

No. 610,400.

Patented Sept. 6, 1898.

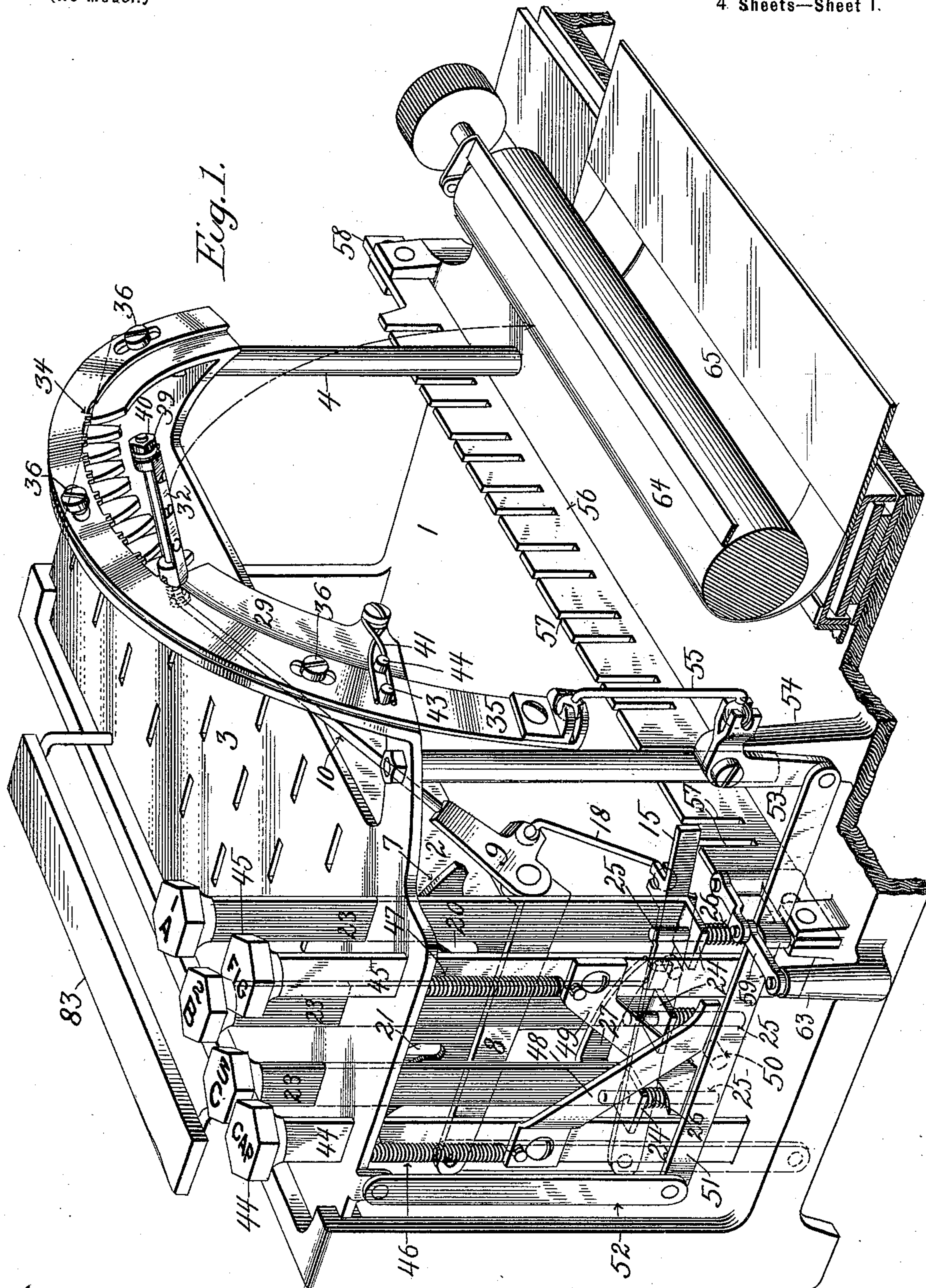
E. B. HESS & J. M. STOUGHTON.

TYPE WRITING MACHINE.

(Application filed Nov. 18, 1897.)

(No Model.)

4 Sheets—Sheet 1.



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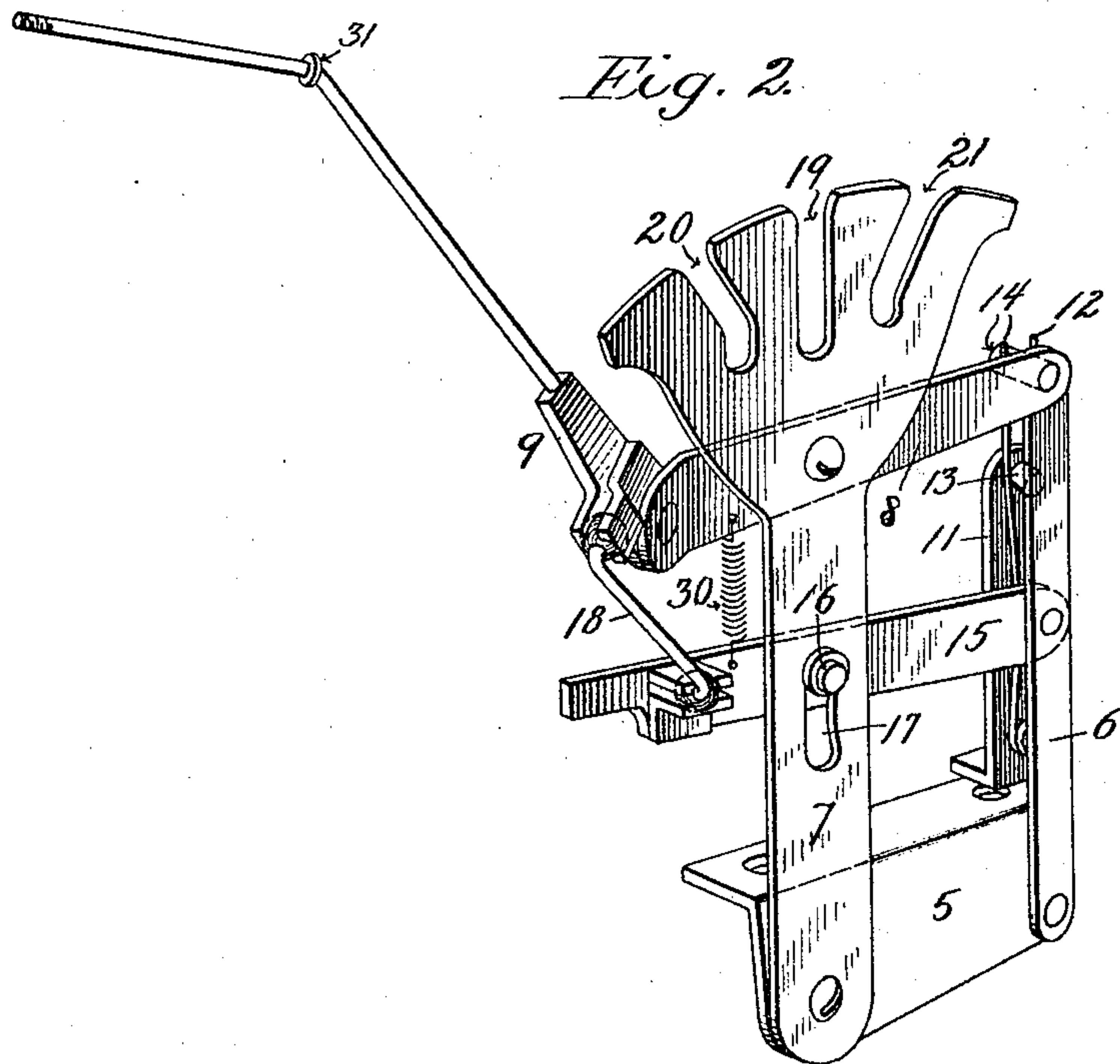
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E. B. HESS & J. M. STOUGHTON.
TYPE WRITING MACHINE.

(Application filed Nov. 16, 1897.)

(No Model.)

4 Sheets—Sheet 2.



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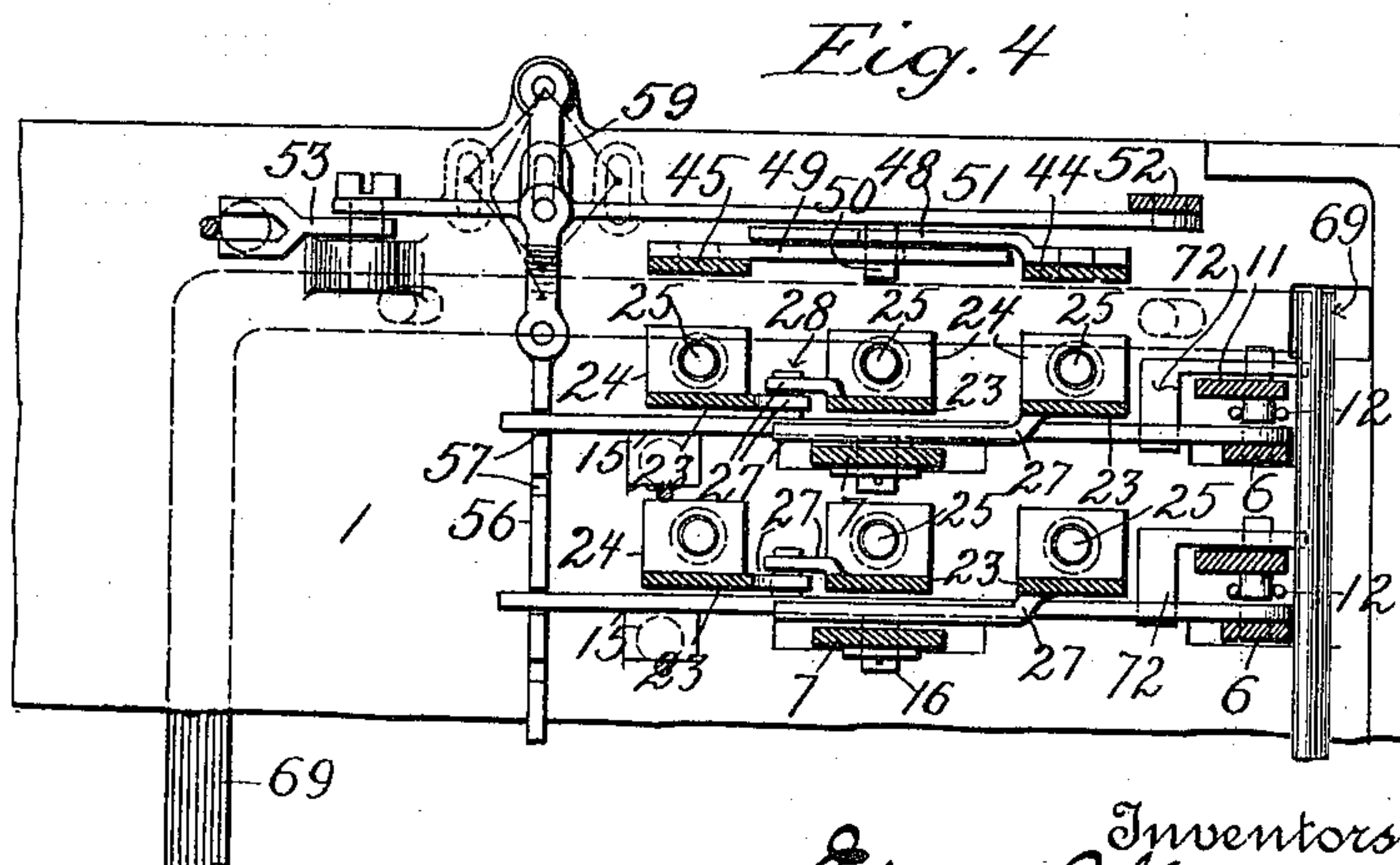
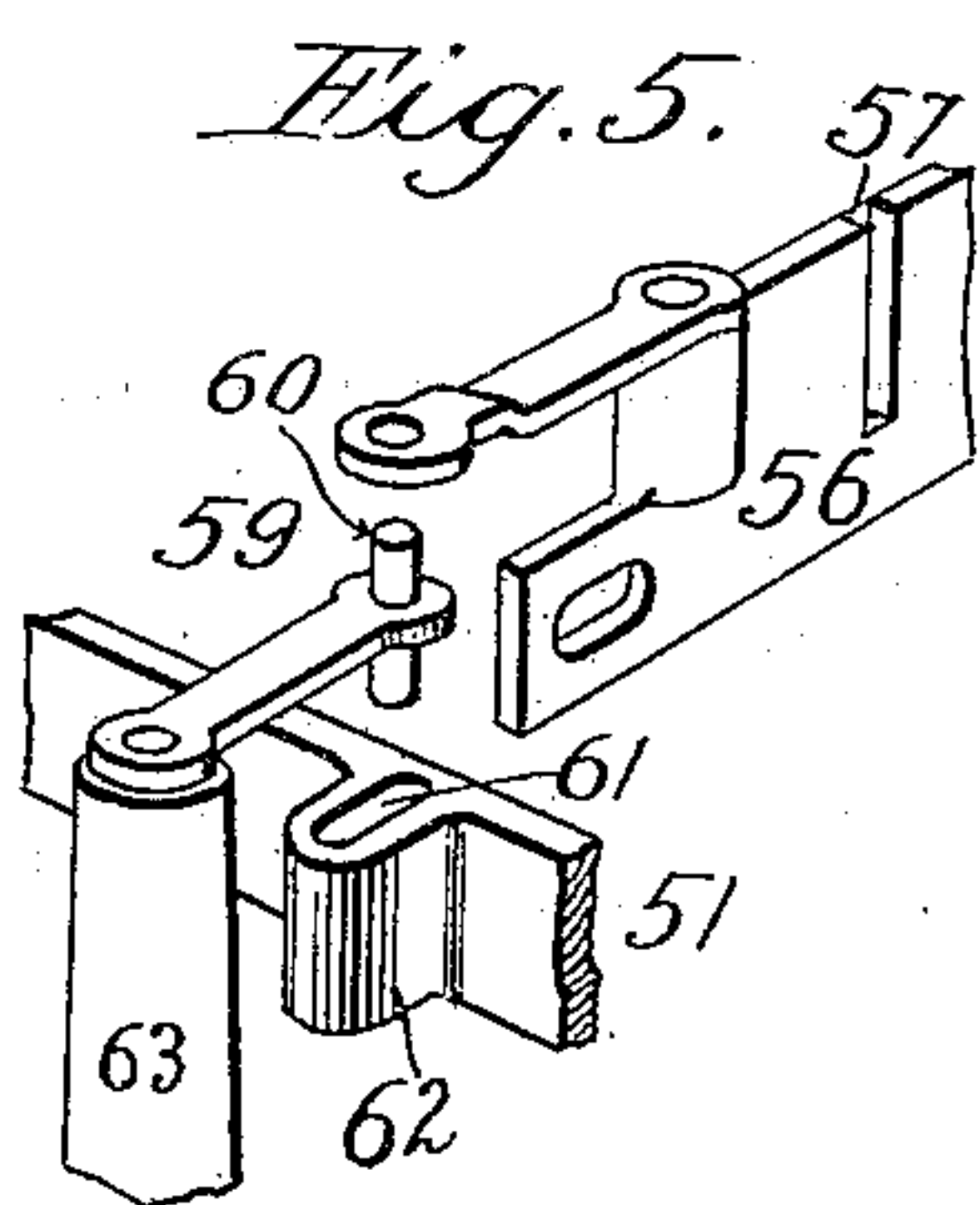
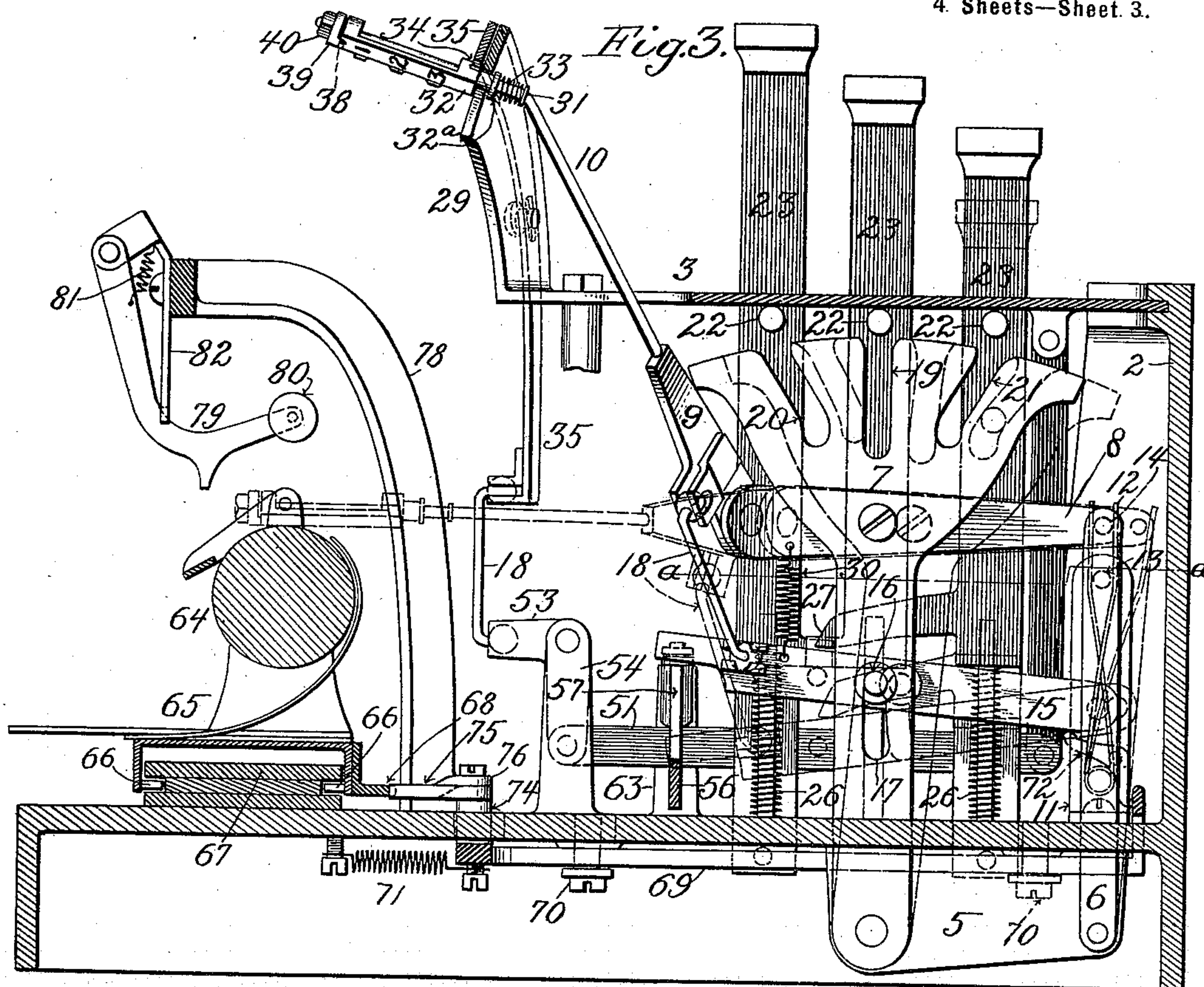
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TYPE WRITING MACHINE.

(Application filed Nov. 16, 1897.)

(No Model.)

4. Sheets—Sheet 3.



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TYPE WRITING MACHINE.

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4 Sheets—Sheet 4.

Fig. 6.

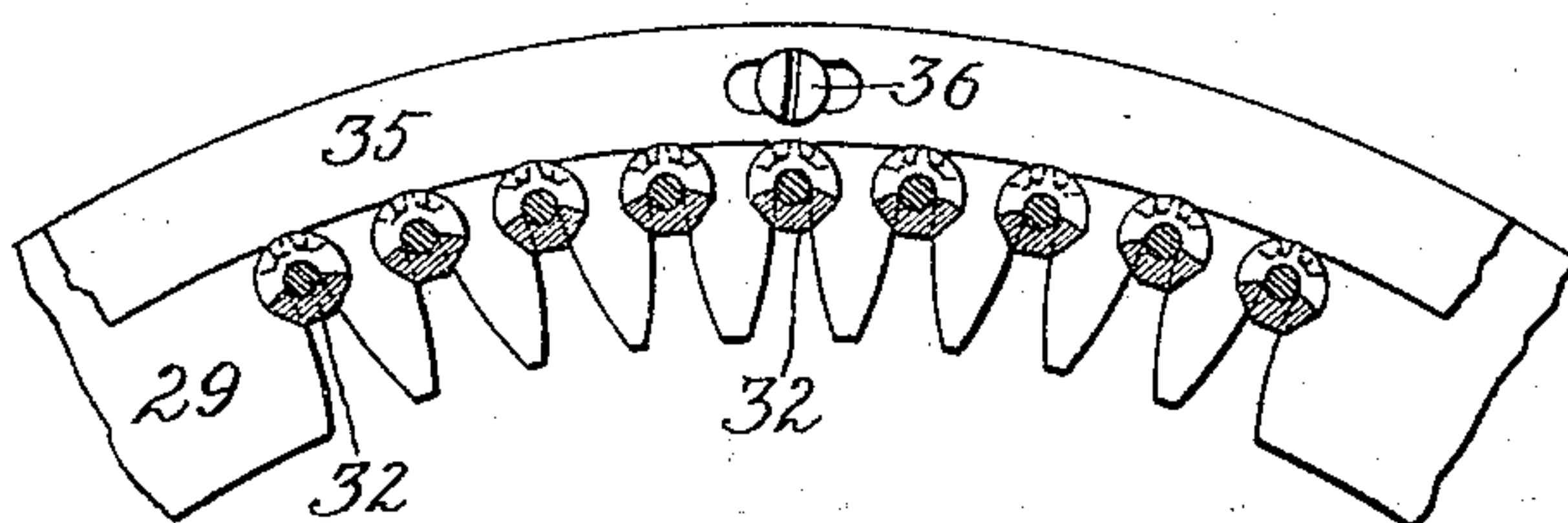


Fig. 7.

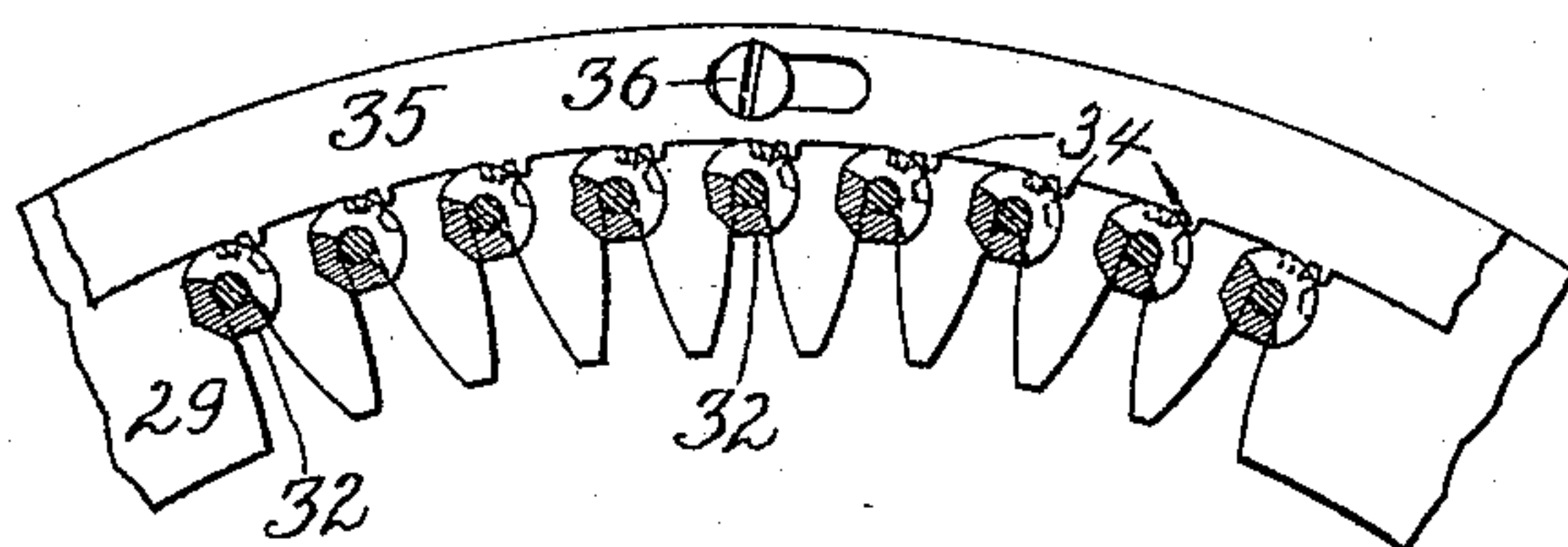


Fig. 8.

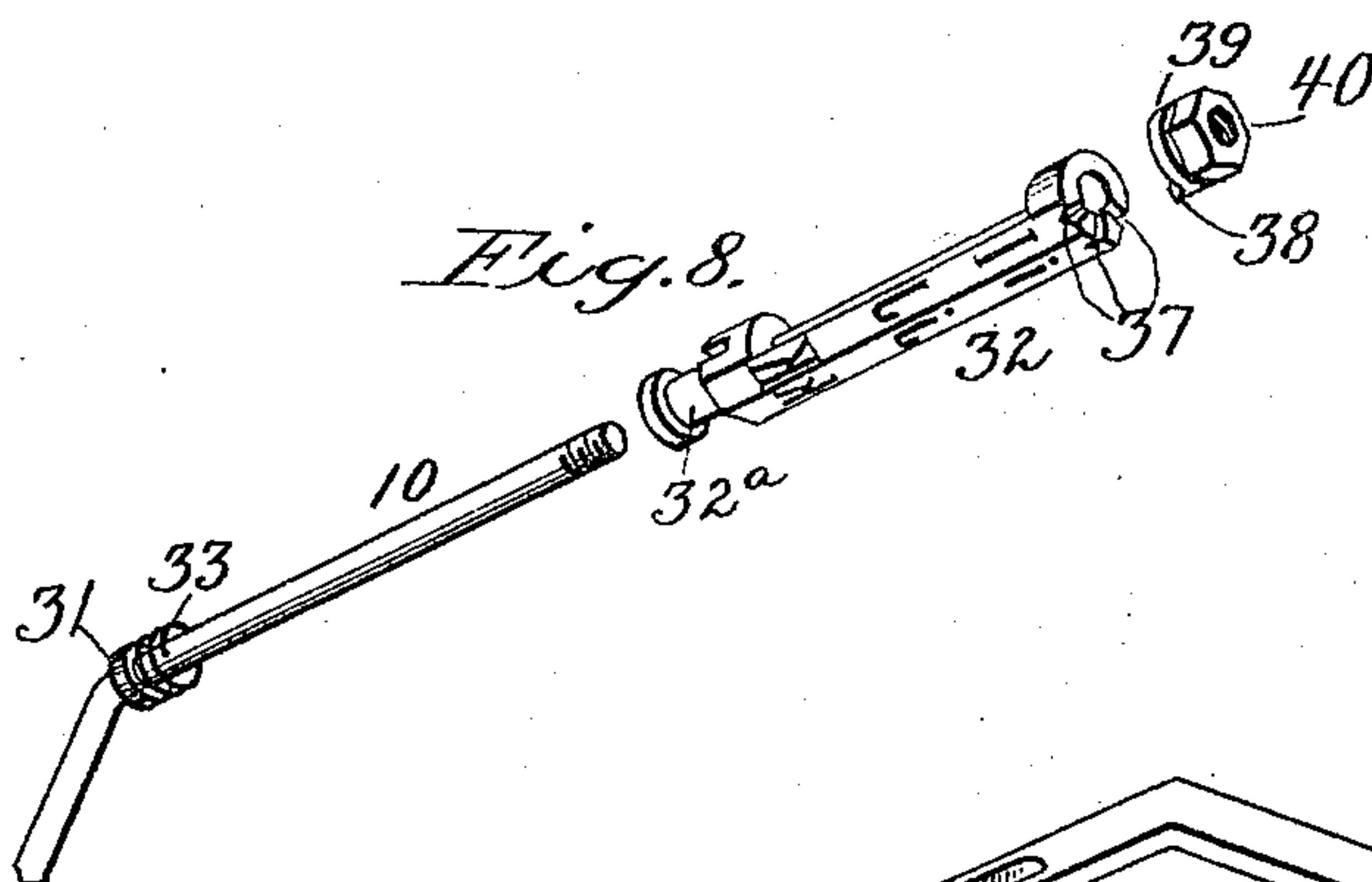
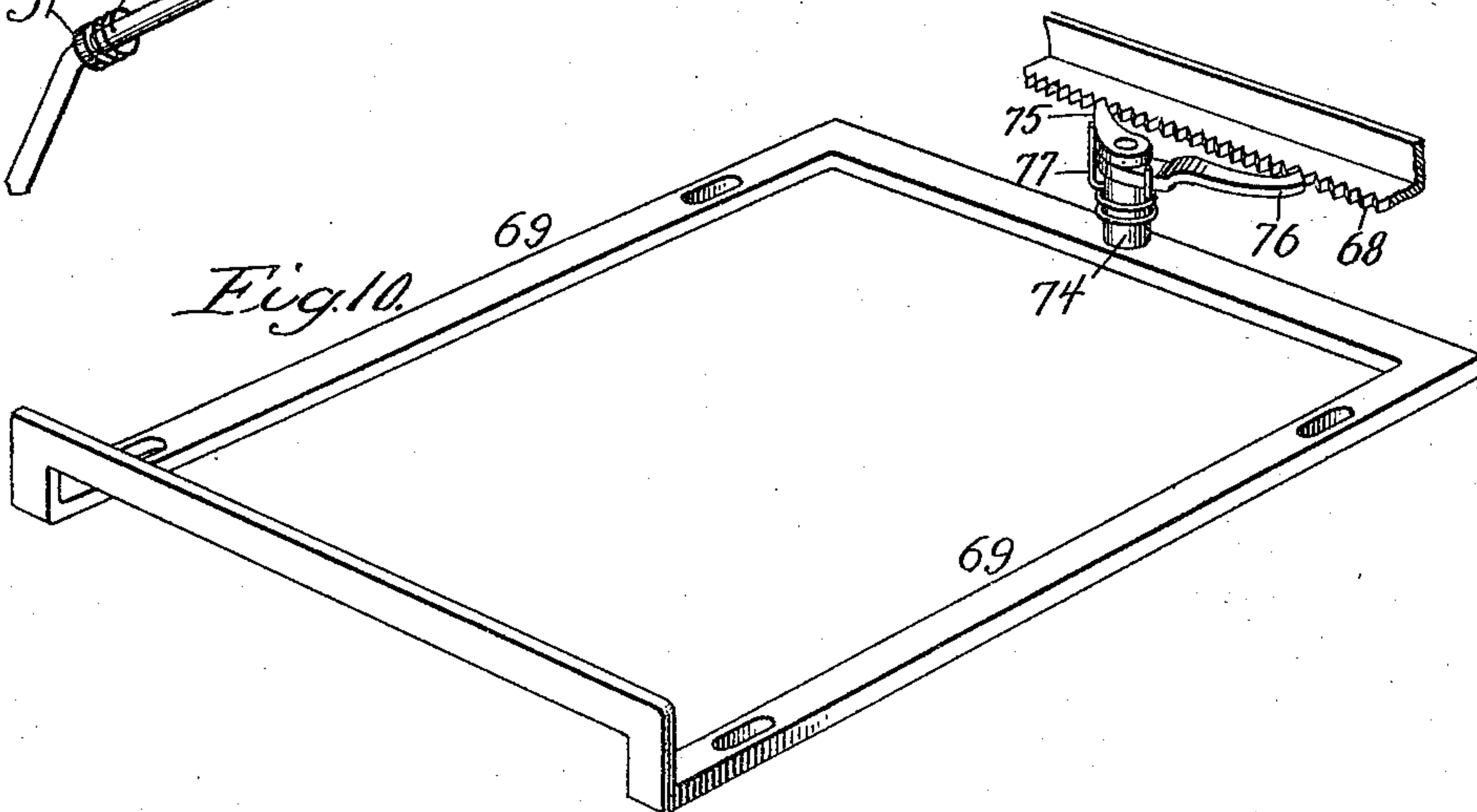


Fig. 9.



Fig. 10.



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UNITED STATES PATENT OFFICE.

EDWARD B. HESS, OF NEW YORK, AND JOSEPH M. STOUGHTON, OF
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TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 610,400, dated September 6, 1898.

Application filed November 16, 1897. Serial No. 658,719. (No model.)

To all whom it may concern:

Be it known that we, EDWARD B. HESS, residing at New York city, in the county of New York, and JOSEPH M. STOUGHTON, residing at Yonkers, in the county of Westchester, State of New York, citizens of the United States, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention pertains to type-writing machines, and is in part an improvement upon or further development of the construction set forth and claimed in Letters Patent No. 585,838, granted to Lee S. Burridge, bearing date the 6th day of July, A. D. 1897.

A primary object of the present invention is to render each finger-key wholly independent of all others in the keyboard, and incidentally to give to each finger-key a like movement and leverage, so that there shall be no appreciable difference in the stroke required to operate the machine, either as to the force required or the range of movement given.

Various other features, details, and combinations are involved in the construction here shown and described, and these will be pointed out in the description and claims.

The accompanying drawings illustrate the invention, in which—

Figure 1 is a perspective view of a type-writing machine, partially in section and showing only three finger-keys for printing and the two "shift-keys" by which the type-sleeves are rotated upon the ends of the type-bars; Fig. 2, a perspective view of a type-bar and its supporting and actuating devices; Fig. 3, a vertical section through the machine from front to rear; Fig. 4, a horizontal section of one side of the machine, taken about midway between the bed and top plate thereof; Fig. 5, a perspective view of the toggle by which the locking-bar is moved; Figs. 6 and 7, views illustrating the action of the curved rack and the type-bearing sleeves; Fig. 8, a perspective view of the end of a type-bar, its type-sleeve, and attendant parts separated one from another; Fig. 9, a cross-section of the type-sleeve, taken near one end; Fig. 10, a perspective view of the letter-space mechanism.

The details of the machine may vary considerably, particularly as to the manner of building up the main frame, the carriage and carriage-slide, and the spacing mechanism, and as to these we propose to adopt any common and well-known construction that may be found suitable.

In the drawings the main frame is represented as consisting, essentially, of a horizontal bed-plate 1, with a depending skirt or flange upon which it rests or which may be cut away, as in Fig. 1, to form supporting-feet, a vertical wall or shield 2 at the front, and a horizontal top plate 3, one edge of which is let into a groove in the inner side of the wall or shield 2, while the rear side is supported by posts or standards 4.

Beneath the bed-plate 1 is a series of vertical plates 5, which may be screwed or bolted in place or formed integral with the bed-plate, as found expedient. These plates serve as supports for standards 6 and for shifter-plates 7, by which latter the type-bars are moved longitudinally or held against such movement, according to the location of the finger-key caused to act upon said plate, there being one standard and one shifter-plate for each bar. The standards 6 and shifter-plates 7 are pivotally attached to the plates 5 by rivets or screws, as seen in Figs. 2 and 3, and pass upward through slots or elongated openings in the bed-plate 1. (Seen in Fig. 4.)

Pivotally connected with the upper end of the standard 6 and with the shifter-plate 7 is a bar 8, which by reason of this double support at equal distances above the pivots of said parts maintains its horizontal or substantially horizontal position, notwithstanding the forward and backward swinging movement imparted to the plate and standard.

To the inner end of the bar 8, which is bent to stand radial to the printing-point on the platen, or practically so, there is pivotally attached an elbow-lever 9, constituting the rear end of a type-bar 10. Of course the bending of the end of the bar is required only for those bars which are at one or the other side of the central plane of the machine passing through the printing-point.

By the side of each standard 6 there is located a stationary post 11, to which is made

fast a two-armed spring 12, the ends of which tend to approach each other, but are separated and limited in their inward movement by a stud 13, projecting from the face of the post 11, as seen in Figs. 2, 3, and 4.

The joint pin or pivot 14 by which the bar is connected with standard 6 also extends between the two arms of the spring 12, which spring thus serves to hold the standard 6 and the shifter-plate 7 both in vertical position, as indicated by full lines in Fig. 3. If, however, force be applied to move the shifter-plate and standard forward or backward, one or the other branch of the spring yields to permit such movement, while the other branch rests against the stud 13 and remains inactive. Each standard 6 is further connected with its companion shifter-plate 7 by a bar or lever 15, one end of which is pivotally connected with the standard, while a pin or stud 16, projecting from its side about its mid-length, passes through a slot 17, formed in the shifter-plate 7. This slot is curved and suitably widened at its upper and lower ends, as shown in Figs. 2 and 3, so that said lever may fall and rise without pressing the shifter-plate either forward or backward and without causing the pin or stud 16 to bind in the slot 17.

Each lever 15 connects with the elbow-lever 9 of one or another type-bar 10 and when depressed causes such type-bar to descend by a swinging motion about the pivot of said elbow-lever, connection between the two being effected by a link or connecting-rod 18 through ball-and-socket joints, as seen in Figs. 1, 2, and 3, or other joint permitting universal movement. If the lever 15 be simply depressed and the standard 6 and shifter-plate 7 be held at rest, there will be only a swinging motion of the type-bar 10; but if in addition to the depression of the lever the shifter-plate be swung forward or backward the type-bar will be moved longitudinally and one or another of three type or printing characters arranged at different points in its length will thus be caused to print.

With the shifter-plate 7 in its normal vertical position the type at the mid-length of the type-carrying head or sleeve will be caused to print, the others being brought to printing position by a forward or a backward movement of the type-bar due to a like movement of the shifter-plate. In this way three characters may be printed from a single face of the type-carrying head or sleeve without moving the platen toward or from the keyboard, the operation being analogous to that of the machine set forth in the Burrige patent above noted.

For the purpose of moving the shifter-plate forward or backward and locking it in its given position and at the same time causing a depression of lever 15 and consequent descent of the type-bar the shifter-plate 7 is made wide at its upper end or is extended in a direction from front to rear of the machine,

and it is provided with three slots 19, 20, and 21 to receive studs or pins 22, projecting from vertically-movable slides or stems 23. The slot 19 is a vertical slot, while slots 20 and 21 are inclined in opposite directions to a point near their lower ends, where they, too, take a radial direction, as seen in Figs. 2 and 3, with reference to the pivot of the shifter-plate.

Each slide or stem 23 passes through a hole or opening in the top plate 3 and is formed with a laterally-projecting foot 24, which is provided with a hole to receive a vertical guiding-stem 25, rising from the bed-plate 1. Each stem 25 is encircled by a spiral spring 26, which, bearing beneath the foot 24, tends to elevate the slide or stem 23 and to maintain it in its elevated position, the rise of the slides being limited by the studs 22, which bear against the lower face of top plate 3 when the slides or stems are at their greatest elevation.

Each slide or stem 23 is furnished at its upper end with a finger-button bearing appropriate characters to indicate what letters or signs may be printed through its depression and each is formed or furnished with a toe 27 to act upon and depress the lever 15.

It is desirable that the several toes which act upon any given lever 15 do so at a like distance from the fulcrum or pivot point in order that each may have the same leverage and the same resistance and that all may descend the same distance in actuating the lever 15 and its associated type-bar. This is conveniently attained by providing the lever 15 with a lateral stud 28, upon which the toes 27 of the inner and middle stems 23 bear, one lapping past the other, as in Figs. 1 and 4, the forward stem 23 having its toe 27 carried back to a point in line with the axis of stud 28 and being arranged to bear upon the upper edge of lever 15, as shown in Figs. 3 and 4, or on the stud 28.

It will be observed upon referring to Fig. 3 that the studs 22 stand somewhat above the upper end of the shifter-plate 7 when the stems are not depressed and that a limited travel takes place before the studs enter the slots 19, 20, and 21. This arrangement is made for the purpose of giving to the type-bars a downward movement sufficient to withdraw their type-bearing ends from a notched guide-plate or comb 29, which rises in the form of a bowed or laterally-curved arch at the inner side of top plate 3, as shown in Figs. 1 and 3.

The guide-plate or comb 29 serves to limit the rise of the type-bars and to guide them to their proper positions of rest, a spiral spring 30 extending from the bar 8 to the lever 15 and serving to elevate said lever and the type-bar 10, connected therewith, as indicated in Figs. 2 and 3.

If desired, each type-bar may carry but three type or printing characters, in which case there will be as many type-bars as the number of printing characters divided by

three; but to simplify the construction of the machine and render the same compact it is preferred to provide each type-bar with a type-bearing sleeve having a plurality of faces, each face provided with a plurality of type. In the drawings the sleeve is represented as having three type-bearing faces, each face bearing three type, so that each type-bar is adapted to print nine different characters.

As the longitudinal movements of the type-bars are effected by the mere manipulation of the type-keys without the use of a shift-key, it is desirable to place characters of the same order on any given face of the sleeve—that is to say, one face should contain capitals, another small letters, and a third face figures or punctuation-marks, so that without manipulating any shift-key the small letters shall be printed in response to their finger-keys, while capitals will be brought into play after actuating an appropriate shift-key, and figures and punctuation-marks will be brought into printing position upon the actuation of another shift-key.

The construction of the type-bars and their sleeves is illustrated in Figs. 1, 2, 3, 6, 7, 8, and 9, being best shown in Fig. 8. Referring to the latter figure, it will be seen that the outer end of the type-bar is of cylindrical form and that a collar or abutment 31 is formed at some distance from the outer extremity of the cylindrical portion, which extremity is screw-threaded. The type-bearing sleeve 32, which may be a complete tube, or, as is preferred, may be cut away between its tubular end portions, as in Figs. 6, 7, and 8, has three flat faces, each of which is provided with raised type or printing characters, as shown in Figs. 8 and 9. The inner end of the sleeve or collar has a shouldered neck 32^a to fit the spaces or notches of the comb or guide plate 29, the shouldered end of said neck serving also as a bearing-surface for a spring 33, which encircles the cylindrical end of the type-bar and bears at one end against the collar 31 thereof. The inner end of the type-sleeve, or that portion adjoining the neck 32, is notched or toothed, as indicated in Figs. 6, 7, and 8, to constitute a pinion or toothed sector for engagement by the teeth 34 of a rack-bar 35, curved to conform to and lie upon the face of the guide-plate or comb 29, as shown in Figs. 1, 3, 6, and 7. The rack-bar 35 is slotted, the slots being curved concentrically with said rack-bar 35 and with the guide-plate 29, upon which it rests, and it is held to said guide-plate by screws 36 or equivalent fastenings. The outer end of each type-sleeve 32 is provided with three V-shaped notches 37 to receive a V-shaped stud or projection 38, formed on a washer or collar 39, which is slipped upon the outer end of the type-bar and pressed against a shoulder thereon, where it is clamped at any desired angular adjustment about the axis of the bar by a binding-nut 40. The washer 39 is so adjusted that when the type-sleeve 32 has its

middle face in proper position to cause the printing of the type thereon the middle notch 37 and the projection 38 shall exactly register and by reason of their interlocking hold the sleeve in such position, the spring 33 serving to press the sleeve outward and to maintain the engagement of said parts. The bevel or inclination of the walls of the notches 37 and of the projection 38 is such that by applying slight pressure to the sleeve in a direction to cause its rotation about its axis the sleeve may be caused to force back the spring and to disengage itself from the projection 38. This rotation is effected by a longitudinal movement of the rack-bar 35 in the curved path prescribed by the slots formed in it and the guide-screws 36.

As above indicated, the sleeves stand normally with their middle faces downward. Hence a slight movement of the rack-bar 35 in one direction will bring one of the side faces to the printing position and a corresponding movement in the reverse direction will bring the other face to the printing position, while the engagement of the type-sleeve and the collar 39 will cause the sleeve to maintain the position given it by the movement of the rack-bar. To maintain the rack-bar in its medial position, there is provided a spring 41, having two stems or branches separated by a stud 42, projecting from guide-plate 29, the arms of the spring reaching past said stud and extending to opposite sides of a like stud 43, projecting from the face of the rack-bar. With the parts constructed and arranged as thus described it will be seen that upon depressing any given letter-key in the keyboard the appropriate type-bar will be caused to move downward. It may also be caused to move forward or rearward, according as one or another of its controlling or actuating finger-keys is depressed; but the printing will be from the middle face of the type-sleeve, because the rack-bar will, so far as anything yet described is concerned, stand always in its middle position and the type-sleeves will not be turned. For the purpose of rotating the type-sleeves and causing the simultaneous rotation of the entire series the rack-bar 35 is provided and is connected through suitable lever mechanism with two shift-key stems or slides, the finger-buttons of which are advisably arranged at one side of the keyboard, as seen in Fig. 1. The stems 44 and 45 are represented as flat metal bars passing through slits or openings in the top plate and the bed-plate of the machine and normally held at a predetermined elevation or level by spiral springs 46 and 47, their rise being limited by a stop of any suitable character engaging the under side of the top plate or bed-plate, as found convenient. The slide or stem 44 is provided with an inclined arm 48, and the slide 45 is provided with a similar inclined arm 49, which arms project from one side toward the other and overlap each other, as shown in Fig. 1. Di-

rectly beneath the V or angle formed by the overlapping of the arms is arranged a horizontal stud or pin 50, which projects from the side of a horizontal bar or rod 51, one end of which is pin-jointed to a pendulous link 52, the upper end of which is similarly jointed or pivoted to the top plate of the machine. The other or inner end of the bar 51 is jointed or pivotally connected to the depending arm of an elbow-lever 53, fulcrumed on a standard or post 54, rising from the bed-plate of the machine. From the second arm of the lever 53 a link or connecting-rod 55 extends to one end of the rack-bar 35, the ends of the link being connected with the elbow-lever and with the rack-bar by ball-and-socket joints or by similar connections permitting of universal motion. Under this construction and arrangement of parts a depression of stem 44 will cause the inclined under face or edge of its arm 48 to ride against the stud 50 and to move the same toward the front of the machine, thereby moving bar 51 longitudinally, swinging the elbow-lever 53 about its pivot or fulcrum, and drawing down the rack-bar 35 through the medium of the connecting-link 55. This will cause the longitudinal movement of the rack-bar and the consequent partial rotation of the type-sleeves 32, thus bringing to printing position the capital letters carried by the face thus turned down. The instant the stem 44 is released, however, the lower arm of the spring 41 carries back the rack-bar 35 to its normal position, thereby restoring the type-sleeves to their normal adjustment. If now the other side face of the type-sleeves be required, the stem 45 is depressed, whereupon the beveled under face or edge of its arm 49, acting upon the other side of stud 50, causes a longitudinal movement of bar 51 inward or toward the platen of the machine, thereby throwing upward the shorter arm of elbow-lever 53 and moving the rack-bar 35 longitudinally in a direction the reverse of that given it by the depression of stem 44. Upon the release of said stem 45, however, the second arm of spring 41 restores the rack-bar, and consequently the type-levers, to their first or normal position, the stems 44 and 45 being in each case elevated by their springs 46 and 47. It will thus be seen that provision is made for causing the descent of each type-bar in response to an appropriate finger-key and that the actuation of certain of said finger-keys will cause not only the descent but the longitudinal movement of the type-bar forward or backward, while by first depressing a shift-key the type-sleeves may be turned to bring one or another face into action, and then by depressing the appropriate finger-keys the type-bars may still be thrown downward, either with or without longitudinal movement. By this simple mechanism it is rendered possible to print with each type-bar nine distinct characters, which number may be increased, if desired, by providing additional shift-keys to vary the extent of rota-

tion and correspondingly increasing the number of type-bearing faces on the sleeves.

It is deemed desirable to prevent the possible depression of any type-bar when the type-sleeves are not completely turned to one or another of their several printing positions, and to this end there is provided a longitudinally-movable bar or plate 56, having a series of slots or notches formed in its upper edge and extending downward toward the lower edge a suitable distance. This bar is guided between suitable posts or supports 58 and is actuated by a toggle 59. (Shown in Figs. 1, 4, and 5.) The pin or stem 60, which connects the two links or levers of the toggle, extends downward into a slot or elongated opening 61, formed in a lug 62, projecting from the side of bar 51, so that as said bar is moved longitudinally either forward or backward it shall act upon the pin and "break" or shorten the toggle, thereby causing a longitudinal movement of the plate or bar 56, with which one link of the toggle is connected, the other link being connected to a post 63, rising from the bed-plate of the machine. The slots 57 are so spaced or located in bar 56 that when the two links of the toggle are in alinement and the plate or bar 56 is thrown to its extreme limit of movement in one direction one set of the slots shall lie directly below the projecting inner ends of the levers 15, as indicated in Figs. 1 and 4. When, however, either stem 44 or 45 is depressed and the bar 51 is thereby caused to move longitudinally, the bowing or buckling of the toggle and the consequent longitudinal movement of the bar or plate 56 will move the slots 57, which normally stand below the levers 15, out of alinement with said levers. If this movement be insufficient to bring the second series of notches or slots beneath the levers 15, they cannot descend, and consequently the type-bars cannot be thrown down to the platen. It is therefore manifest that before the type-bars can descend the bar 56 must be moved the distance necessary to bring said second series of notches beneath the type-bars, and this movement can only be effected when the stem 44 or the stem 45 is depressed a distance sufficient to move the rack-bar 35 the distance required to completely turn the type-sleeves 32 from one position to another. Various other ways will readily suggest themselves in which to effect the longitudinal movement of said bar; but that represented is preferred.

A paper-carriage and platen of any suitable construction may be used in connection with the mechanism above described, and the letter and line spacing mechanism may vary considerably. In the drawings we have represented a platen 64 as mounted in the standards or uprights of a carriage 65, which is represented as having guiding pins or lugs 66 extending into the grooved edges of a bed or support 67. (Shown in Fig. 3.) As indicated in Figs. 1, 3, and 10, the carriage 65 is pro-

vided with a horizontal rack-bar 68 on its inner side, the teeth of which have one wall perpendicular to the axis of the carriage and platen and the other face inclined, as shown in Fig. 10. Beneath the bed-plate is a rectangular frame 69, (shown in Figs. 3 and 10,) which is slotted in the direction of its length and is supported in a horizontal position by screws or tap-bolts 70, passing through the slots and entering the under face of the bed-plate. The front cross-bar of the frame 69 rises above the bed-plate and extends across the upper face thereof, as shown in Figs. 3 and 4, suitable openings being made in the frame for the upwardly-turned arms which support said cross-bar.

Beneath each lever 15 is arranged one arm of an elbow-lever 72, the other arm of which bears against the rear cross-bar of the frame 69, as shown in Figs. 3 and 4. When, therefore, any lever 15 is depressed, it causes the upper arm of its elbow-lever 72 to be thrown down and the lower arm to be swung forward, thereby acting upon the forward cross-bar of frame 69 and moving said frame toward the front of the machine against the stress or pull of spring 71. At the rear end of the frame 69 and at or about the mid-length of its rear cross-bar there is a post 74, upon which are pivotally supported two dogs or pawls 75 and 76, both of which are acted upon by a spring 77, tending to throw the free ends of said dogs into engagement with the toothed rack-bar 68 of the carriage. Whenever the frame 69 is moved forward through the action of the levers 15 and elbow-levers 72, the dog 75 rides backward over the tooth with which it is at the moment in engagement and engages the succeeding tooth of the rack-bar, while the dog 76 merely plays back and forth over the point of the tooth with which it is in engagement without being carried far enough to clear said tooth and engage the next. When the finger-key is next released, the spring 71 draws frame 69 rearwardly and causes the dog 75 to straighten out or swing in the direction in which the carriage is required to travel, thereby advancing the carriage the necessary distance for letter-spacing. The dog 76 merely serves to prevent the carriage from being moved backward by the dog 75 as the latter rides backward over the teeth of the rack.

Any suitable means may be provided for applying ink to the type or interposing between the type and the paper a body capable of giving off the necessary ink for printing. In the drawings there is represented a standard 78, from which is hung an angular frame or yoke 79, carrying at its free end an ink-charged roller 80, of felt or other absorbent material. This roller is located in the path of the descending type-bars; but the point of suspension of frame 79 and the shape of said frame or yoke are such that the roller will be readily thrown backward by the impact of the descending type, and thus made to

clear the type, but will be prevented from returning to its first position by reason of the end of the type-bar lying in the path of such return. As soon, however, as the type-bar rises the frame 79, with its roller 80, will be drawn back to its first position by a light spring 81, which normally holds the frame against a stop-arm 82, as shown in Fig. 3. This ink device is at once simple and effective.

A space-key bar 83 is arranged at the front side of the machine and may connect with the frame 69 in any usual or convenient manner. A convenient arrangement will be to locate the ends of its vertical supporting stems over two of the elbow-levers 72, so that upon depressing the space-bar said lever shall be actuated and caused to move the frame 69 longitudinally.

It is to be noted that in the present construction the finger-keys and their stems 23 are wholly independent of and distinct from one another, so that any key may be depressed without carrying with it or imparting motion to any other finger-key of the keyboard.

We have above described the construction and operation of the reciprocating comb or notched bar 56 and stated one of its functions, which is to prevent the actuation of any finger-key and type-bar when the rack-bar 35 is partially moved from one to another of the positions required to bring a type-face of the sleeve 32 to printing position. This bar, however, has several useful functions in addition to that noted. Thus it serves to guide and steady the lever 15 in its downward movement and to prevent vibration or lateral play due to the diagonal strain of the link 18, connecting the lever 15 and the type-bar. Again, when the comb or notched bar 56 is in its normal position it acts as a lock against the shift-keys. It prevents the operation of them or either of them while any type-bar is partially or wholly down. It further serves, when moved from its normal position by either shift-key, to prevent any return movement of the rack-bar 35 while a type-bar is down and until said type-bar is returned to its position in the comb or guide plate 29 and entered again into mesh with the teeth 34 of the rack-bar 35. This provision is necessary to prevent the shifting or partial rotation of the type-sleeves not depressed while a given type-bar is passing to and returning from the printing-point. Such shifting would manifestly cause the returning type-sleeve to go into mesh with the rack-bar in a different relation thereto from that held by the other sleeves and would result in a disarrangement of the various type-sleeves of the series. Lastly, the notched bar or reciprocating comb 56 serves to prevent the depression of any of the operating-keys while either of the shift-keys is partially but not wholly depressed.

It is to be observed that in this machine we employ a series of type-bars each carrying a multifaced type-sleeve, each face bearing a plurality of printing types or characters and

the several sleeves jointly containing the letters of the alphabet with appropriate punctuation-marks, figures, and commercial signs. It thus differs, on the one hand, from those machines in which each type-bar carries a plurality of printing signs or characters on a single face, which characters are brought into action by a movement of the platen or a longitudinal movement of the type-bars, and, on the other hand, from those machines in which a single sleeve or wheel is carried by a swinging lever and contains an entire alphabet, with punctuation-marks, figures, and such other signs as are usually provided.

The invention being thus described, what is claimed is—

1. In a type-writing machine, the combination of a type-bar provided with a plurality of type or printing characters; a movable support to which said type-bar is pivoted; and a plurality of finger keys or buttons, each adapted to act upon said type-bar and support and to make its own full movement independently of all other finger-keys of the keyboard, to swing the said type-bar about its pivot, and also to move it longitudinally; whereby the type-bar is caused to print different characters through actuation of the different finger keys or buttons, without moving more than one key or button at a time.

2. The combination in a type-writing machine, of a platen or paper-support; a series of type-bars each provided with a plurality of printing characters; a series of independently-movable supports to each of which is pivoted one of the type-bars; and a series of independent finger-keys arranged in groups of two or more, those of each group being adapted and arranged to act upon one and the same type-bar, to move the same longitudinally varying distances and to swing the same about its pivotal support; whereby each printing character of every type-bar is carried to and caused to make an impression at a common printing-point.

3. In a type-writing machine, the combination of a series of type-bars, a series of type-bearing sleeves each carried by one of said bars and having a plurality of type-bearing faces, each face bearing a plurality of type or printing characters; a series of movable supports to each of which is pivoted one type-bar of the series; a plurality of finger keys or buttons each adapted to act upon one or another type-bar of the series and to swing the same about its pivot or to swing said bar and move the same longitudinally; and means for turning or partially rotating the several type-bearing sleeves simultaneously.

4. In combination with a longitudinally-movable type-bar having a plurality of printing characters and pivotally supported at or near one end; a plurality of independent and disconnected finger-keys, one adapted simply to swing the type-bar about its pivot without effecting longitudinal movement thereof, and the other or others adapted both to swing the

type-bar about its pivot and to move the same longitudinally.

5. In a type-writing machine, the combination of a series of type-bars each provided with a rotatable type-bearing sleeve having a plurality of type-bearing faces and a plurality of type on each face; means for swinging the type-bars about their pivots; means for moving the type-bars longitudinally; and means for rotating the several type-bearing sleeves to bring corresponding faces thereof to printing position.

6. In a type-writing machine, the combination of a type-bar; a rotatable type-bearing sleeve mounted thereon; a spring bearing against said sleeve and tending to move the same longitudinally; a fixed washer or abutment toward which the sleeve is pressed by said spring, the sleeve and the abutment being adapted to interlock substantially as and for the purpose set forth.

7. In combination with type-bar 10 having collar or shoulder 31; type-bearing sleeve 32 swiveled upon said type-bar; spring 33 bearing against said sleeve and tending to move the same longitudinally away from the collar 31; and fixed washer or abutment 39 provided with tooth or projection 38 to enter one or another of a series of notches 37 formed in the sleeve 32.

8. In a type-writing machine, the combination of an oscillating plate 7 provided with a series of notches 19, 20 and 21; an oscillating standard 6; a bar 8 connecting the plate and standard; a type-bar pivotally attached to the bar 8; a lever 15 connected with the type-bar; and a series of finger-key stems 23 each provided with a stud or projection 22 adapted to enter one or another of the slots in the oscillating plate 7, and each provided with a toe or projection to engage with and move the lever 15.

9. In combination with oscillating standard 6 and oscillating plate 7, the latter provided with slots 19, 20 and 21; connecting-bar 8; a type-bar pivotally connected to said bar 8; spring-arms serving to hold the bar 8 and its connected parts normally in a medial position; and a series of independent finger-key stems or slides each provided with a projection to enter one of the slots of the plate 7 and adapted also to effect a depression or swinging of the type-bar.

10. In combination with standard 6, slotted plate 7, connecting-bar 8 and type-bar 10 carried by the bar 8; double spring 12 having its branches arranged to bear on opposite sides of a stud or projection 14; and a fixed stop 13 serving to limit the movement of the arms of the spring, substantially as and for the purpose set forth.

11. In combination with oscillating standard 6 and slotted plate 7; connecting-bar 8; type-bar 10 carried by said connecting-bar; lever 15 pivotally connected to standard 6; link 18 connecting the lever 15 and the type-bar; spring 30 serving to elevate the lever 15

and the type-bar; and a series of finger-key stems 23 each provided with a stud or projection to enter a slot of the oscillating plate 7, and with a toe or projection to act upon and depress the lever 15.

12. In combination with the series of type-bars each provided with a rotatable type-bearing sleeve; a rack-bar meshing with the several sleeves and serving to impart rotary motion thereto; a reciprocating bar connected with and serving to move the rack-bar; a stud projecting from the reciprocating bar; a spring acting upon the rack-bar and serving to move the same in one direction; and a finger-key stem or slide having an inclined arm arranged to bear upon the stud of the reciprocating bar and to impart longitudinal motion thereto and to the connected rack-bar in opposition to the spring, substantially as set forth.

13. In combination with a series of type-bars each having a rotatable type-bearing sleeve; a rack-bar meshing with and serving to rotate said sleeve; a reciprocating bar provided with a stud or projection; two finger-key stems or slides each provided with an inclined arm to act upon the stud or projection and to move the same in one or the other direction; and intermediate connections between the rack-bar and the reciprocating bar substantially such as shown and described, whereby the movements imparted by the finger-key stems to the reciprocating bar are transmitted to the rack-bar.

14. In combination with guide-bar or comb 29 and type-bars 10 arranged to enter the notches of said comb and provided with rotatable type-bearing sleeves 32; rack-bar 35 having teeth to engage with and rotate the type-bearing sleeves; spring-arms arranged to resist longitudinal movement of the rack-bar in either direction; reciprocating bar 51; intermediate connecting devices between the reciprocating bar and the rack-bar 35; and finger-key stems 44 and 45 provided respectively with inclined arms 48 and 49 arranged to bear on opposite sides of a stud or projection 50 of the bar 51.

15. In combination with a series of type-bars each provided with a rotatable type-bearing sleeve; means for rotating said sleeves; actuating-levers connected with and serving to swing the type-bars about their pivots; a notched bar located in the path of the actuating-levers and provided with a plurality of series of notches, one series arranged to come into alinement with the actuating-levers when the type-sleeves are at their normal or medial adjustment, and another series arranged to come into alinement with said actuating-levers when the type-sleeves are turned their full distance in either direction from the normal position; a bar connected with and serving to rotate the type-sleeves; finger-key stems for moving said bar in one and the other direction; and connections between said finger-key stems and the notched bar, where-

by said bar is moved longitudinally when said finger-key stems are actuated.

16. In a type-writing machine, the combination of a series of type-bars 10 each provided with a rotatable type-bearing sleeve; a series of actuating-levers 15 connected with said type-bars; a rack-bar 35 adapted to engage with and turn said type-sleeves; a reciprocating bar 51 connected with and serving to impart longitudinal motion to the rack-bar; finger-key stems 44 and 45 provided with inclined or oblique arms 48 and 49 for imparting longitudinal motion to bar 51; a bar 56 extending beneath the free ends of levers 15 and provided with two series of notches 57; and a connection between the reciprocating bar 51 and the notched bar 56 substantially as shown, whereby the bar 56 is caused to move longitudinally whenever either stem 44 or 45 is depressed and to carry one series of notches out of alinement with the levers 15, and to carry the second series of notches into alinement therewith, all substantially as set forth.

17. In combination with the actuating-levers 15 and notched bar 56; reciprocating bar 51; actuating key-stems 44 and 45 for effecting a reciprocation of said bar; and a toggle 59 having one end connected with the bar 56, its other end connected with a fixed support, and its intermediate joint-pin connected with the reciprocating bar, substantially as and for the purpose set forth.

18. In combination with a series of type-bars each provided with a rotatable type-sleeve; a rack-bar adapted to engage with and to rotate said sleeve; a two-armed spring 41 having its branches arranged to bear on opposite sides of a stud; and means for moving said rack-bar longitudinally.

19. In combination with a type-bar and its support arranged to move in the direction of the length of the type-bar; a shifter-plate connected with the type-bar support and having a series of slots formed therein at different angles; and a series of independent and disconnected finger-key stems each provided with a stud to enter a different notch of the shifter-plate.

20. In combination with the type-bars of a type-writing machine and with their actuating-levers 15; a carriage 65 provided with a rack-bar 68; a reciprocating frame 69 provided with dogs or pawls 75 and 76; elbow-levers 72 interposed between the actuating-levers 15 and a cross-bar of the frame 69; and a spring 71 serving to move the frame 69 toward the rack-bar.

21. In a type-writing machine, a series of type-bars, each provided with a multifaced type-bearing sleeve adapted to be rotated in action, each face containing a plurality of printing characters, and the several sleeves containing jointly but not severally, all the characters represented in the keyboard.

22. In combination with a series of type-bars each provided with a multifaced type-bearing

sleeve 37, each face containing a plurality of printing characters; pinions or toothed members carried by the several sleeves; and a rack-bar 35 having teeth adapted to mesh with the pinions or toothed members and to turn the type-sleeves.

23. In combination with a series of swinging and longitudinally-movable type-bars 10, each provided with a rotatable type-bearing sleeve having a plurality of faces and a plurality of printing characters on each face; a notched plate or comb 29 serving to retain the type-bars in fixed position and relation; and a movable rack-bar 35 having teeth to mesh with teeth of the type-sleeves, whereby one or another type-bearing face of the sleeves may be brought to printing position preparatory to the swinging or swinging and longitudinal movement.

24. In a type-writing machine, a series of type-bars arranged to swing to a common printing position, each bar capable of longitudinal movement, and each sleeve capable of being turned to bring one or another printing-face toward the surface to be printed.

25. In a type-writing machine, the combination of a series of type-bars each provided with a rotatable type-bearing sleeve; a means for rotating said sleeves; and a lock or stop bar

substantially such as described and shown, for preventing the movement of any type-bar to printing position while any type-sleeve is but partially turned from one printing adjustment to another.

26. In a type-writing machine, the combination of a series of type-bars, each provided with a rotatable type-bearing sleeve; a series of levers each connected with and serving to actuate a bar of said series; a bar adapted to engage with and to simultaneously rotate the several type-bearing sleeves; a shift-key serving to move said bar to effect rotation of the sleeves; and a comb-plate located in the path of the actuating-levers of the type-bars and connected with the bar by which the sleeves are rotated; said comb-plate serving through engagement of the actuating-levers therewith to prevent movement of the sleeve-rotating bar while any type-bar is at or on its way to or from the printing-point.

In witness whereof we hereunto set our hands in the presence of two witnesses.

EDWARD B. HESS.

JOSEPH M. STOUGHTON.

Witnesses:

ANDREW SHERIDAN,

LOUIS ECKERT.