G. J. BARRETT.

TYPE WRITING MACHINE.

APPLICATION FILED FEB. 6, 1911.

1,021,817.

Patented Apr. 2, 1912.

3 SHEETS-SHEET 1.

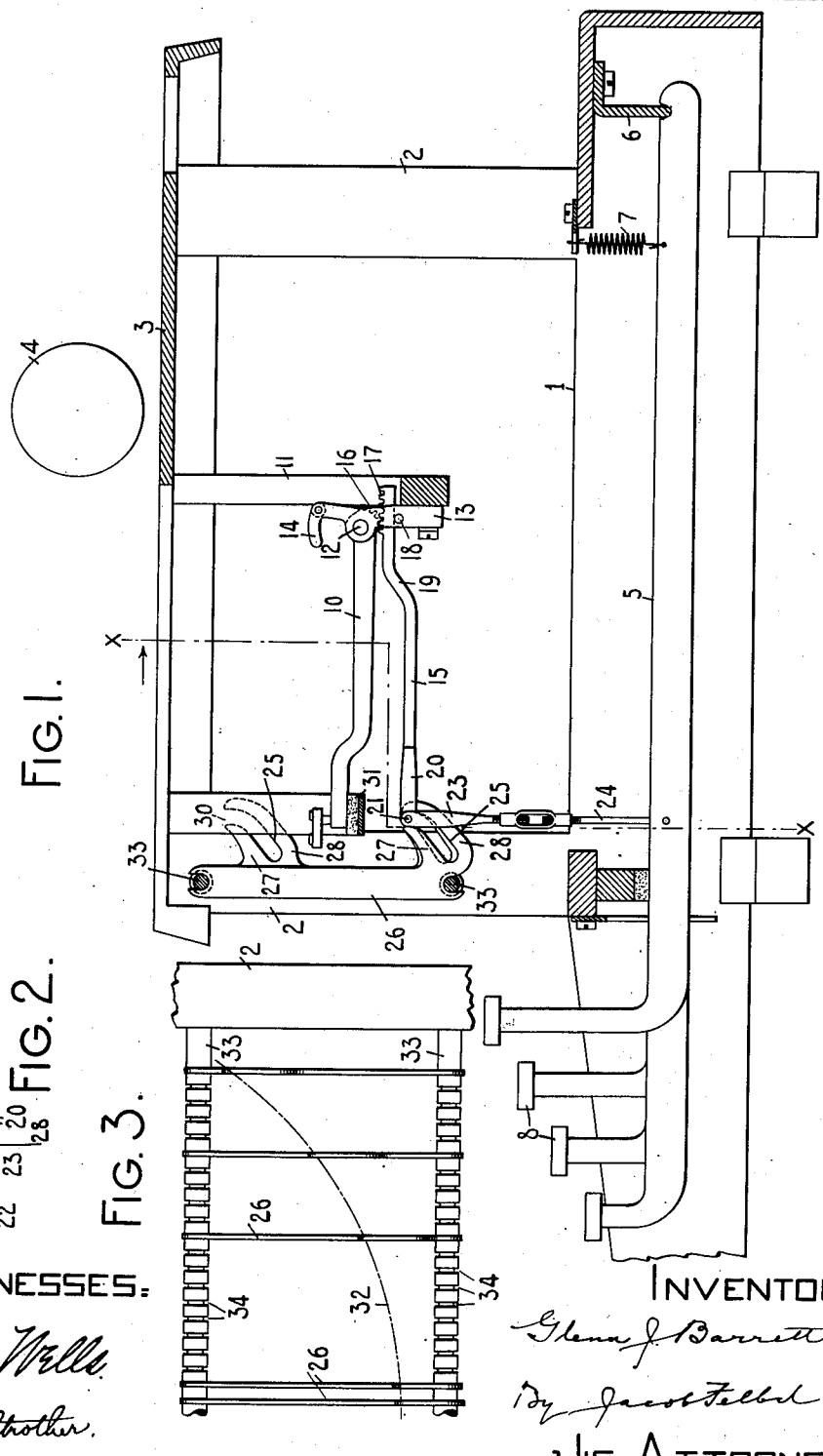

FIG. 1.

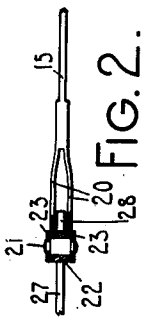

FIG. 2.

FIG. 3.

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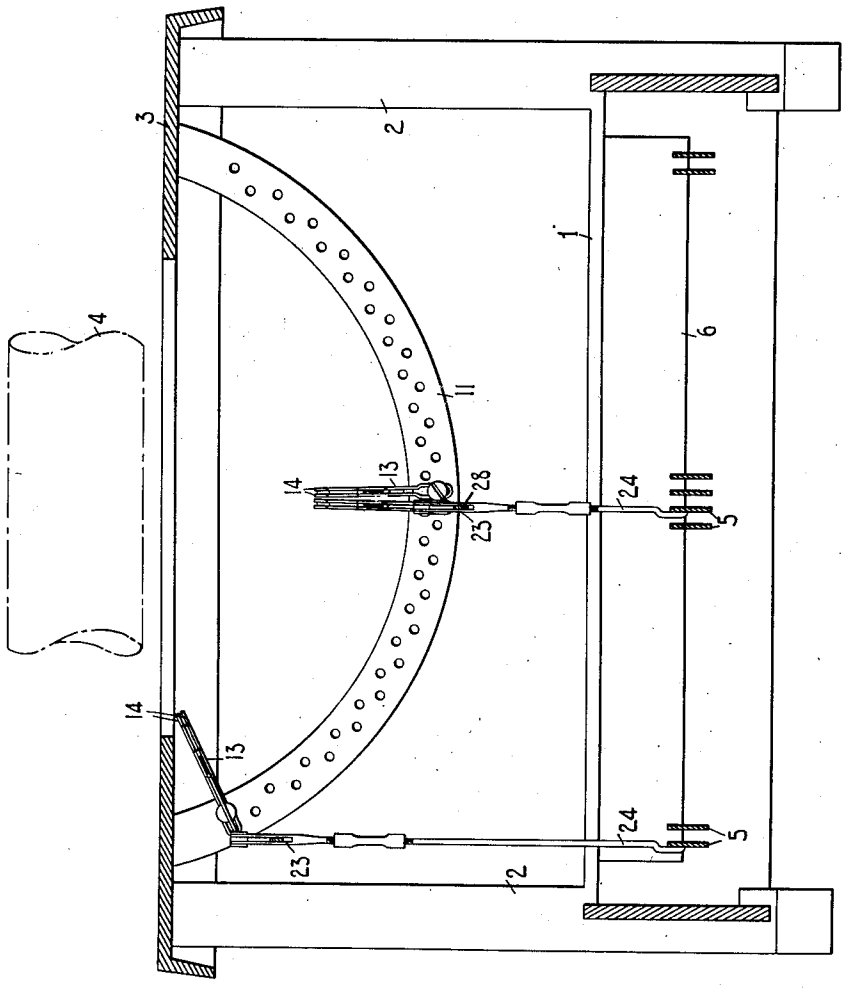
3 SHEETS—SHEET 2.

FIG. 4.



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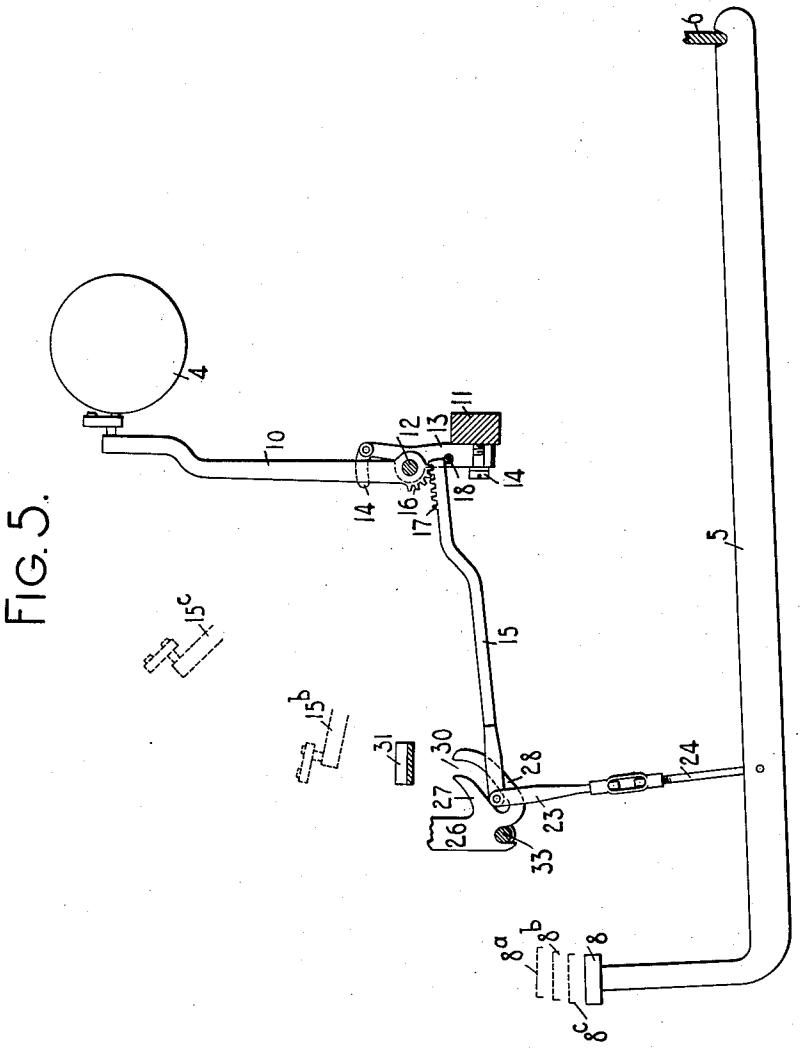
3 SHEETS—SHEET 3.

FIG. 5.



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UNITED STATES PATENT OFFICE.

GLENN J. BARRETT, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

1,021,817. Specification of Letters Patent. Patented Apr. 2, 1912.

Application filed February 6, 1911. Serial No. 606,844.

To all whom it may concern:

Be it known that I, GLENN J. BARRETT, citizen of the United States, and resident of Grand Rapids, in the county of Kent and State of Michigan, 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 action for the printing mechanism.

The type action herein set forth is capable of adaptation to typewriters more or less different in style, but said type action has been more especially designed for a front strike machine.

The invention contemplates a type action in which the number of moving parts is reduced nearly to a minimum and in which said moving parts are light and are subjected wholly or principally to stress longitudinally of the members which connect the key lever with the type bar.

The design admits of giving to the type bar an easy start and an accelerated motion and the degree of acceleration can be regulated to any desired extent by suitable modification of the shape of some of the parts, as will be explained.

The invention also includes means for locking the type bars against rebound from the type rest or pad. The type action is also easy and inexpensive to manufacture.

To the above and other ends my invention consists in certain features of construction and combinations and arrangements of parts all of which will be fully set forth herein and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal vertical sectional view of so much of a typewriting machine as is necessary to an understanding of my invention. Fig. 2 is a fragmentary top view, partly in section, of some of the elements of the connections from the key lever to the type bar. Fig. 3 is a fragmentary rear elevation of part of a system of cam plates. Fig. 4 is a front view in vertical section on the line x—x of Fig. 1. Fig. 5 is a side elevation, partly in section, of the mechanism of one of the type actions and illustrating diagrammatically the acceleration of the type bar.

As far as the present invention is concerned, the general outline of the machine may be of any suitable or usual character. I have here shown a main frame comprising a base 1, corner posts 2, and top plate 3, above which last there is a carriage of any suitable sort which supports the paper platen 4. Printing key levers 5 are pivoted at their rear ends on a rib 6 and are normally held up by springs 7 and carry printing keys 8 at their forward ends. These key levers are of ordinary construction.

I have indicated a segmentally arranged series of front strike type bars 10 which may be mounted in any suitable manner on a segment 11. These type bars may be pivoted in any suitable way to strike upwardly and rearwardly against the front face of the platen 4. As here shown, they are pivoted at 12 in hangers 13 which are secured by screws to the segment 11. The hangers 13 may be of any suitable description. As here shown they are of U-shape and have at their upper ends forwardly directed arms 14 having between them guide slots for accurately guiding the types to the printing point. The type bars are operated by a series of substantially or approximately horizontally disposed links 15, which links in the present instance are connected with the type bars below the pivots of the latter and extend therefrom toward the front of the machine. Said links may be connected with the type bars in any suitable manner and as here shown they are connected by toothed gearing, each of the type bars having a gear segment 16 formed on the heel thereof and meshing with rack-teeth 17 on the link 15. The racks are held in engagement with the pinion segments by transverse pins 18 and the racks and type bars are guided laterally by reason of the fact that they lie between the arms of the hangers. The gearing 16, 17 lies in a radial plane and in the case of those type bars that are at a distance from the middle of the segment the links 15 may be twisted to different and appropriate extents in order to bring the rack-teeth 17 into the proper

planes. As here shown each of said links is formed with an off-set bend 19 and instead of twisting the links, each of them may be bent to an appropriate extent at this off-set.

Each of the links 15 is bifurcated at its forward end as shown in Fig. 2, being provided with two arms or branches 20 which are pivoted on a horizontal shouldered rivet 21 and which embrace an anti-friction roller 22 that is journaled on said rivet between said arms 20. Both ends of the rivet 21 are reduced and to said reduced ends are secured branches 23 constituting the upper bifurcated end of a vertically disposed link 24 which is pivoted at its lower end to one of the key levers 5. The roller 22 constitutes a follower that runs in a slot 25 in a cam plate 26, said slot being included between an upper arm 27 and a lower arm 28, each projecting toward the rear from said plate 26. The arm 28 passes through the bifurcations or spaces included between the branches 23 of the link 24 and the branches 20 of the link 15, so that said arm 28 prevents lateral displacement of the roller 22 from the slot 25.

The construction is such that the link 24 moves the link 15 transversely, that is to say, transverse to the length of said link 15. In the present instance the forward end of the link 15 is moved downwardly so that it turns on a pivotal center near the opposite end of the link. As the cam slot 25 has an inclination downward and forward the downward swinging motion of the link 15 forces said link to move longitudinally toward the front of the machine, thus operating the type bar. The dip of the keys can be regulated in the manufacture of the machine by giving a suitable inclination to the slot 25, the dip being greater as the slot is more nearly vertical. The dip of the keys of the different banks can also be made as nearly uniform as desired by suitably varying the inclination of the several slots. Thus in Fig. 1 the type bar shown is connected with a key in the rear bank of keys, with the result that the point at which the link 24 is connected with said key lever moves downward for a given dip on the key farther than the corresponding point of a key lever of the front bank.

I have shown not only the slot 25 connected with the key referred to, which key is in the rear bank, but have shown just back of it another slot designed for a key of the front bank, the second slot being more nearly horizontal than the first one, thus giving substantially the same dip to the two keys. I also prefer to make the upper end 30, Fig. 5, of the slot 25 so that at that point the walls of the slot are substantially at right angles to the length of the link 15. With the parts constructed in this fashion the link 24 cannot be depressed by a forward motion of the link 15 when the type bar is at rest against the type rest. In other words, this construction automatically locks the type bars against rebound from said type rest, the upper part of the arm 27 constituting an abutment to prevent forward motion of the link 15.

Any desired degree of acceleration may be given to the type bar by suitably shaping the slot 25. For example, if it is desired to give the type bar a high and constantly increasing acceleration the slot 25 will be made on a curve throughout its length, the steepness of the slot gradually diminishing from the upper to the lower end of it. If it is not desired that the acceleration shall be so great in the last part of the stroke, then the slot will be made more nearly straight. The particular form of slot shown in the drawings gives some such acceleration as is indicated in Fig. 5 in which 8^a represents the normal position of the key 8, 8^b represents the position of the key at one-third of the down stroke, 8^c, the position of said key at two-thirds of the down stroke and the key is shown in full lines at the bottom of its stroke. The type bar normally rests against the type rest 31 and the positions of the type bar corresponding to the key positions marked 8^b and 8^c are marked respectively 15^b and 15^c. I consider the degree of acceleration indicated to be good but it can be varied in the manner above described to suit the preferences of other persons.

The cam slots 25 are preferably arranged at varying heights, each of said slots being arranged at a height suitable to the corresponding type bar, the different type bars, of course, standing at different elevations in this style of machine. In Fig. 1 I have shown only three of the cams as to show a larger number would merely confuse the drawing. In Fig. 3 I have shown several of the cam plates, the two at the left of the figure being at about the middle of the machine. In said figure the curve marked 32 indicates the general disposition of the anti-friction rollers 22 and it will be seen that these parts are arranged in an arc-shaped or segmental series.

The cam plates 26 may be mounted in the machine in a variety of ways, the preferred construction being shown in the drawings. Two frame rods 33 extend horizontally across the front of the machine, being supported by the two front posts 2. Each of said frame rods is formed with a series of circumferential grooves 34. Each of the cam plates 26 is made in the form of a bar that stands vertically and is formed at each of its ends with an open slot that embraces the reduced part of the rod 33. In other words, the plates are seated in the circumferential slots 34, which slots space the plates suitably apart and support them rig-

idly. The arms 27 and 28 are made at different elevations on the different plates 26, as will be understood.

It will be perceived that the links 15 and 24 are merely tension members jointed together at their ends and the jointed ends are controlled in their motion by the slotted cams. It will of course be understood that it is not essential that the link 24 be connected with the link 15 exactly at the end of said link 15 but I prefer the construction shown, namely, that in which the two links are connected at their ends.

Various changes can 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:—

1. In a typewriting machine, the combination of a type bar; a finger key; intermediate actuating connections between said finger key and type bar for actuating the latter by a depression of said key, said connections comprising a link connected directly with the type bar, means for moving the link transversely at the actuation of a key; and a cam with which certain of said intermediate connections coöperate and which is cammed thereby at each printing operation for effecting a longitudinal movement of said link when it is moved transversely.

2. In a typewriting machine, the combination of a type bar; a finger key; intermediate actuating connections between said finger key and type bar, said connections comprising a link operatively connected at one end to the type bar, means for moving said link transversely at the actuation of a key; and a fixed cam with which said link is coöperative to cam the link longitudinally toward the front of the machine when the link is moved transversely.

3. In a typewriting machine, the combination of a type bar; a finger key; intermediate actuating connections between said finger key and type bar, said connections comprising a link operatively connected at one end to the type bar, means for moving said link transversely at the actuation of a key; a slotted cam; and a follower on said link engaging said slotted cam to effect a longitudinal movement of the link when it is moved transversely.

4. In a typewriting machine, the combination of a type bar, a key lever for actuating the type bar by a depression of said key lever, a link operatively connected to said type bar and which receives a swinging movement at one end thereof, a cam which is engaged by said link and effects a longitudinal movement of the link when said link is swung to move transversely, and a second link which connects the first mentioned link and key lever.

5. In a front strike typewriting machine, the combination of an upwardly and rearwardly striking type bar, a link operatively connected to said type bar and extending forwardly therefrom, a cam with which said link coöperates for effecting a longitudinal movement of said link by camming it forwardly when said link is moved transversely; and an upwardly extending key actuated link connected with the first mentioned link for moving it transversely.

6. In a front strike typewriting machine, the combination of an upwardly and rearwardly striking type bar, a link operatively connected to said type bar and extending forwardly therefrom and having a pivotal as well as a longitudinal movement, the pivotal movement being around a center near one end of the link, a fixed cam engaged by said link at the forward end of the latter for effecting a longitudinal movement of said link when it receives its pivotal movement, a key lever operative to actuate the type bar at each depression thereof, and a second link which extends upwardly from the key lever to the first mentioned link.

7. In a front strike typewriting machine, the combination of an upwardly and rearwardly striking type bar, a substantially horizontally disposed link operatively connected to the type bar at its rear end; a fixed cam engaged by the link at the forward end of the latter and effecting a forward movement of the link when it is moved downwardly, a key lever, and a substantially vertically disposed link extending upwardly from said key lever to the first mentioned link.

8. In a typewriting machine, the combination of a type bar; a finger key; and intermediate actuating connections between said finger key and type bar, said connections comprising a link, means for moving the link transversely at the actuation of a key; a cam for effecting a longitudinal movement of said link when it is moved transversely; and a roller carried by said link and engaging said cam.

9. In a typewriting machine, the combination of a type bar; a finger key; and intermediate actuating connections between said finger key and type bar, said connections comprising a link operatively connected at one end to the type bar, means for moving said link transversely at the actuation of a key, a slotted cam, and a roller carried by said link and working in said slotted cam.

10. In a front strike typewriting machine, the combination of an upwardly and rearwardly striking type bar, a link operatively connected to said type bar and extending forwardly therefrom and carrying an antifriction roller at its forward end, a cam which is engaged by said roller for effecting

a longitudinal movement of said link when the link is moved transversely, and an upwardly extending key actuated link connected with the first mentioned link for moving it transversely.

11. In a front strike typewriting machine, the combination of an upwardly and rearwardly striking type bar, a substantially horizontally disposed link operatively connected at its rear end to the type bar, an anti-friction roller carried by said link at the forward end thereof, a fixed cam engaged by said roller and effecting a forward movement of the link when it is moved downwardly, a key lever, and a substantially vertically disposed link extending upwardly from said key lever to the first mentioned link.

12. In a typewriting machine, the combination of a type bar; a finger key; and intermediate actuating connections between said finger key and type bar, said connections comprising a link, a toothed gear connection between said link and type bar, means for moving the link transversely at the actuation of a key, and a cam for effecting a longitudinal movement of said link when the latter is moved transversely.

13. In a typewriting machine, the combination of a type bar, a key lever, a link, a toothed gear connection between said link and type bar, a cam which is engaged by said link and effects a longitudinal movement of the link when said link is moved transversely, and a second link which connects the first mentioned link and key lever.

14. In a front strike typewriting machine, the combination of an upwardly and rearwardly striking type bar, a link extending forwardly therefrom, a toothed gear connection between said link and type bar, a cam with which said link coöperates for effecting a longitudinal movement of said link when said link is moved transversely, and an upwardly extending key actuated link connected with the first mentioned link for moving it transversely.

15. In a front strike typewriting machine, the combination of an upwardly and rearwardly striking type bar, a substantially horizontally disposed link having a rack on the rear end thereof which meshes with a gear on the heel of the type bar, a fixed cam engaged by the link at the forward end of the latter and effecting a forward movement of the link when said link is moved downwardly, a key lever, and a substantially vertically disposed link extending upwardly from said key lever to the first mentioned link.

16. In a typewriting machine, the combination of a series of type bars, a series of actuating links therefor, key actuated means for swinging each of said links transversely around a pivotal center near one end of the link and a separate fixed cam for each of said links and with which the links coöperate to effect a camming movement of the links longitudinally thereof when a transverse pivotal movement is given the links.

17. In a typewriting machine, the combination of a series of segmentally arranged type bars, a series of segmentally arranged actuating links therefor, key actuated means for moving each of said links transversely, and a series of segmentally arranged cams, one for each of said links and with which said links coöperate for camming the links longitudinally when a transverse movement is given the links.

18. In a front strike typewriting machine, the combination of a series of segmentally arranged upwardly and rearwardly striking type bars, a series of segmentally arranged substantially horizontally disposed links operatively connected to said type bars, a series of segmentally arranged fixed cams one for each of said links, each cam effecting a camming movement of the associated link in the direction of its length when the link is moved transversely, and key controlled means for moving said links transversely.

19. In a front strike typewriting machine, the combination of a series of segmentally arranged upwardly and rearwardly striking type bars, a series of segmentally arranged substantially horizontally disposed links operatively connected to said type bars, a series of segmentally arranged fixed cams one for each of said links, each cam effecting a camming movement of the associated link in the direction of its length when the link is moved transversely, a series of substantially vertically disposed links which vary in length and are connected to the first mentioned links to move them transversely, and key levers connected with the vertically disposed links.

20. In a front strike typewriting machine, the combination of a series of segmentally arranged upwardly and rearwardly striking type bars, a series of segmentally arranged substantially horizontally disposed links operatively connected to said type bars and extending forwardly therefrom, a series of separate segmentally arranged substantially vertically disposed cam plates each having a cam coöperative with the forward end of the associated link to move the link longitudinally as said link is moved transversely, a series of upright links connected to the first mentioned links to move them transversely, and a series of key actuated devices connected to the last mentioned links.

21. In a front strike typewriting machine, the combination of a series of segmentally arranged upwardly and rearwardly striking type bars, a series of segmentally arranged substantially horizontally disposed links operatively connected to

said type bars and extending forwardly therefrom, a series of separate segmentally arranged substantially vertically disposed plates each having a cam, a series of anti-friction rollers carried by said links and having substantially horizontal axes, the cams coöperating with said rollers to effect a longitudinal movement of the links when the links are moved vertically, and key controlled means for moving the links vertically.

22. In a typewriting machine, the combination of a type bar, a link operatively connected thereto, said link having a bifurcated end and carrying an anti-friction roller between the arms formed at the bifurcation in the link, a cam with which said roller coöperates to effect a longitudinal movement of the link when the link is moved transversely, and key controlled means for moving the link transversely.

23. In a typewriting machine, the combination of a type bar, a finger key, a link operatively connected with the type bar, and means for moving the link transversely and longitudinally and for locking the type bar against rebound from the type rest, said means including a cam for effecting the longitudinal movement of said link when it is given a transverse movement.

24. In a typewriting machine, the combination of a type bar, a finger key, intermediate actuating connections between said finger key and type bar, said connections comprising a link, means for moving the link transversely at the actuation of a key, and a cam for effecting a longitudinal movement of said link when said link is moved transversely, said cam having a dwell at substantially right angles to the length of the link to lock the type bar against rebound from the type rest.

25. In a typewriting machine, the combination of a type bar, a finger key, intermediate actuating connections between said finger key and type bar, said connections comprising a link operatively connected at one end to the type bar, means for moving said link transversely at the actuation of a key, a slotted cam, and a follower on said link engaging said slotted cam to effect a longitudinal movement of the link when said link is moved transversely, said cam having a dwell at substantially right angles to the length of the link to lock the type bar against rebound from the type rest.

26. In a typewriting machine, the combination of a type bar, a key lever, a link operatively connected to said type bar, a cam which is engaged by said link and effects a longitudinal movement of the link when said link is moved transversely, and a second link which connects the first mentioned link and key lever, said cam having a dwell at substantially right angles to the length of the first mentioned link to lock the type bar against rebound from the type rest.

27. In a front strike typewriting machine, the combination of an upwardly and rearwardly striking type bar, a link operatively connected to said type bar and extending forwardly therefrom, a cam for effecting a longitudinal movement of said link when said link is moved transversely, an upwardly extending key actuated link connected with the first mentioned link for moving it transversely, and a dwell on said cam at substantially right angles to the length of the first mentioned link to lock the type bar against rebound from the type rest.

28. In a typewriting machine, the combination of a type bar, a key lever, a link, a toothed gear connection between said link and type bar, a cam which is engaged by said link and effects a longitudinal movement of the link when said link is moved transversely, a second link which connects the first mentioned link and key lever, and a dwell on said cam at substantially right angles to the length of the first mentioned link to lock the type bar against rebound from the type rest.

29. In a typewriting machine, the combination of a series of type bars, a series of actuating links therefor, key actuated means for moving each of said links transversely, and a separate cam for each of said links for moving the links longitudinally when a transverse movement is given the links, each of said cams having a dwell at substantially right angles to the length of the associated link for locking the type bar against rebound from the type rest.

30. In a front strike typewriting machine, the combination of a series of segmentally arranged upwardly and rearwardly striking type bars, a series of segmentally arranged substantially horizontally disposed links operatively connected to said type bars, a series of segmentally arranged fixed cams one for each of said links, each cam effecting a longitudinal movement of the associated link when the link is moved transversely, key controlled means for moving said links transversely, and a dwell on each cam at substantially right angles to the length of the associated link for locking the type bar against rebound from the type rest.

31. In a typewriting machine, the combination of a type bar, a link directly connected to the type bar and adapted to receive a pivotal movement around a pivotal center near one end thereof, a fixed cam cooperative with said link to cam the link in the direction of its length when it receives its pivotal movement, and key actuated means operating on said link at substantially right angles to its length to move the link transversely and effect a pivotal movement thereof.

32. In a typewriting machine, the combination of a type bar, a link operatively connected to the type bar, a fixed cam operative to move said link longitudinally when said link is moved transversely, key actuated means operating on said link at substantially right angles to its length to move the link transversely, and an abutment that resists a longitudinal movement of said link from its normal position to lock the type bar against rebound from the type rest.

33. In a typewriting machine, the combination of a type bar having a segmental toothed rack on the heel thereof, a link having a rack which meshes with said segmental rack, a fixed cam coöperative with said link to move it longitudinally when said link is moved transversely, and key actuated means operating on said link at substantially right angles to its length to move the link transversely.

34. In a typewriting machine, the combination of two links jointed together at their ends, a type bar connected with one of said links, a key lever connected with the other link, and a fixed cam with which the link connected with the type bar coöperates for controlling the motion of the first mentioned ends of said links.

35. In a typewriting machine, the combination of a front strike type bar, a horizontally disposed link and a vertically disposed link jointed together at their ends, said horizontally disposed link being connected to said type bar, a key lever connected to said vertically disposed link, and a fixed cam with which one of said links coöperates for guiding the ends of said links that are jointed together.

36. In a typewriting machine, the combination of a segmentally arranged series of front strike type bars, a series of links extending horizontally from said type bars, a series of vertical plates having cam slots for guiding the forward ends of said links, the several cam slots being each arranged at a height appropriate to the corresponding type bar, key levers, and connections from said key levers to said links.

37. In a typewriting machine, the combination of a type bar, a link connected with said type bar, a key, key-actuated means for moving said link transversely and effecting a pivotal movement of the link around a pivotal center near one end of the link, and a fixed cam with which said link coöperates for camming the link and effecting a longitudinal motion thereof when the link is given a pivotal movement, said cam being so formed as to give to said type bar an accelerated motion, the degree of such acceleration depending on the shape of said cam.

38. In a typewriting machine, the combination of a series of type bars, a series of links connected with said type bars, a series of key levers, connections whereby said key levers when operated give a transverse motion to said links, and cams coöperating with said links to give a longitudinal motion to said links when the latter are moved transversely, said key levers being of different lengths and said cams being at different inclinations to compensate for the difference in the lengths of said key levers.

39. In a typewriting machine, the combination of a type bar, a key lever, and connections between said key lever and said type bar comprising two tension members connected together and controlled by a fixed cam and with which one of said members coöperates to receive a camming movement in the direction of the length of said member.

Signed at Grand Rapids, in the county of Kent, and State of Michigan, this second day of February A. D. 1911.

GLENN J. BARRETT.

Witnesses:
FRED. H. DOERR,
EVERETT E. THAYER.