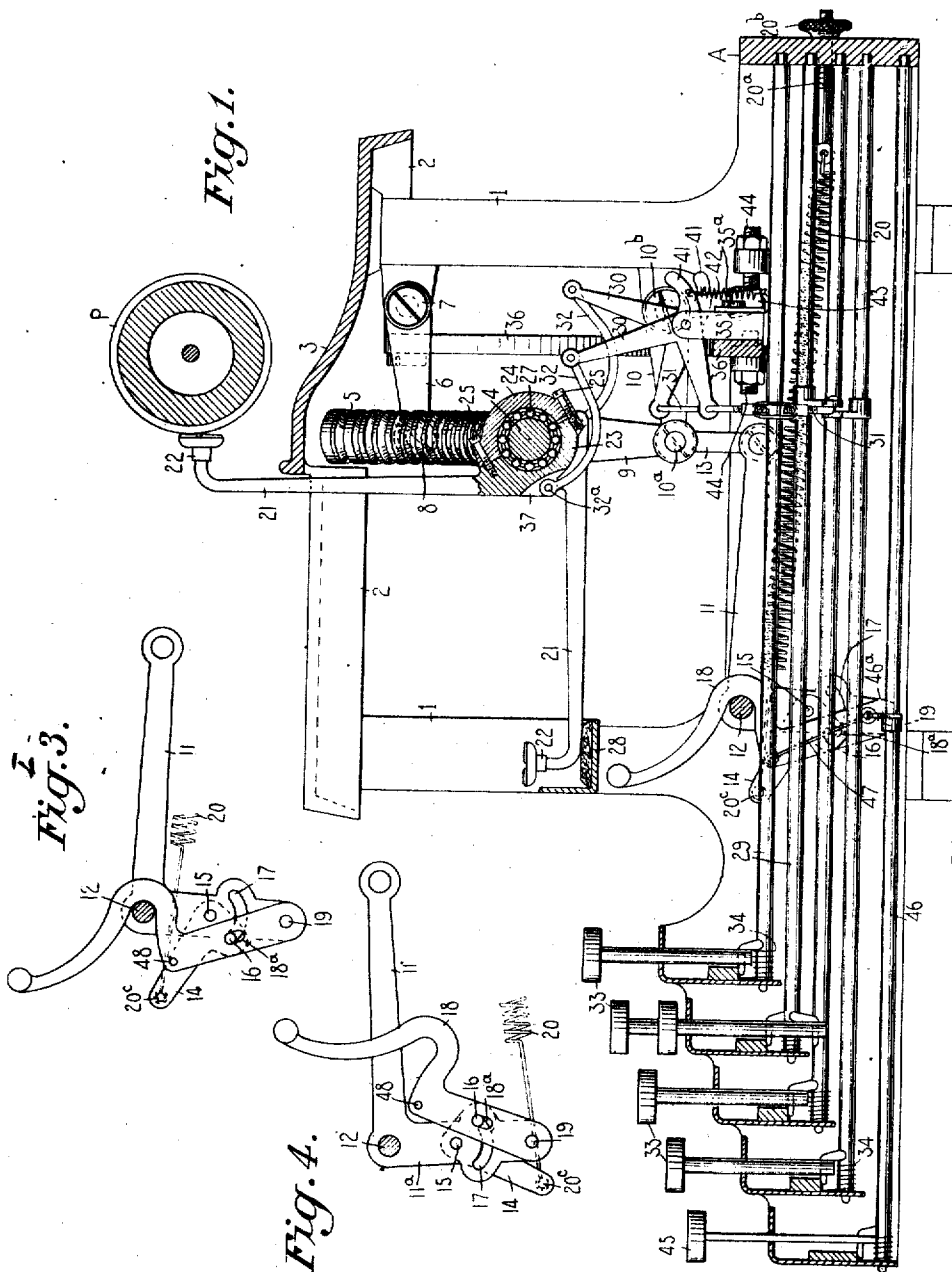


971,721.

Fig. 1.



Witnesses
E. M. Wells
Charles E. Smith

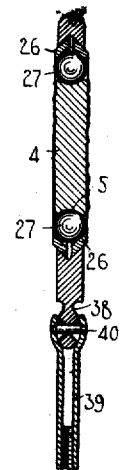
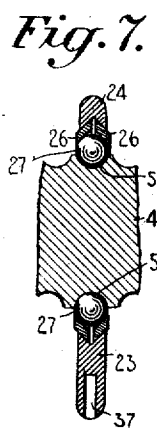
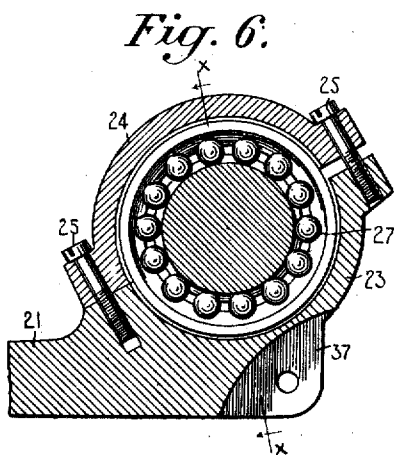
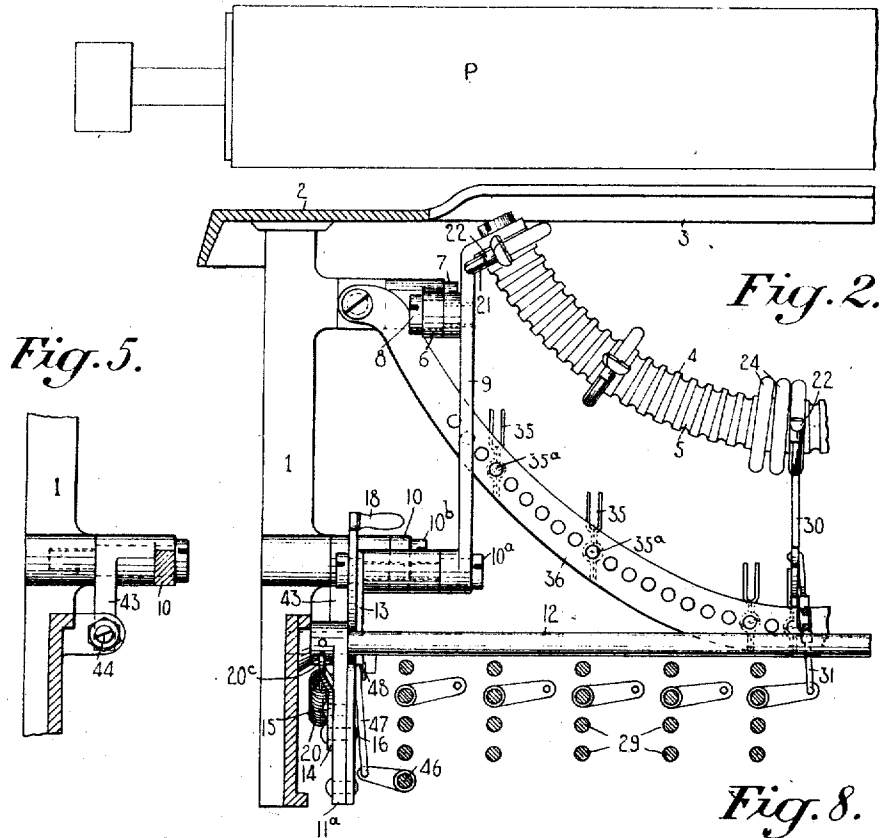
Inventor
Alexander S. Brown
By His Attorney Jacob Feller

A. T. BROWN.
TYPE WRITING MACHINE.
APPLICATION FILED APR. 2, 1904.

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Patented Oct. 4, 1910

3 SHEETS—SHEET 2.



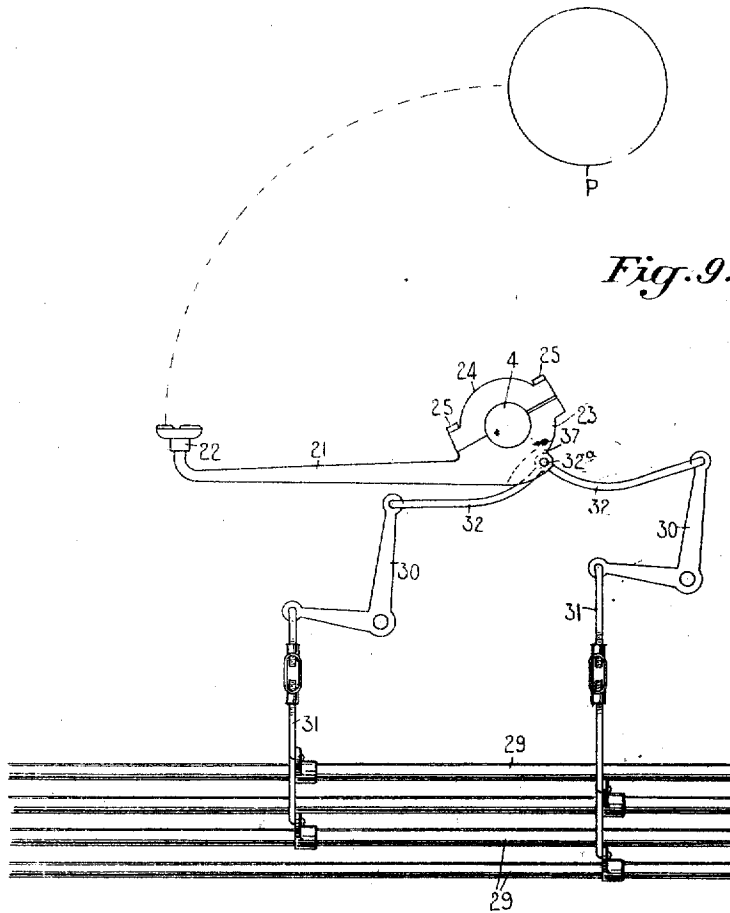
Witnesses
E. W. Wells.
Charles E. Smith

Inventor
Alexander T. Brown
By his Attorney Jacob F. Heller

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UNITED STATES PATENT OFFICE.

ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK.

TYPE-WRITING MACHINE.

971,721.

Specification of Letters Patent.

Patented Oct. 4, 1910.

Application filed April 2, 1904. Serial No. 201,260.

To all whom it may concern:

Be it known that I, ALEXANDER T. BROWN, 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.

The present invention relates more particularly to that class of typewriting machines wherein the type bars are mounted in comparatively small arcs or segments, another object being to use flat type bars or those which are devoid of side or lateral bends and to provide such bars with relatively large and steady bearings whereby the alinement may be preserved.

Another object is to shift the type bar segment for upper and lower case writing without disturbing the leverage or affecting the operation of any part of the type actions.

Other objects will appear hereinafter.

To these and other ends which will hereinafter appear the invention consists of features of construction, arrangements and combinations of devices hereinafter described and more particularly pointed out in the appended claims.

One form of the invention is illustrated in the accompanying drawings, forming part hereof, in which,—

Figure 1 is a central vertical longitudinal sectional view of the machine. Fig. 2 is a vertical transverse sectional view from the front of the machine with parts omitted. Figs. 3 and 4 are detail side views of the shifting mechanism. Fig. 5 is a fragmentary detail front view of the stop devices of the case shifting mechanism. Fig. 6 is an enlarged detail transverse sectional view of a type bar bearing shown on a smaller scale in Fig. 1. Fig. 7 is a sectional view of the same on the line $x-x$ of Fig. 6, and looking in the direction of the arrow at said line. Fig. 8 illustrates a modified form of connection with the type bar. Fig. 9 illustrates two ways in which the key mechanism may be connected with the type bars.

In the drawing the A indicates the base of a suitable framework in which the movable parts are mounted, said framework being provided with standards 1, to the upper

end of which the top plate 2 is secured. The platen P is carried by a suitable carriage (not shown), and 3 designates a plate or dust shield that is preferably substantially horizontal in transverse section and may be part of the top plate which extends across the machine underneath the platen, and forward of the front face thereof as shown in Fig. 1, and slopes backward, whereby scrapings from the paper on the platen will be caught by said plate 3 and may be removed from the machine by brushing and without falling upon the type mechanism, so that the grit or rubbings from the paper cannot reach the bearings of the type bars and other working parts of the type action.

A bar or pivotal support 4 for the type bars is bent into the form of a segment and provided with circumferential grooves 5 to form ball races that radiate substantially from the printing center. Said bar 4 is carried by arms or links 6 which are pivoted at 7 to the framework 1 of the machine and at 8 to uprights 9, one at each side of the segment, the lower ends of the uprights 9 being carried by rearwardly extending arms or links 10 which are pivoted to said uprights at 10^a and to the framework of the machine at 10^b. The arms 6 and 10 are of equal lengths and are in the nature of parallel links which afford a substantially vertical movement of the segment 4 and one which enables the segment to be in the same vertical plane in both the upper and lower case position of the segment. A bell crank lever 11 which is fulcrumed at 12 is connected by a link 13 with one of the uprights 9 or the associated arm 10. A bell crank lever 14 is pivoted at 15 on the arm 11^a of the lever 11 and is provided with a pin 16 which passes through a slot 17 struck in an arc of a circle whose center is the pivot 15. A hand lever 18 is pivoted at 19 on the lever 11 and is provided with a slot 18^a for engagement with the pin 16 of the lever 14. A spring 20 is adjustably connected with the framework A at one end by a screw 20^a and thumb nut 20^b and is connected at the other end 20^c with the lever 14. The lever 18 operates the lever 14 and so causes the point 20^c of attachment of the spring 20 to the lever 14 to be carried above and below the fulcrum 15, as indicated in Figs. 3 and 4,

whereby the spring 20 holds the type bar segment 4 in either its upper or lower case position, depending upon the position of the hand lever 18. The parts are so proportioned and arranged that the spring 20 exerts a greater leverage when the type bar segment is in its upper case position.

The type bars shown in the drawings are adapted to swing upwardly and rearwardly to the printing position and each bar consists of a body portion 21 having its type bearing end bent upwardly with relation thereto when the bar is at rest and provided with a type block 22 having two types thereon, and it is remarked that the bent or goosenecked end of the bar permits of accurate alinement of the type by slightly bending the bent end. The heel or hub of the type bar is made in two parts and is situated wholly at the same side of the body 21 of the bar and preferably at the same side as the type block 22. The heel is split in semi-circular halves 23 and 24 which are joined by screws 25, as shown in Fig. 6 so as to make an expansible and contractible split ring or eye and the inner faces of the semi-circular segments thus formed are provided with substantially V-grooves as indicated in Fig. 7 so as to provide oppositely disposed sloping walls for purposes presently to appear. Two endless rings or circular plates 26 whose inner and outer faces are conoidal, fit in the grooves of the parts 23 and 24 and the inner faces of the rings form race ways for balls 27 lying in the race ways 5 before mentioned. The rings 26 are supported side by side in the eye of the type bars and are forced toward each other by tightening the screws 25, whereby wear may be taken up at any time and the pressure be regulated by adjusting the screws 25 or one of them. The type bars in their normal positions rest in a basket 28 and afford ready access at all times to the adjusting screws 25 from the front of the machine.

The mechanism shown in the drawings for operating the type bars comprises key operated horizontally disposed rock shafts 29 that extend fore and aft of the machine, bell crank levers 30 and links 31 that connect the bell cranks to crank arms 31* on the rock shafts and bowed links 32 that are curved first downwardly and then upwardly and connect the bell cranks and type bars. The rock shafts are journaled in the frame A and the keys 33 are held in their upper positions by springs 34 each connected at one end to the frame of the machine and at the other end to a rock shaft. The bell cranks 30 are preferably of a uniform or substantially uniform size and are parallel and fulcrumed in individual hangers 35 which are connected by screws 35* with the segment 36 secured at its ends to the fixed framework of the machine. The bell cranks

and substantially horizontally disposed links 32 are thus segmentally arranged and are arranged in substantial accordance with the segmental arrangement of the type bars and so that the upper ends of the bell cranks are arranged in an arc that is substantially co-extensive with and directly in the rear of the arc in which the type bars are situated. The links 32 are curved in the manner shown so that each link will be bowed in the plane of movement of the type bar to which the link is connected and will receive the force applied thereto in the general direction of its length to afford a resiliency thereof and such links may be connected with the type bars by means of rivets or pins 32* passing through perforations in the ears 37 formed on the type bars and through eyes on the ends of the link, as indicated in Figs. 1 and 6. One side of each type bar may be milled away where it connects with the associated link, or the type bars may be provided with arms 38 of lenticular or spherical shape formed as indicated in Fig. 8, such arms being perforated and the perforations being countersunk, and the links 32 each being provided with spring arms 39, one of which has a pin 40 riveted therein and the other being provided with a perforation for receiving the free end of the rivet 40, and said rivet 40 passing through the arm 38 of the associated type bar. This construction affords a relative movement of the type bar and link in more than one direction to avoid cramping the parts in the operation of the machine and the resiliency of the arms 39 render them separable so that a connection or disconnection between each link and type bar may be readily effected. By constructing and connecting the links 32 in the manner shown the greatest extent of cranking or leverage of each link on its associated bar is afforded at the initial portion of the printing stroke and each link is substantially concentric with the pivotal center of its associated type bar when the latter is in the printing position and a portion of the type bar is seated in the curve of the link. The bell crank levers 30 may be in the nature of three arm levers by providing them with arms 41 to which restoring springs 42 are secured to quicken the return of the type mechanism.

One or both of the arms 10 of the shifting mechanism may be provided with an arm 43 whose motion is limited by oppositely disposed adjustable stops 44 on the fixed frame of the machine, whereby the shift mechanism is limited in its motion and the proper position of the segment in both the upper and lower case position thereof may be determined. The spring 20 holds the arm 43 against one or the other of stops 44, according to the position of lever 11. A key 45 is provided for operating the shift

mechanism against the force of the spring 20 so that upon the release of the shift key 45 the shift mechanism will return the type bar segment to the position from which said key moves the same. The key 45 operates a rock shaft or lever 46 which has its crank arm 46^a connected by a link 47 with the lever 18 at the point 48.

The levers 30 may be placed in front or in rear of the segment 4, as is indicated in Fig. 9, but it is preferred to put them in rear of said segment as it brings the entire type bar bearings and the bearings of the bell-levers 30 and their operating mechanism under the cover of the plate 3, whereby they are protected from falling particles and more particularly the grit or rubbings that may fall from the platen or paper thereon.

It will be understood that by bending the free end of the type bars in the manner shown and by locating or off-setting the type block and the hub or heel of each bar at the same side of the body portion thereof, a construction is provided which enables the top plate to extend over the pivotal bearings of the type bars and into the recess in the bar thus formed, so that the top plate may be interposed between the printing line and the pivot bearings of the type bars and yet not interfere with the printing operation of the type bars.

The invention is not limited to the precise details or arrangements thereof illustrated in the drawings and above described; changes and inversions may be made without departing from the invention.

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

1. The combination of a curved bar provided with radially arranged ball races, balls therein, type bars, one for each of said races, made with internally grooved semi-circular or segmented bearing parts, conical annuli, a pair for each type bar and having their external cones caught within said grooves of said segments, and screws arranged in the planes of the type bars for connecting said segments and varying their relative positions, whereby the type bars may be brought close together and yet be rigid against side play.

2. The combination of a curved bar provided with radially arranged ball races with adjacent races in an arc concentric with the printing point, balls in said races, type bars, one for each of said races and made with internally grooved semi-circular or segmented bearing parts, conical annuli, a pair for each type bar and having their external cones caught within said grooves of said segments, and screws arranged in the planes of the type bars for connecting said segments and varying their relative positions, whereby the type bars may be brought close together and yet be rigid against side play.

3. In a typewriting machine, the combination of a curved bar support having radial ball receiving grooves, type bars each having an expansible and contractible eye that surrounds a ball groove of the support, independent bearing members received within the eye of each type bar and forming a ball race between them and which receive a relative adjustment by an expansion or contraction of the eye of the associated type bar, and balls interposed between said bearing members and said grooved support.

4. In a typewriting machine, the combination of a bar segment having radial ball receiving grooves, type bars each having a sectional eye that surrounds a ball groove of the segment, adjustable means for uniting the members of each of said eyes, independent bearing rings received within and carried by the eye of each type bar and forming a ball race between them and which receive a relative adjustment by a relative adjustment of the members of the eye of the associated type bar, and balls interposed between said bearing rings and said grooved segment.

5. In a typewriting machine, the combination of a type bar that has its pivotal end split, and means to which access may be gained from the front of the machine and while the type bar is in normal position for uniting said split portion of the type bar.

6. In a typewriting machine, the combination of a type bar that has its pivotal end made in sections, and means to which access may be gained from the front of the machine and while the type bar is in normal position for uniting and effecting a relative adjustment of said sections.

7. In a typewriting machine, the combination of an upwardly and rearwardly striking type bar having its pivotal end made in sections, and means that may be adjusted from the front of the machine and while the type bar is in normal position for uniting the sections and adjusting the bearings thereof.

8. In a front strike typewriting machine, the combination with a platen, upwardly and rearwardly striking type bars, and a top plate of the machine having a portion thereof interposed between the pivotal portions of the type bars and the front face of the platen to prevent scrapings or grit that may drop from the front face of the platen or the paper thereon from entering the pivotal bearings of the type bars.

9. In a front strike typewriting machine, the combination of an upwardly and rearwardly striking type bar having the type or types thereon and the pivotal portion thereof off-set from the body of the bar and on the same side thereof so as to form a recess in the bar, and a plate substantially coincident with the top plate of the machine and

extending into said recess in the bar when it is in the printing position to cover the pivotal bearing thereof.

10. In a front strike typewriting machine, the combination of a platen, an upwardly and rearwardly striking type bar having the type or types thereon and the pivotal portion thereof off-set from the body of the bar and on the same side thereof so as to form a recess in the bar, the pivotal portion of the bar being situated in a vertical plane substantially coincident with the front face of the platen, and a fixed plate substantially coincident with the top plate of the machine and extending into said recess in the bar when it is in the printing position and forward of the pivotal bearing thereof to cover said pivotal bearing.

11. In a front strike typewriting machine, the combination of a platen, upwardly and rearwardly striking type bars and a dust shield that is formed as a part of the top plate of the machine and extends forward of the front face of the platen and covers the pivotal bearings of the type bars.

12. In a front-strike typewriting machine, a dust shield arranged above the ends of the curve of the arc in which the type bars are pivoted and extending in an unbroken line across the printing point of the machine.

13. In a front-strike typewriting machine, the combination of a series of rearwardly striking pivoted type bars, the pivotal centers of which are arranged in an upright arc, and a dust shield arranged over the pivots of the type bars and above the chord of the arc in which said type bars are pivoted and extending uninterruptedly across the printing point.

14. In a front strike typewriting machine, the combination of a platen, a series of upwardly and rearwardly striking pivoted type bars, and a top plate of the machine interposed between the pivotal bearings of the type bars and the printing line on the platen.

15. In a front strike typewriting machine, the combination of a platen, a series of upwardly and rearwardly striking pivoted type bars, and a top plate of the machine interposed between the pivotal bearings of the type bars and the printing line on the platen, and which slopes downwardly and rearwardly from the forward edge portion thereof which extends beyond and protects the pivotal bearings of the type bars.

16. In a front strike typewriting machine, the combination of a platen, a series of upwardly and rearwardly striking pivoted type bars, actuating devices therefor, and a fixed top plate of the machine that has its front edge extending forward of the pivotal bearings of the type bars and forward of the front face of the platen and between said pivotal bearings and front face, and which protects the pivotal bearings of the type bars, said

actuating devices and all of the working parts of the machine beneath the top plate and between the front and the rear edge thereof from falling grit or rubbings that may drop from the platen.

17. In a typewriting machine, the combination of a series of rearwardly striking pivoted type bars, a shiftable segment that carries said type bars, and a dust-shield that covers the pivotal bearings of said type bars, and which is carried by a fixed portion of the machine and is fixed against movement with the type bar segment.

18. In a typewriting machine, the combination of a series of rearwardly striking pivoted type bars, a shiftable segment that carries said type bars, and a top plate of the machine that extends above and covers the pivotal bearings of said type bars.

19. In a front strike typewriting machine, the combination of a platen, a segment, a series of upwardly and rearwardly striking pivoted type bars carried thereby, and a fixed plate that is located above the segment and between the pivotal bearings of the type bars and the front face of the platen and which is substantially horizontal in transverse section and protects the pivotal bearings of the type bars from grit or rubbings that may drop from the platen or the paper thereon.

20. The combination of a type bar segment arranged vertically, type bars connected therewith and having their main longitudinal parts to one side of their axes of motion, a platen having its printing line substantially in the vertical plane through the axes of said type bars, and a top-plate of the machine covering said bar segment, whereby the type mechanism is protected from scrapings that may drop from the platen.

21. A front strike typewriting machine having a platen above the frame and a backwardly sloping top plate under said platen and extending forward of the vertical plane tangent to said platen at its front face and type mechanism below said plate whereby the type mechanism is protected from scrapings that may drop from the platen.

22. In a front strike typewriting machine, the combination with a curved bar provided with ball races and arranged in a vertical plane, flat type bars provided with ball races and having both races and type blocks wholly to one side of their main bodies, balls in said races, a platen having its printing line substantially in the vertical plane through the axis of said bar, and a backwardly sloping top plate interposed between the platen and bar and covering the type bar bearings against scrapings that may drop from the platen.

23. In a typewriting machine, the combination of a series of segmentally arranged upwardly and rearwardly striking pivoted

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type bars, a series of segmentally arranged bell cranks that vibrate fore and aft of the machine and which terminate at their upper ends in an arc substantially coextensive with the arc in which the type bars are situated, and a series of curved links that extend fore and aft of the machine and connect the type bars and bell cranks, the curve in each link being in a plane coincident or substantially coincident with the plane of movement of the associated type bar.

24. In a front strike typewriting machine, the combination of a pivoted type bar, a key operated rock shaft, a crank on said shaft, a bell crank lever operatively connected to said shaft, a curved link between said type bar and bell crank lever and connected to the type bar so as to have its greatest leverage on said type bar during the first part of the stroke.

25. In a front strike typewriting machine, the combination of a pivoted type bar, a key operated rock shaft, a crank on said shaft, a bell crank lever having one arm extending forwardly in the machine, a link connecting said forward arm with said crank, and a curved link between the type bar and bell crank lever and connected to said type bar below its pivot to have its greatest leverage on said bar during the first part of the stroke.

26. In a front strike typewriting machine, the combination with a type bar turning on a row of balls lying in the plane of motion of said bar, a key operated rock shaft, a crank on said shaft, a bell crank lever having an upstanding and a forwardly extending arm, a link connected to said upstanding arm and to the type bar below its pivot and having its greatest leverage on said bar during the first part of the stroke and bent in the plane of motion of said type bar to relieve stiffness, and a link connecting said crank on the rock shaft and said forward lever-arm of the bell crank.

27. In a front-strike typewriting machine, the combination with a type bar turning on a row of balls lying in the plane of motion of said bar, a key operated rock shaft, a crank on said shaft, a bell crank lever, a link connected to the upper arm of said bell

crank lever and bent in the plane of motion of said type bar and connected thereto to have its greatest leverage thereon during the first part of the stroke acting thereafter with a decreasing leverage, and a link connecting said crank and a horizontal arm of said bell crank lever.

28. In a front-strike typewriting machine, the combination of a type bar segment, type bars pivoted thereon, parallel motion arms operatively connected to and by which said segment is moved up and down for shifting the case, bell crank levers fulcrumed on the main frame, links for connecting the upper arms of said bell crank levers with the type bars, and means for actuating said bell crank levers.

29. In a typewriting machine, the combination of a key actuated sub-lever, a type bar, a curved resilient link interposed between the type bar and sub-lever, the curvature of the link being in substantially the same plane as the plane of movement of the type bar, and a series of key actuated rock shafts operatively connected to said sub-levers.

30. In a front-strike typewriting machine, the combination of a series of segmentally arranged upwardly and rearwardly striking pivoted type bars, a series of segmentally arranged bell cranks that vibrate fore and aft of the machine and which terminate at their upper ends in an arc substantially coextensive with the arc in which the type bars are situated, a series of curved links that extend fore and aft of the machine and connect the type bars and bell cranks, the curve in each link being in a plane coincident or substantially coincident with the plane of movement of the associated type bar, and key actuated rock shafts which extend fore and aft of the machine and which are operatively connected to said bell cranks.

Signed at Syracuse, in the county of Onondaga and State of New York this twenty-sixth day of March A. D. 1904.

ALEXANDER T. BROWN.

Witnesses:

JOHN H. BARR,
GEO. C. CARHART.