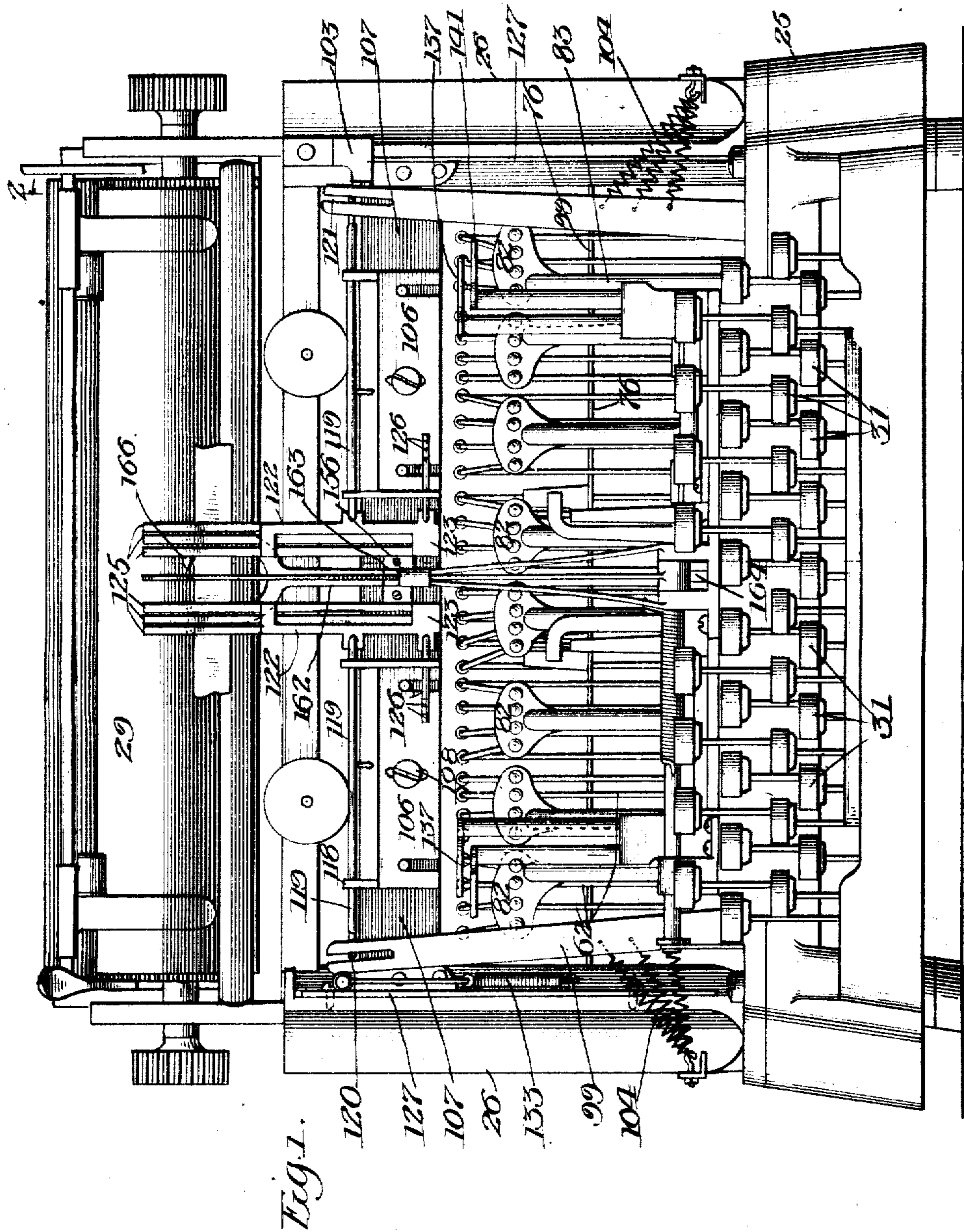


F. SHOLES.
TYPE WRITING MACHINE.
APPLICATION FILED OCT. 28, 1907.

963,949.

Patented July 12, 1910.

5 SHEETS—SHEET 1.



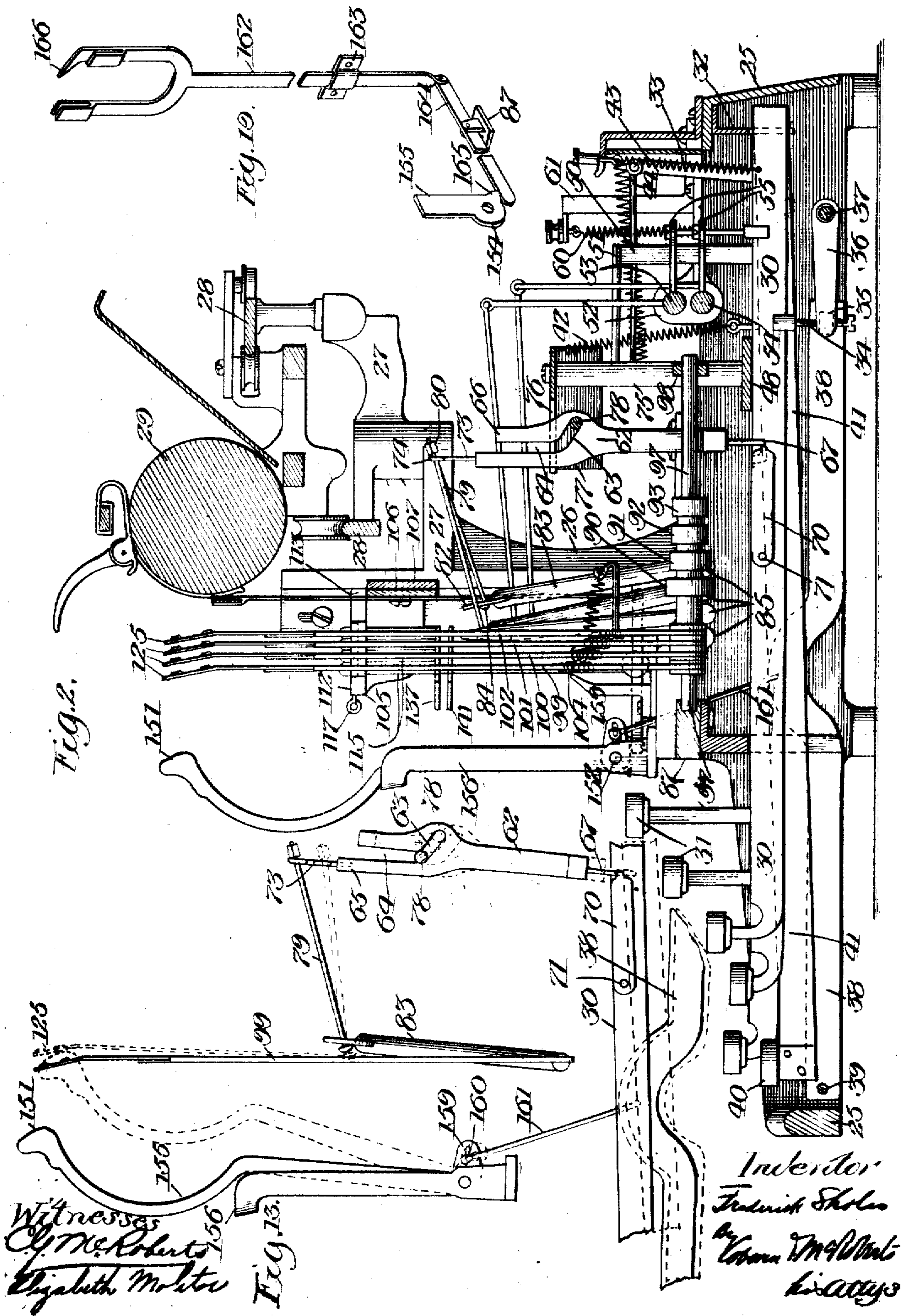
Witnesses:
C. M. Vermick
C. M. Roberts

Inventor
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his atty

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5 SHEETS—SHEET 2.

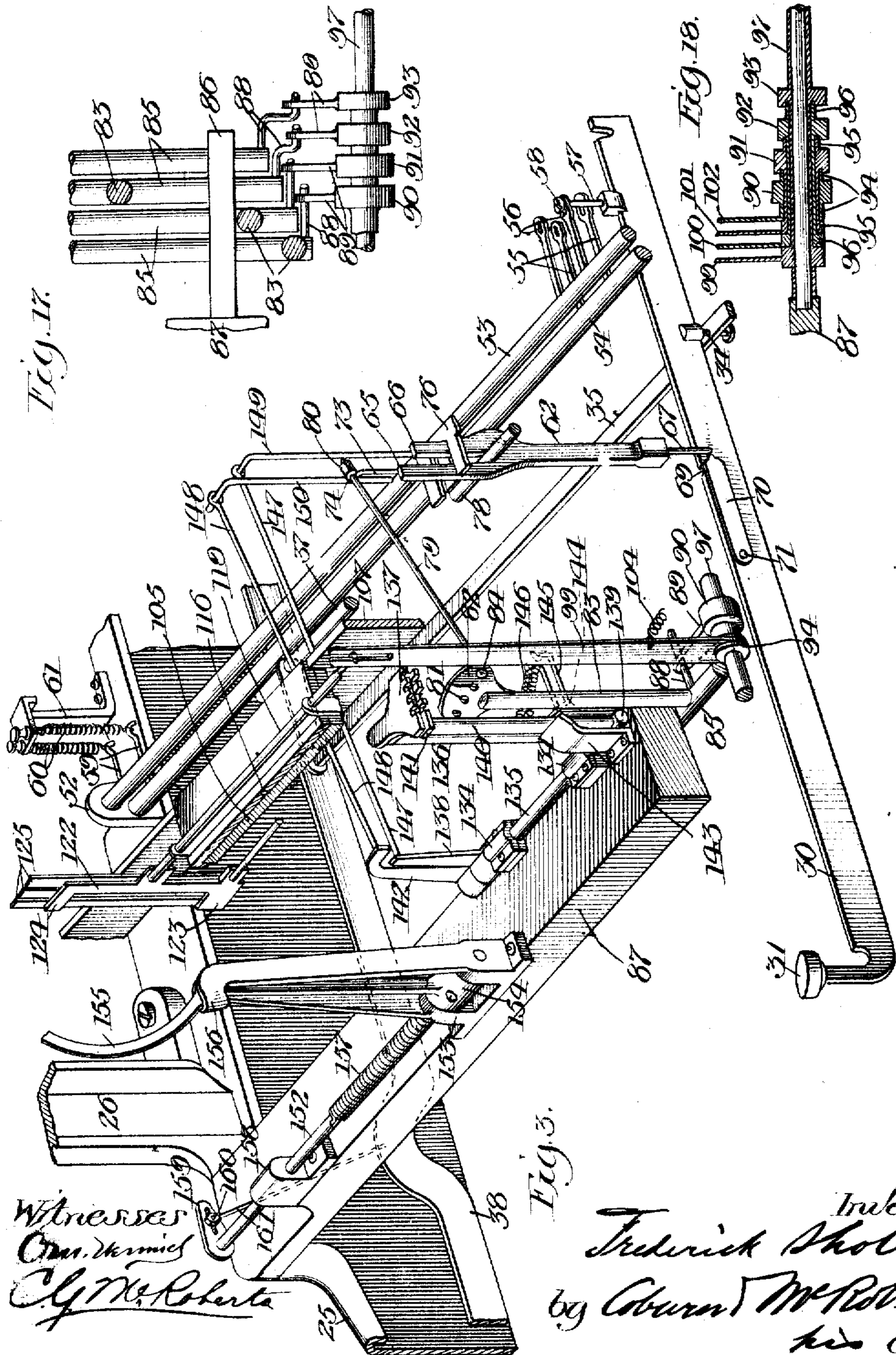


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6 SHEETS—SHEET 3.

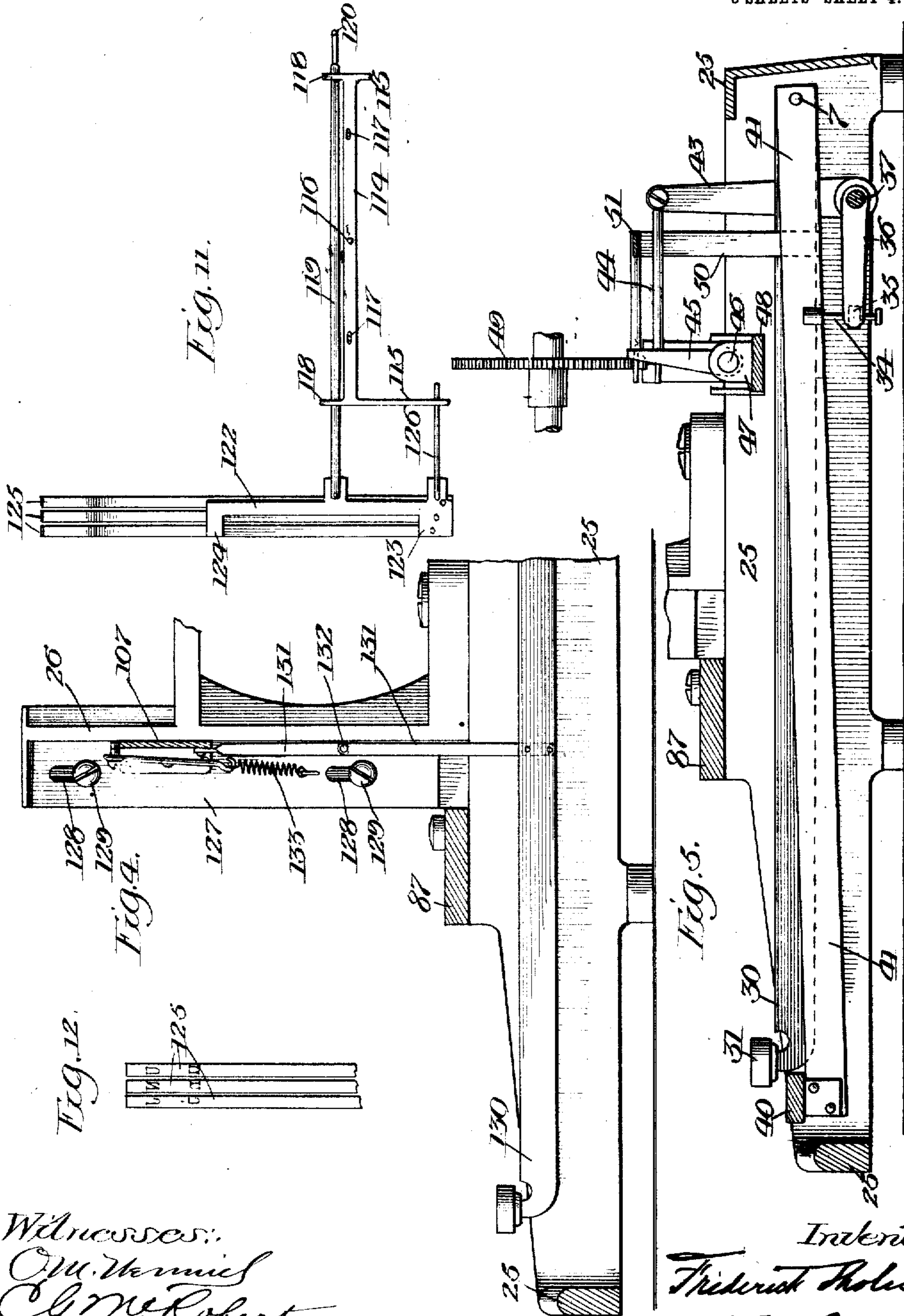


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6 SHEETS—SHEET 4.



Witnesses:
O. M. Vermil
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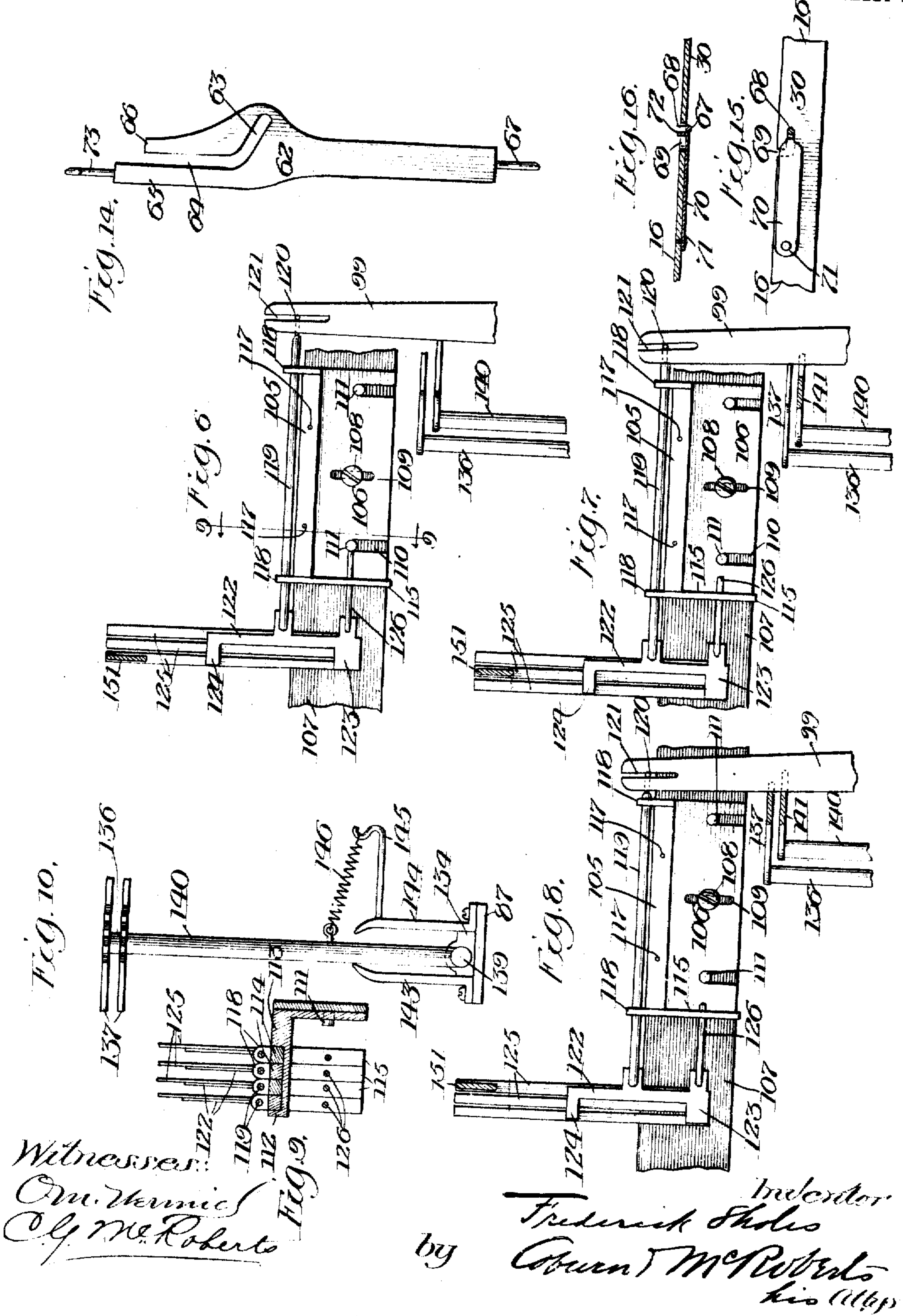
Inventor
Frederick Sholes
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5 SHEETS—SHEET 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

FREDERICK SHOLES, OF CHICAGO, ILLINOIS.

TYPE-WRITING MACHINE.

963,949.

Specification of Letters Patent. Patented July 12, 1910.

Application filed October 28, 1907. Serial No. 398,423.

To all whom it may concern:

Be it known that I, FREDERICK SHOLES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to type writing machines, and more particularly to the printing action for front-strike machines, and the invention consists in the various organizations and arrangements of parts, all as will be hereinafter fully described and particularly pointed out in the appended claims.

In the accompanying drawings, wherein like reference numerals designate like parts in the different views: Figure 1 is a view in front elevation of a type writing machine embodying my invention; Fig. 2 is a view in longitudinal sectional elevation on the line 2—2 of Fig. 1; Fig. 3 is a detail perspective view with parts broken away and parts removed showing one key-lever and associated mechanism; Fig. 4 is a detail view in side elevation with parts broken away and in section of the shift-bar and connections to shift the type-bars; Fig. 5 is a detail view in side elevation, with parts broken away, of a key-lever, space-bar and actuating mechanism connected therewith to operate the escapement; Fig. 6 is a detail view in front elevation of one set of the type-bars with associated parts showing the bars in one position of movement to receive the impression blow from the hammer; Figs. 7 and 8 are similar views showing the type-bars and associated parts in two other positions; Fig. 9 is a sectional view on the line 9—9 of Fig. 6; Fig. 10 is a view in side elevation of the stops which control the movement of the type actuating levers; Fig. 11 is a detail view in side elevation of one of the type-carrier supports showing the type-bars and associated parts; Fig. 12 is a fragmentary view in rear elevation of a set of the type-bars showing the type thereon; Fig. 13 is a detail view in side elevation of different parts of the printing mechanism illustrating the manner in which the type-bars receive the impression blow from the hammer. Fig. 14 is a side view in elevation of one of the cam-levers; Fig. 15 is a fragmentary view in side elevation of one of the key-levers showing my preferred way of securing the cam-lever

thereto; Fig. 16 is a longitudinal sectional view of the parts of Fig. 15; Fig. 17 is a detail plan view of the front rock-shafts and associated mechanism; Fig. 18 is a longitudinal sectional view through the sleeve 97, the collars 90—93 and levers 99—102 as shown in Fig. 2; and Fig. 19 is a perspective view of the ribbon carrier and associated operating mechanism.

In the drawings 25 designates the frame of the machine provided with standards 26 having brackets 27 which support transverse tracks or ways 28 on which the carriage is adapted to travel; the carriage forms no part of the present invention, may be of any suitable style, and need not be further described. A platen 29 is carried by the carriage which is provided with the usual equipment in any preferred manner.

Key-levers 30 having the usual finger-keys 31 are notched at their inner ends to engage a suitable comb-shaped plate 32, secured to the rear of the frame to insure the proper alinement of the key-levers, and are held therein by means of suitable contractile springs 33, which also serve to restore the key-levers to their normal position when depressed and after the operator has released the finger-key. The levers when depressed contact with screws 34 passing upwardly through a cross-bail 35, carried by arms 36 on the rock-shaft 37 disposed transversely of the machine under the key-levers and pivoted at each end in the sides of the frame. To the free end of the arm 36 at the left side of the machine is pivoted the rear end of a forwardly extending hammer-lever 38 which is also suitably pivoted at its front end on a transverse rod 39 secured at each end to the sides of the frame. The rear end of the lever is slotted in a manner well understood to provide sufficient play for the pivot when the lever is moved for a purpose hereinafter described. A spring returns the cross-bail 35 to normal position in the usual manner, it being understood that the cross-bail is depressed by the action of the key-levers when the finger-keys are struck by the operator.

The space-bar 40 is of any suitable form and the spacing levers 41 at each side of the machine are adapted to abut upon screws 34 on the space-bail, their inner ends being suitably fulcrumed as on pivots 7. A contractile spring 42, having one end secured to one of the space-bar levers and its other

end to the frame of the machine is adapted to restore the space-bar levers to their normal position.

The spacing bail operates the carriage-escapement in any suitable manner; for example, the rock-shaft 37 has a vertical arm 43 provided with a link 44 connected to a lever 45 on a rock-shaft 46 journaled in bearings 47 on a cross-bar 48 of the frame and adapted to operate the escapement pawls (not shown) cooperating with the escapement wheel 49. The space-bar levers 41 carry arms 50 connected by a cross-bar 51 which is operatively connected to the lever 45; the escapement *per se* forms no part of my present invention, any suitable form may be employed, and so requires no further description.

To each side of the frame is secured a bracket 52 providing bearings for rock-shafts 53 and 54 which are journaled therein. Each rock-shaft is provided with a plurality of rearwardly extending arms 55, the free ends of which have slotted openings 56 to receive draw-links 57, which are in the form of screws. Heads 58 on the free ends of the links bear upon the arms and the other ends are adjustably connected to the key-levers by means of lugs secured thereon and having threaded openings adapted to receive the threaded ends of the links. Each rock-shaft is also provided near one end with a horizontally and rearwardly extending arm 59 to which is suitably secured the lower ends of contractile spring 60 the other end of which is secured to a bracket 61 carried by the side of the frame.

Each key-lever has pivotally secured thereto about midway between its ends a cam-lever 62 which is provided near its upper end, which is widened for this purpose, with a cam-slot 63 extending downwardly and rearwardly, the upper end of the cam-slot uniting with and forming an extension of a vertical open slot 64 which divides the upper end of the cam-lever into two vertical portions 65 and 66 forming in effect a yoke, all as clearly shown in Fig. 14. The lower end of the cam-lever receives the threaded end of a draw-link 67, the other end of which is suitably bent to form a hook 68 adapted to be inserted in a bayonet slot 69 in the key-lever. This slot runs longitudinally of the key-lever and terminates at its front end in a vertical opening through which the hook 68 passes as it is moved to seat in the slot. To retain the hook in its seat and prevent accidental displacement I provide a flat spring 70 pivoted at 71 at one end to the key-lever, the other end having a lug 72 projecting inwardly and adapted to enter the slot 69 and held therein by the action of the spring. The link 67 is also threaded for the purpose of allowing the cam-lever to be adjusted. To the front fork

65 of the cam-lever is secured a link 73 its free end being bent back upon itself to form an eye or opening 74. It is of course to be understood that each key-lever and each cam-lever is, respectively, identical in construction. 70

Running transversely of the machine, parallel with the rock-shaft 54 and in front thereof, is the cross-bar or support 48, having its ends secured to the sides of the frame, and secured thereon are vertical posts 75 which support a comb-shaped plate 76 having slotted openings on its front face to receive the cam-levers which pass vertically therethrough and are thus held in proper alinement. This plate extends across the entire width of the machine and has as many openings as there are cam-levers, it being understood that there is a cam-lever for each key-lever. The plate has depending ends 77 in which are secured the ends of a transverse rod 78 which passes through the cam-slot of each of the cam-levers and is normally seated in the lower end of the slot, all as shown in Fig. 2. It is to be understood that one purpose of the open vertical slot 64 is to allow any one or more of the cam-levers to be removed without disassembling the remaining cam-levers, and it is evident that this construction also allows the cam-levers to be independently and readily assembled. 80 85 90 95

The eye 74 of each link 73 is adapted to receive the threaded end of a draw-link 79, which is adjustably held therein by a nut 80, the other end of the link passing freely through one of a series of openings 81 in the head 82 of a rock-post 83 and is headed as at 84. As will be hereinafter particularly described the heads 84 bear against the outer face of the head 82 to move the rock-post rearwardly, it being understood that the amount of motion communicated to a head 82 by its cooperating links 79 varies; this may be accomplished by adjusting the links by means of their nuts 80 so that they shall have varying lost motion with respect to their head 82, and the purpose thereof will be apparent hereinafter. As shown each head 82 is provided with four openings to receive an equal number of draw-links, but it is to be understood that the heads may be provided with any desired number of openings. The lower end of each rock-post 83 is suitably secured to a rock-shaft 85 journaled in suitable bearings 86, carried by the cross-bar 87 of the frame. It is to be understood that there is a rock-shaft 85 for every rock-post 83, the former being disposed transversely of the machine and parallel to each other. As shown in the drawings, there being eight rock-posts, the rock-shafts are preferably arranged in two sets of four each and are disposed one set on each side of the center of the machine. Each 100 105 110 115 120 125 130

rock-post and rock-shaft being, respectively, identical, a description of one is sufficient to a proper understanding of their construction and operation.

5 Near the outer end of each rock-shaft 85 is suitably secured a crank-pin 88 which is suitably connected to the free end of a rock-arm 89 secured to one of a series of collars 90, 91, 92 and 93 mounted upon a series of
10 concentric sleeves 94, 95, 96 and 97 disposed horizontally from front to rear at each side of the machine and corresponding in number with the rock-shafts 85 on each side. The inner sleeve 97 is journaled in bearings
15 98 at one end and in the cross-bar 87 at the other, and carries the collar 93 near one end and a vertical lever 99 near the front end; the second sleeve 96 is rotatably mounted on the inner one and carries the collar 92
20 at its inner end and a vertical lever 100 at its front end; the third sleeve 95 is rotatably mounted on the second and carries the collar 91 and vertical lever 101, and the outer sleeve 94 is rotatably mounted on the third
25 and carries the collar 90 and vertical lever 102. The sleeves are rotatably mounted and are maintained against displacement along their length by any suitable means. The upper end of each of the vertical levers, which
30 are flat and have their flat faces lying parallel to each other, rests against a stop 103 on the standard 26 and is held in contact therewith by means of a spring 104, the ends of which are suitably secured to the lever
35 and to a bracket also on the standard 26. The levers 99, 100, 101 and 102 move the type-bars to position opposite the printing point, as hereinafter fully described, and while each such lever may of course move
40 but one type-bar to printing position, I prefer to utilize each such actuating lever to so move a plurality of type-bars. For this purpose each head 82 associated with an actuating-lever may be provided with a plurality
45 of cooperating links 79, the number in general corresponding with the number of type-bars actuated by the associated type-actuating lever. While each head is shown provided for four links 79, it is obvious a less
50 number of links may be employed with each head, and as I here show but three type-bars moved by each type-actuating lever, I of course need employ only three links with each head. As before explained, the actuating
55 levers correspond in number with the rock-shafts 85, there therefore being eight such actuating levers arranged in two sets of four each and disposed one set on each side of the center of the machine, as shown
60 in Fig. 1. Each actuating-lever and its associated type-bars are the same, and so a description of one will suffice and I will now proceed to describe the type-bars and associated mechanism.

65 A short horizontal shelf 105 having a de-

pending side 106 is secured thereby to the cross-bar 107 on each side of the center of the machine in any suitable manner as by a screw 108 passing through a slotted opening
70 109 in the side. The side is also provided with vertical open-end slots 110 to receive pins 111 secured in the cross-bar which serve to guide the shelf when it is being moved to adjusted position. The shelf is also provided
75 on its upper face with front and rear flanges 112 and 113 which provide an intermediate channel or groove to receive the type-carrier supports. Each type-carrier support comprises a horizontal strip or body
80 114 provided with depending end lugs 115 which embrace the ends of the associated shelf 105, the flanges 112 and 113 of the shelf and the bodies 114 being provided with registering holes 116 to receive pins
85 117 securing the type-carrier supports in place. Each shelf is provided with a plurality of type-carrier supports, carrying one half the entire number, and each type-carrier support is readily removable and replaceable. Each body 114 has a pair of up-
90 standing lugs 118 provided with holes or openings to receive and guide a rod 119 whose outer end is hooked-shaped as at 120 to enter a slot 121 in the bifurcated end of one of the actuating levers; the inner end of
95 each rod is provided with a type carrier 122 of any suitable form and comprising in the present instance a vertical plate secured about midway its length to the rod and having upper and lower horizontal end portions
100 or arms 123 and 124. To the arm 123 is secured in any preferred manner type-bars 125 which are preferably of resilient metal and normally abut against the arm 124 which forms a stop therefor. To the arm 123 is
105 secured a guide-pin 126 adapted to freely enter an opening in the depending front lug 115.

As shown in the drawings each bar preferably is provided with a plurality of type
110 in any preferred manner, and in order to shift the bars to bring the different types to the printing point, I provide means to raise and lower the supporting bar 107. In this purpose this bar which extends transversely
115 of the machine is secured at each end to slide-plates 127 having slotted openings 128 and held in sliding engagement with the standards 26 by means of screws 129. The cross-bar forms the support for the type-
120 bars and is adapted to be drawn downward to shift the type-bars, by depressing the shift-key lever 130 which is suitably connected to the bar at the left side of the machine by the draw-links 131 which are piv-
125 otally connected as at 132, and is returned to its normal position by a contractile spring 133 suitably secured at one end to the said bar and at its other end to the standard
130 26 at the same side of the machine.

It is desirable to employ a stop-mechanism which shall insure the accurate positioning of the type-bars, and when each type-actuating lever moves a plurality of type it is preferable to have this stop-mechanism in the nature of a selective-mechanism which shall provide for the desired type or the one corresponding to the key operated. For this purpose, I provide on each side of the machine in association with each set of type-actuating levers a selective stop-device. In the form shown suitable bearings 134 are mounted on the cross-bar 87 adjacent to the actuating-levers, in which is journaled a tubular sleeve 135, to the outer end of which is secured a vertical post 136 having a flat head 137 extending at a right angle thereto in the direction toward the actuating levers and provided with a serrated or toothed edge in line with the edges of the said levers and adapted to receive the same in a manner to be explained. To the inner end of the sleeve 135 is secured a vertical arm 138. A rod 139, suitably journaled in the tubular sleeve 135, is provided at its outer end which extends beyond the sleeve a short distance for this purpose with a vertical post 140 secured thereto and disposed parallel with the first post 136 at its side adjacent the actuating levers, and having a head 141 similar to the head 137 but lying in a plane below that of the latter and having a toothed edge, the teeth being slightly shorter than the teeth of the head 137 and the indentations registering with those of the other head. To the inner end of the rod 139 is secured a vertical arm 142 parallel with the arm 138, its free end being curved over the top of the latter, as clearly shown in Figs. 1 and 3.

Front and rear stops 143 and 144 are secured to the cross-bar 87 and control the extent of the movement of the posts, the rear stop 144 being provided with rearwardly projecting arms 145 to which are secured the outer ends of light contractile springs 146, the inner ends of which are, respectively, connected to the posts 136 and 140 to draw them into contact with the stop 144. The free ends of the arms 138 and 142 contact, respectively, with the inner ends of the rods 147 and 148, whose other ends are suitably pivoted, respectively, to vertical posts 149 and 150, which are carried, respectively, by the rock-shafts 54 and 53. The rods 147 and 148 are held by the springs 60, which are of greater strength than the springs 146, in position to keep the arms 138 and 142 normally toward the front of the machine, as shown in Fig. 10, in which position the teeth of the stop-heads 137 and 141 register. If now the operator strikes a key corresponding to the outer type-bar of any head i. e. a type-bar farthest from the center of the machine, the actuating-lever, (as 99 in Fig.

8) is free to pass to the lowest point in the stop-heads and bring its outer type-bar to the printing point and in line with the hammer as shown in Fig. 8, it being understood that the associated key-lever does not operate either shaft 53 and 54. If the operator strikes a key corresponding to the middle type of a head, its key-lever rocks the shaft 54 against the force of its spring 60 to withdraw the rod 147 from the arm 138 to permit its associated spring 146 to rock its associated arm 136 rearwardly thereby moving the head 137 to bring one of its teeth into the path of the lever 99 (as shown in Fig. 7) to bring the middle type-bar opposite the hammer. Suitably, when the operator strikes a key corresponding to the inner type of a head, its key-lever rocks the shaft 53 against the force of its spring 60 to withdraw the rod 148 from the arm 142 to permit the associated spring 146 to rock its associated arm 140 rearwardly thereby moving the head 141 to bring one of its teeth into the path of the lever 99 (as shown in Fig. 6) to bring the inner type-bar opposite the hammer. By means of the movable heads with teeth of different lengths, the various types may be positioned; each actuating-lever operating three type-bars is controlled as to all three types by a pair of teeth, and the heads may therefore control as many actuating levers as it has pairs of teeth. If each type-carrier carries more than three type-bars it is obvious that they may be controlled and selected by merely adding a head for each added type.

The impression may be accomplished by any suitable means, and for this purpose a hammer 151 may be employed. The hammer is carried by a horizontally disposed shaft 152 journaled at one end in bearings 153 on the cross-bar 87 and which are suitably spaced apart to receive a collar 154 rigidly fixed to the shaft by a set screw; and integral with the collar, or secured thereto in any desired manner, is a vertical hammer-lever 155 terminating at its free end in a head or hammer 151. The bearings are extended upwardly to form a stop 156 against which the hammer-lever is normally held in engagement by a coil spring 157 carried on the extended end of the shaft, one end of which is secured to the bearing 153, its other end being suitably fixed to the shaft. One end of the shaft is extended and journaled in a side bearing 158 and carries thereon a rock-arm 159 having a slotted opening in which a pin 160 is adjustably secured in any preferred manner. A draw-link 161 is suitably pivoted at its upper end to the pin and at its other to the hammer lever 38 which is operated by the depression of the bail 35 common to all the key-levers.

The vertical portions 64 of the slots in the cam levers permit the hammer to be

brought up against the type-bars after the latter are positioned. As appears from Fig. 13, the first part of the downward movement of a cam-lever 62 causes it to be cammed rearwardly by the action of the rod 78 on its cam-slot 63 which draws the associated post 83 rearwardly and moves the corresponding type-bar to position, as before explained, and after the type-bar is positioned the straight part 64 of the slot in the cam-lever moves idly down over the rod 78 to permit the key-lever to be further depressed to swing the hammer up against the type. The initial movement of the key-lever positions its type, and the further movement operates the hammer, which of course should not strike until the type is positioned at the printing point. The selection of the particular type of a group is determined, as before stated, by the relative lost-motion between the heads 82 and links 79.

A vertical ribbon-carrier 162 of any preferred type passes through a guide 163 secured to the cross-bar 107 and is reciprocated by a lever 164 fulcrumed on the cross-bar 87. The other end of the lever is adapted to be depressed by a lug 165 on the collar 154 to raise the ribbon-carrier, which may be restored to its normal position by gravity. The upper end of the ribbon-carrier is preferably yoke-shaped and to one of the arms is suitably secured a pointer 166 which is adapted to indicate the printing point on the platen. When the hammer is thrown forward the lug 165 raises the ribbon-carrier into the path of the type.

It is of course to be understood that any number of type-bars may be carried on the type-carriers which are parallel and preferably disposed one-half on each side of the center of the machine, and the actuating mechanism therefor and associated parts which have been particularly described and which are located at the right side of the machine are identical with like parts on the other side and no description of the same or of their operation will be necessary. It is also to be understood that the operation of all key-levers to produce an imprint from any one of the type is in general the same, and therefore a general description only will be necessary to an understanding of the operation of the machine. Referring particularly to Figs. 2, 3, and 13, when a finger-key 31 is struck by the operator the key-lever depresses the cross-bar 35 against the action of its contractile spring to operate the escapement pawls. As the key-lever is depressed it draws its cam-lever down and the latter is cammed rearwardly by the cam-rod 78 to operate its associated link 79 and post 83 through which motion is imparted to the associated type-actuating lever by the intermediate connections shown in Figs. 17 and 18. The actuating lever moves its as-

sociated type-carrier support, the extent of movement to bring the selected type to the printing point being determined by the selective mechanism as above described. After the type is thus brought opposite the printing point lost motion between the type-bar and its associated key-lever is provided by the vertical portion 64 of the cam-slot to allow the key-lever to operate the hammer, as also above described, the ribbon-carrier being moved thereby as stated. When the type-bar is struck by the hammer the type is moved into contact with the paper and by reason of the resiliency of the material of the type-bar when the hammer is retracted the type-bar springs back against the stop 124 and all vibration thereof is immediately checked by the stop. When the finger-key is released by the operator the several parts are restored to their normal positions by the associated springs against the action of which the parts are moved.

I claim:

1. In a type-writing machine, a removable type-carrier support consisting of a body having end lugs and a reciprocating type-carrier mounted in the lugs.

2. In a type-writing machine, a removable type-carrier support consisting of a body having end lugs, and a reciprocating type-carrier having a rod slidably mounted in the lugs, and a pin guided on the body.

3. In a type-writing machine, a removable type-carrier support consisting of a horizontal body having guides one of which projects above and below the body, and a reciprocating type-carrier having a rod slidably mounted in the guides and a pin also in the guide below the body.

4. In a type-writing machine, a shelf, a removable type-carrier support having a body resting on the shelf and a reciprocating type-carrier, and means to connect the body and shelf.

5. In a type-writing machine, a shelf having a channel, a removable type-carrier support having a body adapted to said channel, means to detachably connect the body and shelf, and type-bars on the support.

6. In a type-writing machine, a shelf, a removable type-carrier support having a body provided with lugs to embrace the shelf, and type-bars on the support.

7. In a type-writing machine, a shelf, a removable type-carrier support having a body provided with end lugs to engage the shelf, detachable means to connect the body and shelf, and type-bars on the support.

8. In a type-writing machine, a shelf, a removable type-carrier support having a body provided with end lugs to engage the shelf, a rod movably mounted on the body, and a type-bar carried by the rod.

9. In a type-writing machine, a shelf, a removable type-carrier support having a

body provided with end lugs to engage the shelf, detachable means connecting the shelf and body, a rod slidably mounted on the body, and a type-bar carried by the rod.

5 10. In a type-writing machine, a shelf, a series of removable type-carrier supports mounted on the shelf, and a movable type-bar carried by each support.

10 11. In a type-writing machine, a shelf, a series of removable type-carrier supports independently mounted on the shelf, detachable means commonly connecting the supports and shelf, and a movable type-bar on each support.

15 12. In a type-writing machine, a shelf, a series of removable type-carrier supports independently mounted on the shelf, means common to the supports to detachably connect the same to the shelf, and type-bars on 20 the supports.

25 13. In a type-writing machine, a shelf having a channel, a series of independent removable type-carrier supports mounted in the channel, a detachable pin connecting the supports and shelf, and a plurality of type-bars on each support.

30 14. In a type-writing machine, a shelf having a channel, a series of independent removable type-carrier supports each comprising a body mounted in the channel, detachable means connecting the bodies and shelf, a rod movably mounted on each body, and a series of type-bars on each rod.

35 15. In a type-writing machine, a shelf, and a type-carrier support comprising a body removable from the shelf and a type-carrying rod movable in the body.

40 16. In a type-writing machine, a shelf having a channel, and a series of type-carrier supports each comprising a body removably mounted in the channel and a type-carrying rod movable in the body.

45 17. In a type-writing machine, a shelf, a series of removable type-carrier supports and means to lock the supports on the shelf, each support comprising a body having end lugs and a type-carrying rod mounted to reciprocate in the lugs.

50 18. In a type-writing machine, a shelf, a body removably mounted on the shelf and having lugs, a rod movably mounted in the lugs, and a type-carrier on the rod having a projection guided in one of said lugs.

55 19. In a type-writing machine, a hammer opposite the printing point, a shelf on each side of the hammer, a series of type-carrier supports removably mounted on each shelf, and means to successively move the supports and hammer.

60 20. In a type-writing machine, a hammer opposite the printing point, a series of type-carrier supports removably mounted on each side of the printing point, and means to successively move a support and the hammer.

65 21. In a type-writing machine, a platen, a

hammer, a series of parallel removable type-carriers each having a plurality of flexible type-bars, and means to move a carrier selectively as to its type and to operate the hammer to print.

70 22. In a type-writing machine, a platen, a hammer, a series of type-carriers on each side of the hammer, flexible type bars on the carriers, means to selectively move any carrier into the path of the hammer, and means 75 to move the hammer to bend the bar against the platen.

23. In a type-writing machine, a series of parallel reciprocating type-carriers each having a plurality of type, levers to actuate the 80 carriers, and means to control the extent of movement of the carriers.

24. In a type-writing machine, a series of parallel reciprocating type-carriers each having a plurality of type, levers to actuate the 85 carriers, and a selective stop-device cooperating with the levers.

25. In a type-writing machine, a series of reciprocating type-carriers each having a plurality of type, levers to actuate the carriers, and a selective stop-device comprising 90 a pair of reciprocating toothed plates cooperating with the levers.

26. In a type-writing machine, a series of key-levers, a series of type-bars, connections 95 between the levers and type-bars including actuating-levers, and a selective stop device comprising a pair of relatively movable toothed plates cooperating with the actuating levers.

100 27. In a type-writing machine, a series of key-levers, a head common to a plurality of key-levers and differentially operated thereby, a type-carrier having a plurality of type, a lever movable by the head to move the 105 type to printing position, and a selective device cooperating with the lever to control the extent of movement of the carrier.

28. In a type-writing machine, a series of key-levers, a head common to a plurality of 110 key-levers and differentially operated thereby, a type-carrier having a plurality of type, a lever movable by the head to move the type to printing position, and a selective device 115 comprising a pair of toothed plates cooperating with the lever to control its extent of movement.

29. In a type-writing machine, a series of key-levers, a series of heads each common to a plurality of key-levers and variously operated thereby, a series of type-carriers each 120 having a plurality of type, respective connections between the heads and carriers each including a lever, and a selective device cooperating with the levers to limit their 125 movement.

30. In a type-writing machine, a series of key-levers, a series of heads each common to a plurality of key-levers and variously operated thereby, a series of type-carriers each 130

having a plurality of type, respective connections between the heads and carriers each including a lever, and a pair of relatively movable toothed plates in the path of the
5 levers.

31. In a type-writing machine, a series of key-levers, a series of heads each common to a plurality of key-levers and variously operated thereby, a series of type-carriers each
10 having a plurality of type, respective connections between the heads and carriers each including a lever, and a pair of relatively movable plates in the path of the levers and having teeth of different length.

32. In a type-writing machine, a series of key-levers, a series of heads, connections between each head and a group of key-levers, a series of type-carriers each having a plurality of type, connections between the respective carriers and heads comprising levers arranged in a group, a pair of differentially
20 notched plates in the path of the levers, means to move the plates relatively to each other controlled by the key-levers.

33. In a type-writing machine, a series of key-levers, a series of heads, connections between each head and a group of key-levers, a series of type-carriers each having a plurality of type, connections between the respective carriers and heads comprising levers arranged in a group, a pair of differentially
30 notched plates in the path of the levers, a spring tending to move each plate relatively to the other, a stop for each plate, and means controlled by the key levers to independently operate the stops.

34. In a type-writing machine, a series of key-levers, a series of heads, connections between each head and a group of key-levers, a series of type-carriers each having a plurality of type, connections between the respective carriers and heads comprising levers arranged in a group, a pair of differentially
40 notched spring-pressed plates in the path of the levers, a stop for each plate, a rock-shaft controlling each stop, and connections between the rock-shafts and certain key-levers.

35. In a type-writing machine, a platen, a hammer, a key-lever, a type-carrier, and a cam-lever connecting the carrier and key-lever to move the former and providing lost-motion between them to permit the key-lever
50 to then move the hammer to print.

36. In a type-writing machine, a platen, a hammer, a key-lever, a type-carrier, and a lever connecting the carrier and key-lever, said lever having a slot comprising cam and straight portions, a rod in the slot adapted
60 to cam the lever during the initial movement thereof to move the carrier and then pass into the straight portion of the slot to permit further movement of the key-lever to operate the hammer.

37. In a type-writing machine, a platen, a hammer, a key-lever, a type-carrier, a lever

connecting the carrier and key-lever and having a vertical and angular slot, a rod in the slot adapted to cam the lever during its initial movement, and connections between the key-lever and hammer.

38. In a type-writing machine, a platen, a hammer, a key-lever, a type-carrier, a lever connecting the carrier and key-lever and having a vertical and angular slot, and a rod in the slot upon which the lever rides
70 when the key-lever is depressed.

39. In a type-writing machine, a platen, a vertically movable support mounted on the frame of the machine below the platen, a series of parallel reciprocating type-bars on
80 the support each having a plurality of type, means to shift the support with relation to the printing point on the platen, and a hammer to strike the type-bars.

40. In a type-writing machine, a platen, a vertically movable cross-bar mounted on the frame below the platen, a shelf on the bar on each side of the printing point, a series of parallel transversely movable type-bars on each shelf, each type-bar having a
85 plurality of type in vertical alinement, means to move the type-bars, means to shift the cross-bar with relation to the printing point, and a hammer for the type-bars.

41. In a type-writing machine, a platen, a vertically movable cross-bar mounted on the frame below the platen, a shelf on the bar on each side of the printing point, a series of parallel transversely movable type-bars removably mounted on each shelf, each
90 bar having a plurality of type in vertical alinement, means to move the type-bars, means to move the cross-bar with relation to the printing point, and a hammer for the type-bars.

42. In a type-writing machine, a platen, a vertically movable cross-bar mounted on the frame below the platen, a shelf adjustably mounted on the bar on each side of the printing-point, a series of parallel transversely movable type-bars on each shelf, each
100 type-bar having a plurality of type, means to move the type-bars to the printing point, a hammer to strike the type-bars, and means to shift the cross-bar.

43. In a type-writing machine, a platen, a vertically movable support mounted on the frame of the machine below the platen, a series of parallel reciprocating type-bars on the support each having a plurality of
110 type, a series of actuating levers each having a sliding connection with a type-bar, means to move the support with relation to the printing point, and a hammer for the type-bars.

44. In a type-writing machine, a platen, a vertically movable support mounted on the frame below the platen, a series of transversely reciprocating type-bars on the support each having a plurality of type, a series
125

of actuating levers mounted at one side of the printing point, a pin and slot connection between each actuating-lever and one of the type-bars, means to move the support with relation to the printing point, and a hammer for the type-bars.

45. In a type-writing machine, key-levers, a cam-lever operatively connected to each key-lever, a series of movable heads arranged across the machine and each having a series of openings, rods adjustable in the openings and connecting each cam-lever to a head, an actuating-lever operated by each head, and a type-carrier having a plurality of type-bars operated by each actuating-lever.

46. In a type-writing machine, a series of transversely reciprocating type-carriers each having a plurality of type, a series of trans-

versely moving actuating levers connected respectively to the type-carriers, a series of concentric sleeves on which the actuating-levers are mounted, each sleeve having a rock-arm, and connections intermediate each rock-arm and a group of key-levers.

47. In a type-writing machine, key-levers, type-bars movable to printing position by the key-levers, a bail operated by the key-levers, a hammer to strike the type-bars, a shaft on which the hammer is mounted, a hammer-lever operated by the bail, and a link between the hammer-lever and shaft.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK SHOLES.

Witnesses:

GEORGE R. HARBAUGH,
J. McROBERTS.