A. T. BROWN.

TYPE WRITING MACHINE.

APPLICATION FILED MAR. 4, 1904.

923,243.

Patented June 1, 1909.

2 SHEETS—SHEET 1.

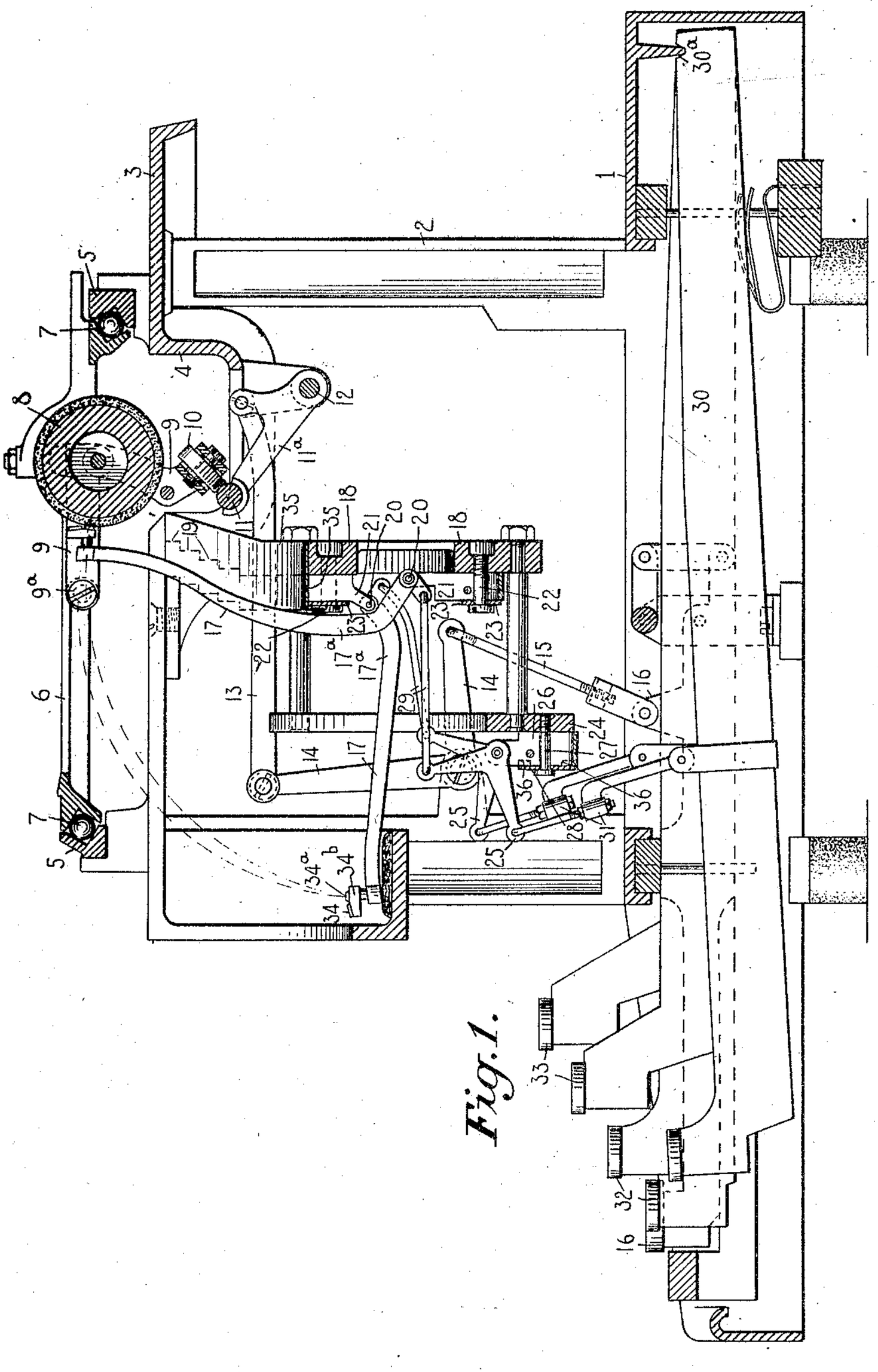

Fig. 1.

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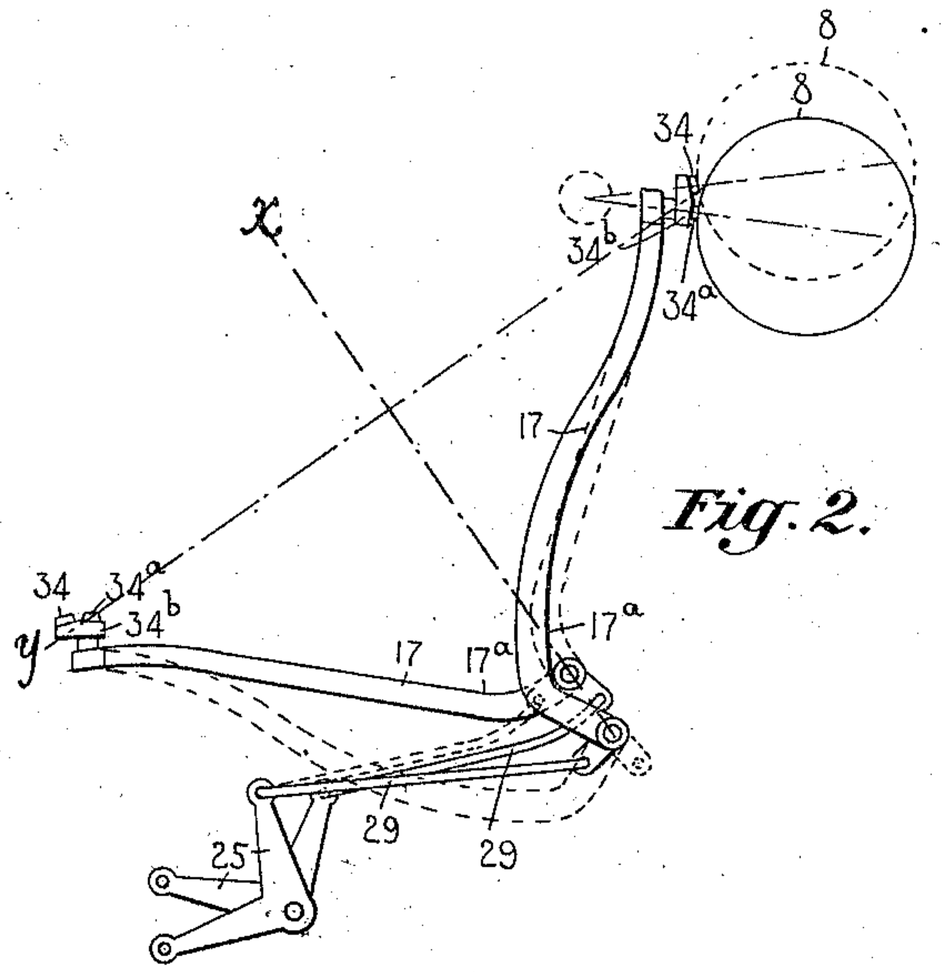
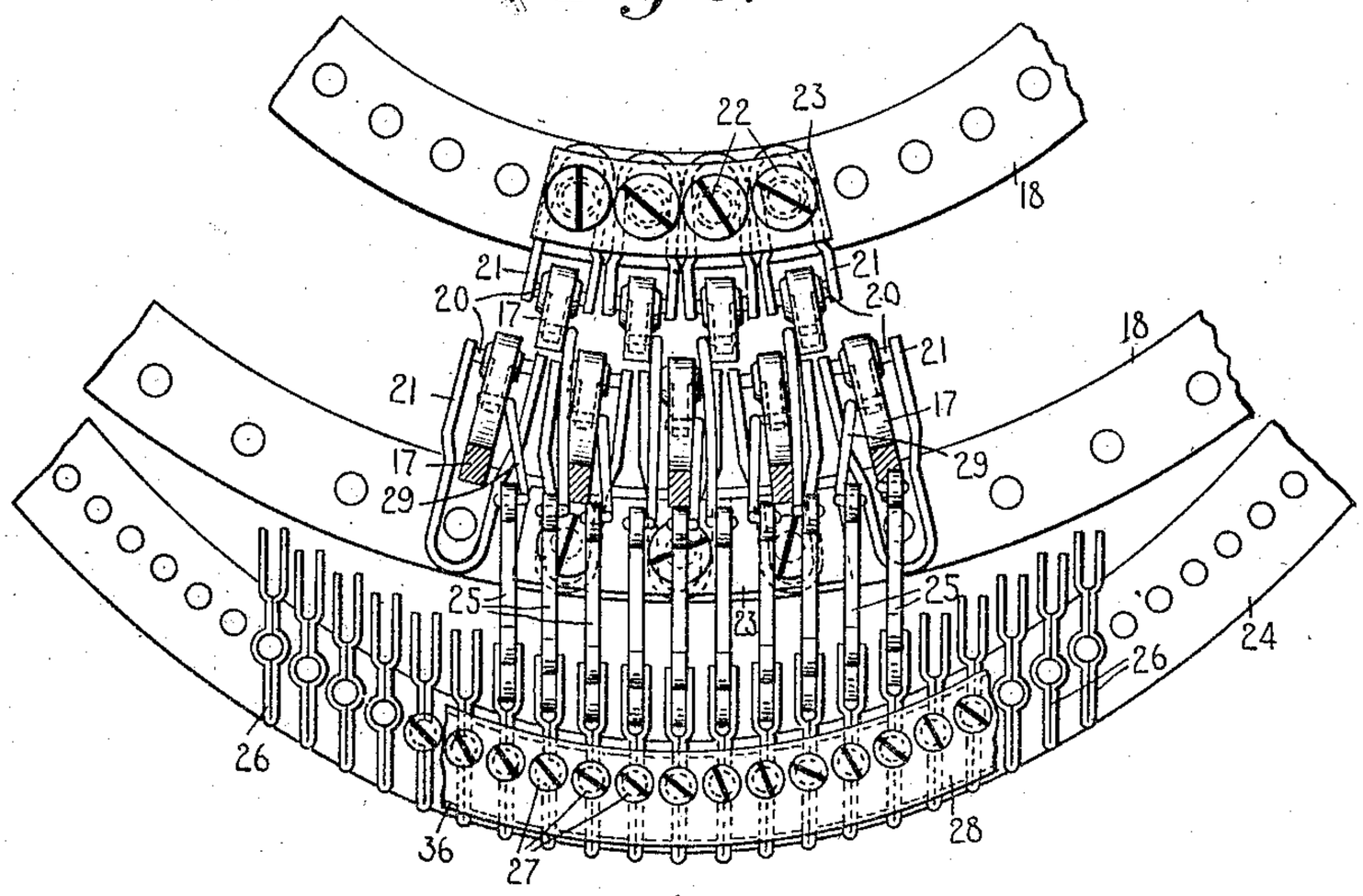


Fig. 2.

Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK.

TYPE-WRITING MACHINE.

No. 923,243. Specification of Letters Patent. Patented June 1, 1909.

Application filed March 4, 1904. Serial No. 196,537.

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 to typewriting machines, and more especially to front strike typewriting machines, the objects of this invention being to hang the type bars in several arcs all on the same side of the printing point and with a minimum difference in the length of the type-bars of the several sets; to secure uniformity of touch; to secure direct action upon the type-bars; in a front strike typewriting machine, to use long bearings or transverse pivot bars for the type levers or bars; to pivot type bars having long bearings or transverse pivot bars in arcs whose average radius is not materially different from that of the arc in which flat type bars in front strike typewriting machines are pivoted; to protect type bar pivots from falling dust, scrapings, etc.; to prevent the turning of hangers or supports for levers; to increase the durability of the machine, simplify its construction, and at the same time to preserve or use standard forms or parts; and other objects as will hereinafter appear.

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

The invention is embodied in the machine illustrated in the accompanying drawing forming part hereof, in which:—

Figure 1 is a central vertical longitudinal sectional view. Fig. 2 is a diagrammatic side elevation illustrative of the platen shift and the type action; and Fig. 3 is a detail fragmentary front view partly in section showing the connections to the type bars and the arrangement of the hangers, type bars and bell cranks.

Referring to the drawing, the reference numeral 1 indicates the base of a frame having posts or standards 2 to which a top plate 3 is attached. The top plate 3 has a drop, recessed or depressed portion 4 for a purpose presently to appear.

5 marks guide rails secured to the top plate 3 and 6 is a carriage running upon anti-friction devices 7 which coöperate with the rails 5 and 6 and connect the carriage and the rails and prevent the former from rising. A platen 8 is suitably journaled in a platen frame or carrier 9 which is pivotally connected at 9^a with the carriage 6 in front of the platen so that the platen 8 may have a limited up and down motion with the platen frame, it being understood that the usual detent (not shown) is carried by the platen frame and coöperates with the platen or with the line-spacing wheel thereof. The frame 9 is p vided with an anti-friction roller 10 which runs upon a shift rail or bar 11, carried by arms 11^a from a rock shaft 12 which is journaled in hangers from the top plate 3 and is rocked by a link 13, bell-lever 14, link 15 and a key lever 16, said parts being pivotally connected. The drop 4 in the frame 3 provides an unobstructed space for the lower parts of the platen-carrier 9 to afford a travel thereof with the carriage, beyond the sides of the machine frame.

The two series of segmentally arranged upwardly and rearwardly striking type bars 17 are supported at their pivotal ends by two type bar segments 18 of different radii and which are rigidly connected to the top plate 3 and may be cast as one part or connected together in any suitable manner, but whether cast in one piece or connected by any suitable means may be regarded as two segments. In the disposition of the parts illustrated in the drawing, these segments 18 are arranged vertically one below or outside of the other with relation to the printing point, and each segment has its ends at about the level of the bottom of the platen 8 and these ends are carried backward in a step-like manner, as indicated at 19, to receive the hangers for the type bars at the sides of the system. This arrangement of the type bar segments permits the platen carrier 9 to be pivotally connected with the carriage 6 at a point in front of the platen 8 and simplifies its construction and for reasons which will hereinafter appear the construction is rendered more efficient.

The type bars 17 shown in the drawing are mounted upon transverse pivots or journals 20, which are connected to the bars and are received within journal bearings in lugs, ears or arms 21 of the type bar hangers, which lugs, ears, or arms are joined by a cross piece in such a manner that when viewed from the

front, the hanger has the general appearance of the letter "U", the cross pieces connecting the lugs, ears or arms of the lower set of hangers being lowermost, whereas the cross pieces of the hangers of the upper set are uppermost. By preference, cone-bearings are used in connecting the type bars and the U-shaped hangers and the hangers are connected with the segments 18 by headed screws 22 and washers 23. The type bar hangers of one set are staggered with relation to the hangers of the other set, whereby the type bars that are pivoted farthest from the platen move between those pivoted nearer the platen without, however, moving between the hangers of the uppermost set of type bars. The type bar hangers are oppositely disposed so that the type bar bearing portions of the hangers of one set project toward the type bar bearing portions of the hangers of the other set in the same vertical plane and cover them, whereas the stems of one set of hangers extend away or in an opposite direction from the stems of the hangers of the other set, and the pivots of the type bars are situated in two arcs arranged at different heights and intermediate the type bar segments 18; that is to say, the said pivots are at a greater distance from the printing point than one, and at a less distance from the printing point than the other of said segments, an arrangement that provides space for wide bearings within the limits of the frame of standard machines. It will be observed that, in the instance illustrated in the drawing, the radial and segmentally arranged type bar hangers are mounted in two sets or series located one directly above the other upon vertical faces of the segments 18 that are in the same or substantially the same vertical plane, which is the preferred arrangement, and that the construction is such as to afford a radial adjustment of each hanger and also a lateral adjustment thereof around the associate screw 22 therefor.

While the front faces of the segments 18 and the coöperating securing faces of the hangers 21 are in the same or substantially the same vertical plane it will be observed that the pivotal points of the two sets of type bars are arranged in different relative positions on their hangers and are situated in two parallel vertical planes and that a plane represented by the dotted line *x* (Fig. 2) in which the pivots of each fore and aft pair of type bars is situated, is substantially midway between the printing point and a type on one of said bars when the latter is at rest, or at substantially right angles to a line extending from one of said types to the printing point, as indicated by the dotted line *y*, and that by this arrangement the free ends of the type bars of both sets terminate substantially in the same vertical transverse plane, except where they are stepped back at the ends of the segments. Notwithstanding this relation, that the pivotal centers of each fore and aft set of type bars bear one to the other, an individual adjustment of the hangers both radially and laterally is afforded.

A segment 24 is mounted in the machine in front of and below the type bar segments 18, and a single series of parallel, segmentally arranged bell cranks 25 of a uniform or substantially uniform size throughout the series is pivotally connected with the segment 24, preferably by means of independent parallel hangers or supports 26, headed screws 27 and a washer or covering plate 28. From an inspection of Figs. 1 and 3 it will be observed that each of the hangers 26 is formed of a single strip of metal doubled and folded on itself and formed with an enlargement or opening in the stem for the passage of the stem of a screw 27 which secures the hanger in place and that the free ends of the folded strip of metal are bent outwardly to form a bifurcated portion in which the pivoted member or bell crank 25 is received. The bell cranks are mounted in their hangers upon horizontal axes, so that pivots of bell cranks are alined or extend in an arc situated in a plane that extends transversely of the machine, and the bell cranks are connected with the type bars 17 by substantially horizontally disposed wire draw links 29, the pivotal connection between each type bar and its link 29 being in the plane of movement of the bar.

By reference to Fig. 3 it will be observed that the links 29 pass through the arms of the type bars 17 from the inside; that is, said links are between their respective type bars and the center of the machine, an arrangement that contributes to compactness and efficiency of operation. It will also be seen by reference to Fig. 1 that the hangers for the type bars and bell cranks and the pivots of the type bars and bell cranks are situated in arcs, the planes of which are in parallel vertical planes, and it will be understood that the segments 18 and the two sets of type bars occupy approximately the same angular space about the printing point.

The bell cranks 25 are connected with the key levers 30 by two-part links 31 the members of each link being adjustably connected to shorten or lengthen the links, the links connecting with the key levers in a single transverse plane. The key levers 30 are fulcrumed at 30^a in a single transverse plane and the keys upon the key levers shown in the drawings are arranged in two sets, each set containing two banks of keys, a front set 32 and a rear set 33, and the bell crank 25 connected with the longer levers, having the front set of keys 32, are connected with the longer type bars 17, while the shorter key levers having the rear set of keys 33 are connected with shorter type bars, thus af-

fording a substantially uniform leverage and "touch" throughout the system of type actions.

The types 34 and 34[a] upon each type-head or block 34[b] are arranged with their faces in planes which intersect in front of the type faces and at an obtuse angle. It will be observed that the type faces match a face of the platen, as indicated in Fig. 2, in either shifted position of the platen.

By reason of the peculiar beveled or inclined arrangement of the faces of the types, I am enabled to place the types much closer together than heretofore and thus reduce the amount of offset or extent of "cranking" heretofore necessary in mounting several types upon a bar, and especially those bars which approach and are at the upper ends of the segment. For example, it will be understood that if the faces of the types were both in the same plane or were inclined reversely to that shown, the types would have to be more widely separated in order to avoid the liability of a portion of one type printing when another on the same bar is leavin its impression. When, however, the faces of the types on the same bar are inclined backwardly away from each other in the manner shown, a greater space is provided between the surface of the platen and the type on the bar which is not at the printing point when the other type is in printing position, and hence a relatively shorter shift of the line of print may be obtained without liability of both types printing at the same blow. Thus the close arrangement of the types on each type block not only reduces cranking action, thereby avoiding blurring when the offset type is printing, but it likewise enables a reduced shifting movement at the printing point without liability of a part of one type printing upon the platen when the other type on the same bar is printing. By this construction I am able to employ comparatively thick and rigid type bars which are straight throughout their lengths, that is to say, bars which at their type ends have no lateral or sidewise bends, but of course my improved types may be used with bars having such bends. The straight type bar avoids the liability of the type being deflected or "whipped" out of its proper course during a rapid or violent movement of the type bar to the printing position. This defect is particularly apparent in a thin sheet metal type bar having a lateral bend at its free end where the types are located.

A fixed sheet metal segmental cover plate or dust shield 35 is bent and shaped to overlie the hangers 21 and the pivots of the type bars and to overlap or extend over the upper type bar segment 18, thereby protecting the hangers and type bar pivots from falling dust, grit, scrapings, etc., which may fall from the front face of the platen in making erasures. It will be seen that each type bar has a bend, depression or recessed portion 17[a] in which the dust shield 35 is received when the type bar is in the printing position, so that while the pivots of the type bars are beneath the shield it nevertheless does not interfere with the movement of the type bars to the printing positions.

The washer or covering plate 28 shown in the drawing is provided at its edges with lugs or ears 36 which provide spaces between them for spacing apart and preventing motion of the hangers 26 that are seated in recesses formed between the lugs or ears 33 on the plate 28, whereby the hangers may be readily positioned and are prevented from turning on the screws 27.

The invention is not limited to the precise construction shown in the drawings and above described, for the construction may be embodied in forms other than that illustrated and described herein without departing from the invention, and while the various features of my invention are shown embodied in a front strike machine, from certain aspects the invention is not restricted to such a machine.

Case-shifting mechanism differing in details from the construction herein shown and the beveled faced types are claimed broadly in my application Serial No. 103,898, filed April 21, 1902. The specific form of case-shifting mechanism shown and described herein, however, is claimed in a division of this present application, said division bearing Serial No. 461,396, filed November 6th, 1908.

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

1. In a front strike typewriting machine, the combination of two sets of substantially horizontally disposed upwardly and rearwardly striking type bars of different lengths, the free ends of the type bars of both sets terminating substantially in the same transverse plane, the type bars of one set working between the type bars of the other set, draw links connected to said type bars, bell cranks that are mounted to vibrate fore and aft of the machine and which are connected to the links of both sets of type bars, key levers, and links interposed between said key levers and bell cranks.

2. In a front strike typewriting machine, the combination of two sets of substantially horizontally disposed upwardly and rearwardly striking pivoted type bars of different lengths, the free ends of the type bars of both sets terminating substantially in the same transverse plane, the type bars of one set being pivoted in an arc arranged forward of and at a greater height than the arc in which the type bars of the other set are pivoted, and the type bars of one set working between the type bars of th other set, draw

links connected to said type bars, bell cranks connected to said links, key levers, and links interposed between said key levers and bell cranks.

3. In a front strike typewriting machine, the combination of two segments arranged one above the other in substantially the same vertical plane, type bar hangers mounted on the front faces of said segment, two sets of substantially horizontally disposed upwardly and rearwardly striking type bars of different lengths pivoted to said hangers, the type bars of one set working between the type bars of the other set, and key actuated means for operating said type bars.

4. In a front strike typewriting machine, the combination of two segments arranged one above the other in substantially the same vertical plane, type bar hangers mounted on the front faces of said segment, two sets of substantially horizontally disposed upwardly and rearwardly striking type bars of different lengths pivoted to said hangers, the type bars of one set working between the type bars of the other set, links connected to said type bars, bell cranks connected to said links, and key levers connected to said bell cranks.

5. In a front strike typewriting machine, the combination of two sets of substantially horizontally disposed upwardly and rearwardly striking pivoted type bars of different lengths, the free ends of the type bars of both sets terminating substantially in the same transverse plane, the type bars of one set being pivoted in an arc at a different height from the arc in which the pivots of the type bars of the other set are located, and separate hangers to which said type bars are pivoted, the construction and arrangement being such that the type bars of one set work between the type bars of the other set without working between the hangers thereof.

6. In a front strike typewriting machine, the combination of two segments arranged one above the other in substantially the same vertical plane, two sets of type bar hangers mounted on the front faces of said segments one above the other, two sets of substantially horizontally disposed upwardly and rearwardly striking type bars pivoted to said hangers, the type bars of one set working between the type bars of the other set but not between the hangers thereof, and key actuated means for operating said type bars.

7. In a front strike typewriting machine, the combination of two segments arranged one above the other, in substantially the same vertical plane, two sets of type bar hangers mounted on the front faces of said segments one above the other, two sets of substantially horizontally disposed upwardly and rearwardly striking type bars pivoted to said hangers, the type bars of one set working between the type bars of the other set but not between the hangers thereof, links connected to said type bars, bell cranks connected to said links, and key levers connected to said bell cranks.

8. In a front strike typewriting machine, the combination of two sets of substantially U-shaped type bar hangers with the open mouths thereof presented toward each other and located in the same vertical plane, the type bar hangers of one set being located above the other set of hangers and staggered relatively thereto, upwardly and rearwardly striking type bars pivoted to said hangers, and key actuated means for operating said type bars.

9. In a front strike typewriting machine, the combination of two sets of substantially U-shaped type bar hangers with the open mouths thereof presented toward each other and located in the same vertical plane, the type bar hangers of one set being located above the other set of hangers and staggered relatively thereto, upwardly and rearwardly striking type bars pivoted to said hangers, links connected to said type bars, bell cranks connected to said links, key levers, and links connecting said key levers and type bars.

10. In a typewriting machine, the combination of two sets of type bars pivoted in two arcs which are in parallel planes, a single set of bell cranks pivoted in a single arc and operatively connected to said type bars, and key levers operatively connected to said bell cranks.

11. In a front strike typewriting machine, the combination of two sets of upwardly and rearwardly striking type bars pivoted in two arcs one above the other said arcs being in parallel planes, a single set of bell cranks pivoted in a single arc and operatively connected to said type bars, and key levers operatively connected to said bell cranks.

12. In a front strike typewriting machine, the combination of two sets of upwardly and rearwardly striking type bars pivoted in two arcs located one above the other, a single set of bell cranks pivoted in a single arc, the plane of which is parallel to the plane of the arcs in which the pivots of the type bars are situated, said bell cranks being operatively connected to said type bars, and key levers operatively connected to said bell cranks.

13. In a typewriting machine, the combination of two sets of type bars pivoted in two arcs that are in parallel planes, a single set of bell cranks pivoted in a single arc and operatively connected to said type bars, links that connect said type bars and bell cranks, key levers, and links that connect said key levers and bell cranks.

14. In a typewriting machine, the combination of two sets of type bars, the pivots of which are located in two arcs that are in parallel planes, the type bars of one set being adapted to work between the type bars of the other set, a set of bell cranks pivoted in a

single arc and operatively connected to said type bars, and key levers operatively connected to said bell cranks.

15. In a front strike typewriting machine, the combination of two sets of type bars the pivots of which are located in two arcs one above the other, the type bars of one set being adapted to work between the type bars of the other set, a set of bell cranks pivoted in a single arc, the plane of which is parallel to the planes of the arcs in which the pivots of the type bars are situated, said bell cranks being operatively connected to said type bars, and key levers operatively connected to said bell cranks.

16. In a front strike typewriting machine, the combination of two sets of oppositely disposed hangers that are arranged in two vertical arcs one above the other, the hangers of one set being staggered relatively to the hangers of the other set, upwardly and rearwardly striking type bars pivoted to said hangers, a single set of bell cranks for all of said type bars, all of said bell cranks being pivoted in a single arc, and a plane which is parallel to the planes of the arcs in which the hangers are situated, key levers, and operative connections between said key levers and bell cranks and between said bell cranks and type bars.

17. In a front strike typewriting machine, the combination of two sets of type bars, the pivots of which are arranged in two arcs one above the other, a single series of bell cranks of a uniform size and the pivots of which are situated in an arc forward of and in a plane parallel to the planes in which the type bar pivots are situated, links that extend from said bell cranks to both sets of type bars, key levers, and links connecting said type bars and bell cranks.

18. In a front strike typewriting machine, the combination of two sets of type bars, the pivots of which are arranged in two arcs one above the other in the same vertical plane, the type bars of one set being staggered relatively to and working between the type bars of the other set, a single series of bell cranks of a uniform size and the pivots of which are situated in an arc forward of and in a plane parallel to the planes in which the type bar pivots are situated, substantially horizontally disposed draw links that extend from said bell cranks to both sets of type bars, key levers, and links connecting said type bars and bell cranks.

19. In a typewriting machine, the combination of two sets of type bars of different lengths, and key levers having their keys arranged in different banks fore and aft of the machine and pivoted in a substantially single transverse plane, all of the levers with keys in the forward banks being connected to the long type bars, and all of the levers with keys in the rear banks being connected to the short type bars.

20. In a typewriting machine, the combination of two sets of type bars of different lengths and key levers fulcrumed in a single plane and have their keys arranged in different banks fore and aft of the machine, intermediate connections between the key levers and type bars, the levers with keys in the forward banks being connected to the long type bars and the levers with keys in the rear banks being connected to the short type bars, all of said intermediate connections connecting with the key levers in substantially the same transverse plane.

21. In a typewriting machine, the combination of two sets of type bars of different lengths, a single set of bell cranks of a uniform size that are operatively connected to said bell cranks, key levers which have their keys arranged in different banks fore and aft of the machine, and connections from said key levers to said bell cranks, the points of the various connections to the key levers being in the same plane transverse of the machine, and the key levers having their keys in the forward banks being operatively connected with long type bars and the key levers with their keys in the rear banks being connected with the short type bars.

22. In a typewriting machine, the combination of two sets of type bars of different lengths, a single set of bell cranks of a uniform size, links that connect the type bars to said bell cranks, key levers which have their keys arranged in different banks fore and aft of the machine, and are fulcrumed in the same plane transverse of the machine, and links that connect said key levers and bell cranks, the points of connection of the links to the key levers being in the same plane transverse of the machine, and the key levers having their keys in the forward banks being operatively connected with long type bars and the key levers with their keys in the rear banks being connected with the short type bars.

23. In a typewriting machine, the combination of type bar segments arranged on the same side of the printing point, type bars pivotally connected with said segments, key levers having their keys arranged in front and rear sets, and their fulcrums in substantially a single transverse plane, and means for connecting all of the longer key levers with the longer type bars and all of the shorter key levers with the shorter type bars.

24. In a typewriting machine, the combination of type bar segments arranged in a vertical plane and on the same side of the printing point, radial type bar hangers connected with the said segments with their pivot-bearings intermediate the same, type

bars pivoted on said bearings, key levers having their keys arranged in front and rear sets, and means for connecting the levers having the front set of keys with the longer type bars; and the levers having the rear set of keys with the shorter type bars.

25. In a typewriting machine, the combination of vertically disposed type bar segments arranged below the printing point with the central part of each in the same plane and with the end parts of each set out of such plane in a step-like manner, with type bar hangers mounted on said segments, and type bars mounted on said hangers.

26. In a typewriting machine, the combination of vertically disposed type bar segments arranged below the printing point with the central part of each in the same plane and with the end parts of each set out of such plane in a step-like manner, with radially adjustable type bar hangers having their bearings intermediate said segments, and type bars mounted on said bearings.

27. In a typewriting machine, the combination of vertically disposed type bar segments arranged lower than the printing point with the central part of each in one plane, and with the end parts of each set backward in a step-like manner, with U-shaped type-bar-hangers mounted on said segments, and type bars pivoted to said hangers.

28. In a front strike typewriting machine, the combination of vertically disposed type bar segments arranged one lower than another, upwardly and rearwardly striking type bars pivotally connected with said segments and provided each with a plurality of type having their faces in intersecting planes, a platen, and a platen-carrier pivoted at a point in front of the printing point.

29. In a typewriting machine, the combination of a segment, a series of hangers secured thereto, and pivoted members carried by said hangers, each hanger comprising a strip of metal doubled and folded on itself to form a stem with contacting side members and an enlargement that provides an opening for the passage of the stem of a securing screw, the free ends of the strip being bent outwardly from the stem to form a bifurcated portion between the arms of which a pivoted member is received.

30. In a typewriting machine, the combination of two sets of hangers, the faces of said hangers which bear against their support being in the same vertical plane, the hangers being arranged in two arcs one above the other, and two sets of type bars pivoted to said hangers, the pivots of the type bars of one set being situated at relatively different points on the hangers from the pivots of the type bars of the other set to bring said pivots in different vertical transverse planes, the pivots of each fore and aft pair of type bars being in a plane which cuts midway of a line drawn between the printing point and the normal position of a type.

31. 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, the type bars on one segment being staggered relatively to the type bars on another segment, a sub-lever segment, 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 the type bar segments.

32. In a typewriting machine, the combination of a platen, a plurality of type bar segments, type bars mounted on said segments, the type bars on one segment being staggered relatively to the type bars on another segment, a sub-lever segment, a series of sub-levers mounted on said sub-lever segment, and links connecting said sub-levers with said type bars.

33. In a typewriting machine, the combination of a platen, a plurality of type bar segments occupying approximately the same angular space about the printing point; a series of type bars mounted on said segments, the type bars on one segment being staggered relatively to the type bars on another segment; a single sub-lever segment; and a series of sub-levers mounted on said sub-lever segment and operatively connected with the type bars on the different type bar segments.

34. In a front strike typewriting machine, the combination of a platen, two type bar segments of different radii mounted below said platen and one below the other, a series of type bars mounted on said segments, a sub-lever segment, a series of sub-levers mounted on said sub-lever segment, and a series of links connecting said sub-levers with said type bars, those sub-levers connected to the type bars on one segment alternating with the sub-levers connected to the type bars on the other segment.

35. In a front-strike typewriting machine, the combination of upwardly and rearwardly striking type bars pivoted in a plurality of arcs arranged one above another, individual hangers for said type bars, said hangers being arranged in different arcs and the hangers in one arc being staggered relatively to the hangers in another arc, angular levers, the upright arms of said angular levers vibrating fore and aft of the machine and all of said angular levers being pivoted in the same transverse plane, pull links extending fore and aft of the machine from the upper ends of the upright arms of said angular levers to the type bars, and key levers operatively connected to said angular levers.

36. In a front-strike typewriting machine, the combination of a platen, a plurality of

vertically disposed type bar segments of different radii arranged below the platen, one segment being arranged below another, upwardly and rearwardly striking type bars pivoted in a plurality of arcs arranged one above another, hangers for said type bars arranged on the front faces of said segments, said hangers being arranged in different arcs and the hangers in one arc being staggered relatively to the hangers in another arc, angular levers, the upright arms of said angular levers vibrating fore and aft of the machine, links extending from the upright arms of said angular levers to the type bars, and key levers operatively connected to said angular levers.

37. In a front-strike typewriting machine, the combination of a platen, a plurality of vertically disposed type bar segments of different radii arranged below the platen, one segment being arranged below another, upwardly and rearwardly striking type bars pivoted in a plurality of arcs arranged one above another, hangers for said type bars arranged on the front faces of said segments, said hangers being arranged in different arcs and the hangers in one arc being staggered relatively to the hangers in another arc, angular levers, the upright arms of said angular levers vibrating fore and aft of the machine and all of said angular levers being pivoted in the same transverse plane, links extending from the upright arms of said angular levers to the type bars, and key levers operatively connected to said angular levers.

38. In a front-strike typewriting machine, the combination of a platen, a plurality of vertically disposed type bar segments of different radii arranged below the platen, one segment being arranged below the other, upwardly and rearwardly striking type bars pivoted in a plurality of arcs arranged one above another, hangers for said type bars arranged on the front faces of said segments, said hangers being arranged in different arcs and the hangers of one arc being staggered relatively to the hangers in another arc, angular levers, the upright arms of said angular levers vibrating fore and aft of the machine and all of said angular levers being pivoted in the same transverse plane, pull links extending fore and aft of the machine from the upper ends of the upright arms of said angular levers to the type bars, and key levers operatively connected to said angular levers.

39. In a front-strike typewriting machine, the combination of two segments arranged one above the other in substantially the same vertical plane, type bar hangers mounted on the front faces of said segments, the hangers on one segment being staggered relatively to the hangers on the other segment, two sets of upwardly and rearwardly striking type bars of different lengths pivoted to said hangers, the type bars of one set working between the type bars of the other set, and key actuated means for operating said type bars.

40. In a front-strike typewriting machine, the combination of two segments arranged one above the other in substantially the same vertical plane, type bar hangers mounted on the front faces of said segments, the hangers on one segment being staggered relatively to the hangers on the other segment, two sets of upwardly and rearwardly striking type bars of different lengths pivoted to said hangers, the type bars of one set working between the type bars of the other set, links connected to said type bars, bell cranks connected to said links, and key levers connected to said bell cranks.

Signed at the borough of Manhattan, in the county of New York, and State of New York, this 3rd day of March, A. D. 1904.

ALEXANDER T. BROWN.

Witnesses:
K. V. Donovan,
E. M. Wells.