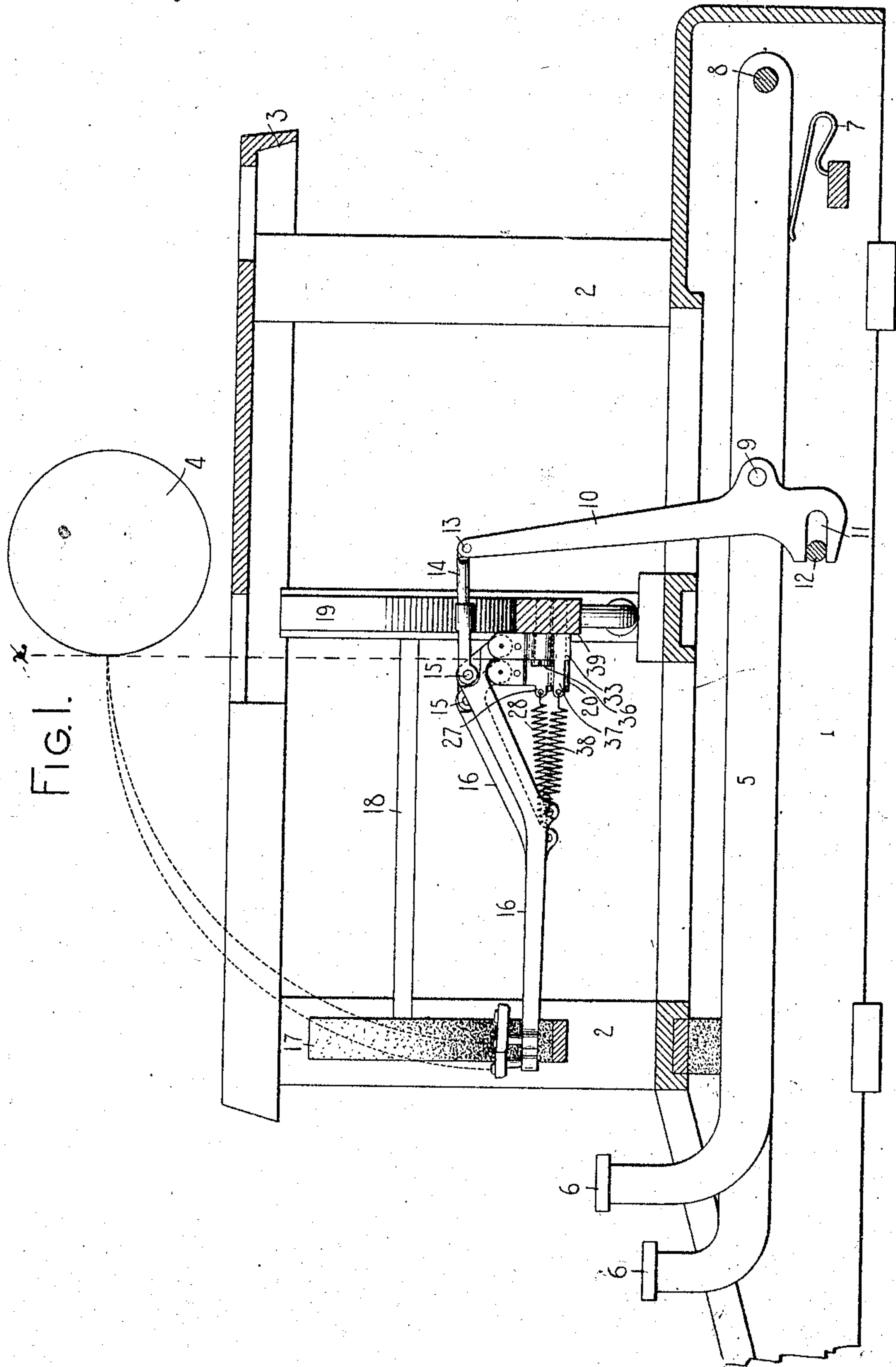


975,770.

N. F. KNOX.  
TYPE WRITING MACHINE.  
APPLICATION FILED MAY 24, 1904.

Patented Nov. 15, 1910.

2 SHEETS—SHEET 1.



WITNESSES.

*Wm. Pool*  
*J. B. Davis*

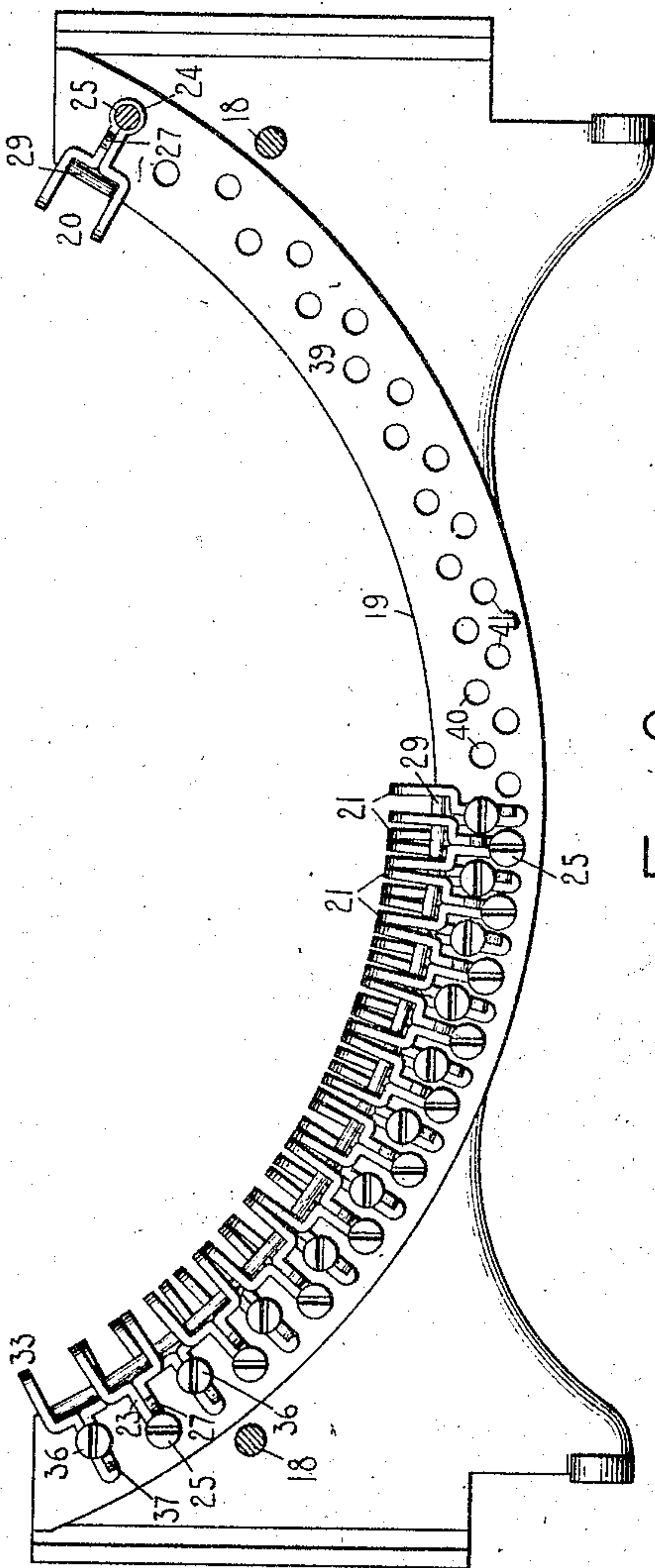
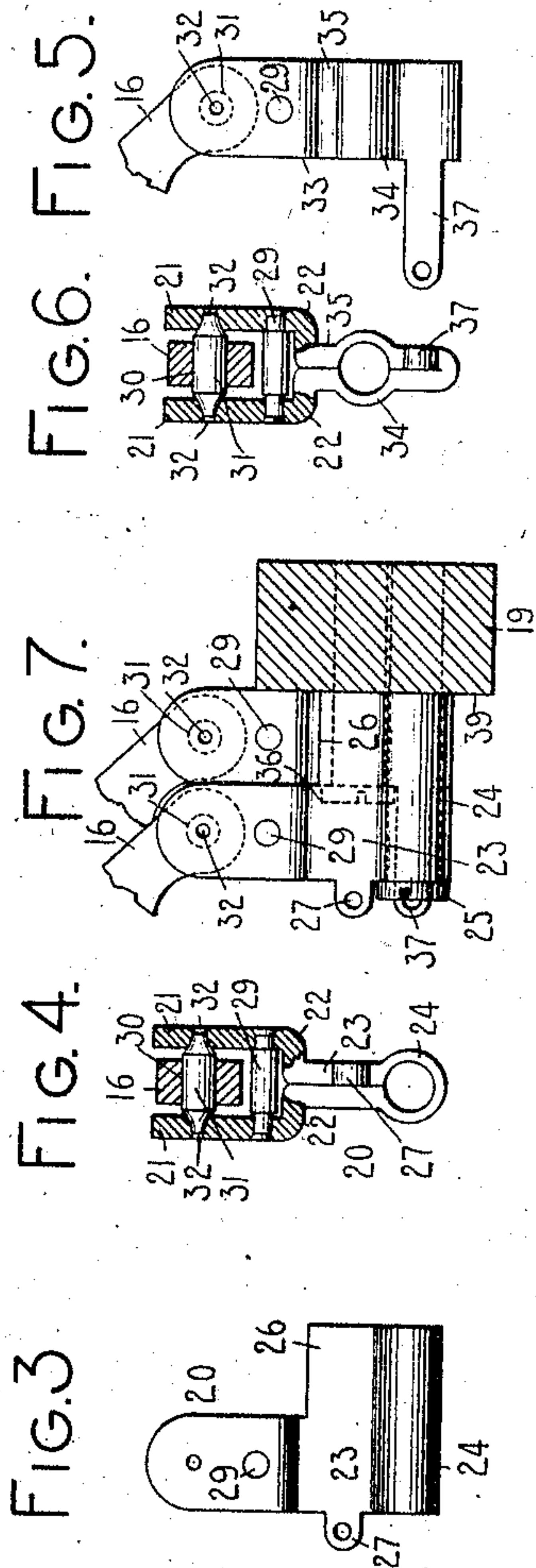
INVENTOR.

*Nel on F. Knox*  
*By James Felbel*  
HIS ATTORNEY

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WITNESSES:  
*Wm. Pool*  
*J. B. Deves*

INVENTOR:  
*Nelson F. Knox*  
By *Jacob F. Fiedel*  
HIS ATTORNEY



# UNITED STATES PATENT OFFICE.

NELSON F. KNOX, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE MONARCH TYPE-WRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

## TYPE-WRITING MACHINE.

975,770.

Specification of Letters Patent.

Patented Nov. 15, 1910.

Application filed May 24, 1904. Serial No. 209,474.

*To all whom it may concern:*

Be it known that I, NELSON F. KNOX, citizen of the United States, and resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to typewriting machines of the class known as type bar machines, and more especially to that style in which each type bar is mounted in a separate and individual hanger.

One object of the invention is to provide a hanger which shall afford a wide bearing for the type bar and which is substantial in character and capable of manufacture at small cost.

Another object is to so arrange the type bar hangers upon their support that they may be very compactly assembled and that any type bar hanger may be placed upon, removed from, or secured to said support without disturbing or interfering with any other type bar hanger.

To these and other ends, which will subsequently appear, the invention consists in certain features of construction and combinations of devices, all as will be hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a vertical front to rear sectional view, taken centrally of the typewriting machine to which the invention has been applied, parts of said typewriting machine being omitted in order that the invention may be more clearly disclosed; Fig. 2 is a front elevation of the type bar hanger support or segment, a number of type bar hangers being shown assembled thereon; Fig. 3 is an enlarged side elevation and Fig. 4 an enlarged and partly sectional front elevation of one of the hangers of the forward series; a part of the type bar also being shown; Figs. 5 and 6 are corresponding views of one of the hangers of the rear set or series; and Fig. 7 is an enlarged side elevation of a front hanger and a rear hanger, and parts of their type bars, as the said hangers appear when assembled on the segment, a section of the latter also being shown.

Like parts are designated by like numerals throughout the several views, wherein—

1 indicates the base of the machine, 2

corner posts supporting the top plate 3, which in turn sustains the carriage (not shown), the latter carrying the platen 4 which is diagrammatically illustrated in Fig. 1. Key levers 5, each provided with the usual key button 6 and restoring spring 7, are pivoted at 8 in the rear of the base of the machine. Each key lever has pivoted to it at 9 a sub-lever 10, the lower part of which is formed with a slot 11 receiving a fixed fulcrum bar 12, which extends from side to side of the machine beneath the key levers and is supported in the base of the frame. Pivoted to the upper end of each sub-lever at 13 is the rear end of a connecting link 14, the forward end of said connecting link being pivoted at 15 to type bars 16. The outer or type ends of the type bars are each provided with two types and are sustained in normal or rest position by a segmental rest or pad 17 supported by several arms, of which only the left-hand arm 18 is shown, the said arms extending forwardly from the support 19 to which they are attached.

The support 19, as herein shown, is of the form commonly known as a segment, and will be so described hereinafter. Although the drawings disclose a segment of the shift order, that is, one which is bodily moved when it is desired to change from upper to lower case or the reverse, it is to be understood that the particular style of segment is immaterial for the purposes of this invention, and that a stationary segment and a shiftable platen might be employed or that neither platen nor segment should be shiftable and each type bar have but a single type, and that either of these latter constructions would still be within the scope of the invention. It is not deemed necessary to describe a mechanism for shifting the segment 19, since the invention is not concerned with this feature; any mechanism desired may be employed for the purpose, such, for example, as that used in the Monarch typewriting machine.

The type bar hangers which are supported or mounted upon the segment 19 and in which the type bars 16 are pivoted are of two forms; those of one form, that illustrated most clearly in Figs. 3 and 4, are assembled upon the segment in one row or series, which is the forward row, and the hangers of the other form, that illustrated most clearly in Figs. 5 and 6, are assembled



upon a machine in a second row or series, that is, the rear row or the one wherein the pivot bearings are the closer to the face of the segment. Though the form of the hangers composing these series differs somewhat, the method employed in manufacturing them is preferably the same. Each hanger 20 of the forward set or series is preferably stamped out of sheet metal, and the blank so stamped or punched out is thereafter folded or bent up so as to form two bearing walls which, with the turns 22 at the bottom of each, form a part which is substantially U-shaped in cross-section. Depending from the bottom of, and preferably centrally from, the U is a shank or stem 23 formed of two plies or folds of metal, the continuations of said plies or folds forming the bearing walls 21, the lower end of the shank or stem 23 terminating in an eye 24 which is reamed out sufficiently to receive the stem of a headed screw 25 by which it is secured to the segment 19. The part of the metal blank which is to compose the shank or stem 23 and the eye 24 is twice as wide as the part to compose the walls 21, so that when the hanger 20 is folded into shape the shank and eye portion is substantially twice as deep as the bearing wall portion, the former portion having a rearwardly projecting part 26, as appears most clearly in Fig. 3. The right hand ply of the stem 23 of each hanger is provided, just above the eye 24, with a short, forwardly projecting lug 27, which is perforated to receive one end of a type bar restoring spring 28, the other end of the said spring being connected with the underside of the associated type bar 16 at about its longitudinal center. The bearing walls 21 are held in a fixed relation to each other by a shouldered rivet 29, the ends of which are inserted in perforations near the bottoms of the bearing walls while the hanger is in process of being folded or shaped into its final form. After the shouldered rivet 29 has been dropped into place, the bearing walls are pressed toward each other until they are substantially in parallelism. Each type bar 16 is provided near its rear end with a perforation 30 into which a pivot 31 with conoidal ends is driven or pressed, and the type bar pivot 31 is thereafter inserted in the conical bearings 32 which have been previously formed in the side walls 21 of the hanger, the latter having sufficient spring or give to allow of the seating of the pivot, without permanently altering their set. The ends of the shouldered rivet are then headed, or, as it is termed, up-set, the bearing walls being thus brought into a fixed relation as previously determined by the length of the rivet 29. It will be noted upon an inspection of Fig. 4 that the body portion or the distance between the shoulders of the shouldered rivet 29 is somewhat shorter than the

distance between the inner surfaces of the bearing walls 21, the difference being sufficient to permit of taking up of the side walls to compensate for considerable wear in the type bar bearing. One reason for employing a shouldered rivet is that this form of rivet is more conveniently headed in the hanger than is an ordinary rivet of uniform diameter throughout, which would be liable to drop out of the hanger before the heading operation was performed.

The method of assembling each type bar of the rear set with its associate hanger 33, which with its fellows composes the rear or inner series when mounted in the segment 19, is the same as that just described for the forward hangers 20. An inspection of Figs. 5 and 6 will disclose certain differences between the two forms of hangers, however. The eye 34, which is provided in the two-ply depending shank or stem 35 for the purpose of receiving the stem of a headed set screw 36, whereby the hanger 33 is secured to the segment 19, is in this case formed near the upper end of the said shank 35. Furthermore a lug 37 for the type bar restoring spring 38 is formed on the right hand ply of the shank 35, below the eye 34 and near the end of said shank, and the said lug 37 is longer than the lug 27 of the hanger 20, so that when assembled in the machine the ends of said lugs are in substantially the same vertical plane as best appears in Figs. 1 and 7. It will also be noted that the hanger 33 is not provided with a part corresponding to the rearward portion 26 of the hanger 20, but that the said hanger 33 is, except for the forwardly projecting lug 37, of a uniform depth throughout, such depth being half as great as that of the deeper parts of the other set. The result is that when the sets are assembled upon the segment the faces of the front walls of the deeper hangers will be in a plane forward of the plane of the front walls of the shallower hangers, though the faces of the rear walls of the two series are in the same plane. The type bars are bent or recessed near their pivots so that the rear bars will clear the hangers of the forward set.

In assembling the hangers upon the segment 19, the rear set or series composed of hangers 33 are secured against the surface of the side or face 39 of the said segment by the headed screws 36, the stems of which pass through the eyes 34 and are screwed into holes 40 in the segment, the said holes being tapped to receive the said set screws. The front or forward series composed of the hangers 20 are secured to the front face of the segment by set screws 25, which pass through the eyes 24 and screw into tapped holes 41 in the segment. The set screws 25 are longer than the set screws 36, since the



former are required to pass through the eyes 24 which, it will be remembered, are double the depth of the eyes 34. It is to be understood that after the type bars and hangers 5 are thus in place, the former are connected in the usual manner with their associate links 14, which extend over the open segment and are connected as has been previously described with the key levers 5 by the sub-levers 10, so that when a finger key 10 is adequately depressed the corresponding type bar is actuated to swing it to the printing position, as is common in this style of machine.

15 The curved opening of segment 19 conforms to an arc of a circle, the center whereof is approximately the printing point on the platen. It will be noted on an inspection of Fig. 2 that the centers of the holes 20 40 are in an arc of a circle of which the printing point is also the center; that the centers of the holes 41 are in an arc of a greater circle, struck about the same center; and that the said holes of the two sets or series are staggered relatively to each other, a statement which also applies to the two series of set screws which are screwed into the said holes to secure the sets or series of hangers in place.

30 The position of the segment 19 with relation to the printing point on the platen 4 and the relative depths of the two series of hangers are such that a plane passed through the pivots of the forward series of type bars would be parallel to a vertical plane passed through the printing line on the platen, (said last named plane being indicated in Fig. 1 by the dotted line  $x$ ) and would be the same distance from such a plane as would be a similar plane passed through the pivots of the rear series of type bars, which latter plane would also be parallel to the other two; in other words, the printing point is equidistant from the pivots 45 of all the type bars of both series. It will be further noted that the form and disposition of the hangers is such that when they are assembled on the segment they are in two series, one behind the other; that viewed from the front of the machine the bearing walls of any hanger in the forward series, except, of course, in the case of the end hangers, overlap one wall of each of the hangers at either side of it in the rear series; 55 that by means of this overlapping or staggered arrangement of the hangers in respect of each other, a broader bearing is secured for each type bar than would be possible with a single series of hangers on the segment 19; that the securing screw of each hanger of the rear series passes between the shanks 23 of the adjacent hangers of the forward series and does not interfere with said forward hangers or their securing screws, so that all of the hangers are sepa-

50 rately adjustable and any one may be removed or replaced or assembled upon the machine without in any way disturbing any other one; that the construction admits of a forked or two-wall hanger for each type bar; that this arrangement of the hangers is a particularly compact one; that the types on the ends of the type bars are, the type bars themselves being of equal length, staggered, that is to say, the type of each bar 75 which is pivoted in one of the forward series stands farther forward on the rest 17 than does the corresponding type of either of the type bars adjacent to it, both the latter bars being pivoted in hangers of the rear series; and that the hangers near the ends of each series are spaced wider apart in order that the connection between each type bar and its associate key lever may be vertically arranged, thus affording more room 85 and enabling relatively wider hangers to be used near the ends of each series than are used in the neighborhood of the center of each series. Moreover it will be seen that I provide a full complement of type bar hangers arranged in two segmental rows, one row being behind the other, the adjacent arms of adjacent hangers of each row being close together, the adjacent arms of adjacent hangers of the rear row being opposite the 95 spaces between the hanger arms of the forward row and the adjacent hanger arms of the front row being opposite the spaces between the hanger arms of the rear row, the type bars being pivotally mounted in the 100 hanger arms of each row, the hanger arms of the front row of hangers lying between the pivots and the type bearing ends of the type bars of the rear row, and the type bars of the rear row being formed to arch or 105 reach over the tops or free ends of adjacent hanger arms of the front row; that the type bar hangers in one row or set alternate with those of the other row or set; that the type bars of the two rows when in normal position are alternately arranged; that the hangers are formed or arranged with their hanger arms projecting upwardly and in the direction of the printing point; that the shanks or stems of the two rows of hangers 115 are provided with eyes for the passage of the securing screws, said eyes being arranged in two arcs, the eyes in one arc alternating with those of the other; and that a set of substantially horizontal pull links are 120 pivotally connected at their forward ends to the type bars of the two rows forward of the type bar pivots, the rear ends of said pull links being pivotally connected to a set of sub-levers which in turn are operatively 125 connected with key actuated levers.

Although I have shown two forms of type bar hangers which are mounted in two series upon the segment. I do not desire to be limited to that particular number, 130



as the number of forms or series or both might be varied and still be within the scope of this invention, when considered from certain aspects thereof.

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

1. In a front-strike typewriting machine, the combination of a substantially vertically disposed segment, a set of type bars  
10 mounted in individual hangers secured at one side of said segment, and another set of type bars mounted in individual hangers secured at the same side of said segment, the pivots of the type bars of one set being  
15 contained in a single plane and the pivots of the type bars of the other set being contained in another and different plane, the hangers of the two sets being arranged so that they overlap, and the type bars of one set  
20 being bent or recessed near their pivots so that when normally at rest they arch over the tops of the hangers of the other set.

2. In a front-strike typewriting machine, the combination of a substantially vertically disposed segment, a set of type bars  
25 mounted in individual hangers at one side of said segment, another set of type bars mounted in individual hangers at the same side of said segment, and screws securing  
30 said sets of hangers to said segment, said screws having a staggered arrangement, the screws of one set being arranged between the stems of the hangers of the other set, the type bars of one set being bent  
35 or recessed near their pivots so that in normal position they arch over the tops of the hangers of the other set.

3. In a front-strike typewriting machine, the combination of a substantially vertically disposed segment, a set of type bars  
40 mounted in individual hangers at one side of said segment, another set of type bars mounted in individual hangers at the same side of said segment, and means by which  
45 the two sets of hangers are secured to the segment, said means having a staggered arrangement, the securing means for one set of hangers being arranged between the stems of the hangers of the other set, said  
50 hangers being arranged so that they overlap and the type bars of one set being bent or recessed near their pivots so that in normal position they arch over the tops of the hangers of the other set.

55 4. In front strike typewriting machine, the combination of a substantially vertically disposed segment, a set of type bars mounted in individual hangers secured at one side of said segment and another set of  
60 type bars mounted in individual hangers secured at the same side of the said segment, the pivots of all the type bars of one set being in one substantially vertical plane and the pivots of all the type bars of the other  
65 set being in another and different substan-

tially vertical plane, and the bars of one set being bent or recessed near their pivots so that in normal position they arch over the tops of the hangers of the other set.

5. In a typewriting machine, the combination of a segment, a set of type bars mounted  
70 in individual hangers secured to the surface of the front face of said segment, and another set of type bars mounted in individual hangers also secured to the surface of the  
75 front face of said segment, the pivots of all the type bars of one set being in one substantially vertical plane and the pivots of all the type bars of the other set being in another and different substantially vertical  
80 plane, and the bars of one set being bent or recessed near their pivots so that in normal position they arch over the tops of the hangers of the other set.

6. In a typewriting machine, the combination of a substantially vertical type bar segment, a plurality of sets of type bar hangers  
85 mounted thereon, type bars pivoted in said hangers, and a type rest which sustains the type ends of said type bars, the pivots of all  
90 the type bars in the machine being equidistant from the printing point and the pivots of the type bars of each set being in a substantially vertical plane, the type bars of one set when sustained by the type rest  
95 arching over the tops of the hangers of the other set and the type bearing ends of all the bars being staggered on the type rest.

7. In a typewriting machine, the combination of a segment, and a series of individual  
100 type bar hangers each carrying only one type bar, the hangers being secured at the same side of the segment by screws set staggered, the said series of hangers being so arranged that each hanger overlaps the hanger  
105 adjacent to it on either side and certain of said type bars being bent or recessed so that when at rest they arch over the tops of the hangers.

8. In a typewriting machine, the combination of a support, a set of hangers mounted  
110 on said support, lugs on said hangers, a set of type bars mounted in said hangers, individual restoring springs having their ends connected to said type bars and said lugs,  
115 another set of hangers mounted on said support, lugs on said hangers differing in length from the lugs on the first set, another set of type bars mounted in said second set of hangers, and individual restoring springs  
120 having their ends connected to the type bars of said second set and to the lugs of the second set of hangers, the points of connection of both sets of restoring springs with their respective lugs being in substantially the  
125 same plane.

9. In a front strike typewriting machine, the combination of a segment, a set of upwardly and rearwardly striking type bars  
130 mounted in hangers secured to the front



face of said segment, and another set of upwardly and rearwardly striking type bars mounted in a set of hangers which differ in dimensions from the hangers of the first set and are secured to the front face of the said segment, the pivots of all the type bars of one set being in one vertical plane and the pivots of all the type bars of the other set being in another and different vertical plane, and the bars of one set being bent or recessed near their pivots so that in normal position they clear the hangers of the other set.

10. In a front strike typewriting machine, the combination of a substantially vertically disposed segment, a set of upwardly and rearwardly striking type bars mounted in individual hangers secured on the surface of one of the faces of said segment, and another set of upwardly and rearwardly striking type bars mounted in another set of individual hangers differing in dimensions from the hangers of the first set and secured on the same surface of the said segment as the first set, the pivots of all the type bars of one set being in one substantially vertical plane and the pivots of all of the type bars of the other set being in another and different substantially vertical plane, the bars carried by the rear set of hangers being bent or recessed near their pivots so that in normal position they clear the hangers of the front set.

11. In a typewriting machine, two sets of type bar hangers arranged in different planes, the hangers of each set having shanks and the shanks of each set having eyes, the eyes being differently located for each set of shanks, and the type bar bearings in all the hangers of both sets being equidistant from the printing point, while the bearings in each set of hangers are in a plane different from that of the other set.

12. In a typewriting machine, the combination of a hanger support, two sets of type bar hangers having centrally arranged shanks attached to the same face of said support, the shanks of one set having eyes between their ends and the shanks of the other set having eyes at their lower ends, and the type bar bearings in all the hangers of both sets being equidistant from the printing point, while each set of bearings is embraced in a plane different from that of the other set.

13. In a typewriting machine, two sets of U-shaped hangers having centrally projecting stems, the stems of one set having eyes intermediate the ends of the stems and the stems of the other set having eyes at the outer ends of the stems, the type bar bearings in all the hangers being equidistant from the printing point, while each set of bearings is embraced in a plane different from that of the other set.

14. In a typewriting machine, the combination of two sets of type bar hangers, the type bar pivots being arranged in two parallel planes, and all of said pivots being equidistant from the printing point, the pivotal ends of the hangers being U-shaped and terminating in centrally disposed shanks, the shanks of one set of hangers having eyes arranged in one arc and the shanks of the other set of hangers having eyes arranged in another arc, and a segment or support to which said hangers are secured.

15. In a typewriting machine, the combination of a type bar segment or support having two parallel arc-shaped rows of perforations, the perforations of one row being staggered relatively to the other, two sets of type bar hangers secured to said segment or support by two arc-shaped rows of screws, the hangers of each set being U-shaped at their type bar pivot portions and having centrally arranged shanks, the shanks of one set having eyes which register with one set of the perforations in the segment or support and the shanks of the other set of hangers having eyes that register with the other set of holes or perforations in the segment, the type bar bearings in both sets of hangers being equidistant from the printing point.

16. In a front-strike typewriting machine, the combination of a segment, a series of type bars, a series of individual hangers for said type bars mounted on said segment in two sets, the hangers of the first set having their pivot points in one plane and the hangers of the second set having their pivot points in another plane in front of the first plane, each of said hangers having a part adapted to be secured to said segment and two arms spaced apart to afford a wide pivotal bearing for the corresponding type bar, the adjacent hangers of each set having their proximate arms close together and the type bars of the first set being arched over the tops of the hangers of the second set so that the type bars of the first set when normally at rest clear the tops of the hangers of the second set.

17. In a front-strike typewriting machine, the combination of a segment, a series of type bars, individual hangers for said type bars arranged in two sets both mounted on the same side of said segment, the hangers of the first set having their pivot points arranged in one plane and the hangers of the second set having their pivot points arranged in another plane in front of the first plane, each hanger comprising a part adapted to be secured to said segment and two arms spaced apart to afford a wide pivotal bearing for the corresponding type bar, the adjacent hangers of each set having their proximate arms close together and the type bars of the first set being arched over the



ends of the hangers of the second set so that the type bars of the first set when normally at rest clear the tops of the hangers of the second set.

- 5 18. In a front-strike typewriting machine, the combination of type bars, type bar hangers, and a supporting segment; the type bar hangers being arranged in two segmental rows, one row being behind the other, the adjacent arms of adjacent hangers of each row being close together, the adjacent arms of adjacent hangers of the rear row being opposite the spaces between the hanger arms of the forward row and the adjacent hanger arms of the front row being opposite the spaces between the hanger arms of the rear row, the type bars being pivotally mounted in the hanger arms of each row, and the type bars of the rear row being formed to arch or reach over the said adjacent arms of the hangers of the front row so that when normally at rest the type bars of the rear row clear the hangers of the front row.
- 25 19. In a front-strike typewriting machine, the combination of type bars, type bar hangers, and a supporting segment; the type bar hangers being arranged in two sets one behind the other, those of one set alternating with those of the other, the adjacent hanger arms of the front set being close together and the type bars of the rear set being formed to arch over the tops of said adjacent hanger arms of the front set.
- 35 20. In a front-strike typewriting machine, the combination of a supporting segment having a vertical face, a full complement of type bar hangers secured to said face and arranged in two rows one behind the other, the adjacent arms of adjacent hangers being close together and said adjacent arms of one row registering with the spaces between the arms of the hangers in the other row, type bars pivotally mounted in the arms of the hangers of each row and the type bars of the rear row arching over adjacent hanger arms of the front row and arranged to alternate between successive type bars mounted in the front row so that when normally at rest the type bars of the rear row clear the hangers of the front row.
- 50 21. In a front-strike typewriting machine, the combination of a supporting segment having a vertical face, a full complement of type bar hangers secured by screws to said face and arranged in two rows one behind the other, the said hangers being forked and arranged with their hanger arms projecting upwardly and in the direction of the printing point, the hangers of each row being set close to each other and so that adjacent hanger arms of adjacent hangers of the front row lie opposite the spaces between the hanger arms of the rear row, the shanks or stems of the two rows of hangers being

provided with eyes for the passage of the securing screws, said eyes being arranged in two arcs, the eyes of one arc alternating with those of the other, type bars pivotally mounted in the spaces between the hanger arms and the type bars of the rear row being constructed to arch over the ends or tops of adjacent hanger arms of the front row so that when normally at rest the type bars of the rear row clear the hangers of the front row. 70 75

22. In a front-strike typewriting machine, the combination of a supporting segment, two rows of forked hangers secured to the front face thereof, the adjacent arms of adjacent hangers of the front row being close together and opposite the spaces between the hanger arms of the rear row, type bars pivotally mounted on the hangers of both rows, the rear ends of the type bars of the rear row being constructed to arch over the free ends of the adjacent hanger arms of the front row, the type bars of the two rows alternating in the normal positions of the type bars, a set of substantially horizontal pull links, the forward ends of which are pivotally connected to the type bars of each row forward of their pivots, a set of sub-levers to which the rear ends of the pull links are pivotally connected, and key actuated levers operatively connected with said sub-levers. 80 85 90 95

23. In a front-strike typewriting machine, the combination of a supporting segment, two rows of forked hangers secured to said segment, type bars pivotally mounted in both rows of hangers, the hanger arms of the front row lying between the pivots and the type bearing ends of the type bars of the rear row and the type bars of the rear row being arched to clear when normally at rest the ends of the hanger arms of the front row. 100 105

24. In a typewriting machine, the combination with the platen, of a type-bar segment, a series of hangers mounted on said segment and each having a pair of divergent pivot-sustaining arms, the arms of adjacent hangers being overlapped, a series of uniform type-bars pivoted between the arms of said hangers, each of said type-bars having a recess to overlap the arm of the adjacent hanger. 110 115

25. In a typewriting machine, the combination with the platen, of a series of type-bars having a common printing point at the front of the platen, a type-bar segment, a series of hangers mounted on one side of said type-bar segment and each having a pair of divergent pivot-sustaining arms, the arms of said hangers being overlapped and arranged on opposite sides of a plane tangent to the printing point of the platen, said type-bars being pivoted between the arms of said hangers and the type-bar pivots being at 120 125



the same radial distance from the printing point.

26. In a visible writing typewriting machine, the combination of a segment, a set of type bars mounted in individual hangers secured at one side of said segment and another set of type bars mounted in individual hangers secured at the same side of the said segment, the pivots of all the type bars of one set being in a single plane and the pivots of all the type bars of the other set being in a different plane, and the bars of one set being bent or recessed near their pivots so that in normal position they arch over the tops of the hangers of the other set.

27. In a typewriting machine, the combination of a segment, a set of type bars mounted in individual hangers secured to the surface of the front face of said segment, and another set of type bars mounted in individual hangers also secured to the surface of the front face of said segment, the pivots of all the type bars of one set being in a single plane and the pivots of all the type bars of the other set being in a different plane, and the bars of one set being bent or recessed near their pivots so that in normal position they arch over the tops of the hangers of the other set.

28. In a typewriting machine, the combination of a type bar segment, a plurality of sets of type bar hangers mounted thereon, type bars pivoted in said hangers, and a type rest which sustains the type ends of said type bars, the pivots of all the type bars in the machine being equidistant from the printing point, and the pivots of the type bars of each set being in a single plane, the type bars of one set when sustained by the type rest arching over the tops of the hangers of the other set, and the type bearing ends of all the type bars being staggered on the type rest.

29. In a visible writing typewriting machine, the combination of a segment, a set of upwardly and rearwardly striking type bars mounted in hangers secured to the front face of the segment, and another set of upwardly and rearwardly striking type bars mounted in a set of hangers which differ in dimensions from the hangers of the first set and are secured to the front face of the said segment, the pivots of all the type bars of one set being in a single plane, and the pivots of all the type bars of the other set

being in a different plane, and the bars of one set being bent or recessed near their pivots so that in normal position they clear the hangers of the other set.

30. In a visible writing typewriting machine, the combination of a segment, a set of upwardly and rearwardly striking type bars mounted in individual hangers secured on the surface of one of the faces of the segment, and another set of upwardly and rearwardly striking type bars mounted in another set of individual hangers differing in dimensions from the hangers of the first set, and secured on the same surface of the said segment as the first set, the pivots of all the type bars of one set being in one plane and the pivots of all the type bars of the other set being in a different plane, the bars carried by the rear set of hangers being bent or recessed near their pivots so that in normal position they clear the hangers of the front set.

31. In a typewriting machine, the combination with a platen, of a series of type bars having a common printing point at the front of the platen, a type bar segment, a series of hangers mounted on the same flat side of said type bar segment and each having a pair of divergent pivot sustaining arms, the arms of said hangers being overlapped and arranged on opposite sides of the plane tangent to the printing point and the platen, said type bars being pivoted between the arms of said hangers and the type bar pivots being at the same radial distance from the printing point.

32. In a typewriting machine, the combination with the platen, of a type-bar segment, a series of hangers arranged side by side on the same flat side of said segment and having divergent overlapping pivot-sustaining arms and a series of uniform type-bars pivoted between the arms of said hangers, the pivots of said type-bars being arranged at practically the same radial distance from the printing point of the platen, substantially as described.

Signed at the borough of Manhattan, city of New York, in the county of New York and State of New York, this 23rd day of May A. D. 1904.

NELSON F. KNOX.

Witnesses:

MORRIS W. POOL,  
E. M. WELLS.