

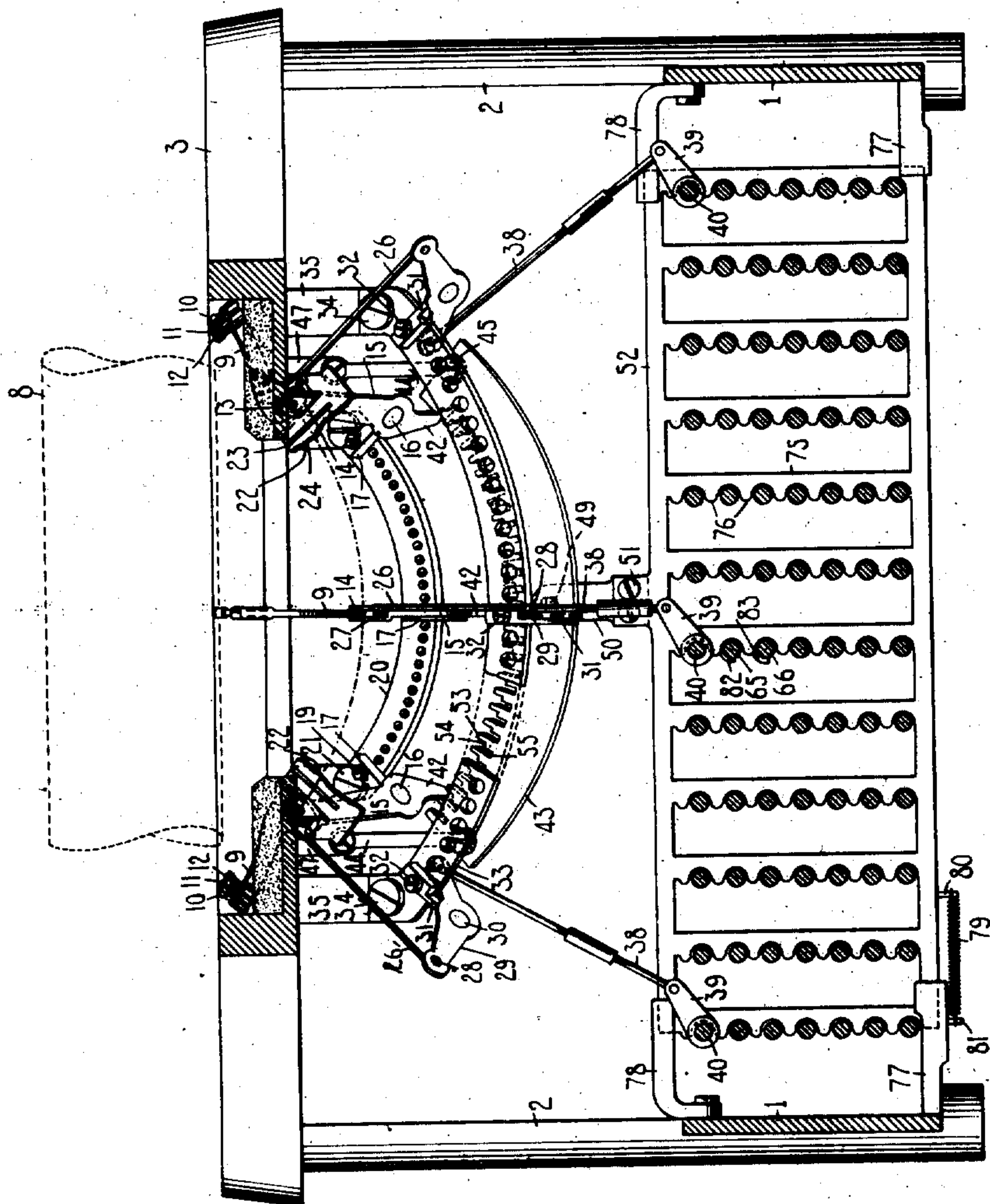
No. 896,707.

PATENTED AUG. 25, 1908.

B. A. BROOKS.
TYPE WRITING MACHINE.
APPLICATION FILED JAN. 4, 1905.

4 SHEETS—SHEET 1.

FIG. 1.



WITNESSES.

R. H. Strother.
W. F. Hammer.

INVENTOR.

Bryan A. Brooks

By Jacob F. Felt

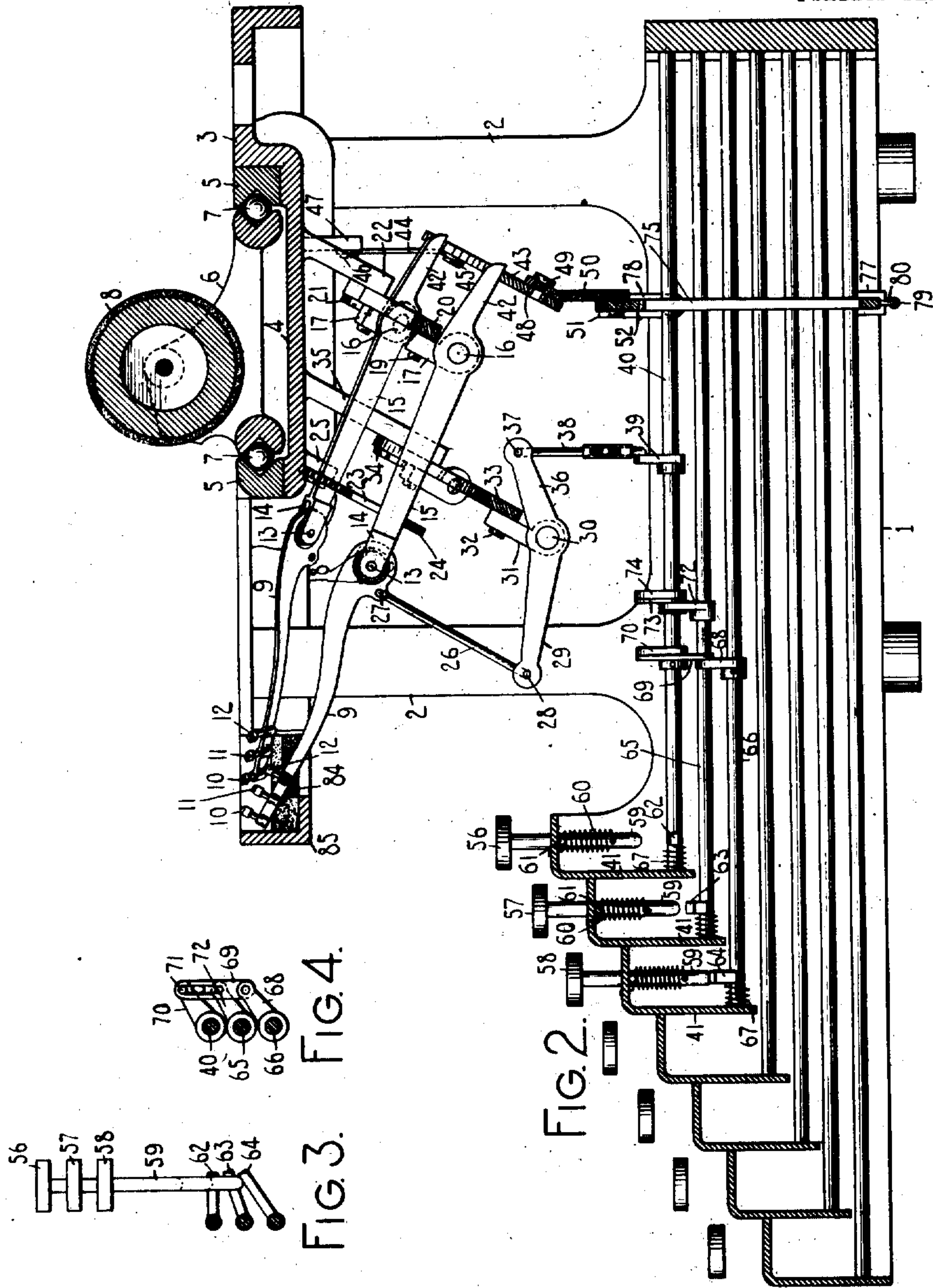
HIS ATTORNEY

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4 SHEETS—SHEET 2.



WITNESSES.

R. Helthofer.
W. F. Hanswiler.

INVENTOR.

Byron A. Brooks
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4 SHEETS—SHEET 3.

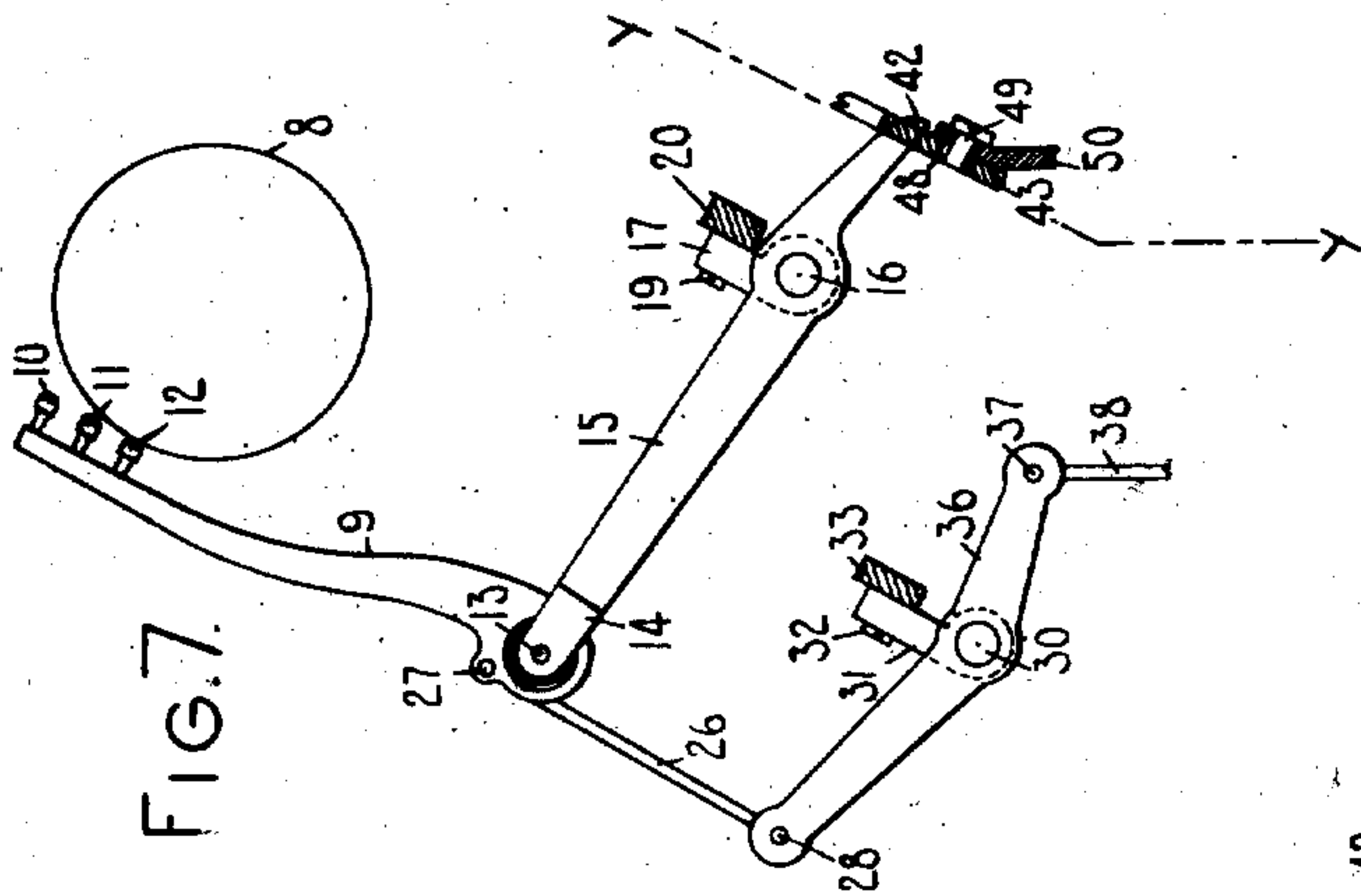


FIG. 7.

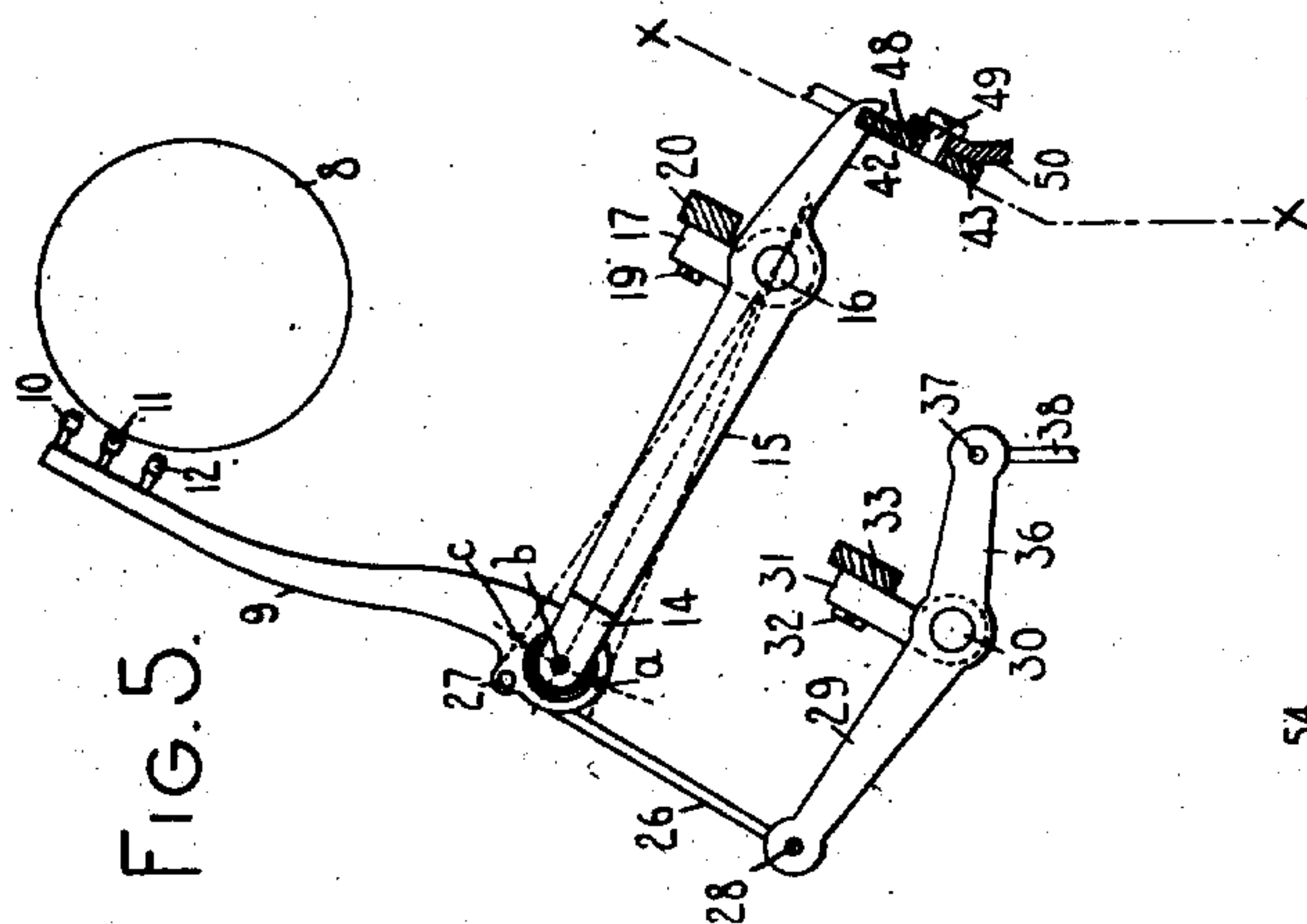


FIG. 5.

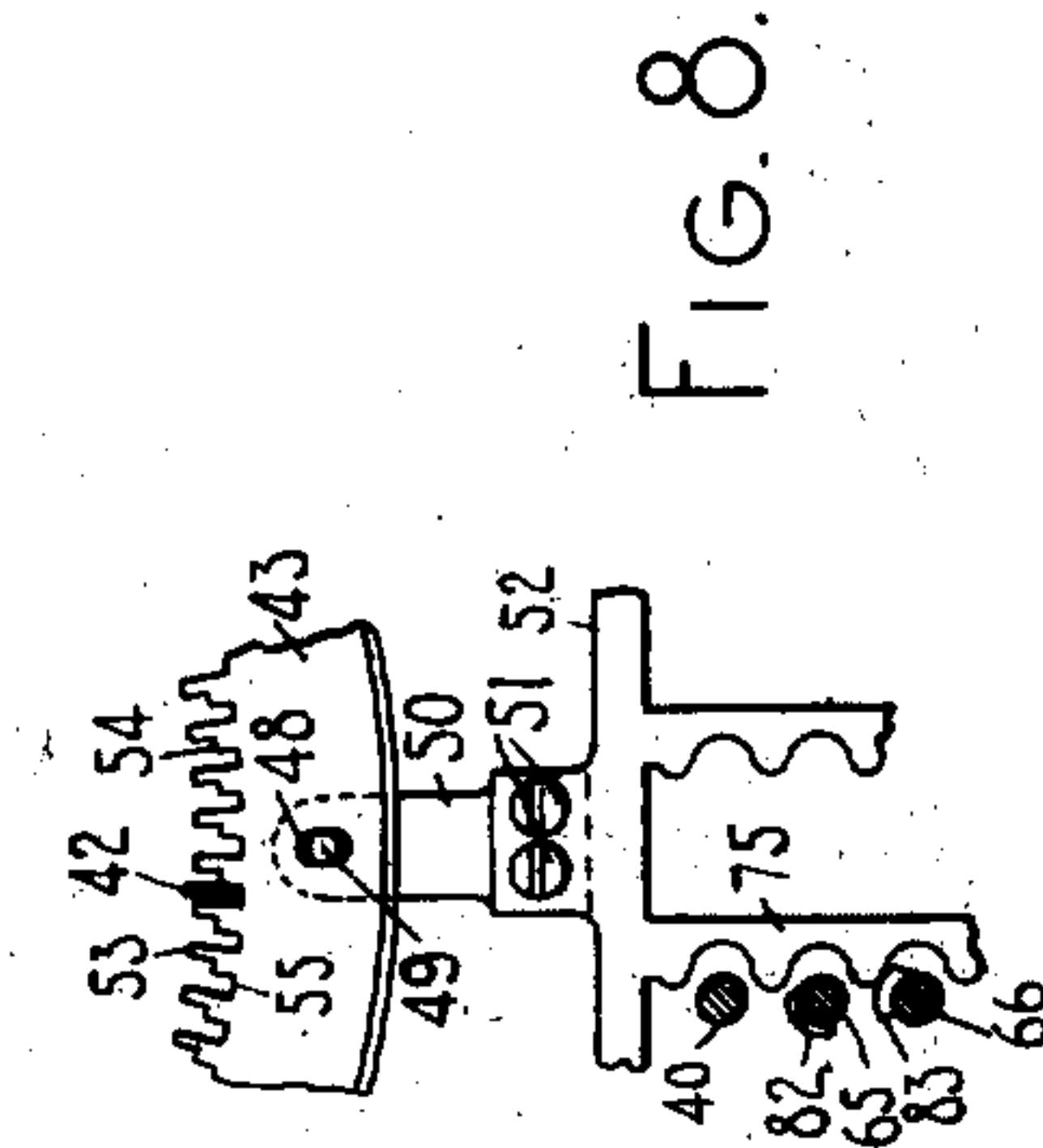


FIG. 8.

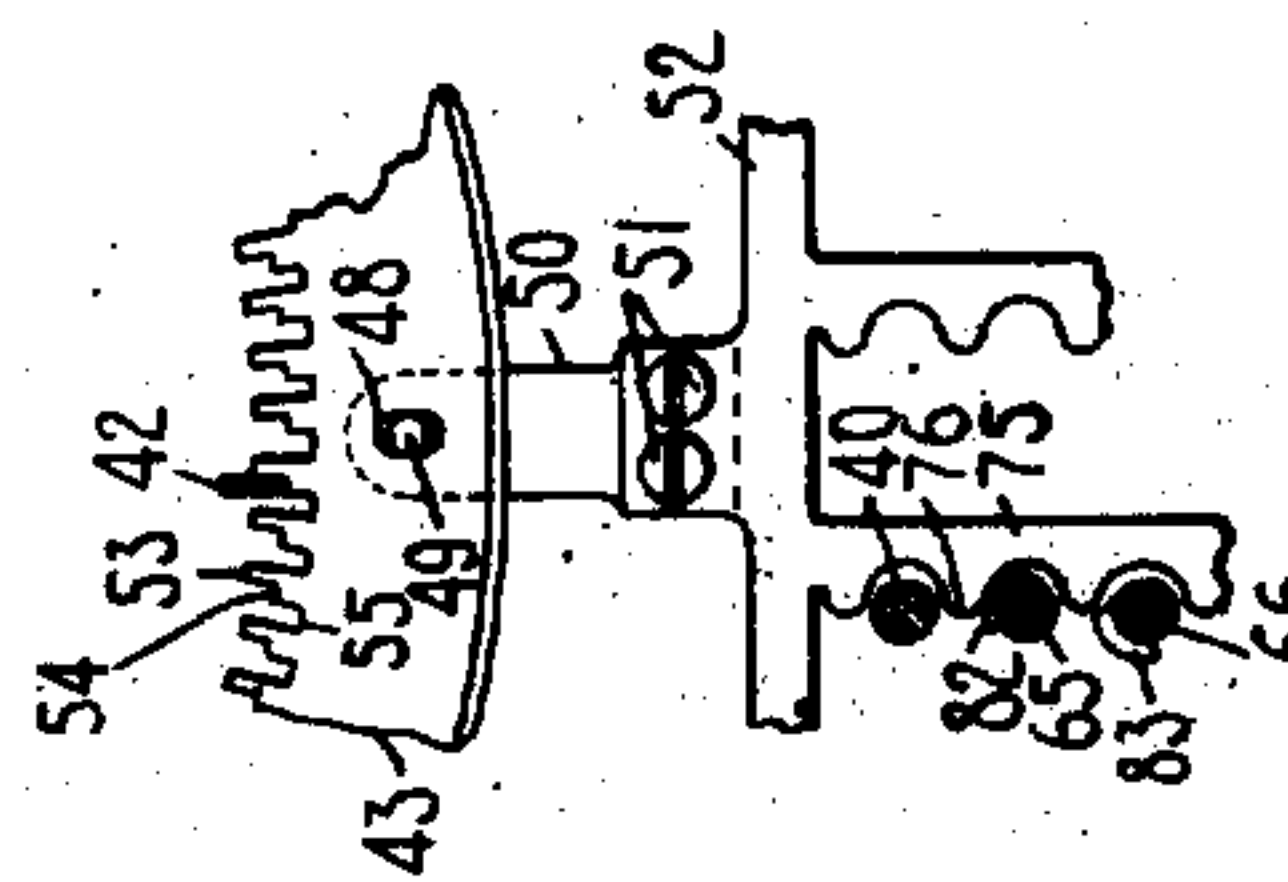


FIG. 6.

WITNESSES.

R. H. H. H. H. H.
W. F. H. H. H. H.

INVENTOR.

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By Jacob F. F. F.

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APPLICATION FILED JAN. 4, 1906.

4 SHEETS—SHEET 4.

FIG. 9.

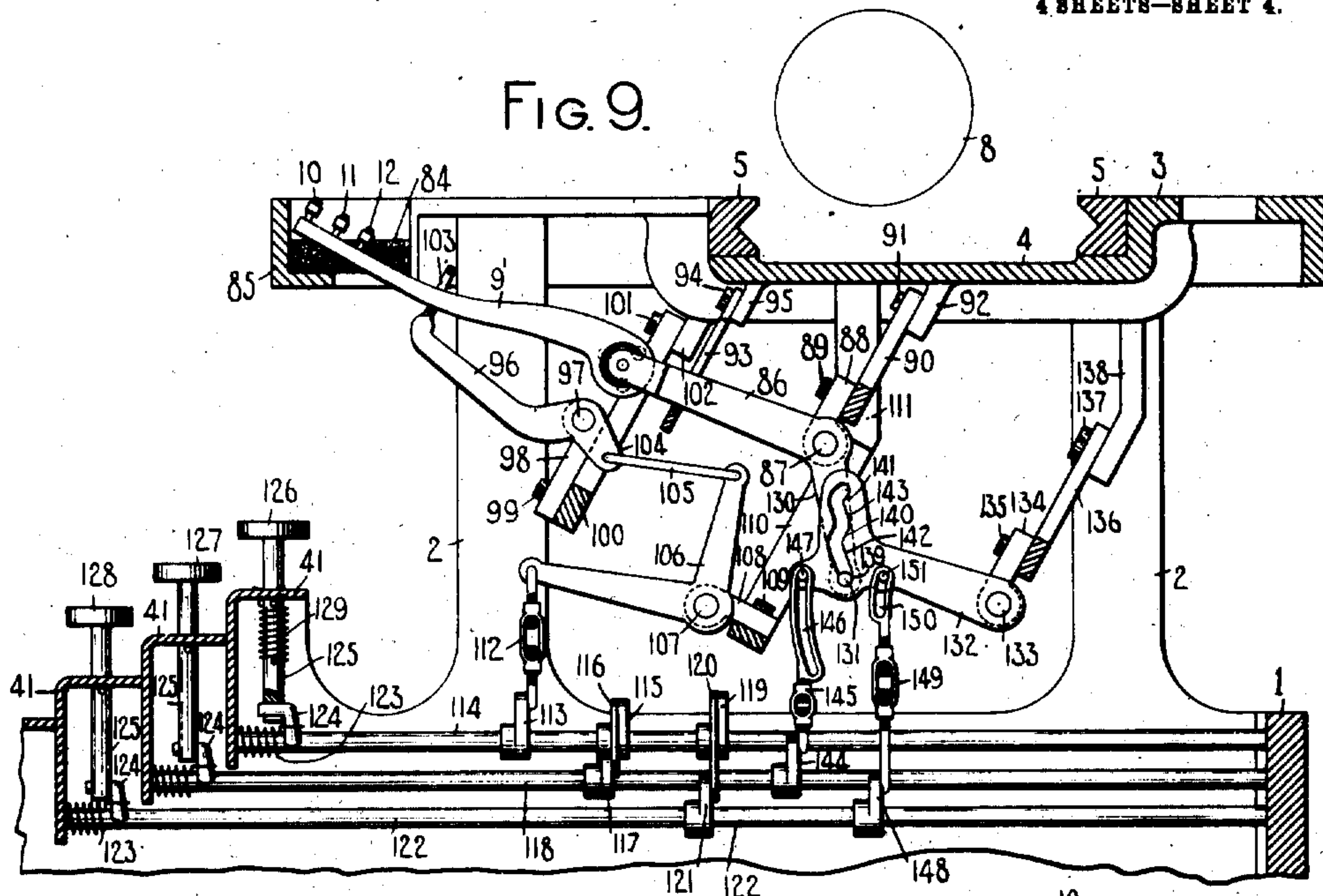
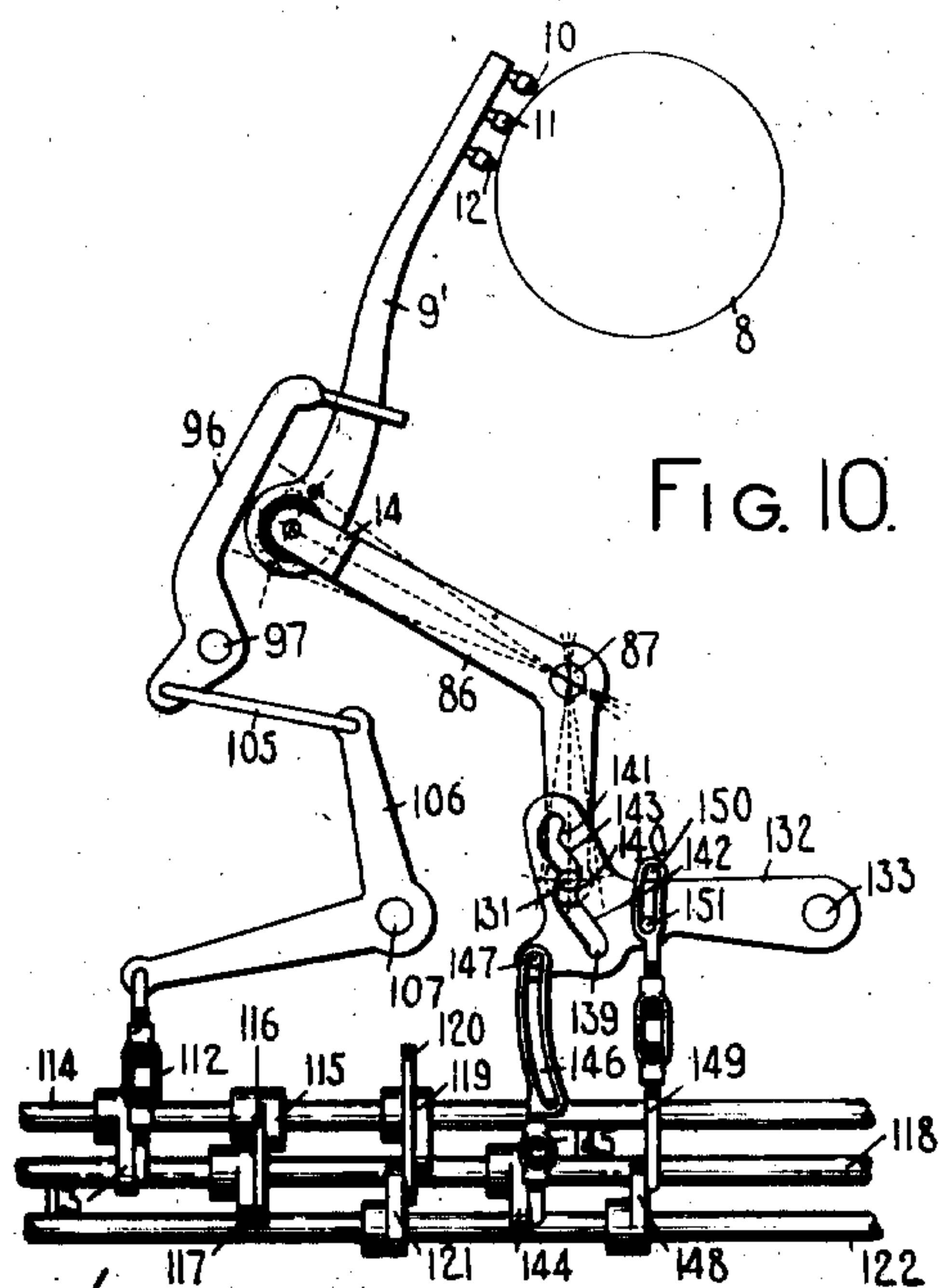


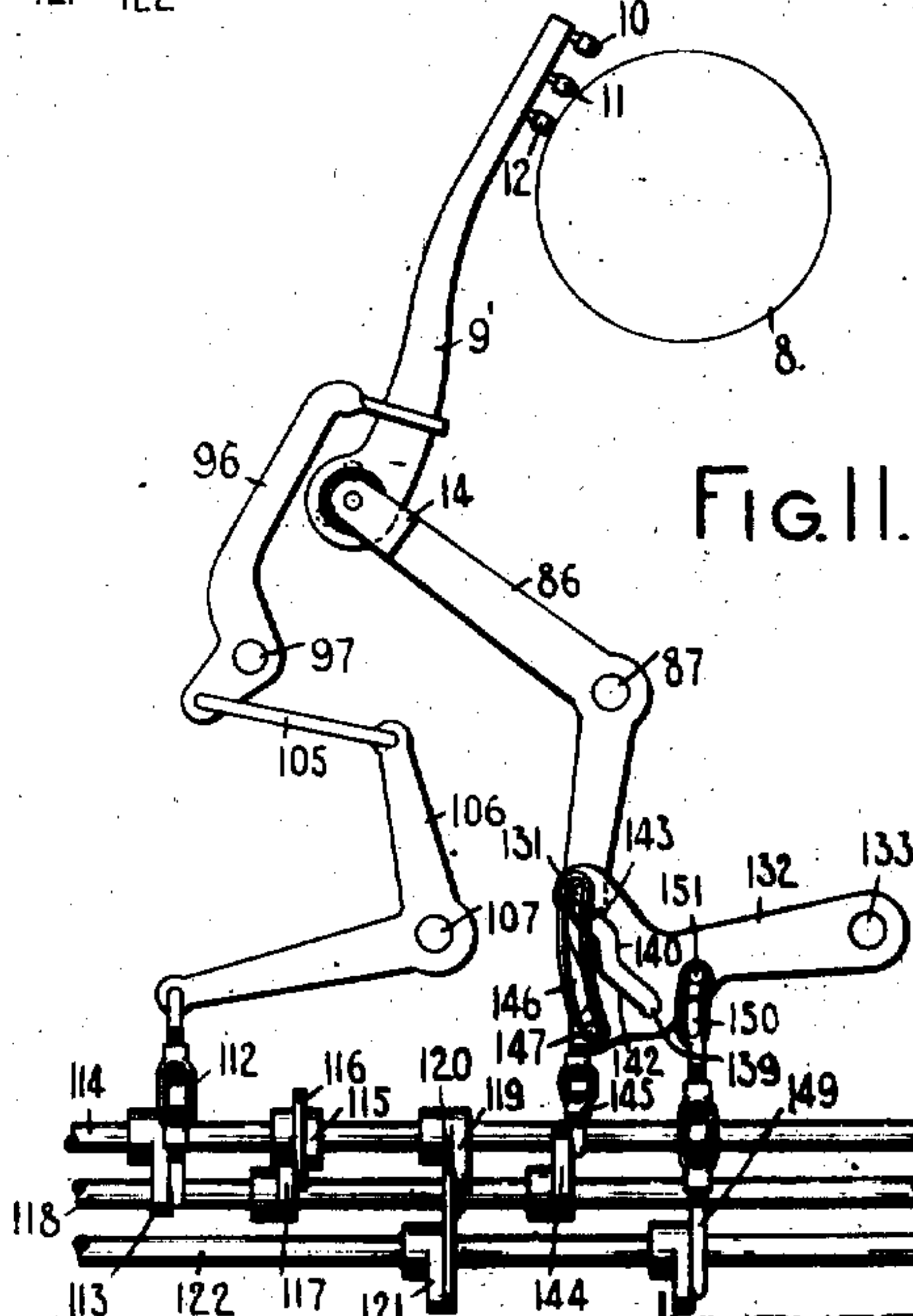
FIG. 10.



WITNESSES.

R. H. Strother
W. F. Haurwiler

FIG. 11.



INVENTOR.

Byron A. Brooks
By Jacob F. Fiedel
HIS ATTORNEY.

UNITED STATES PATENT OFFICE.

BYRON A. BROOKS, OF NEW YORK, N. Y., ASSIGNOR TO UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

No. 896,707.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Application filed January 4, 1905. Serial No. 239,643.

To all whom it may concern:

Be it known that I, BYRON A. BROOKS, citizen of the United States, and resident of the borough of Brooklyn, city of New York, 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.

My invention relates to typewriting machines and more especially to the type action of such machines.

One of the objects of the invention is to provide a series of type bars, each one carrying a plurality of types, and to connect to each of said type bars a plurality of keys, one for each type, in such manner that if any key be depressed it will impart to the corresponding type bar such a motion as to cause the type appropriate to that particular key to strike the paper.

In the accompanying drawings, Figure 1 is a front view partly in section of a machine in which my invention is embodied; Fig. 2 is a front to rear sectional view of said machine; Fig. 3 is a detail view showing a part of the key connections; Fig. 4 is a detail view showing the manner of connecting the different keys with a type bar; Fig. 5 is a view similar to Fig. 2 and showing a type bar and its connections in the act of printing from the middle one of three types; Fig. 6 is a fragmentary transverse sectional view on the line $x-x$ of Fig. 5; Fig. 7 is a view similar to Fig. 6 but showing the parts in the act of printing from the lower one of three types; Fig. 8 is a sectional view on the line $y-y$ of Fig. 7; Fig. 9 is a front to rear sectional view of a machine having a preferred form of my invention embodied therein; and Figs. 10 and 11 are views similar to Fig. 9 but showing the parts in position for printing from the middle type and the lower type respectively.

I have shown my invention applied to a front-strike typewriting machine, or, more specifically, a three-quarter strike machine; but it will be understood that the invention is not restricted to this class of machines, but is applicable to typewriters generally.

The main frame of the machine illustrated in the drawings comprises a base portion 1, from which rise posts 2, which support a top plate 3. Said top plate has a depressed portion 4. Seated within the angles formed by the depressed portion 4 of the top plate are two transverse grooved rails 5, the grooves in

which face each other and constitute ball races which coöperate with corresponding ball races formed in rails which constitute part of a carriage 6. Anti-friction balls 7 run in said ball races and support the carriage. The cylindrical platen 8 has a shaft which is journaled in the end pieces of the carriage 6. The carriage and platen may be fed across the machine by any known or suitable means.

The form of type action illustrated in Figs. 1-8 will be first described. Type bars 9 have a plurality of types mounted thereon, three such types being shown in the present case, said types consisting of an outer or end type 10, a middle type 11 and an inner or lower type 12. The type bars are pivotally mounted to strike the platen on the front face thereof at a point approximately thirty degrees above a horizontal plane through the axis of the platen, but so far as my invention is concerned said type bars might be arranged to strike the platen at some other point. Each of the type bars is formed at its pivotal end with a circular opening or eye which is internally grooved to form a ball race and within said eye there is situated a disk which is peripherally grooved to form a coöperating ball race. Said disk is mounted by means of a pin 13 between the arms 14 of the forked end of a hanger 15 which is pivotally mounted at 16 on a hanger 17. Within the coöperating ball races in the type bar pivot run anti-friction balls 18.

I have not illustrated all of the details of the ball bearing as the precise construction of said bearing is immaterial to my invention. The hangers 15 are in effect levers which are pivoted to swing toward and from the printing point in the same planes as their respective type bars. To this end, the hangers 17 are secured by screws 19 to a fixed segment 20 which lies back of and below the type bar pivots and which is secured by screws 21 to brackets 22 depending from the top plate of the machine. Near their free ends, the hangers or levers 15 are guided by radial slots 23 (Fig. 1) formed in a fixed segmental plate 24 which is secured to brackets 25 (Fig. 2) which depend from the top plate. The segments 22 and 24 are inclined, as shown, at an angle appropriate to the point at which the type are adapted to strike the platen. In the present case they incline downward and toward the front of the ma-

chine at an angle of about thirty degrees with the vertical.

The type bars are thrown upward and backward to print by push links 26 which are pivoted at 27 to said type bars in front of the type bar pivots. Each of said links lies substantially in the plane of its type bar and extends from its type bar in a downward and forward direction. Said links are pivoted at 28 to arms 29 of a series of sub-levers, each of which is pivoted at 30 to a hanger 31, which is secured by a screw 32 to a fixed segment 33, which is secured by screws 34 to hangers 35 which depend from the top plate. Each of the sub-levers has a rearwardly extending arm 36 to which is pivoted at 37 the upper end of a pull link 38, the lower end of which is pivoted to an arm 39 which is rigidly mounted on a rock shaft 40, which extends from front to back of the machine. The shaft 40 is journaled at its rear end in the back plate, which constitutes a part of the base portion 1 of the main frame, and at its forward end said shaft is journaled in a frame piece 41 forming part of the keyboard of the machine.

It will be perceived that when any one of the sub-levers 36, 29 is operated, its link 26 will tend to swing the type bar 9 about its pivot to cause the type to print and the thrust of said link will also tend to move the type bar support or hanger 15 about its pivot, thus moving the pivoted end of the type bar nearer to the printing point. I have provided means for controlling this motion of the hanger in such manner as to cause either one of the three types to strike the platen. In the present instance three keys are connected to each type bar, one for each type, and the controlling means for the type bar supports are governed by these keys automatically. Each of the type bar supporting levers 15 has a rearwardly extending arm 42, the free end of which stands in position to engage a stop segment 43 which is supported at its ends by links 44, which are pivoted to said segment on shouldered and headed screws 45 which pass loosely through the lower ends of said links and are threaded into the segment. The links 44 are pivoted at their upper ends on shouldered and headed screws 46 which are threaded into brackets 47 which depend from the top plate of the machine. Near its middle, said segment is formed with a slot 48 (Fig. 6) into which a pin 49 projects from a bracket 50, which is secured by screws 51 to a universal bar 52, which is controlled by the keys. As shown in the present case, the pin 49 consists of the end of a screw which is threaded through the bracket 50.

As best shown in Figs. 1, 6 and 8, the segment 43 is formed on its inner edge with a series of stepped stops having the form of teeth. Said segment normally stands in the

position shown in Fig. 1 with the ends 53 of the stepped stops in position to be engaged by the arms 42. If a type bar is operated when the segment stands in this position, the type bar support will be arrested by the stop 53 in position for the end type 10 to strike the platen. The segment may be shifted by the universal bar to the position shown in Figs. 5 and 6, when if a type bar be operated the arm 42 thereof will be arrested by the second step 54 of the stepped stop in position for the middle type 11 to strike the platen; or the segment may be further shifted by the universal bar to the position shown in Figs. 7 and 8, when the arm 42 of the operated type bar will be arrested by the third step 55 in such position that the inner type 12 will strike the platen. Each type bar is controlled by three keys 56, 57 and 58, each of which has a vertical stem 59 which is slidably mounted in one of the frame pieces 41. Each of the stems 59 is provided with a returning spring 60 which is connected at one end to said stem and at the other end to the frame piece 41, and the upward motion of said key stem, under the impulse of said spring, is limited by a stop pin 61 which engages the frame piece 41. The stem of the key 56 has its lower end standing above an arm 62 which projects from the rock shaft 40, and the stems of the keys 57 and 58 have their lower ends standing above arms 63 and 64 respectively, which project from rock shafts 65 and 66, which are mounted in the machine beneath the rock shaft 40 and in the same manner as said rock shaft. The arrangement of the rock shafts 40, 65 and 66 is similar to the arrangement used in the Smith Premier typewriter. Each of said rock shafts is provided with a returning spring 67. As best shown in Figs. 1 and 4, the rock shaft 66 has projecting therefrom an arm 68 to which is pivoted a link 69 which is connected with an arm 70 which projects from the rock shaft 40. The link 69 has an elongated slot in the upper end of which normally rests a pin 71 which projects from the arm 70. The construction is such that if the shaft 66 will be rocked by depressing the key 58, the shaft 40 will also be rocked through the arms 68 and 70 and the link 69; but if the rock shaft 40 be operated by the key 56, the pin 71 will move idly in the slot in the link 69 without affecting the rock shaft 66. The rock shaft 65 is connected with the rock shaft 40 in the same manner as the rock shaft 66 by an arm 72 projecting from the rock shaft 65, a slotted link 73 and an arm 74 which projects from the rock shaft 40. It will be seen that the rock shaft 40 will be operated by the depression of either of the keys 56, 57 or 58 and that the sub-lever 29, 36 will be operated by the link 38.

The universal bar 52 has the form of a grid or gate having bars 75, one bar for each ver-

tical tier of rock shafts, and said bars are formed with projections 76, one for each rock shaft. Said universal bar is slidably mounted near its ends in brackets 77 and 78 (Fig. 1), which project from the main frame. The universal bar is held in and returned to normal position by a spring 79 which is connected at one end to a pin 80 which projects from the universal bar, and at the other end to a pin 81 which projects from one of the brackets 77. The rock shaft 40 is not provided with any means for moving the universal bar, so that when this shaft is operated by depressing the key 56, the universal bar and segment 43 remain in their normal position with the highest steps 53 of the stepped stops in position to be engaged by the arms 42 of the type bar supports. The rock shaft 65 is formed with a segmental lug or projection 82 (Figs. 1, 6 and 8) which, when said rock shaft is operated, engages the projection 76 of the universal bar and moves said universal bar to the position shown in Fig. 6. This moves the segment 43 so that the steps 54 are in position to be engaged by the arms 42 and to arrest the type bar support of the operated type bar in position for the middle type to strike the platen. The rock shaft 66 is provided with a segmental lug or projection 83 which is similar to the projection 82 of the rock shaft 65, but is of greater radius, so that when the rock shaft 66 is operated by the key 58, the universal bar is moved far enough to move the third step 55 of the stepped stop into position to arrest the type bar hanger so as to cause the inner type 12 to strike the platen. The projections 82 and 83 are segmental in form, their peripheries being concentric with the rock shafts, so that the motion of the universal bar is made in the first part of the motion of a rock shaft and in the latter part of the motion of said shaft the universal bar is stationary.

In Fig. 5 the three positions of the type bar pivot are indicated at *a*, *b* and *c* respectively, and the corresponding positions of the type bar support are indicated by the dotted lines drawn through said points *a*, *b* and *c*. It will be perceived that the link 26 and the parts which operate said link have to move further when the type bar pivot is moved to the position *b* to print from the type 11 than when said pivot stands in position *a* to print from type 10, and that when the type bar pivot is moved to position *c* to print from type 12, the link 26 and its associated parts have to move still further. In order to effect these motions with the same depression of the key in each instance, the arms 62, 63 and 64 of the rock shafts 40, 65 and 66, stand at different angles, as shown in Figs. 2 and 3, thus leaving different amounts of lost motion between the stems of the keys 56, 57 and 58 and their respective arms. It will be perceived that the segment 43 is shifted

transversely of the type bar supports but a short distance for causing one or another of the types of the operated type bar to print, and that this slight motion of said segment throws but little additional work on the keys.

As will be understood by reference to Fig. 1, the links 26 radiate from a point near the printing point in the planes of their respective type bars and the sub-levers 29, 26 are also arranged in said planes. The links 38 are also substantially in the same planes and radiate from a point near the printing point, so that motion is communicated to the end type bars from the end rock shafts without torsional strain.

The type bar pivots are arranged as usual in the segment of a circle having its center at or near the printing point. The free ends of said type bars rest on a pad 84 of felt or other suitable material which is supported by a curved forward portion 85 of the top plate 3. This type rest is segmental in form but the plane of the segment is horizontal instead of being as is usual in machines of this type, parallel with the segment of the type bar pivots. The result of this arrangement is that the free ends of all of the type bars stand at the same vertical height. In front-strike typewriters, more work is required to operate the type bars near the middle of the segment, because the end type bars move in paths more nearly horizontal so that the weight of said type bars has to be lifted a less distance against gravity than is the case with the middle type bars. By the present arrangement all of the type bars start at the same elevation and strike the platen at the same elevation so that the same amount of work due to gravity is done in operating one type bar as is done in operating another. It will be understood that according to this arrangement the path of an end type bar from its normal to its printing position is somewhat longer than that of a middle type bar. The forward vertical part of the segmental portion 85 of the top plate reaches up to the level of the types as they lie in their normal positions, as shown in Figs. 1 and 2, so that this part of the frame serves as a shield for the free ends of type bars.

I have illustrated the preferred form of my invention in Figs. 9, 10 and 11. In this form of machine, the main frame, platen and carriage are substantially the same as in the other form and the general arrangement of the type bars and the manner in which said type bars are supported and pivoted are substantially the same; but the means for shifting the type bar supports and the means for operating the type bars are somewhat modified. The type bars 9' are pivotally mounted, preferably by ball bearings such as those already described, in hangers or supports 86 which are pivoted at 87 to hangers 88 which are secured by screws 89 to a fixed segment

90, which is secured at its ends by screws 91 to brackets 92 depending from the top plate. The type bar supports 86 are supported and guided at their free ends by a slotted segment 93 which is secured by screws 94 to brackets 95 depending from the top plate. Each of the type bars is operated by a sub-lever 96 which is pivoted at 97 to a hanger 98, which is secured by a screw 99 to a fixed segment 100, which is secured by screws 101 to brackets 102 depending from the top plate. The type bars 9 pass loosely through slots 103 in the ends of their respective sub-levers. Each of said sub-levers has a rearwardly extending arm 104 which is connected by a push link 105 with an upwardly extending arm of a bell crank sub-lever 106 which is pivoted at 107 to a hanger 108. The hangers 108 are secured by screws 109 to a fixed segment 110 which is secured to brackets 111 which depend from the top plate. Each of the sub-levers 106 has a forwardly extending arm which is connected by a pull link 112 with an arm 113 which projects from the rock shaft 114 which is journaled at its rear end in the back plate of the base 1 of the machine, and at its forward end in one of the frame plates 41 which constitute the keyboard. The rock shaft 114 has an arm 115 which is connected by a slotted link 116 with an arm 117 which projects from a rock shaft 118 which stands beneath the rock shaft 114. Said rock shaft 114 also has projecting therefrom an arm 119 which is connected by a slotted link 120 with an arm 121 which projects from a third rock shaft. The connections between the rock shaft 114 and the rock shafts 118 and 122 are of the same kind as the connections between the rock shafts 40 and the rock shafts 65 and 66. Each of said rock shafts is provided with the usual returning spring 123 and arms 124 projecting from said rock shafts are operated by the stems 125 of keys 126, 127 and 128 respectively. The stems of the keys 127 and 128 are pivotally connected with their arms 124, but the stem of the key 126 is formed with an open ended slot, as shown in Fig. 9, which fits over the arm 124 of the rock shaft 114 so that when said rock shaft is operated by either of the keys 127 or 128, the key 126 will not be moved. In order to hold said key in its normal position under these circumstances, it is provided with a returning spring 129 which is connected at one end to the stem of the key and at the other end to the frame plate 41.

The type bar support 86 has the form of an angle lever, the type bar being mounted on the free end of the forwardly extending arm of said lever. The other arm 130 of said lever extends substantially radially away from the printing point and has projecting from its free end a pin 131 which plays in a cam slot formed in the end of a lever 132 which is pivoted at 133 to a hanger 134 which

is secured by a screw 135 to a fixed segment 136. Said fixed segment is secured by screws 137 to brackets 138 depending from the top plate. The cam slot in the lever 132 is formed with three dwells or concentric portions 139, 140, 141 at different distances from the center, and these dwells are connected by inclined portions 142 and 143. When the pin 131 rests in the dwell 139, the type bar support stands in position for the type 10 to strike the platen, this being the normal position of the parts; but if the lever 132 be moved to the position shown in Fig. 10, with the pin 131 in the dwell 140, the type bar support is in position for the middle type 11 to strike the platen, and if the lever 132 be moved still further to the position shown in Fig. 11, the parts stand in position for the inner type 12 to strike the platen. The rock shaft 114 is not provided with any means for moving the lever 132 so that if said rock shaft be operated by depressing its key 126, the type bar will be thrown to the printing point and the type 10 will strike the platen.

The rock shaft 118 has an arm 144 projecting therefrom, and pivoted to said arm is a link 145 having an elongated slot 146 formed in its upper end, said slot being concentric with the lever 132. A pin 147 projects from the end of the lever 132 into the slot 146 and said pin normally stands at the top of said slot. The rock shaft 122 has projecting therefrom an arm 148 to which is pivoted a link 149 having in its upper end a slot 150 into which a pin 151 projects from the lever 132. The pin 151 is nearer to the pivotal point of the lever 132 than the pin 147, so that the link 149 will move the said lever through a greater distance than the link 145. The construction is such that if the key 127 be depressed, rocking the shaft 118, the link 145 will draw the lever 132 to the position shown in Fig. 10 and the connection 115, 116, 117 will rock the shaft 114, thus operating the type bar and causing the type 11 to strike the platen. If the key 128 be depressed and the shaft 122 be rocked, the lever 132 will be drawn down to the position shown in Fig. 11 by the link 149 and the rock shaft 114 will be operated by the connection 119, 120, 121, so that the type 12 will be thrown against the platen. When the lever 132 is moved by either of the links 145 or 149, the pin 151 or 147 will move idly in the slot in the other link. Any suitable means, such as a spring, may be provided for restoring the lever 132 to normal position.

By an inspection of Figs. 9, 10 and 11, it will be seen that the initial and final positions of the sub-lever 96 are the same whether the key 126, 127 or 128 be operated, so that one key is depressed to the same extent as another in order to operate the parts.

Various changes may be made in the de-

tails of construction and arrangement without departing from the gist of my several improvements.

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

1. In a typewriting machine, the combination of a series of type bars, each carrying a plurality of types, a series of movable supports for said type bars; a series of keys; a plurality of said keys being connected to each type bar; a series of rock shafts, one for each key; means operated by one of said rock shafts for operating a type bar; means operated by other of said rock shafts for operating said first mentioned rock shaft; and means operated by the last-named rock-shaft or shafts for controlling the support of the operated type bar.

2. In a front-strike typewriting machine, the combination of a platen; a series of type bars carrying types, said type bars having their pivots arranged approximately in a plane passing through the printing point and said types being adapted to strike against the front face of said platen; and a support for the free ends of said type bars, said support being adapted to normally maintain the free ends of the several type bars at substantially the same elevation.

3. In a front-strike typewriting machine, the combination of a platen; front-strike type bars segmentally arranged below said platen and the plane of the segment passing approximately through the printing point; and a support for the free ends of said type bars, said support maintaining the free ends of the middle type bars of the series nearer to the printing point than the end type bars.

4. In a typewriting machine, the combination of a series of type bars each carrying a plurality of types; a series of keys, a plurality of said keys being connected with each type bar; a segmentally arranged series of supports for said type bars, each pivoted to a fixed part for motion radially toward and from the printing point; a series of cams for controlling the motion of said supports to cause one or another of the types on an operated type bar to print; and means whereby certain of said keys control said cams.

5. In a typewriting machine, the combination of a series of type bars each carrying a plurality of types, a segmentally arranged series of supports for said type bars, each of said supports being mounted to move radially toward and from the printing point; a cam 132 for each of said supports; a series of keys, a plurality of said keys being connected with each of said type bars; and means whereby certain of said keys move said cam 132 to cause one or another of the types on the operated type bar to print, different keys moving said cam different distances.

6. In a typewriting machine, the combination of a series of type bars each carrying a

plurality of types; a series of supports for said type bars each pivoted to swing substantially in the plane in which its type bar moves; a series of cams one controlling each support and each of said cams mounted to move in substantially the same plane as its type bar and type bar support; a series of keys, a plurality of said keys being operatively connected with each type bar; and means whereby certain of said keys operate said cams.

7. In a typewriting machine, the combination of a series of type bars each carrying a plurality of types; a series of supports for said type bars each movable toward and from the printing point to cause one or another of the types to print; a series of sub-levers pivoted to a stationary segment and each having its pivot point approximately in a line which extends from the printing point through the pivot point of the corresponding type bar, said sub-lever having sliding connection with said type bar; means for operating said sub-levers; and means for controlling said type bar supports.

8. In a typewriting machine, the combination of a series of type bars each carrying a plurality of types; a series of supports for said type bars each movable toward and from the printing point; a segmentally arranged series of sub-levers each pivoted to swing in the plane of its type bar on a fixed pivot which is approximately in the line which extends from the printing point through the pivot point of the corresponding type bar; a plurality of keys, one for each type, connected with each of said sub-levers; and means operated by certain of said keys for controlling said type bar support.

9. In a typewriting machine, the combination of a series of type bars each carrying a plurality of types; a series of keys, a plurality of said keys being connected with each type bar; a series of horizontal rock shafts one for each key; a series of supports for said type bars each movable toward and from the printing point; a series of cams controlling said supports; arms on certain of said rock shafts; and slotted links connecting said arms with said cam whereby different keys move said cam through different distances.

10. In a typewriting machine, the combination of a series of type bars each carrying a plurality of types; a series of type bar supports pivotally mounted on a fixed segment; a series of cam plates, each pivotally mounted and controlling one of said type bar supports; a series of sub-levers each having sliding connection with one of said type bars; and a series of keys, a plurality of said keys being connected with each of said sub-levers and certain of said keys being connected with said cam plates.

11. In a typewriting machine, the combination of a type bar carrying a plurality of

types; a lever pivoted to a stationary segment and having said type bar pivotally mounted thereon; a cam plate pivoted to a fixed part of the machine and having a cam slot therein; a pin on said lever running in said cam slot; and means for moving said cam plate through different distances to adjust said type bar support into position for one or another of said types to print.

Signed at the borough of Manhattan, city 10 of New York, in the county of New York, and State of New York, this 3d day of January, A. D. 1905.

BYRON A. BROOKS.

Witnesses:

E. M. WELLS,
J. B. DEEVES.