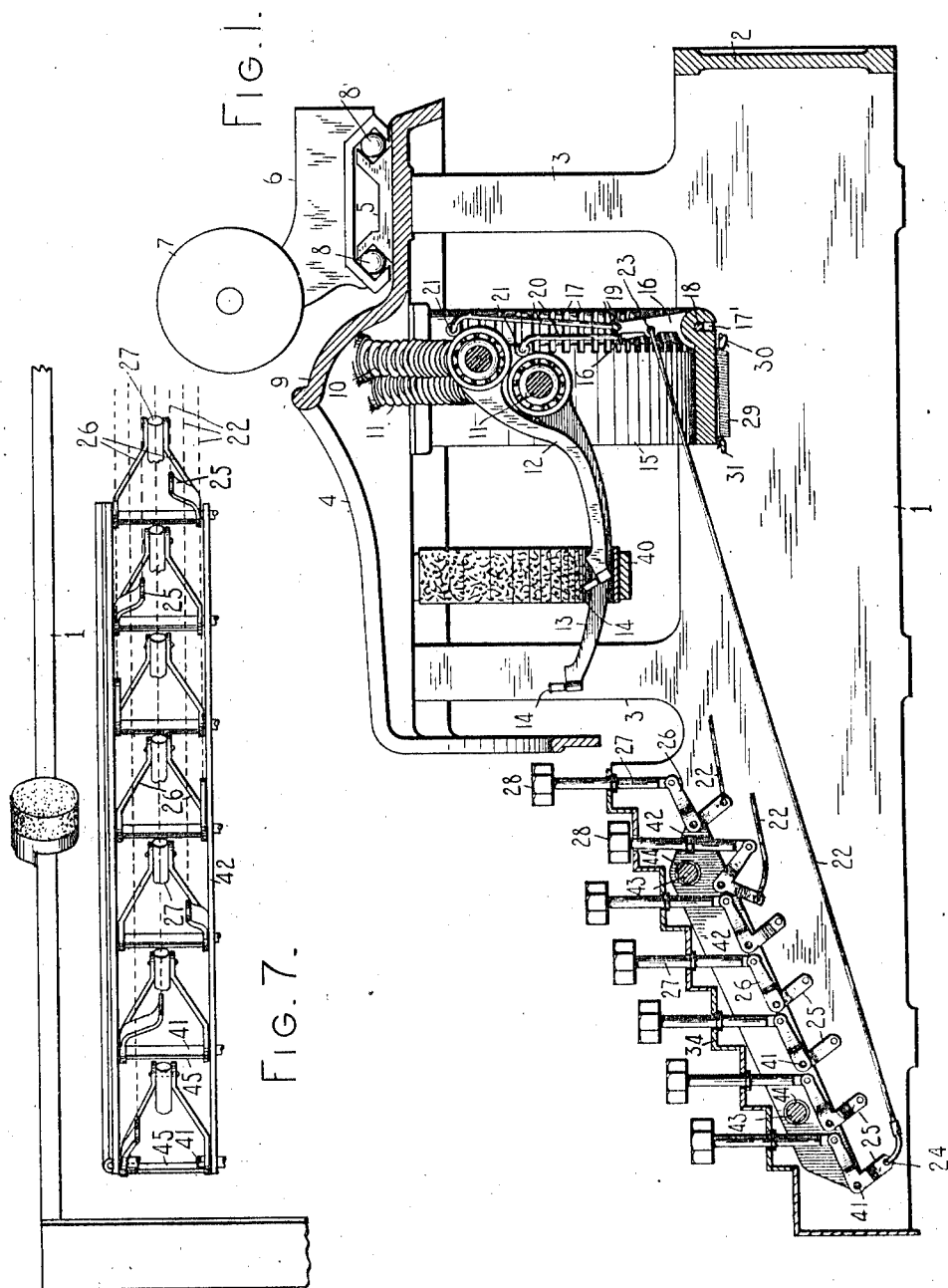


J. H. BARR.
 TYPE WRITING MACHINE.
 APPLICATION FILED MAY 26, 1905.

1,000,361.

Patented Aug. 15, 1911.

4 SHEETS-SHEET 1.



WITNESSES.

E. M. Wells.
R. H. Strother.

INVENTOR.

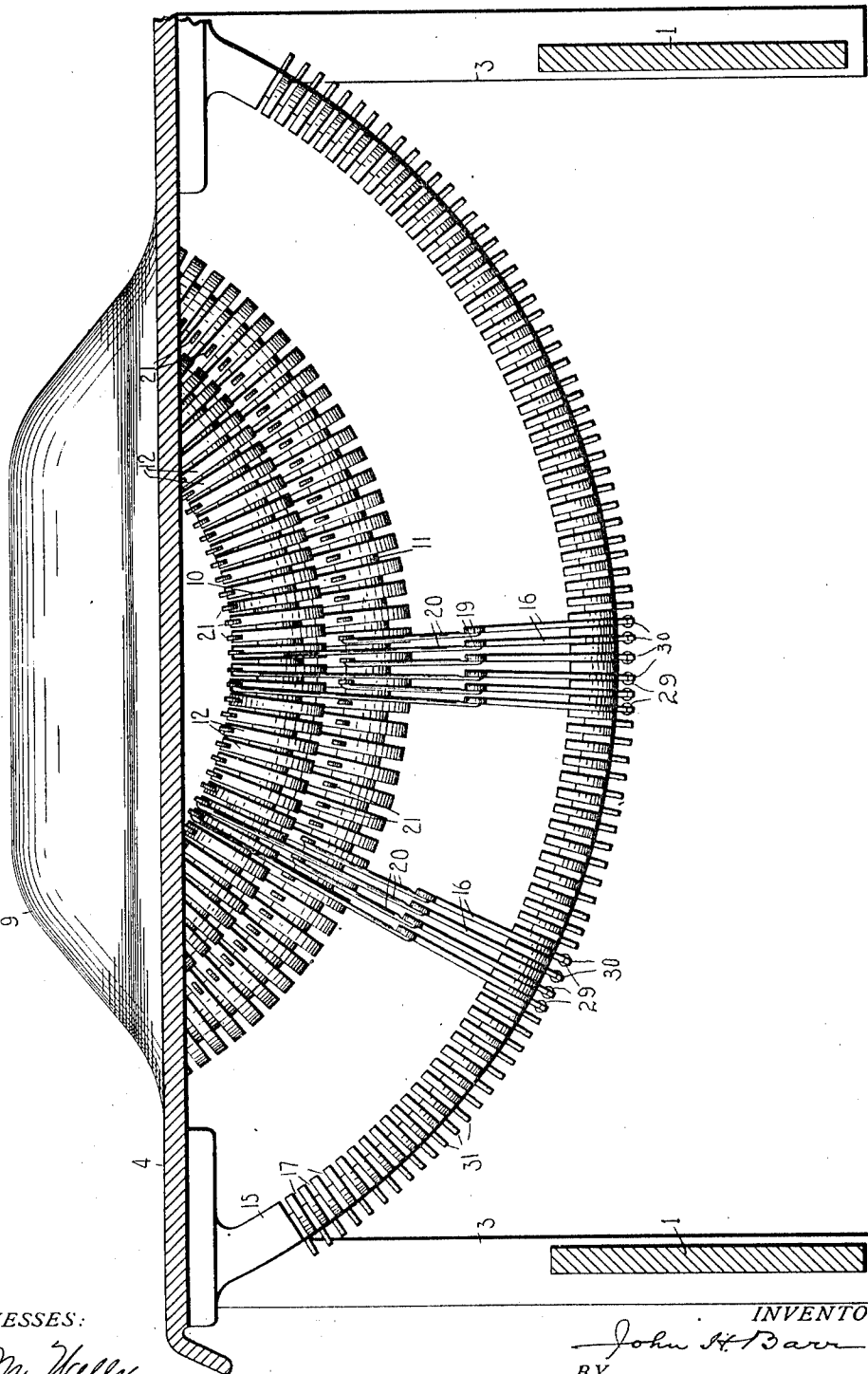
John H. Barr
 BY *Jacob F. Ball*
 ATTORNEY.

1,000,361.

J. H. BARR.
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4 SHEETS—SHEET 2.

FIG. 2.



WITNESSES:

E. M. Wells
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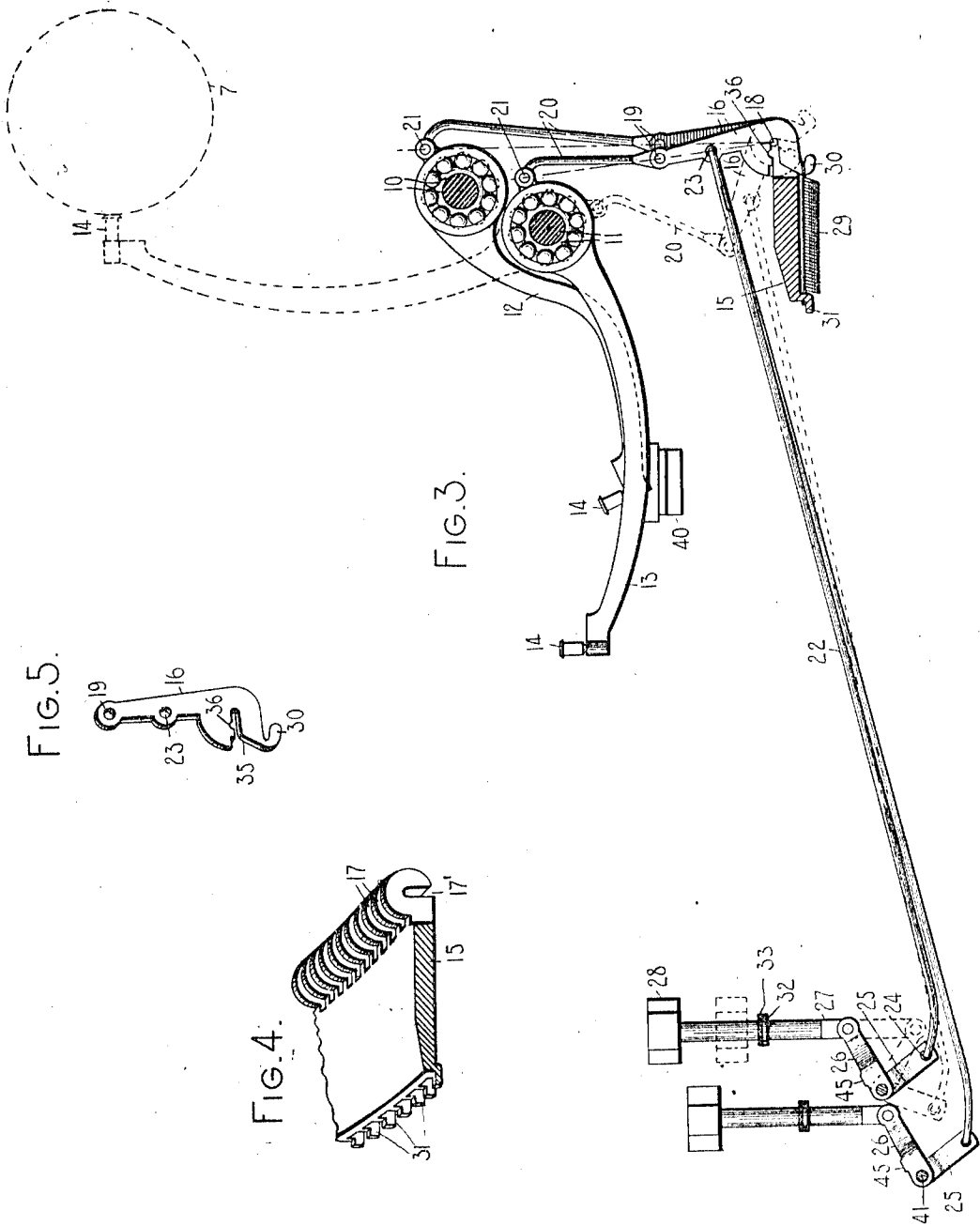
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J. H. BARR.
 TYPE WRITING MACHINE.
 APPLICATION FILED MAY 28, 1905.

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 4 SHEETS—SHEET 3.

1,000,361.



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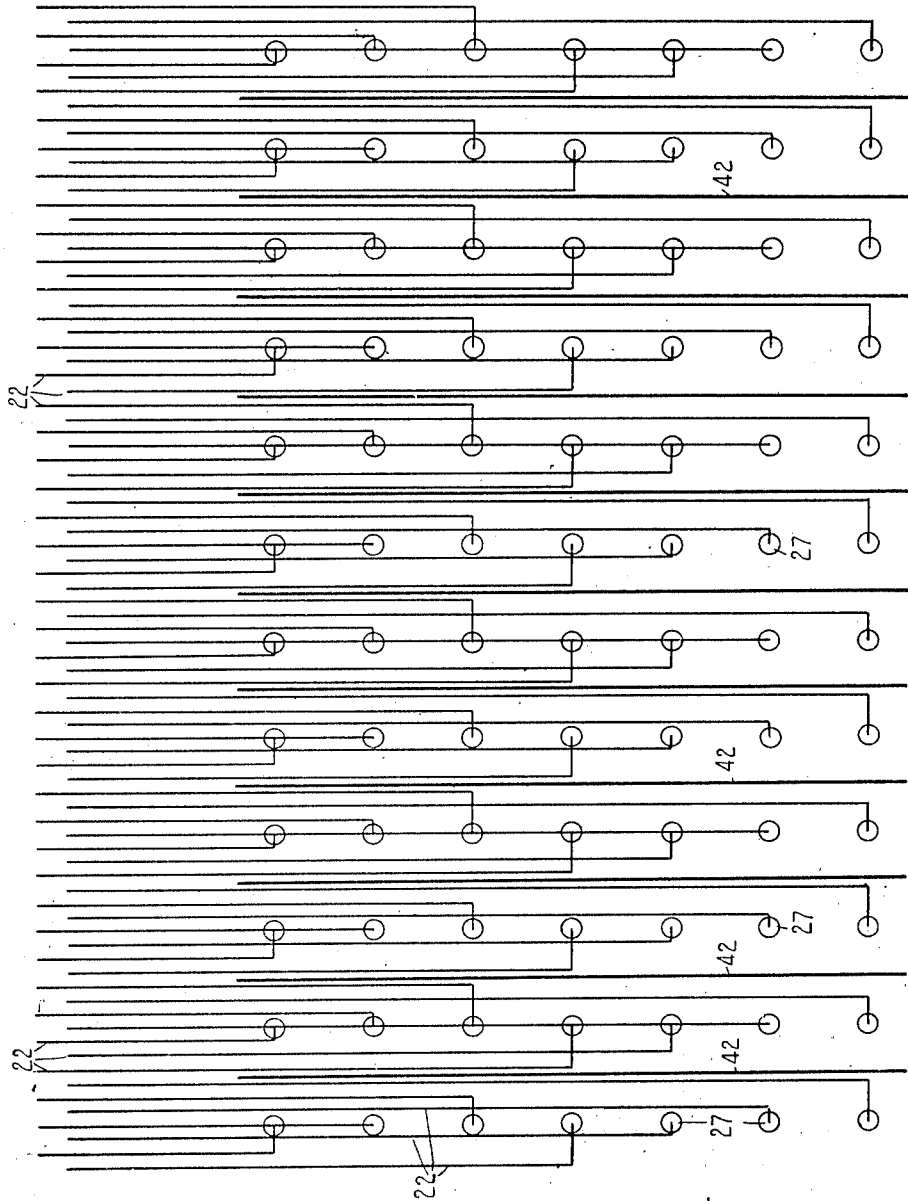
1,000,361.

J. H. BARR.
TYPE WRITING MACHINE.
APPLICATION FILED MAY 26, 1905.

Patented Aug. 15, 1911.

4 SHEETS—SHEET 4.

FIG. 6.



WITNESSES:

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R. H. Strother.

INVENTOR:

John H. Barr
By Jacob F. Fabel

HIS ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN H. BARR, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE SMITH PREMIER TYPE-WRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

1,000,361.

Specification of Letters Patent. Patented Aug. 15, 1911.

Application filed May 26, 1905. Serial No. 262,395.

To all whom it may concern:

Be it known that I, JOHN H. BARR, citizen of the United States, and resident of Syracuse, in the county of Onondaga and State of New York, 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 the type actions of such machines.

My invention is more especially designed for use in a front-strike machine but it is capable of adaptation to other styles of typewriting machines.

My invention is illustrated in the accompanying drawings in which,

Figure 1 is a front to rear vertical sectional view of a front-strike machine. Fig. 2 is a transverse view of the same, the section being taken on a plane back of the type bar segments. Fig. 3 is a detail view similar to Fig. 1 but taken on a slightly different section. Fig. 4 is an isometric view of a portion of the segment on which the sub-levers are mounted. Fig. 5 is a similar view of one of said levers. Fig. 6 is a diagrammatical view of the key connections. Fig. 7 is a view of one row of key levers as seen from a point below and in front of the machine.

The base portion of the main frame of the machine shown in the drawings, comprises side plates 1 connected together at the rear by an end plate 2. Posts 3, rising from said side plates, support a top plate 4 on which is secured a bar or rail 5 having in its front and rear edges ball races which cooperate with corresponding ball races in a carriage 6 which supports a platen 7. Antifriction balls or rollers 8 run in said ball races and support the carriage which may be drawn across the machine by the usual spring drum and the motion of which may be controlled by any suitable escapement mechanism. That portion of the top plate 4 which is in front of the carriage is arched as shown at 9 and two type bar segments 10 and 11 are secured at their ends in any suitable manner to the under side of said arched portion of the top plate. As far as some of the features of my invention are concerned one of said type bar segments might be dispensed with if desired; and as far as certain other features of my invention are concerned these

two segments might be replaced with a single segment having two sets of type bars mounted thereon. Both of the segments 10 and 11 are mounted below the platen, the segment 10 being of less radius and situated a little nearer the back of the machine than the segment 11. A set of type bars 12 is mounted on the segment 10 and a set of longer type bars 13 is mounted on the segment 11, each of said type bars carrying at its free end a type 14. As shown in the present instance the segments 10 and 11 consist of rods having formed therein a series of annular V-shaped grooves which constitute ball races and each of the type bars is formed at its pivotal end with an enlarged eye which surrounds the segment and which is internally grooved to form a ball race that cooperates with the ball race in the segment. Antifriction balls running in these cooperating ball races constitute ball bearings for the type bars.

As shown in Fig. 2 the heels of the shorter type bars 12 are arranged quite close together, there being little if any more room between them than is desirable for clearance. The types 14 mounted on these type bars therefore are spaced farther apart than the heels of the type bars, this being due to the fact that said type bars when in their normal positions are at a greater angle than 90° from the printing point. The arc in which the types are arranged is an arc of greater radius and consequently a longer arc than that in which the heels of the type bars are arranged. It is due to this fact that there is room between the types on the shorter type bars 12 for the longer type bars 13 to play between said types. The shorter type bars as they lie in the basket flare or radiate or diverge from their pivot ends toward their free ends, thus leaving between them spaces for the motion of the longer type bars. This arrangement enables me to get into the machine a maximum number of type bars of moderate length and it will be understood that this arrangement may be attained by other means than those here shown. The type bars are here shown mounted on two separate segments but the advantages of the arrangement just described may be secured in other ways than by the use of the separate grooved segments shown.

A third segment 15 of greater diameter 110

than either of the type bar segments, is secured to the under side of the top plate 4 in any suitable manner and lies beneath said type bar segments. A series of links or levers 16 are pivoted in radial slots 17 (Fig. 2) formed in the rear edge of the segment 15 and said links or levers extend in a direction approximately radial of the several segments. A slot 17' (Figs. 1 and 4) is formed in the under side of the segment 15, and a wire 18, lying in said slot, serves as a pivot for all of the sub-levers 16. Each of the levers 16 has pivoted to its free end at 19 a link 20, the other end of which is pivoted at 21 to an ear projecting from the heel of one of the type bars. As shown in the present instance the lever 16 and the link 20 are in substantial alinement and extend in a direction approximately radial of the segments. As shown in the present instance, the pivots 18, 19 and 21 lie substantially in a straight line when the parts are in their normal position, but the pivot 19 may stand normally somewhat in advance of a line joining the pivots 18 and 21 if preferred. Each of the links or levers 16 has a link 22 pivoted thereto at 23 about midway of the length of said lever 16. Said link 22 extends toward the front of the machine and its forward end is pivoted at 24 to the depending arm 25 of an angled key lever, the forwardly extending arm 26 of which has pivoted thereto the stem 27 of a key 28. The construction is such that if one of the keys 28 be depressed the corresponding link 22 will pull the lever 16 toward the front of the machine and throw the type bar to the printing point, as indicated by dotted lines in Fig. 3. The parts are returned to normal position by a returning spring 29 which lies beneath the segment 15 and which is connected at its rear end with a hook 30 formed on the heel of the lever 16 and at its forward end to one of a series of hooks 31 formed on the forward edge of said segment 15. The motion of the parts under the impulse of the returning spring is limited by a collar 32 fixed to the key stem 27 and having mounted above it a washer 33 of felt or other sound-deadening material, which engages the under surface of the keyboard 34, through suitable openings in which the several key stems project. Each of the levers 16 has the form shown in Fig. 5. An open-ended slot 35 formed therein enables the lever to be slipped over the pivot wire 18 and the rear end of said slot constitutes the bearing of the lever on said wire. A notch 36, formed in the upper edge of the slot 35, is adapted to prevent the lever from becoming accidentally displaced from the pivot wire. In case a type bar should stick and the operator pull up on the key 28 it will be seen that the link 22 would tend to push the

lever 16 off of its pivot. In this case the notch 36 would engage the wire 18 and prevent further displacement of the lever. The type bars 12 and 13 have their free ends normally supported by a segmental type rest 40 which is secured at its ends to the under side of the top plate 4.

I prefer to form the links 20 with a backwardly projecting curve as shown in the drawings. This avoids interference between the link and the pivotal end of the type bar, and also gives elasticity to the link. The links 22 are also curved downward near their forward ends, partly for the sake of elasticity and partly to avoid interference between the links and the forwardly extending arms 26 of the bell cranks 25, 26 when the keys are depressed. This will be understood by reference to Fig. 1 in which one key is shown in its depressed position.

The bell cranks 25, 26 are pivotally mounted on a series of transverse rods 41 which pass through and are supported by a series of partition plates 42 (Figs. 1 and 6). These partition plates are supported by two frame rods 43 (Fig. 1) which are supported at their ends in the side plates 1 and the partitions 42 are spaced apart on said frame rods by collars 44. The keys are arranged in transverse and longitudinal rows and there is one partition 42 between each consecutive pair of longitudinal rows. The bell cranks 25, 26 have the form best shown in Figs. 3 and 7. Said bell cranks are formed of sheet metal and each of the arms 26 consists in fact of two branches joined together by a strip 45, which spaces the two arms 26 a suitable distance apart so as to cause the bell crank to occupy substantially the entire space between two partitions 42. Said arms 26 are bent toward each other so as to embrace the key stem 27, the whole, as seen from the top, having about the shape of the letter A. The arm 25 of the bell crank consists of a downward extension of one or the other of the arms 26.

The present machine is a full keyboard machine having a single type on each type bar. I have shown forty-two type bars mounted on each of the segments, and, as will be seen by reference to Fig. 2, the type bars of one segment alternate with those on the other. The entire eighty-four levers 16 are mounted on the segment 15 and every other lever is connected with a short type bar and the alternate levers with the long type bars. The links 22 which extend to the keyboard also alternate, one being connected with a short type bar and the next succeeding one to a long type bar. As the short type bars are, or may be, lighter than the longer ones, I prefer to mount the lower case type on them, said type being more frequently used than the upper case type. Furthermore, it is desirable and usual to

place the lower case keys near the front of the keyboard and the upper case keys and character keys near the back of the keyboard. The connections of the links 22 with the type bars and with the several keys are represented diagrammatically in Fig. 6, in which said links are represented by lines extending toward the top of the sheet. In order to make the arrangement more apparent, I have represented those links 22 which are connected to the longer type bars by lines which project farther toward the top of the sheet than those lines which represent links that are connected to the shorter type bars. As a matter of fact, those links which are connected to the shorter type bars extend farther toward the back of the machine than those which are connected to the longer type bars, but the convention adopted will not be misunderstood with this explanation. These are seven transverse rows of keys and the three front rows are all connected with short type bars and the three rear rows are all connected with longer type bars. The keys of the fourth or middle row are connected alternately with long and with short type bars. As the links 22 which are connected with long type bars alternate with those which are connected with short type bars, in order to avoid crossing of said links and interference between them, the arms 25 of the several bell cranks are bent to the right or left, as required, so as to bring the free end of each particular arm into alignment with the particular link 22 to which it is connected. As will be understood by reference to Fig. 6, the middle key of the extreme left-hand longitudinal row of keys has its arm 25 connected with the left-hand arm 26 of its bell crank and extending substantially straight down from said left-hand arm so as to connect with the extreme left-hand link 22, which, as will be seen from the diagram, is connected with a short type bar. The second link 22 is connected with the rear key of the row which has its arm 25 bent somewhat toward the right in order to properly connect with said link, this link being connected with a long type bar. The third link being connected with a short type bar, extends forward to the third key of the row, which has its arm 25 bent still farther to the right. The fourth link, which is connected to a long type bar, extends to the sixth key of the row, the fifth link to the second key of the row, the sixth link to the fifth key and the seventh link to the first key. In the second row of keys the middle key is connected with a long type bar. The next link 22 is connected to a short type bar and therefore extends forward to the third key of the row; the next one terminates at the rear key of the row and so on across the machine.

It will, of course, be understood that the

particular arrangement of the connection between the several keys and the several type bars above described in detail may be very considerably varied and in some instances it may be desirable to vary these connections, for example, in case the connections described resulted in undesirable combinations in the type basket.

It will be perceived by reference to Figs. 1 and 3 that the long type bars in operation turn through substantially 90° ; but the short type bars turn through a greater angle. The construction is such that the two types move approximately the same distance in passing from their normal positions to the printing point.

By reference to Fig. 3 it will be perceived that the links 20 and 22 and the lever 16, connected with one of the type bars, constitute a connection which gives to the type bar a very easy and gentle start and a continuous acceleration. The link 20 and the lever 16 together constitute a toggle and the type bar is actuated by the breaking of said toggle. As the type bar approaches the end of its stroke, however, the link 20 reaches a position where it is approximately at right angles to the lever 16. On the other hand, at the beginning of the stroke the link 22 is approximately at right angles to the lever 16 so that it acts on said lever with the greatest leverage that it has at any point of the stroke. Near the end of the stroke the lever 16 and the link 22 are at a wide, obtuse angle to each other. The acceleration in the first part of the stroke is due chiefly to the breaking of the toggle and the acceleration in the latter part of the stroke is due chiefly to the widening of the angle between the link 22 and the lever 16.

It will be perceived that although the key is acting on the type bar at a greatly reduced mechanical advantage or leverage when said type bar is at the printing point, nevertheless, the returning spring is acting on said type bar at a good advantage or leverage, thus affording a quick return to the type bar. This is due to the fact that on the down stroke of the key both the point 19 at which the link 20 is pivoted to the sub-lever and the point 21 at which said link is pivoted to the type bar, move in the same general direction, that is to say, they both move toward the front of the machine; and when the parts are in printing position the line joining the points 19 and 21, if extended, lies at a considerable distance from the center of the type bar segment, so that the link 20 has a good leverage on said type bar. At this part of the stroke the spring 29 has as good a leverage on the sub-lever 16 as it had at the beginning of the stroke, although the link 22 has a much less leverage on said sub-lever than at the beginning of the stroke. Moreover, at this time the spring 29 has a

much higher leverage on the link 22 than it had at the beginning of the stroke, so that in the first part of the return stroke the link 22, the key lever and the key offer but little
 5 resistance to the returning spring, thus leaving most of the force of said spring concentrated on the type bar. It will also be perceived that when the parts are in their normal position it is the collar 32 on the key
 10 stem that resists the tension of the returning spring 29, so that in normal position all lost motion between the lever 16 and the key is taken up by the tension of the spring.

Various changes in the details of construction and arrangement may be made without departing from my invention.

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

1. In a typewriting machine, the combination of a segmentally arranged series of front-strike type bars; a segmentally arranged series of operating links pivoted to the heels of said type bars and normally extending therefrom in directions approximately radial of the type bar segment and approximately parallel to the plane of said segment; a series of links or levers connected to said operating links, normally extending therefrom in directions approximately radial
 25 of said type bar segment and pivoted at a segmentally arranged series of fixed points; a series of keys, and connections between said keys and said links or levers.

2. In a typewriting machine, the combination of a type bar segment; a series of front strike type bars supported by said segment; a series of operating links pivoted to the heels of said type bars and normally projecting therefrom in directions approximately radial of the type bar segment and approximately parallel to the plane of said segment; a series of links or levers pivoted to said operating links and normally extending therefrom in directions approximately radial of said type bar segment; a second segment on which said links or levers are pivotally mounted; and a series of keys connected with said links or levers.

3. In a typewriting machine, the combination of a type bar segment; a second segment of greater diameter than said type bar segment and lying approximately in the same plane as said type bar segment; a series of type bars pivotally mounted on said type bar segment; a series of levers pivoted in said second segment and extending in directions approximately radial of said segment; a series of links connecting said levers and said type bars and extending approximately radially of said segments; a series of links connected with said levers and extending toward the front of the machine; and a series of keys connected with said links.

4. In a typewriting machine, the combination of a platen; a type bar segment dis-

posed below said platen; a second segment of greater radius than said type bar segment and situated beneath the same; a series of front-strike type bars mounted on said type bar segment; a series of levers pivotally
 70 mounted on said second segment and extending toward the heels of said type bars in directions approximately radial of said segments; a series of links connecting said levers with said type bars and disposed approximately radially of said segments; a series of links connected with said levers and extending toward the front of the machine; and a series of keys connected with
 80 said links.

5. In a typewriting machine, the combination of a platen; a type bar segment lying below said platen; a second segment of greater radius than said type bar segment lying beneath said type bar segment; a series of type bars mounted on said type bar segment; a series of links pivoted to the heels of said type bars and extending therefrom in directions approximately radial of said segments; a series of levers pivoted in said second segment and extending in directions approximately radial of said segments and pivoted to said links; a series of links pivoted to said levers and extending toward the front of the machine; a series of angled levers to which said links are pivoted; and a series of keys connected with said angled levers.

6. In a typewriting machine, the combination of a platen; two type bar segments disposed below said platen, one of said type bar segments being of greater radius than the other; a third segment of greater radius than either of said type bar segments and lying approximately under said type bar segments; a series of shorter type bars mounted on one of said type bar segments; a series of longer type bars mounted on the other of said type bar segments and alternating lengthwise of said segments with said shorter type bars; a series of links pivoted to the heels of the several type bars and extending therefrom in directions approximately radial of said segments; a series of levers pivotally mounted in said third segment and extending in directions approximately radial of said segments and having said links pivoted thereto; a second series of links pivoted to said levers and extending toward the front of the machine; and a series of keys arranged in a plurality of transverse rows and connected with said second series of links, those keys near the front of the keyboard being connected with the shorter type bars and those keys near the back of the keyboard being connected with the longer type bars.

7. In a typewriting machine, the combination of a platen; a series of shorter type bars; a series of longer type bars; a series

of keys; and a series of connections between said keys and type bars including a series of links extending from the keyboard toward the back of the machine and connected at their forward ends with the keys, those keys that lie near the front of the keyboard being connected with the shorter type bars and those keys lying near the back of the keyboard being connected with the longer type bars.

8. In a front-strike typewriting machine, the combination of a platen; two series of front-strike type bars, the type bars of one series being longer than those of the other and the type bars of one series alternating with those of the other; a series of keys; a series of bell crank levers operated by said keys; and a series of links extending from said bell crank levers toward the back of the machine and operatively connected with said type bars, those links that are connected with keys near the front of the keyboard being connected with shorter type bars, and those links that are connected with the keys near the back of the keyboard being connected with the longer type bars.

9. In a typewriting machine, the combination of a series of shorter type bars; a series of longer type bars; a series of keys arranged in rows transversely and longitudinally of the machine; a series of bell crank key levers, each having an approximately horizontal arm and an approximately vertical arm, said horizontal arms being connected with said keys; a series of links connected with said vertical arms and extending toward the back of the machine and connected with said type bars, those links that are connected with keys near the front of the keyboard being connected with the shorter type bars and those near the back of the keyboard being connected with longer type bars, the vertical arms of said key levers being so disposed transversely of the machine that those links which are connected with the shorter type bars alternate with those links that are connected with the longer type bars.

10. In a front-strike typewriting machine, the combination of a type bar segment; a series of front-strike type bars pivotally mounted on said segment; a series of toggle linkages pivoted to the heels of said type bars and extending therefrom in directions approximately radial of said type bar segment and each comprising a link and a lever; a second segment approximately concentric with said type bar segment and having said levers pivoted thereto; returning springs connected with the heels of said levers and drawing the same toward the front of the machine; links adapted to pull said levers toward the front of the machine; bell crank key levers connected with said links; and keys connected with said bell crank key levers.

11. In a front-strike typewriting machine, the combination of a segmentally arranged series of front-strike type bars; a series of toggle linkages connected with the heels of said type bars and extending therefrom in directions approximately radial of the type bar segment; a series of bell crank key levers connected with said toggle linkages; a series of keys having stems connected with said bell crank levers; a series of returning springs acting on said toggle linkages; and a series of stops on said key stems.

12. In a typewriting machine, the combination of a type bar; a sub-lever connected with said type bar; and a key connected with said sub-lever, said sub-lever having an open-ended slot by which it is pivoted, said open-ended slot being formed between the pivot and the open end of the slot with a notch to prevent accidental displacement of said sub-lever from its pivot.

13. In a front-strike typewriting machine, the combination of a type bar segment, a series of front-strike type bars mounted on said segment, a series of links pivoted to said type bars and extending therefrom in directions substantially radial of said type bar segment, a series of sub-levers pivoted to said links and extending in directions substantially radial of said type bar segment, a series of links pivoted to said sub-levers and extending toward the front of the machine approximately at right angles to said sub-levers, keys for operating said links, and restoring springs connected with said sub-levers.

14. In a front-strike typewriting machine, the combination of a type bar segment, a series of front-strike type bars mounted on said segment, a series of links pivoted to said type bars and extending therefrom in directions substantially radial of said type bar segment, a series of sub-levers pivoted to said links and extending in directions substantially radial of said type bar segment, a series of links pivoted to said sub-levers and extending toward the front of the machine from said sub-levers, keys for operating said links, and restoring springs connected with said sub-levers.

15. In a front-strike typewriting machine, the combination of a type bar segment, a series of type bars mounted on said segment, a series of links pivoted to said type bars and extending therefrom in directions substantially radial of said type bar segment, a series of sub-levers pivoted to said links and extending in directions substantially radial of said type bar segment, a series of links pivoted to said sub-levers and extending toward the front of the machine, said links being approximately at right angles with the sub-levers when the parts are in normal position and at an obtuse angle with said sub-levers when the parts are in print-

ing position, and restoring springs connected with said sub-levers.

16. In a typewriting machine, the combination of a type bar segment; type bars mounted on said segment; links pivoted to said type bars and extending therefrom in directions approximately radial of said segment; sub-levers extending in directions approximately radial of said segment; links pivoted to said sub-levers and extending therefrom toward the front of the machine; said forwardly extending links acting on said sub-levers with decreasing leverage as the keys are depressed; and returning springs connected with said sub-levers in such manner that the leverage of said springs on said sub-levers is substantially as great at the end of the stroke as at the beginning.

17. In a front-strike typewriting machine, the combination of a platen; a plurality of type bar segments of different radii mounted below said platen and one below the other, a series of type bars mounted on each segment, the type bars of one set working between the type bars of the other set, a series of operating links pivoted directly to the heels of the type bars of each of said series and arranged behind said segments and extending in directions approximately radial of said segments, and means for operating said links.

18. In a front-strike typewriting machine, the combination of a platen, a plurality of type bar segments of different radii mounted below said platen, and one segment below the other, a series of type bars on each such segment, a sub-lever segment mounted beneath said type bar segments, a series of sub-levers mounted on said sub-lever segment, and a series of links connecting said sub-levers with the type bars on both type bar segments, each of said links being connected directly to a type bar.

19. In a typewriting machine, the combination of a series of keys arranged in straight longitudinal and transverse rows; stems for said keys; angled key levers each having an arm pivoted to a key stem, said arm consisting of two branches that spread from the key stem toward the pivot of the lever so as to afford a wide pivot for said lever, the other arm of each of said levers consisting of an arm of one of said branches; links pivoted to the second mentioned arms, and type bars operated by said links, said second arms being bent transversely of the machine, each arm being bent to an appropriate extent to connect it with the desired link.

20. In a typewriting machine, the combination of a series of keys arranged in a row extending longitudinally of the machine; a key lever for each key, said key lever having an A-shaped arm to which the stem of

the key is connected and a second arm depending from one of the branches of said A-shaped arm, the second arm of the several levers depending some from the right-hand and some from the left-hand branches of the A-shaped arms and said second arms being bent inward to different extents; links pivoted to said second arms and extending toward the back of the machine, and type bars operated by said links.

21. In a typewriting machine, the combination of two sets of front-strike type bars pivotally mounted one set below the other, the type bars of one set alternating with those of the other, a series of links pivoted to the heels of the several type bars, and extending therefrom in lines that radiate approximately from the printing point, a series of levers pivoted to said links and extending radially therefrom, a second series of links pivoted to said levers and extending toward the front of the machine, and a series of keys arranged in a plurality of transverse rows and connected with said second series of links, those keys near the front of the keyboard being connected with the shorter type bars and those keys near the back of the keyboard being connected with the longer type bars.

22. In a front-strike typewriting machine, the combination of a platen, a plurality of sets of front-strike type bars of different lengths pivotally mounted below said platen and one set below another, a series of operating links pivoted directly to the type bars of each of said sets and extending therefrom in lines that radiate from the printing point, and means for operating said links, the links connected with the shorter type bars extending behind the heels of the longer type bars.

23. In a front-strike typewriting machine, the combination of a platen, a plurality of sets of front-strike type bars pivotally mounted below said platen and one below another, a sub-lever segment mounted beneath the pivotal ends of said type bars, a series of sub-levers mounted on said sub-lever segment and extending radially toward the heels of said type bars, and radial links connecting said sub-levers with said type bars.

24. In a front-strike typewriting machine, the combination of a platen, a plurality of sets of front-strike type bars pivotally mounted below said platen and one below another, a series of radially disposed toggle linkages, each connected at its inner end with the heel of one of said type bars, and means for operating said linkages, the linkages connected with the shorter series of type bars being arranged behind the heels of the longer series of type bars.

25. In a typewriting machine, the combination of a series of type bars arranged in

two sets, the type bars of one set being shorter than those of the other, a series of keys, and means operatively connecting said keys with said type bars, the keys near the front of the keyboard being connected with the shorter type bars and those near the back of the keyboard being connected with the longer type bars.

26. In a front-strike typewriting machine, the combination of a platen; a plurality of type bar segments of different radii disposed below said platen; and type bars mounted on said segments, the type bars on a segment of less radius being curved in one direction to avoid conflict with a segment of greater radius when the type bars are in normal position, and the type bars on a segment of greater radius being curved in the opposite direction to avoid conflict with a segment of less radius when said type bars are in printing position.

27. In a front-strike typewriting machine, the combination of a platen; two type bar segments of different radii disposed below said platen; and type bars mounted on said segments, the type bars on one segment alternating with and working between those on the other, and the type bars on the segment of less radius being curved to avoid conflict with the type bars on the segment of greater radius when said type bars are in normal position, and the type bars on the segment of greater radius being formed to avoid conflict with the segment of less radius when said type bars are in printing position.

28. In a front strike typewriting machine, the combination of a platen; a main frame comprising an upwardly arched top plate; a plurality of segments each secured at its end to the under side of said upwardly arched top plate; and type bars mounted on said segments.

29. In a front-strike typewriting machine, the combination of a platen; a main frame comprising an upwardly arched top plate; a plurality of type bar segments secured to the under side of the arched portion of the top plate, one of said type bar segments being of greater radius than the other; and a series of type bars mounted on said segments, each end of said segments abutting the under side of said top plate and secured thereto by a screw.

30. In a front-strike typewriting machine, the combination of a platen; a main frame comprising an arched top plate; two type bar segments one of greater radius than the other, secured to the under side of said arched top plate; a series of shorter type bars mounted on the segment of less radius and curved to avoid conflict with the segment of greater radius when said type bars are in normal position; and a series of type bars mounted on the segment of greater

radius and formed to avoid conflict with the segment of less radius when said type bars are in printing position.

31. In a typewriting machine, the combination of a plurality of type bar segments each formed with a series of ball bearing grooves; a series of type bars each having an eye encircling one of said segments and mounted thereon by ball bearings, the type bars on one of said segments being curved to avoid conflict with the other of said segments.

32. In a front-strike typewriting machine, the combination of a platen; a plurality of type bar segments of different radii disposed below said platen and one below the other; ball bearing grooves formed in said type bar segments; a series of type bars mounted on said segments, each of said type bars being formed with an eye encircling one of the segments and mounted thereon by ball bearings, the type bars on one of said segments being curved to avoid conflict with another of said segments.

33. In a front-strike typewriting machine, the combination of a platen; a plurality of type bar segments of different radii disposed below said platen; a series of front-strike type bars mounted on said segments; a series of keys; and a series of key operated links lying approximately in a vertical plane and pivoted directly to said type bars at the rear of said segments, the links pivoted to the type bars on a segment of less radius extending behind a segment of greater radius.

34. In a front-strike typewriting machine, the combination of a platen; a plurality of type bar segments of different radii disposed below said platen; a series of type bars mounted on said segments; a series of links pivoted directly to the heels of said type bars and each lying approximately in a transverse vertical plane back of said segments; and keys connected with said links, the links pivoted to the type bars on a segment of less radius extending behind a segment of greater radius.

35. In a front-strike typewriting machine, the combination of two type bar segments of different radii, a set of longer type bars mounted on the segment of greater radius, means for actuating said longer type bars, a set of shorter type bars mounted on the segment of less radius, links pivoted directly to the heels of said shorter type bars and extending down behind said segment of greater radius, and actuating devices connected with said links.

36. In a front-strike typewriting machine, the combination of two type bar segments of different radii, the segment of greater radius being situated a little nearer the front of the machine than that of less radius; a set of longer type bars mounted

on the segment of greater radius; means for
 actuating said longer type bars; a set of
 shorter type bars mounted on the segment
 of less radius; links pivoted to the heels of
 5 said shorter type bars and extending down
 behind said segment of greater radius; and
 actuating devices connected with said links.

37. In a front-strike typewriting ma-
 10 chine, the combination of a platen, a main
 frame comprising an upwardly arched top
 plate, a type bar segment secured to the un-
 der side of the arched portion of said top

plate, and type bars mounted on said seg-
 ment, each end of said segment abutting the
 under side of said top plate and secured 15
 thereto.

Signed at the borough of Manhattan, city
 of New York, in the county of New York
 and State of New York, this 25th day of
 May, A. D. 1905.

JOHN H. BARR.

Witnesses:

E. M. WELLS,
 M. F. HANNWEBER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
 Washington, D. C."