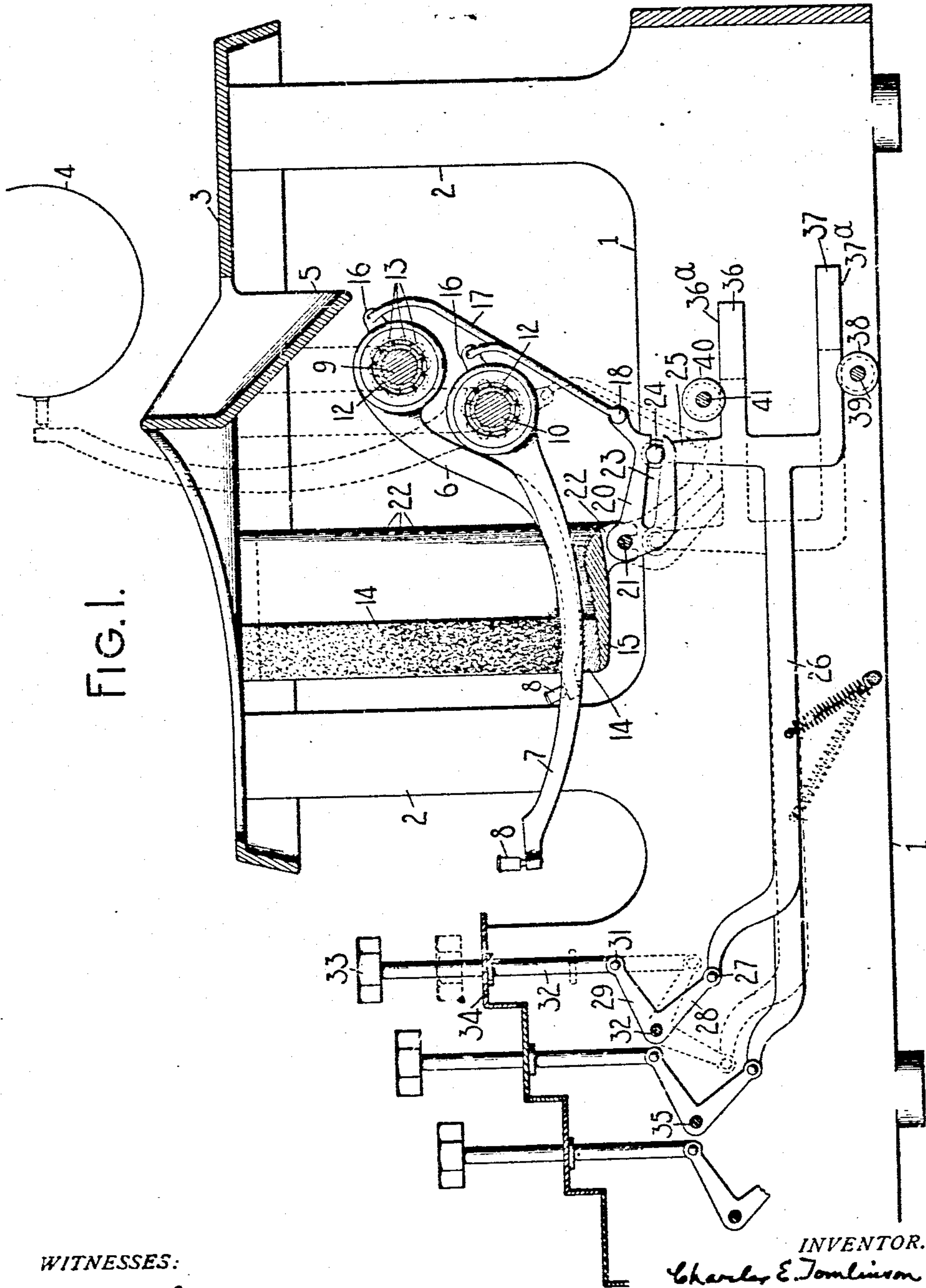


949,509.

C. E. TOMLINSON.  
TYPE WRITING MACHINE.  
APPLICATION FILED SEPT. 25, 1907.

Patented Feb. 15, 1910.

2 SHEETS-SHEET 1.



WITNESSES:

J. B. Keene.  
R. H. Strother.

INVENTOR.

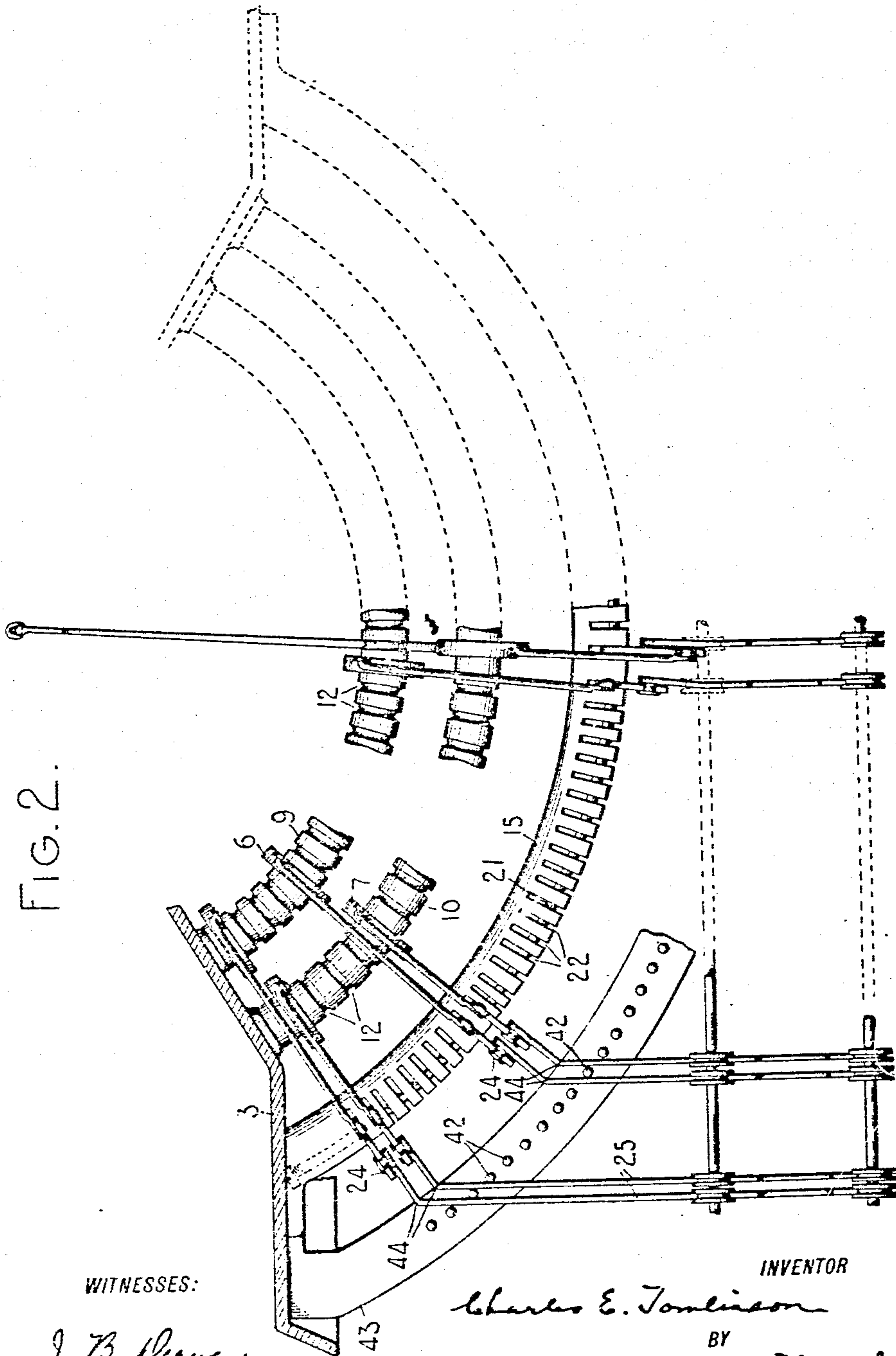
Charles E. Tomlinson  
BY Jacob F. Felt  
ATTORNEY.

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INVENTOR

Charles E. Tomlinson

BY

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ATTORNEY



# UNITED STATES PATENT OFFICE.

CHARLES E. TOMLINSON, OF SYRACUSE, NEW YORK, ASSIGNOR TO ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK.

## TYPE-WRITING MACHINE.

949,509.

Specification of Letters Patent.

Patented Feb. 15, 1910.

Application filed September 25, 1907. Serial No. 394,502.

*To all whom it may concern:*

Be it known that I, CHARLES E. TOMLINSON, 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 it has for its principal object to provide an improved type action.

A further object of the invention is to provide a simple and efficient type action in which the type bars are thrown to the printing point with a motion the first part of which is comparatively slow and which motion is accelerated during the stroke of the key.

A still further object of the invention is to provide simple and efficient means and by which the type bars are automatically locked against rebound when they return to normal position.

To the above and other ends which will hereinafter appear my invention consists of the features of construction, arrangements of parts and combinations of devices described in the following specification and set forth in the appended claims.

In the accompanying drawings, Figure 1 is a front to rear vertical sectional view of as much of a front-strike typewriting machine as is necessary to illustrate the application of my invention thereto. Fig. 2 is a fragmentary rear elevation showing a number of the type actions, the top plate of the machine being shown in section and parts being broken away and parts omitted.

My invention although more particularly adapted for "visible" or front strike machines may be applied to various styles of typewriting machines.

The main frame of the machine shown in the drawings comprises side plates 1, each of which has cast integral therewith corner posts 2 which support a top plate 3 above which may be mounted any suitable form of carriage (not shown) having mounted therein a roller platen 4 diagrammatically shown in Fig. 1. The top plate here shown comprises a dust guard 5 for the type bar pivots.

The type bars may be mounted in any suitable manner, as far as my invention is

concerned, but as here shown said type bars 55 are arranged in two sets comprising shorter type bars 6 and longer type bars 7, each carrying a single type 8. The shorter type bars are mounted on a grooved segment 9 and the longer type bars on a similar grooved 60 segment 10 of greater radius than the other and a little nearer the front of the machine, the type bars 6 alternating with the longer type bars 7. The segments 9 and 10 are circular in cross-section and have circumferential grooves 12, one for each type bar, said grooves constituting race-ways for anti-friction balls 13 which balls run in V-grooves in the heels of the type bars, said heels being formed as eyes which surround the segments 70 and the balls 13. The type bars when in normal position rest against a pad 14 mounted along the forward portion and upper edge of a broad sub-lever segment 15 which is secured at its ends to the top plate 3 by 75 screws or other suitable means.

Each of the type bars has projecting from the heel thereof upward and toward the rear of the machine a lug 16 to which is pivoted the upper end of a link 17, the lower end of 80 which is pivoted at 18 to a sub-lever or actuating device 20. As hereinbefore pointed out the type bars 6 and 7 alternate with each other in the basket and the sub-levers 20 for all of the type bars are pivoted on a pivot 85 wire 21 lying in a suitable slot in a flange or bead on the under side and near the rear edge of the segment 15. The segment is formed with a series of radial slots 22 in which the sub-levers are mounted and by 90 which they are guided in their movements around the pivot wire 21. I prefer to mount the pivot wire 21 some little distance in front of the type bar segments and to arrange the sub-levers substantially horizontal 95 when they are in their normal positions with their rear ends in such positions that all of the links 17 incline toward the front of the machine. Each of the links 17 and sub-levers 20 lies approximately in the plane of 100 motion of the corresponding type bar as will be seen from an inspection of Fig. 2. Each of said sub-levers is formed with a slot 23 which slot as here shown is substantially straight. Each slot 23 receives a pin 24 105 mounted on the upper end of an upstanding arm 25 of a substantially rigid link, slide or actuating bar or device 26 which extends to-



ward the front of the machine and at its forward end is pivoted at 27 to an arm 28 of the bell-crank key lever, the other arm 29 of which is pivoted at 31 to the stem 32 of a printing key 33. Within the scope of my invention the forward ends of the bars 26 may be guided and connected with the keys in other ways than that shown. The key stems 32 pass loosely through a keyboard plate 34. The bell cranks 28—29 are pivoted on a series of transverse rods 35 which are arranged at different elevations and are supported in any suitable manner in the framework of the machine. The pins 24 may be headed and shouldered rivets arranged to contact directly with the sub-levers 20, or they may be such rivets with rollers mounted thereon to reduce wear and friction. Each of the bars 26 is forked at its rear end, being formed with two substantially horizontal arms 36 and 37 having parallel bearing portions 36<sup>a</sup> and 37<sup>a</sup> respectively. Each of the arms 37 rests at its edge 37<sup>a</sup> in a groove in a roller 38 journaled on a rod 39 which is suitably supported in the base of the machine and each of the arms 36 is engaged along its upper edge 36<sup>a</sup> by a similar grooved roller 40 journaled on a frame rod 41 similar to the rod 39. These frame rods 39 and 41 may be supported in any suitable manner and may if desired be provided with supports at intervals lengthwise thereof, but I have not thought it necessary to show these details of construction. If preferred, a fixed guide pin 42 may be mounted by the side of each of the arms 25 near the sides of the system as shown in Fig. 2 to prevent lateral deflection thereof. These pins may be mounted in and may project horizontally from a suitable support 43.

Each of the actuating bars 26 is adapted to move in a substantially straight line directly toward the front of the machine when a key is depressed, and each of the slots 23 normally stands at a very slight angle to the line of motion of the corresponding pin 24, and each of said slots is so disposed that if prolonged it would pass comparatively close to, but would not pass through the center of rotation of the sub-lever. The construction is such that when a key is depressed the corresponding pin 24 moves toward the front of the machine, rocking the sub-lever 20 to the position shown in dotted lines in Fig. 1 and throwing the corresponding type bar to the printing point. Since at the beginning of the stroke the slot 23 is nearly parallel with the line of motion of the pin 24, the first part of the motion of said pin will impart a comparatively slow velocity to the sub-lever and type bar, but as this motion proceeds the slot turns to a greater and greater angle with the line of motion of the pin 24. Moreover, in its initial position said pin is at a considerable

distance from the pivot of the sub-lever and as the motion progresses or proceeds the pin moves closer and closer to such pivotal center. For these two reasons the sub-lever moves with an accelerated velocity and the type bar partakes of this acceleration. Moreover, when each type bar returns to normal position the line of motion of the pin 24 is so nearly at right angles to the slot 23 that motion cannot be imparted from the type bar to the pin and the actuating bar which carries it, so that the type bar is locked against rebound from the pad 14.

In Fig. 1 I have shown two type actions, one for a long type bar and one for a short type bar, these type bars being situated near the middle of their respective segments. In Fig. 2 I have shown two type bars near the middle of the machine, two type bars at the extreme right hand ends of their respective segments, and two type bars in intermediate positions. It will be perceived that not only the end type bars themselves but also the corresponding sub-levers are at a greater elevation than those near the middle of the machine, the sub-levers being arranged in an arc of greater radius than that of either of the type bar segments so that the links 17 of each set of type bars may be made of uniform length. It will also be seen that planes of motion of the type bars, sub-levers and links at the end portions of the segments are inclined to the vertical and that the intermediate type bars and sub-levers and links occupy intermediate positions in these respects. In order to compensate for these differences in elevation and angle, the arms 25 are made progressively longer from the center to the sides of the system and said arms are bent at 44 so as to bring their upper ends substantially into the planes of motion of the respective type bars. The actuating bars 26 are so mounted that their pins 24, even in the cases of those actuating type actions near the sides of the system, move in approximately straight lines directly toward the front of the machine, these pins 24 having substantially the same motion as those pins near the middle of the machine. In other words, the bars 26 sliding in bearings at the rear ends thereof have a substantially parallel motion, that is to say, all parts of each of said bars, at least all of the parts near the rear ends of said bars, move substantially or approximately straight toward the front of the machine.

A type action comprising the substantially rigid actuating devices 26 having the up-standing arms 25 and mounted and guided for motion in a fore and aft direction after the general manner of those devices shown in the present case, are also shown in a companion application of mine filed of even date herewith Serial No. 394,501 and in said companion application such type action is



claimed more broadly than in the present application, the claims in the present application being limited to features not shown in said application Sr. No. 394,501.

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

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

10 1. In a front strike typewriting machine, the combination of a front-strike type bar, a key actuated lever, a separate sub-lever, a link operatively connecting said sub-lever with the type bar, and an actuating device  
15 mounted to slide fore-and-aft of the machine, said actuating device being operated by said key actuated lever and operating said sub-lever.

20 2. In a front-strike typewriting machine, the combination of a front-strike type bar, a key actuated bell crank, a separate sub-lever operatively connected with the type bar, and an actuating device pivoted to said key actuated bell crank and operating said  
25 sub-lever, said actuating device being mounted to slide fore and aft of the machine.

3. In a front strike typewriting machine, the combination of an upwardly and rear-  
30 wardly striking type bar, a key actuated lever, a separate sub-lever operatively connected with the type bar, and an actuating device intermediate said key actuated lever and sub-lever, said actuating device being  
35 mounted to slide in the machine and having approximately a right-line movement fore and aft of the machine, the construction and arrangement of the parts being such that an accelerated movement is given the type bar  
40 in its movement to printing position and the type bar is locked against rebound in the normal position thereof.

4. In a front-strike typewriting machine, the combination of an upwardly and rear-  
45 wardly striking type bar, a key actuated lever, a separate sub-lever operatively connected with the type bar and pivoted to swing approximately in the plane of motion of said type bar, and an actuating device  
50 intermediate said key actuated lever and sub-lever, said actuating device being mounted to slide in the machine and having approximately a right-line movement fore and aft of the machine, the construction and  
55 arrangement of the parts being such that an accelerated movement is given the type bar in its movement to printing position and the type bar is locked against rebound in the normal position thereof.

60 5. In a front-strike typewriting machine, the combination of a pivoted front-strike type bar, a sub-lever connected with said type bar and pivoted to swing approximately in the plane of motion of said type  
65 bar, a key, and connections between said

key and said sub-lever comprising an end-wise movable member, said member moving fore-and-aft of the machine and having direct sliding connection with said sub-lever.

6. In a typewriting machine, the combination of a pivoted type bar, a sub-lever connected with said type bar, a key, and connections between said key and said sub-lever comprising an actuating bar or device having direct sliding connection with said sub-  
75 lever, a key actuated lever to which one end of said bar or device is pivoted and by which said device is operated, and means separate from said sub-lever for guiding the other end of said bar or device. 80

7. In a front-strike typewriting machine, the combination of a front-strike type bar, a sub-lever connected with said type bar and pivoted to swing approximately in the plane of motion of said type bar, and connections  
85 between said key and sub-lever including a pivoted device actuated by said key, and a bar or actuating device pivoted at its forward end to said pivoted device and slidably mounted at its rear end. 90

8. In a front-strike typewriting machine, the combination of a series of front-strike type bars, a series of sub-levers connected with said type bars and each pivoted to a relatively fixed part to swing approximately  
95 in the plane of motion of the corresponding type bar, a series of keys, key levers at the front of the machine, and connections between said key levers and said sub-levers comprising a series of rigid bars or actuating  
100 devices slidably mounted at their rear ends for motion in a fore and aft direction.

9. In a front-strike typewriting machine, the combination of a series of front-strike type bars, a series of sub-levers connected  
105 with said type bars and each pivoted to a relatively fixed part to swing approximately in the plane of motion of the corresponding type bar, a series of keys, key levers at the front of the machine, and connections be-  
110 tween said key levers and said sub-levers comprising a series of rigid bars or actuating devices slidably mounted at their rear ends for motion in a fore and aft direction and each having an upstanding arm for  
115 operating a sub-lever.

10. In a front-strike typewriting machine, the combination of a series of front-strike type bars, a series of links pivoted to the heels of said type bars and lying behind said  
120 type bars, a series of sub-levers connected with said links, a series of keys, and connections between said keys and sub-levers comprising a series of actuating bars having a pin and slot connection with said sub-lever,  
125 and means for guiding said actuating bars for motion in a fore and aft direction.

11. In a front-strike typewriting machine, the combination of segmentally disposed front-strike type bars, a series of radially  
130



arranged links pivoted to the heels of said type bars and lying behind said type bars, a series of sub-levers pivoted forward of said series of type bars and connected at their rear ends with said links, a series of keys, and connections between said keys and sub-levers comprising a series of actuating bars having a pin and slot connection with said sub-lever, and means for guiding said actuating bars for motion in a fore and aft direction.

12. In a front-strike typewriting machine, the combination of a series of front-strike type bars, a series of sub-levers each connected with a type bar, each of said sub-levers lying approximately horizontal and having straight slots therein, a series of keys, and connections between said keys and sub-levers comprising a device having a pin working in said slot and guided for motion substantially in a straight line.

13. In a front-strike typewriting machine, the combination of a series of front-strike type bars, a series of sub-levers each connected with a type bar and pivoted at its forward end to swing approximately in the plane of motion of the corresponding type bar and each of said sub-levers lying approximately horizontal and having straight slots therein, a series of keys, and connections between said keys and sub-levers comprising a device having a pin working in said slot and guided for motion substantially in a straight line.

14. In a front-strike typewriting machine, the combination of a series of front-strike type bars arranged in two segmental sets, one of less radius than the other, links pivoted to the heels of said type bars and extending therefrom in radial planes, and a series of sub-levers pivoted to swing approximately in the planes of the corresponding type bars, each of said sub-levers being pivoted at one end on a fixed pivot and at its rear end to one of said links, a series of keys, and connections between said keys and sub-levers comprising a series of bars mounted for a bodily motion in a fore and aft direction and having a pin and slot connection with said sub-lever.

15. In a front-strike typewriting machine, the combination of a series of front-strike type bars arranged in two segmental sets, one of less radius than the other, links pivoted to the heels of said type bars and extending therefrom in radial planes, a sub-lever segment mounted in front of the pivots of said type bars, and a series of sub-levers pivoted in said sub-lever segment to swing approximately in the planes of the corresponding type bars, each of said sub-levers being pivoted at its forward end to said segment and at its rear end to one of said links, a series of keys, and connections between said keys and sub-levers comprising

a series of bars mounted for a bodily motion in a fore and aft direction and having a pin and slot connection with said sub-lever.

16. In a front-strike typewriting machine, the combination of a series of front-strike type bars arranged in two segmental sets, one of less radius than the other, links pivoted to the heels of said type bars and extending therefrom in radial planes, and a series of sub-levers pivoted to swing approximately in the planes of the corresponding type bars and links, each of said sub-levers being pivoted to one of said links, a series of keys, and connections between said keys and sub-levers comprising a series of bars mounted for motion in a fore and aft direction and having a pin and slot connection with said sub-lever, the construction and arrangement being such that each of said pins imparts to the corresponding sub-lever a motion that is relatively slow in the first part of the stroke and that is accelerated during the stroke.

17. In a front-strike typewriting machine, the combination of a series of front-strike type bars arranged in two segmental sets, one of less radius than the other, links pivoted to the heels of said type bars and extending therefrom in radial planes, a sub-lever segment mounted in front of the pivots of said type bars, and a series of sub-levers pivoted in said sub-lever segment to swing approximately in the planes of the corresponding type bars and links, each of said sub-levers being pivoted at its forward end to said segment and at its rear end to one of said links, a series of keys, and connections between said keys and sub-levers comprising a series of bars mounted for motion in a fore and aft direction and having a pin and slot connection with said sub-lever, the construction and arrangement being such that each of said pins imparts to the corresponding sub-lever a motion that is relatively slow in the first part of the stroke and that is accelerated during the stroke.

18. In a front-strike typewriting machine, the combination of a series of front-strike type bars arranged in two segmental sets, one of less radius than the other, links pivoted to the heels of said type bars and extending therefrom in radial planes, a sub-lever segment mounted in front of the pivots of said type bars, and a series of sub-levers pivoted in said sub-lever segment to swing approximately in the planes of the corresponding type bars, each of said sub-levers being pivoted at its forward end to said segment and at its rear end to one of said links, a series of keys, and connections between said keys and sub-levers comprising a series of bars mounted for motion in a fore and aft direction and having a pin and slot connection with said sub-lever, the relation of the parts being such that when a type bar



is in normal position said actuating devices are capable of actuating said sub-lever but said sub-lever is incapable of actuating said actuating devices, whereby the type bars are locked against rebound when they return to normal position.

19. In a front-strike typewriting machine, the combination of a series of front-strike type bars, a series of keys, and connections between said keys and type bars comprising a series of actuating devices operatively connected at their forward ends with the keys and having at their rear ends upper arms 36 and lower arms 37, grooved rollers mounted above said upper arms 36 and guiding the same, and grooved rollers mounted beneath said lower arms 37 and guiding the same.

20. In a typewriting machine, the combination of segmentally arranged type bars, sub-levers mounted in an arc, radially disposed links connecting said type bars and sub-levers, and key operated sliding actuating devices co-acting directly with said sub-levers.

21. In a front-strike typewriting machine, the combination of segmentally arranged upwardly and rearwardly striking type bars, sub-levers mounted in an arc, radially disposed links connecting said type bars and sub-levers, said links moving in approximately the same planes that the type bars swing in, and key operated sliding actuating devices which move approximately in straight lines fore and aft of the machine and co-act directly with said sub-levers.

22. In a typewriting machine, the combination of segmentally arranged type bars, sub-levers mounted in an arc, radially disposed links connecting said type bars and sub-levers, and key operated sliding actuating devices co-acting directly with said sub-levers, said actuating devices having progressively longer arms from the center to the sides of the system.

23. In a front strike typewriting machine, the combination of segmentally arranged upwardly and rearwardly striking type bars, sub-levers mounted in an arc, radially disposed links connecting said type bars and sub-levers, said links moving in approximately the same planes that the type bars swing in, and key operated sliding actuating devices which move approximately in straight lines fore and aft of the machine and co-act directly with said sub-levers, said actuating devices having progressively longer arms from the center to the sides of the system.

24. In a typewriting machine, the combination of segmentally arranged type bars, sub-levers mounted in an arc, radially disposed links connecting said type bars and

sub-levers, and key operated sliding actuating devices co-acting directly with said sub-levers, said actuating devices having arms which coöperate with said sub-levers, and which are bent at progressively greater angles from the center to the sides of the system.

25. In a typewriting machine, the combination of segmentally arranged type bars, sub-levers mounted in an arc, radially disposed links connecting said type bars and sub-levers, and key operated sliding actuating devices co-acting directly with said sub-levers, said actuating devices having arms which coöperate with said sub-levers and which extend to progressively greater distances from the actuating devices and are bent at progressively greater angles from the center to the sides of the system, so as to bring the ends of the arms which are connected with the sub-levers approximately in the same planes as the sub-levers.

26. In a front-strike typewriting machine, the combination of segmentally arranged upwardly and rearwardly striking type bars, sub-levers mounted in an arc, radially disposed links connecting said type bars and sub-levers, said links moving in approximately the same planes that the type bars swing in, and key operated sliding actuating devices which move approximately in straight lines fore and aft of the machine and co-act directly with said sub-levers, said actuating devices having arms that extend upwardly to progressively higher elevations from the center to the sides of the system and coöperate with said sub-levers.

27. In a front-strike typewriting machine, the combination of segmentally arranged upwardly and rearwardly striking type bars, sub-levers mounted in an arc, radially disposed links connecting said type bars and sub-levers, said links moving in approximately the same planes that the type bars swing in, and key operated sliding actuating devices which move approximately in straight lines fore and aft of the machine and co-act directly with said sub levers, said actuating devices having arms which extend upwardly to progressively higher elevations and which are bent at progressively greater angles from the center to the sides of the system to bring the upper ends of said arms approximately in the same planes as the sub-levers to which they are connected.

Signed at Syracuse, in the county of Onondaga, and State of New York, this 16 day of Sep. A. D. 1907.

CHARLES E. TOMLINSON.

Witnesses:

C. C. SCHOENECK,  
J. A. PROSS.