arms 32 which extend to a uniform height indicated by the dotted line *a* in Fig. 2 where they are provided with laterally projecting headed pins 33 received in vertically disposed slots 34 in a series of straight sub-levers 35 of the third order, said sub-levers being fulcrumed on a pivot rod 36 which extends from side to side of the machine and is secured at its ends in the rear corner posts 2. The sub-levers 35 extend downwardly from their fulcrums in an opposite direction from the sub-levers 10. In other words, the two series of upright sub-levers 10 and 35 extend in opposite directions from their fulcrums, one series 10 extending upwardly and the other downwardly and the two series of sub-levers are parallel when at rest at least throughout a portion of their length. The sub-levers 35 may be of a uniform length, although there is a variation in the effective lengths of the levers as will hereinafter more clearly appear. The two sets of sub-levers 10 and 35 are connected by substantially horizontally disposed links 37 which are at progressively higher elevations from the center to the sides of the machine. These links are of uniform length and the points in the lengths of the associated sub-levers 10 and 35 where the links are to be connected to the levers may be readily determined by moving the type bar to the printing position as shown in Fig. 3 and depressing the associated finger key the requisite distance. A link 37 may then be maintained substantially in a horizontal position and positioned with reference to the associated sub-levers 10 and 35 until the ends of the link are situated in median planes through the sub-levers, as indicated by the dotted lines *b* and *c* in Fig. 3. This will indicate the proper points of connection of the link with the associated sub-levers.

It will be observed that the links 37 connecting the two sets of sub-levers affords a relative shifting movement between them during the case shifting movement of the type bars; that during this case shifting movement the key levers and sub-levers 35 remain fixed while the sub-levers 10 shift with the type bars and turn the links 37 around their rear ends where they are pivotally connected to the sub-levers 35. From a comparison of Figs. 1 and 3 it will be seen

that normally the sub-levers 35 and 10 are substantially parallel, whereas when a printing key is depressed the associated pair of sub-levers move into converging lines, as shown at *b c* in Fig. 3.

The sub-levers 10 extending to different heights from their fulcrums for cooperation with the series of segmentally arranged type bars have different angular movements and different leverage. In order to compensate for this variation in leverage and angular movements of the sub-levers 10, and to compensate for the variation in leverage produced by the variation in the length of the horizontal arms of the key levers, the connecting links 37 are arranged at different heights and in different positions relatively to the fulcrums 11 and 36 of the two series of sub-levers 10 and 35 respectively. These links as hereinbefore pointed out are arranged at different elevations from the center to the sides of the system and as the links are connected to the sub-levers 10 at progressively greater distances from the fulcrum 11 of said sub-levers they are connected progressively closer to the fulcrums of the sub-levers 35. In this manner I am enabled to provide a uniform leverage throughout the system and a uniform extent of dip of the keys at the keyboard and to compensate for the variations in leverage at different points in the system and to compensate for the variation in angular movements of the parts.

I have hereinbefore stated that the sub-levers 35 may be of a uniform length, although their effective lengths vary. This is by reason of the fact that the connecting links 37 are connected to the sub-levers 35 at different points in the lengths thereof and at different distances from the fulcrum 36, whereas the key levers are connected to the sub-levers 35 at uniform distances from the fulcrums of the sub-levers 35 and the key levers. It is immaterial therefore whether the sub-levers 35 be of a uniform length or be made only of the lengths necessary to actuate their respective links 37.

It will be understood that the open ends 38 of the slots 8 in the type bars enable the headed pins 9 on the sub-levers to be readily seated in said slots. It will also be observed that the slots 34 in the sub-levers 35 are enlarged at their upper ends, in the nature of buttonhole slots, to receive the heads of the pins 33 on the angular key levers in order to facilitate an assembling of the parts.

By the present construction I not alone provide a substantially uniform leverage and a uniform dip of the keys throughout the system, but I also provide an acceleration of the type bar in its approach to the printing position by reason of the pins 9 on the sub-levers 10 working in the inclined slots 8 in the type bars. Each key lever and

the parts controlled thereby are restored to normal position by a restoring spring 39, although additional restoring springs may be employed if desired.

5 The present invention has some of the same objects in view as my cases Serial Nos. 499,228, 499,229 and 499,230, but the claims in the present case are restricted to features not embodied in said prior cases.

10 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:—

15 1. In a 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-
20 lever controlled by said key lever, said sub-levers being fulcrumed at opposite ends and extending in opposite directions from their fulcrums, and means for operatively connecting said sub-levers to afford a relative
25 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,
30 a sub-lever shiftable with said segment and operatively connected with the type bar, a second sub-lever controlled by said key lever, said sub-levers being fulcrumed at opposite ends and extending in opposite directions
35 from their fulcrums, and a link for operatively connecting said sub-levers to afford a relative shifting movement between them when the type bar segment is shifted.

3. In a typewriting machine, the combination of a shiftable type bar segment, a type
40 bar carried thereby, a sub-lever of the third order pivoted on and shiftable with said segment and operatively connected with said type bar, a second sub-lever of the third
45 order pivoted on a fixed portion of the machine, a link connecting said sub-levers, and a key lever operatively connected with said second sub-lever.

4. In a typewriting machine, the combination of a shiftable type bar segment, a type
50 bar carried thereby, a sub-lever of the third order pivoted on and shiftable with said segment and operatively connected with said type bar, a second sub-lever of the third
55 order pivoted on a fixed portion of the machine, said sub-levers being normally substantially parallel and extending in opposite directions from their fulcrums, a link connecting said sub-levers, and a key lever operatively
60 connected with said second sub-lever.

5. In a front-strike typewriting machine, the combination of a shiftable type bar segment, an upwardly and rearwardly striking
65 type bar carried thereby, an upright sub-

lever of the third order pivoted on and shiftable with said segment and operatively connected with said type bar, a second upright sub-lever of the third order pivoted on a fixed portion of the machine, said sub-
70 levers extending in opposite directions from their fulcrums, a link connecting said sub-levers, and a key lever operatively connected with said second sub-lever.

6. In a typewriting machine, the combination of a shiftable type bar segment, a type
75 bar carried thereby, a key lever, a pair of intermediate sub-levers of the third order, one of said sub-levers being carried by a fixed portion of the machine and the other
80 sub-lever being carried by and shiftable with said segment, the sub-levers being normally substantially parallel throughout at least a portion of their lengths and moving
85 into converging lines when actuated, and a link connecting said sub-levers and affording a relative shifting movement between the sub-levers when the segment is shifted.

7. In a typewriting machine, the combination of a series of type bars, a series of sub-
90 levers operatively connected with the type bars, a second series of sub-levers, a series of key levers operatively connected with said second series of sub-levers, and operative
95 connections between each associated pair of sub-levers, said operative connections being at varying distances from the fulcrums of both series of sub-levers.

8. In a typewriting machine, the combination of a series of type bars, a series of sub-
100 levers operatively connected with the type bars, a second series of sub-levers, a series of key levers operatively connected with said second series of sub-levers, and links connecting said sub-levers, the positions of the
105 links varying with reference to the fulcrums of both series of sub-levers.

9. In a typewriting machine, the combination of a shiftable type bar segment, a series
110 of type bars carried by said segment and shiftable therewith, a series of sub-levers operatively connected with said type bars and shiftable with said type bar segment, a second series of sub-levers carried by a fixed
115 part of the machine, a series of key levers operatively connected with said second series of sub-levers, and links which connect said sub-levers at varying distances from the fulcrums of both series of sub-levers and afford
120 a relative movement between the two series of sub-levers when the segment is shifted.

10. In a typewriting machine, the combination of a shiftable type bar segment, a
125 series of type bars carried by said segment and shiftable therewith, a series of sub-levers of the third order varying in length and operatively connected with said type bars and shiftable with said type bar segment, a
130 second series of sub-levers of the third order varying in effective length and carried by a

fixed part of the machine, a series of key levers operatively connected with said second series of sub-levers, and links which connect said sub-levers at varying distances from the fulcrums of both series of sub-levers and afford a relative movement between the two series of sub-levers when the segment is shifted.

11. In a front-strike typewriting machine, the combination of a shiftable type bar segment, a series of upwardly and rearwardly swinging type bars carried by said segment and shiftable therewith, a series of upright sub-levers of the third order varying in length and operatively connected with said type bars and shiftable with said type bar segment, a second series of upright sub-levers of the third order varying in effective length and carried by a fixed part of the machine, the sub-levers of the two series extending in opposite directions from their fulcrums, a series of key levers operatively connected with said second series of sub-levers, and links which connect said sub-levers at varying distances from the fulcrums of both series of sub-levers and afford a relative movement between the two series of sub-levers when the segment is shifted.

12. In a typewriting machine, the combination of a shiftable type bar segment, a series of type bars carried thereby, two series of intermediate sub-levers of the third order which vary in effective length and project in opposite directions from their fulcrums, one series of said sub-levers being shiftable with the type bar segment and the other series being fulcrumed on a fixed portion of the machine, the sub-levers of the two series being normally substantially parallel throughout at least a portion of their length and moving into converging lines when actuated, and a series of links connecting said sub-levers and affording a relative shifting movement between the two series of sub-levers when the segment is shifted.

13. In a front-strike typewriting machine, the combination of a shiftable type bar segment, a series of upwardly and rearwardly striking type bars carried thereby, two series of upright intermediate sub-levers of the third order which vary in effective length and project in opposite directions from their fulcrums, one series of said sub-levers being shiftable with the type bar segment and the other series being fulcrumed on a fixed portion of the machine, the sub-levers of the two series being normally substantially parallel throughout at least a portion of their length and moving into converging lines when actuated, and a series of links connecting said sub-levers and affording a relative shifting movement between the two series of sub-levers when the segment is shifted, said links being at vary-

ing distances from the fulcrums of the two series of sub-levers.

14. In a typewriting machine, the combination of a shiftable type bar segment, a series of type bars carried thereby, a series of key levers, a series of sub-levers shiftable with said segment and operatively connected with the type bars, a second series of sub-levers controlled by said key levers, and links connecting said sub-levers to afford a relative shifting movement between them when the type bar segment is shifted, the positions of the links relatively to the fulcrums of said sub-levers varying from the center to the sides of the system, each link being brought nearer to the fulcrum of one sub-lever as it is situated farther from the fulcrum of its associated sub-lever.

15. In a front-strike typewriting machine, the combination of a shiftable type bar segment, a series of type bars carried thereby, a series of key levers, a series of sub-levers shiftable with said segment and operatively connected with said type bars, a portion at least of each of said sub-levers extending in an upright direction, a second series of upright sub-levers normally substantially parallel with the upright portions of said first mentioned series of sub-levers, and a series of substantially horizontally disposed links connecting said sub-levers to afford a relative shifting movement between them when the type bar segment is shifted, said links being at progressively greater heights from the center to the sides of the system.

16. In a front-strike typewriting machine, the combination of a shiftable type bar segment, a series of type bars carried thereby, a series of key levers, a series of sub-levers shiftable with said segment and operatively connected with said type bars, a portion at least of each of said sub-levers extending in an upright direction, a second series of upright sub-levers controlled by said key levers and normally substantially parallel with the upright portions of said first mentioned series of sub-levers, the sub-levers of the two series extending in opposite directions from their fulcrums, and a series of substantially horizontally disposed links for connecting said sub-levers and to afford a relative shifting movement between them when the type bar segment is shifted, said links being at progressively greater heights from the center to the sides of the system.

17. In a typewriting machine, the combination of a shiftable type bar segment, a series of type bars carried thereby, a series of angular key levers, a series of sub-levers shiftable with said segment and operatively connected with said type bars, a second series of sub-levers controlled by said angular key levers, and a series of links connecting said

sub-levers to afford a relative shifting movement between them when the type bar segment is shifted, said links extending at varying distances from the fulcrums of both series of said sub-levers.

18. In a front-strike typewriting machine, the combination of a shiftable type bar segment, a series of type bars carried thereby, a series of angular key levers, a series of upright sub-levers shiftable with said segment and operatively connected with said type bars, a second series of upright sub-levers connected directly with said key levers, and substantially horizontally disposed links connecting said sub-levers to afford a relative shifting movement between them when the type bar segment is shifted, said links being situated at progressively higher elevations from the center to the sides of the system.

19. 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 upwardly extending sub-levers projecting varying distances from the fulcrums thereof, said sub-levers being carried by said shiftable type bar segment, a second series of sub-levers which extend downwardly from their fulcrums and which are operatively connected with said first mentioned sub-levers at varying distances from the fulcrums thereof and operatively connected to the key levers at a uniform distance from the fulcrum of the key levers, and links connecting said sub-levers for

affording a relative shifting movement between the two series of sub-levers when the type bar segment is shifted.

20. In a front-strike typewriting machine, the combination of a shiftable type bar segment, a series of upwardly and rearwardly striking type bars carried thereby, a series of angular key levers, a series of upright sub-levers of the third order pivoted on and shiftable with said segment and operatively connected with said type bar, a second series of sub-levers pivoted on a fixed portion of the machine and extending from their fulcrums in an opposite direction from the first mentioned series of sub-levers, direct pin and slot connections between the angular key levers and the last mentioned series of sub-levers, and a series of links connecting said series of sub-levers so that each link connects a sub-lever of one series with a corresponding sub-lever of the other series, said links affording a relative movement between the sub-levers when the type bar segment is shifted, said links extending at varying distances from the fulcrums of said sub-levers, the links extending farther from the fulcrums of the first mentioned series of sub-levers and nearer to the fulcrums of the second mentioned series of sub-levers as the sides of the machine are approached.

Signed at Washington, District of Columbia, this 28th day of June A. D. 1909.

JOHN T. SCHAAFF.

Witnesses:

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H. P. LONGLEY.