

No. 670,699.

Patented Mar. 26, 1901.

B. A. BROOKS.
TYPE WRITING MACHINE.

(Application filed Jan. 28, 1899.)

(No Model.)

3 Sheets—Sheet 1.

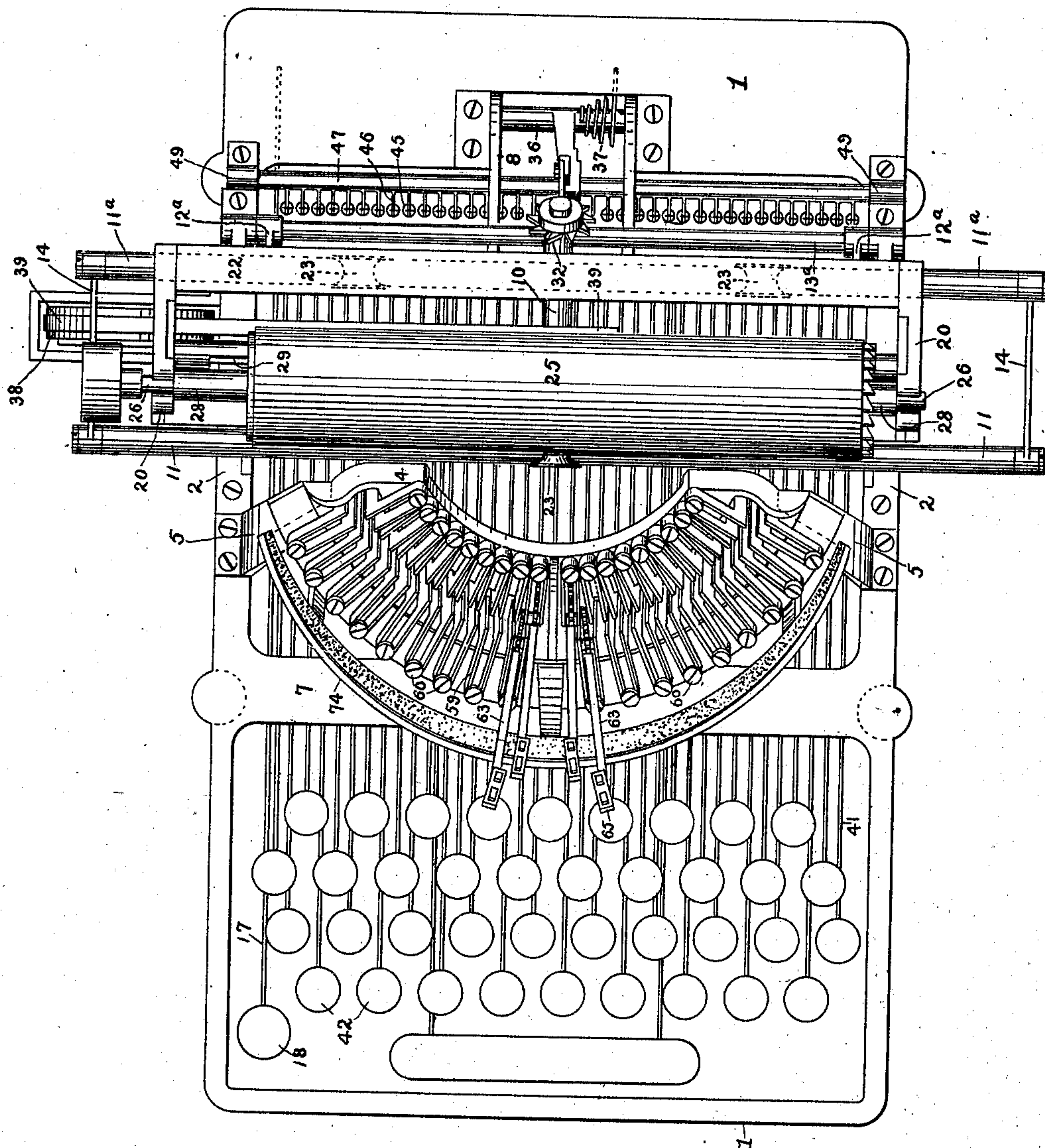


Fig. 1.

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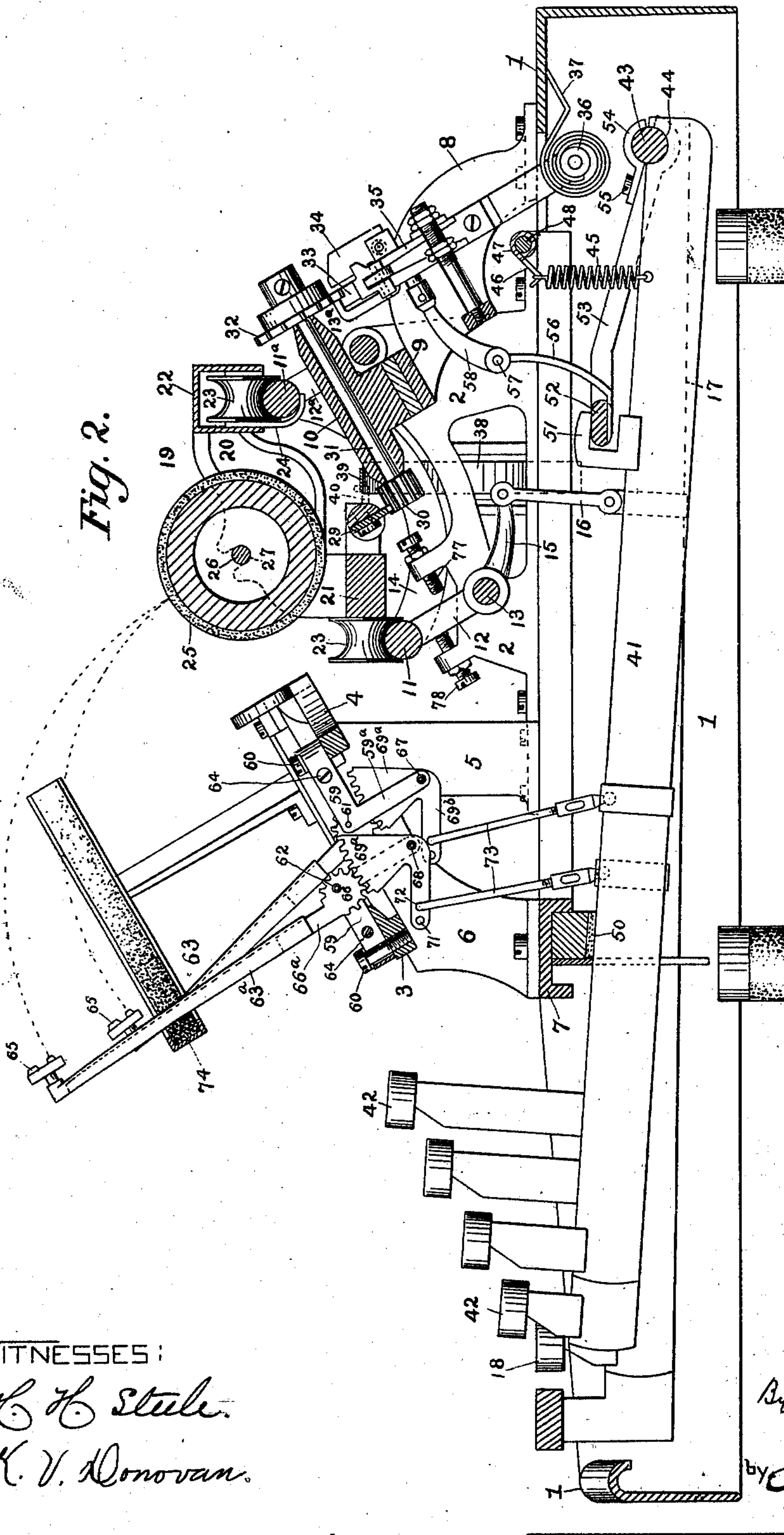
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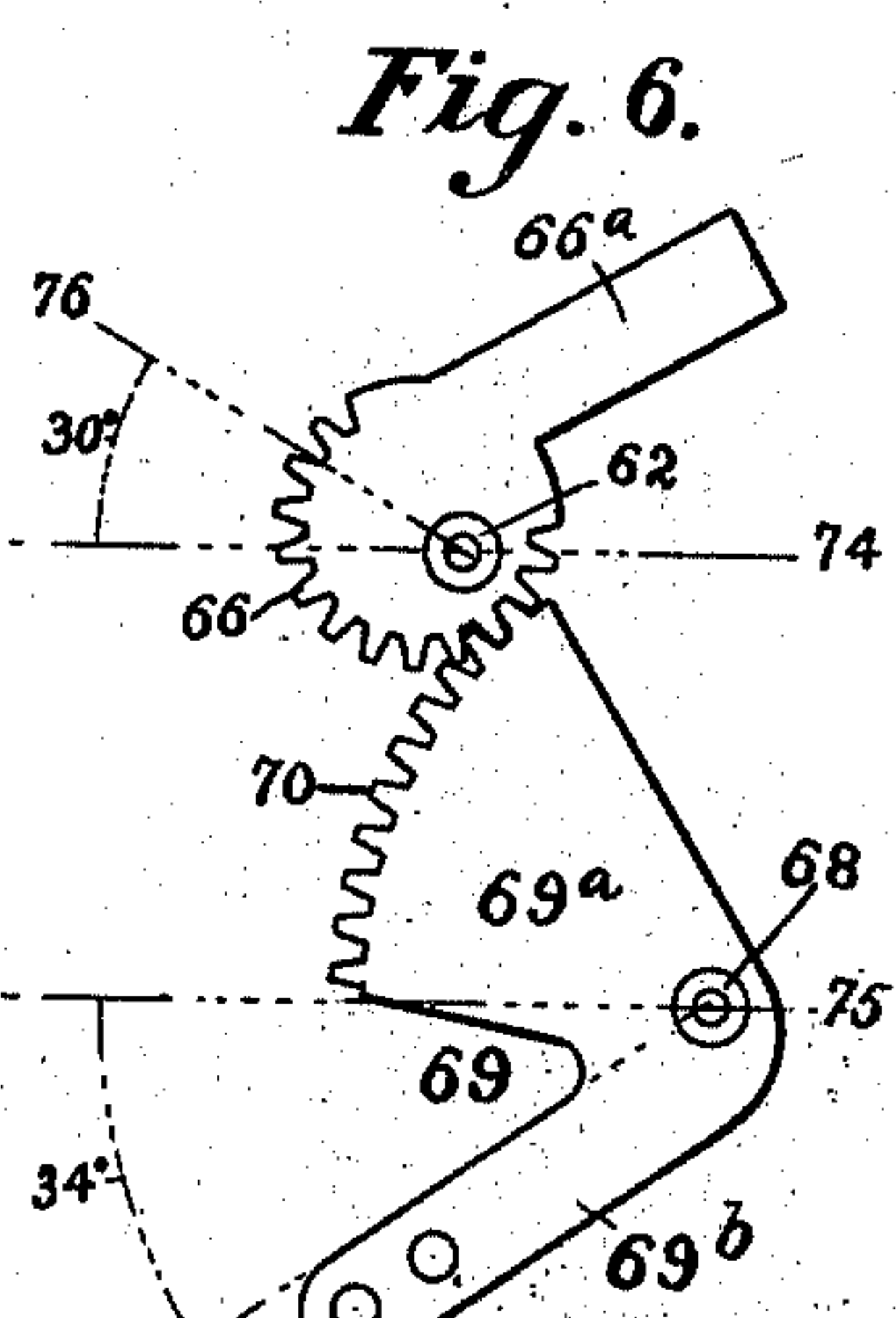
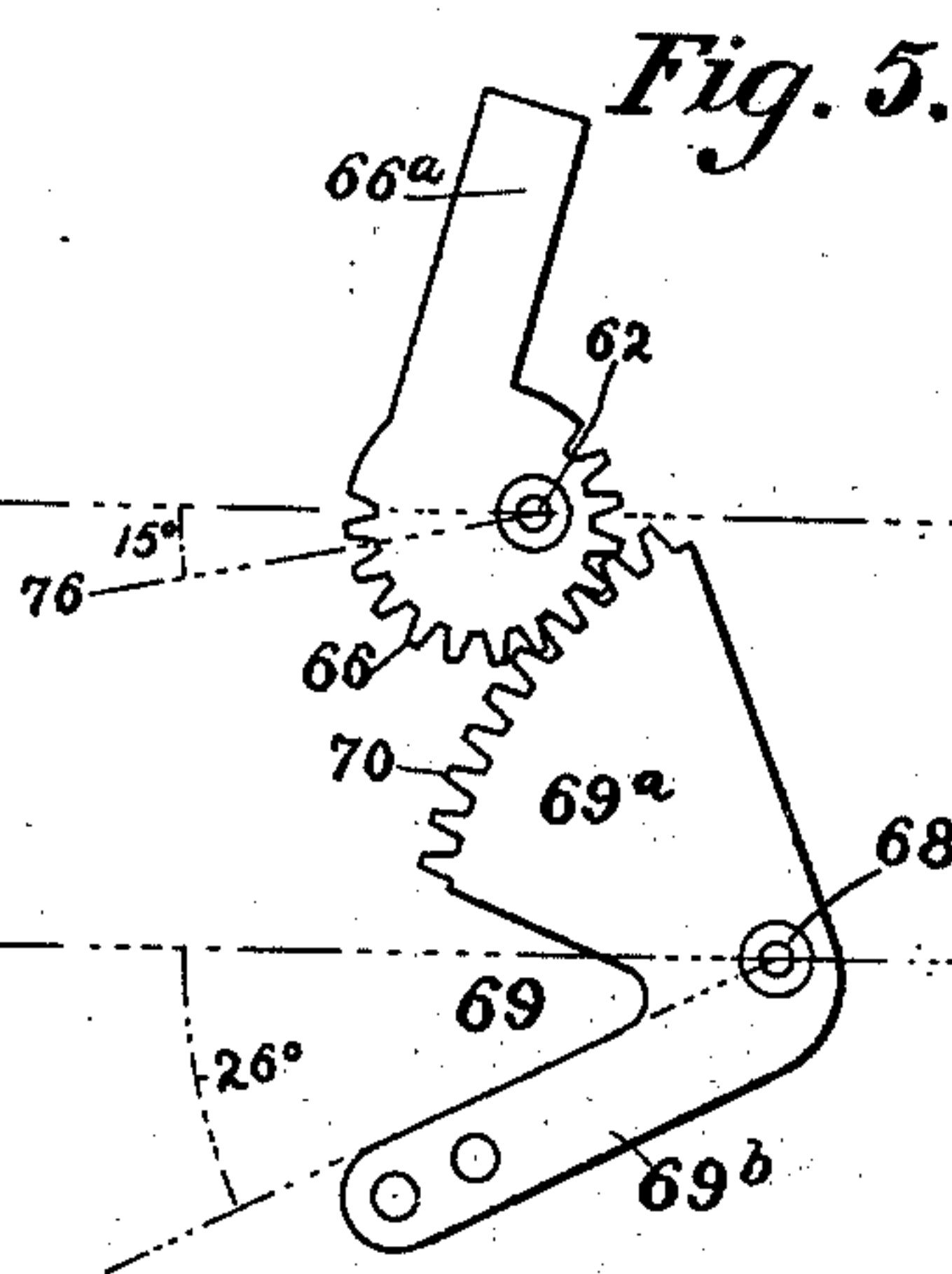
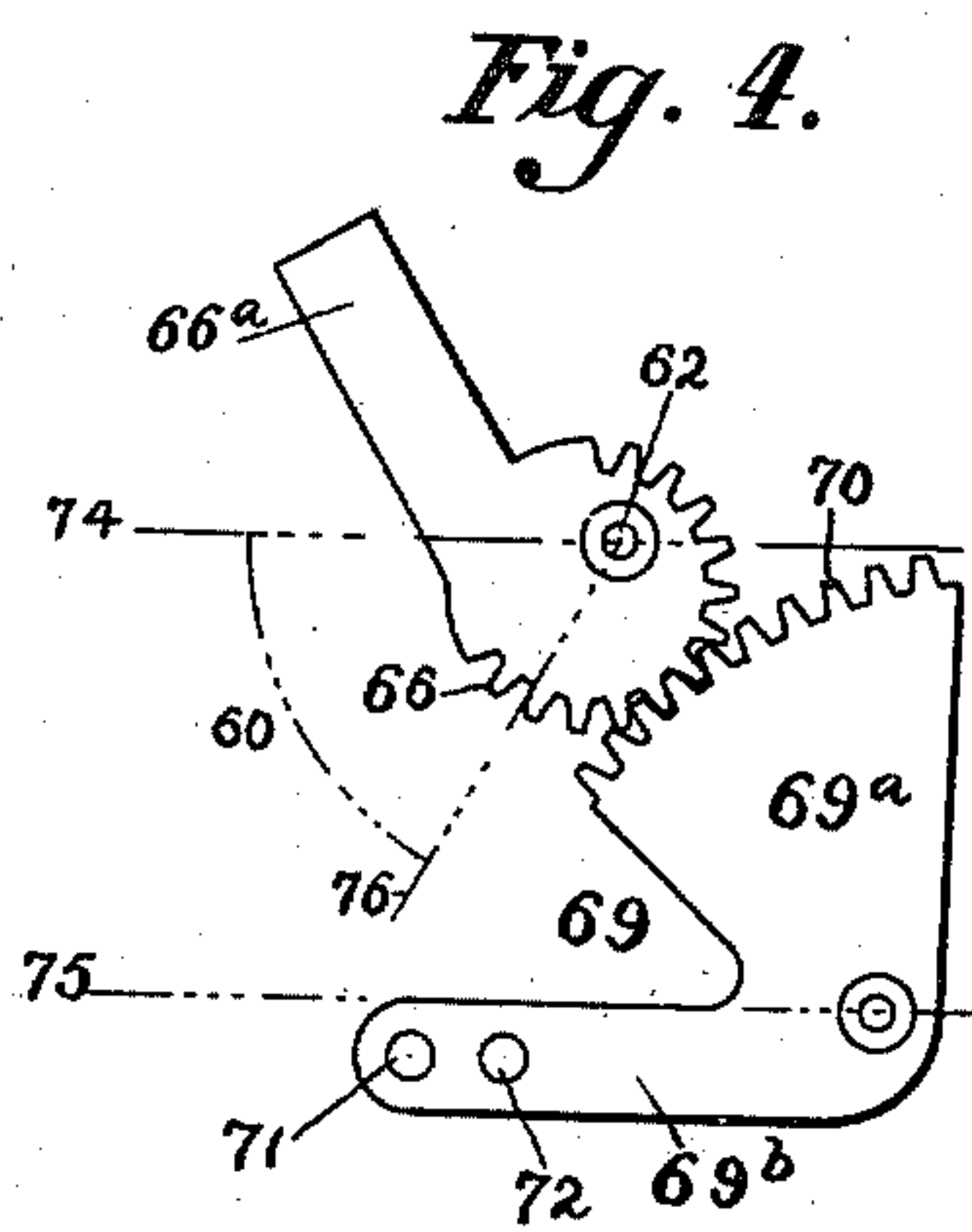
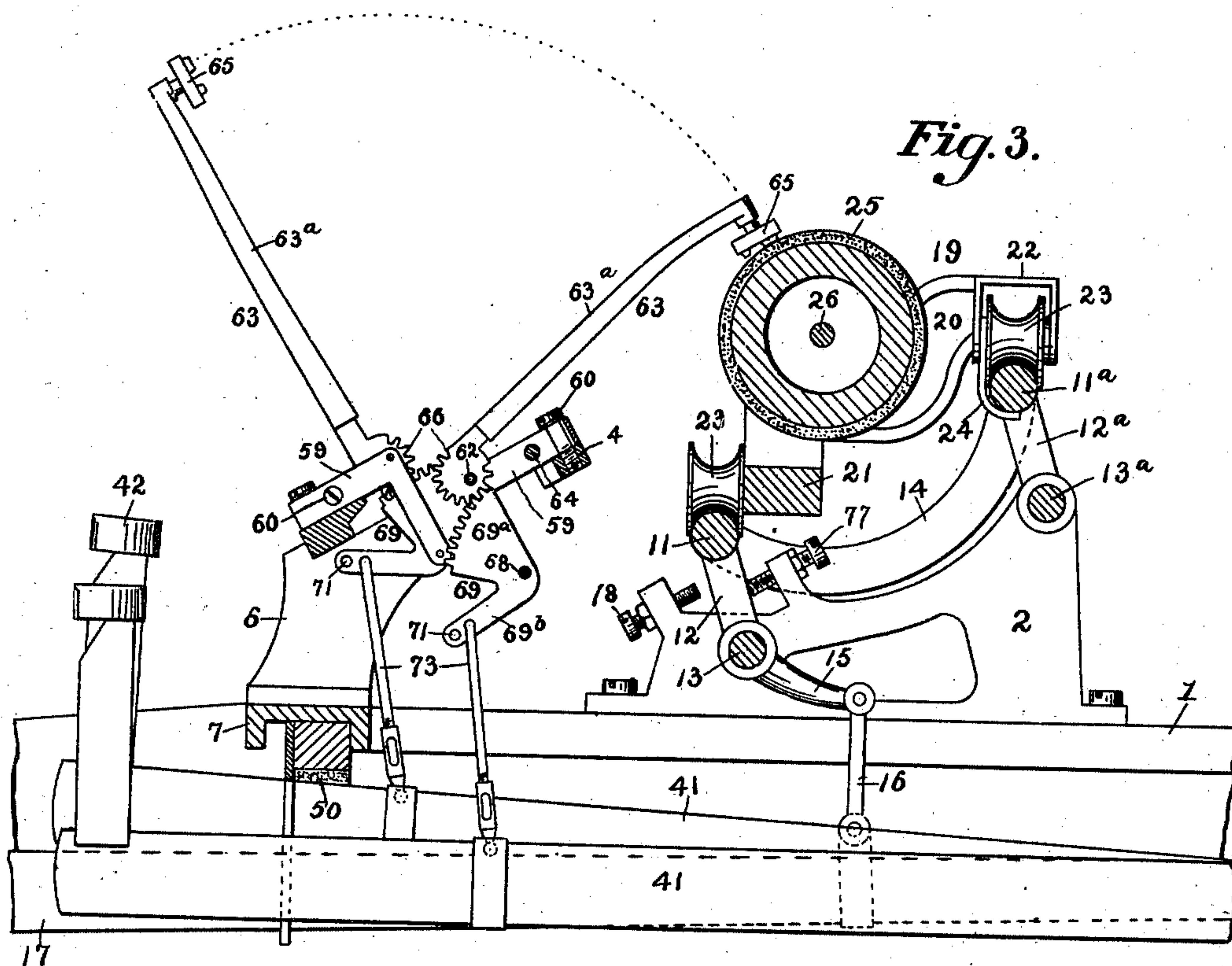
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(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

BYRON A. BROOKS, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 670,699, dated March 26, 1901.

Application filed January 28, 1899. Serial No. 703,642. (No model.)

To all whom it may concern:

Be it known that I, BYRON A. BROOKS, a citizen of the United States, and a 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.

The present invention relates, primarily, to operating mechanism for the type-bars of that class of machines commonly known as "visible-writing" machines.

One object of the invention is to have the writing in plain view of the operator when the latter is in the position assumed for operating the keys of the machine without other effort than that required to turn the eyes in the proper direction.

Another object is to produce or employ a type-bar having a swinging motion of as much as ninety degrees or more without getting the same on a dead-center.

Another object is to cause the type-bar to move toward the printing-point with an increasing or accelerated speed, while the speed of the descending key may remain constant, or substantially so.

Another object is to relieve or prevent side strain of the type-bars, particularly when the type nears the printing-point.

Another object is to have the type-bars set on a firm base and to swing in direct lines to and from the printing-point and to have them connected with straight parallel key-levers.

Another object is to have substantially straight stringing of the connections between the key-levers and the type-bars, and other objects, as will hereinafter more fully appear.

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

The preferred form of the invention is illustrated in the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view, on a reduced scale, of a type-writing machine in which my improvements are embodied, there being but four type-bars shown, however, and the ink-ribbon and its operating mechanism and

other parts being omitted. Fig. 2 is a central vertical longitudinal sectional view on a different scale and showing two type-bars and their operating mechanism. Fig. 3 is a view similar to Fig. 2, but with certain parts omitted or broken away, and one of the type-bars and its operating mechanism being in the positions assumed at the moment of the printing impact, and the platen and its carriage being in the upper-case or shifted position. Figs. 4, 5, and 6 are diagrammatic views illustrating the operation of the preferred form of the connection between the type-bar and its operating mechanism.

The same part will be found to be designated by the same numeral or character of reference in the various views in which the part may appear.

1 designates a suitable framework or base; 2, side arms or risers at each side of the base; 3 and 4, supports for type-bar hangers, the said supports being in the form of segments of rings arranged to be concentric with the printing-point, the plane or planes of the segments being inclined to the horizontal and with their common center (or printing-point) above and to the rearward of said segments, the said center or printing-point being at the upper front side of the platen hereinafter described.

5 and 6 are standards by which the supports 3 and 4 are connected with the sides and also with a cross-bar 7 of the base or frame 1, and 8 overhanging brackets secured to the top plate of the base 1 at the rear and projecting forwardly of the machine, said brackets being united at their overhanging ends by a cross-bar 9, to which is secured a tubular bearing 10, extending longitudinally of the machine and at about the same angle to the horizontal as that formed by the type-bar supports 3 and 4.

11 and 11^a indicate front and rear rods or tracks for the carriage, said tracks being parallel and extending transversely of the machine and being supported, respectively, by arms 12 and 12^a, projecting, respectively, from shafts 13 and 13^a, which are journaled in the brackets 2 aforesaid. The arms 12 and 12^a are equal in length and project upwardly and forwardly of the machine from their respec-

tive shafts 13 and 13^a, and said shafts are arranged with the rear one higher than the front one and parallel to each other, so that a plane passing through the axes thereof is parallel or substantially parallel to the planes of the type-bar supports 3 and 4.

14 indicates curved links pivotally connected at their ends with the ends of the rods 11 and 11^a, whence it results that the rods or ways 11 and 11^a move in unison about their respective shafts 13 and 13^a and also move in equal arcs. The shaft 13 is provided with a rearwardly-extending arm 15, which is connected by a pivoted link 16 with an upper-case lever 17, pivoted at the rear of the base 1 and extending forward on the left-hand side of the machine to near the left-hand front corner, where it is provided with a finger-key 18. The platen-carrier consists of a carriage 19, formed of end pieces 20, a front bar 21, and an inverted-U-shaped or channel bar 22 at the rear, and three rollers 23, one of said rollers being at the front of the carriage and near the center thereof and the other two being at the rear of the carriage and journaled within the bar 22, the said rollers being grooved to fit the round bars 11. One or more hooks or catches 24, secured to the bar 22 and bending under the rear bar 11, serve to prevent the carriage 19 from being accidentally removed from its tracks or guideways 11. The platen 25 is supported by a rod or shaft 26, which has bearings 27 in the ends 20 of the carriage. As shown, these bearings are open at the top, whereby the platen and its shaft may be removed at will from the carriage. Suitable sleeves 28, between the ends of the platen and the inner sides of the ends 20 of the carriage, prevent endwise motion of the platen independently of the carriage.

From the described construction of the carriage-supporting and carriage-shifting mechanism and also the type-bar supports 3 and 4 it results that the platen is shifted from lower-case to upper-case position in a direction which is parallel or substantially parallel to the planes of the type-bar supports 3 and 4. As will hereinafter more fully appear, this direction of shift is parallel or substantially parallel to the plane of the faces of the two types on a type-bar when the types are at the impression-point.

The carriage is provided with a rack-bar 29, extending lengthwise thereof and with its plane at an angle to the vertical, as indicated at Fig. 2. The rack 29 meshes with a broad pinion 30, fast on a shaft 31, which is journaled in the bearing 10 aforesaid and is provided at its rear end with a ratchet-wheel 32. Said ratchet-wheel may be loose upon the shaft and be connected therewith by means of a pawl and ratchet in a well-known manner. Feed and holding dogs 33 34 on a rocking dog-carrier 35 coact with the ratchet-wheel 32 in a known manner to govern the motions of the carriage. The arm 35 is carried by a rocker or shaft 36, journaled under the

top of the base 1, and the shaft is rotated in one direction by a spring 37, fast at one end to the shaft and bearing at its other end under the top of base 1 in such wise that the arm 35 is moved rearwardly whenever the said spring 37 is permitted to rock the shaft. The carriage is moved toward the left by means of a spring-drum 38 and a strap 39, connecting the drum with an arm 40 on the carriage.

41 indicates key-levers provided with finger-pieces 42; 43, a rod at the rear of the machine and secured to the base 1 and against which the key-levers bear by means of notches 44 in their upper edges; 45, spiral springs attached at one end to the levers 41 and at their upper ends to bent arms 46, projecting forwardly from a sleeve 47, fast on a shaft or rod 48, which is secured to the top of base 1 by bearings 49. The sleeve 47 and arms 46 are formed from one piece of metal, which before the bending of the arms and the formation of the sleeve resembles a comb. The sleeve 47 may be adjustably secured to the shaft 48 and the latter be fast in its bearings or the sleeve 47 may be fast to the shaft 48 and the shaft be adjustably secured in its bearings, so that the arms 46 may be raised or lowered to vary or adjust the tension of the springs 45. The upward motion of the key-levers 41 is limited by the bar 43 and a buffer or stop bar 50 under the cross-bar 7 aforesaid. Each key-lever 41 is provided with an overhanging extension 51, which engages with the upper side of a universal bar 52, the distance between the overhang and the key-lever being such that the universal bar may be moved by any one overhang to the extent due to the full depression of the corresponding key-lever without coming in contact with the top of any key-lever or the part connecting with the overhang 51. The universal bar 52 is connected with the shaft 43 by means of arms 53 and jaws 54, secured to the arms 53 by screws 55. An upwardly-projecting arm 56 is attached to the universal bar and is pivotally connected at 57 with a forwardly and downwardly extending arm 58, which is pivoted to a projection on the front of rocker-arm 35 aforesaid.

The type-bar hangers herein shown each comprise two parallel connected arms 59 and two parallel downward extensions 59^a. The hangers are secured to the supports 3 and 4 by screws 60, which pass between the arms 59 and enter threaded holes in said supports, the flat heads of the screws or washers thereunder bearing upon the top edges of the arms. Each hanger is provided, at or near the bend thereof, with appropriate bearings 61 for the coned arbors 62 of type-bars 63. The pivotal points of the type-bars 63 are in front of and below the level of the printing-point on the platen, and the type-bars in normal positions flare upwardly and outwardly of the machine. The arms 59 of the type-bar hanger may be adjusted relatively to each other, so

as to regulate the pressure of the bearings 61 against the pivots 62 in any suitable manner, as by screws 64, which pass freely through the hole in one arm and engage a threaded hole in the other arm in a well-known manner. As shown in the drawings, the bend or angle of each type-bar hanger, which is secured to the support 3, points upwardly, and its arms 59 project upwardly and rearwardly from the support, and the extensions 59^a project downwardly and rearwardly, while the point or angle of each type-bar hanger, which is secured to the support 4, points forwardly of the machine, and the arms 59 thereof project frontwardly and downwardly from the support 4, and the extensions 59^a project rearwardly and downwardly. In both cases the type-bar hangers, type-bars, and levers 69 are arranged radially with respect to the printing-point, and the axis of each type-bar is substantially parallel with the axis of its associated lever 69, and preferably the type-bar and the lever lie in the same plane. The type-bars 63 are preferably each provided with a type-block 65, having two type or characters thereon, and each type-bar is provided with a circular rack or toothed geared segment 66, and the arbor or axis of motion 62 of the type-bar is eccentrically placed with respect to said gear or segment 66. The type-bar hangers are provided near the free ends of the extension 59^a with bearings 67 for the coned arbors 68 of bell-levers 69. One arm 69^a of each bell-lever 69 is provided with a curved rack-segment 70, and the arbor 68 is eccentric with respect to the center of the said segment 70. The eccentric gearing 66 and 70, connecting the arm 69^a with the lever 63, is so arranged that when the type-bar is in normal position (see Fig. 2) the leverage upon the type-bar is greatest, and so that when the type-bar is in position in which its type impacts upon the platen the leverage upon the type-bar is least. The two type-bars shown in Fig. 3 illustrate that at the left the position of greatest leverage and that at the right the position of least leverage. Fig. 4 illustrates the position of the parts at the time of greatest leverage and Fig. 6 the position of least leverage. Preferably the relative radii of the gears 66 and 70 are such that the type-bar swings through an angle nearly three times as great as that through which the bell-lever swings, though of course these proportions may be varied to suit different cases or as may be desired. The arms 69^b of the bell-levers 69 project forwardly of the machine, (the key-levers 41 being pivoted at the rear of the machine,) but are radial with respect to the printing-point and are provided with two perforations 71 72. Connecting-rods 73 are pivotally connected with arms 69^b by means of said perforations 71 (or 72) and with the key-levers 41.

Referring to Figs. 4, 5, and 6, 74 indicates a horizontal line through the axis of motion 62 of the type-bar, and 75 a similar line through

the axis of motion of the bell-lever 69, the top of the arm 69^b being in a horizontal position, (shown as coincident with line 75 in Fig. 4.) If we draw a line from the axis of motion 62 across the face of gear 66, as line 76 in Fig. 4, and then measure the displacement of that line at the moment the type-bar makes its impact, as in Fig. 6, it will be found that the type-bar has moved through, say, ninety degrees, whereas the displacement of the arm 69^b from the position shown in Fig. 4 is but some thirty-four degrees. In Fig. 4 the line 76 makes an angle of sixty degrees with the line 74, the line 76 being beneath the line 74. In Fig. 5 the type-bar has moved through half its throw, and the line 76 now makes an angle of fifteen degrees with the horizontal line 74, and the top of arm 69^b makes an angle of twenty-six degrees with the horizontal line 75—that is to say, during the first half of the motion of the type-bar from a normal position toward the printing-point or through an angle of forty-five degrees the actuating bell-lever 69 moves through an angle of twenty-six degrees, and during the second half of the motion of the type-bar (through an angle of forty-five degrees) the bell-lever 69 moves through an angle of but eight degrees or less than one-third of the angle through which it moved in the first half of the motion of the type-bar. These differences are due to the differences of the radii of the gears 66 and 70 and the eccentricity of the pivots 62 and 68. Of course different relative angular motions of the type-bar 63 and levers 69 may be secured by varying the radii of the gears 66 and 70 and the eccentricity of the pivots 62 and 68.

The operation of the type-bar movement is as follows: Upon the depression of a key 42 the corresponding lever 41 is moved downwardly, and the arm 69^b of the corresponding bell-lever is pulled downwardly by the connecting-rod 73. The upwardly-extending arm 69^a of the bell-lever is moved forwardly of the machine, acting at that time with the maximum of leverage upon the gear 66 and type-bar 63, thus securing an easy start of the type-bar toward the printing-point, and as the motion of the bell-lever is continued the speed of the type-bar is continually increased (even though the bell-lever should continue to move at a uniform speed) until such time as the type-bar strikes the platen, at which moment the type-bar reaches its maximum speed. On the release of the depressed key-lever the corresponding spring 45 raises the key-lever, and the lever through the connecting-rod 73 reverses the direction of motion of the bell-lever 69, and the bell-lever through the described gearing moves the type-bar away from the platen quickly. During the depression of a key-lever 41 the universal bar 52 is drawn down and the arm 35 is drawn forward by the described connections with the universal bar, thus bringing the

holding-dog 34 into engagement with the escape-wheel 32. On the release of the key the arm 35 is moved rearwardly by the spring 37 to bring the feed-dog into engagement with the ratchet-wheel 32, and the carriage is moved forward one letter-space distance by the spring-drum in the usual manner. Upon the depression of the upper-case key the tracks 11 are shifted from the position shown in Fig. 2 to that shown in Fig. 3, and the platen is moved in a direction parallel or substantially parallel to the plane of faces of the two types on the type-bar when the types are at the impression-point. The rack 29 remains in mesh with the gear 30, but slides axially of the gear to a position different from that shown in Fig. 2.

It is observed that the type-bar is not upon a dead-center in any position in which it is moved by the toothed gearing described and that since the action of the gearing 66 and 70 is in the plane of the type-bar there is little or no side strain on the type-bars. By the provision of the eccentric gearing for operating the type-bars it is possible not only to move the type-bars through greater angles, even more than ninety degrees, but also to get them to flare upwardly and outwardly of the machine to such an extent that the operator when sitting in natural position or that assumed for operating the keys of the machine may see the entire line of print upon the platen without moving from such position. The line of print is upon the front and upper side of the platen in better view than if on top of the platen or at its front, it being assumed that the ribbon is automatically or otherwise removed from over the printing-point for the purpose of affording a clear view of the written line. It is also observed that since the arms 59 of the type-bar hanger are parallel and that since the extensions 59^a and arms 59 are at right angles to each other a single screw 64 suffices for adjusting the pressures of the arms and extensions upon the pivots of the type-bar and of the bell-lever.

The rearward shifting movement of the platen-carrier 19 may be limited by set-screws 77, which engage threaded holes in lugs or ears on the brackets 2 and against which the links 12 may contact or strike, while the normal position of the platen-carrier may be defined by similar set-screws 78, engaging with threaded holes in lugs or ears on the brackets 2 and contacting with links or arms 12.

As shown in the drawings, each type-bar 63 is formed of a flat metal segmental gear 66, having an arm 66^a extending therefrom, and a pivot-bearing 62 and a type-block carrier 63^a, which is U-shaped in cross-section for nearly its whole length and which at one end embraces and is soldered to arm 66^a (see Fig. 2) and which at its other end is provided with a seat or bearing for the shank of a type-block, as block 65 aforesaid. The foregoing

is merely the preferred construction of the type-bar. Othersuitable constructions may be employed without departing from my invention.

Various changes in detail, construction, and arrangement may be made without departing from the spirit of my invention.

The novel features of carriage construction and connections illustrated herein are made the subject-matter of a division of this application filed February 20, 1900, Serial No. 5,901.

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

1. In a type-writing machine, the combination of a series of finger-keys arranged in straight transverse rows, a series of levers arranged side by side and moving in vertical planes and operated by said keys, a series of type-bars concentrically arranged over said key-levers, said type-bars having toothed hubs, a series of pivoted levers each provided with teeth to mesh with its associated type-bar-hub teeth, said toothed levers being also arranged above said key-levers, and said type-bars and toothed levers being all arranged radially of the printing-center and the axis of each toothed lever being substantially parallel with the axis of its associated type-bar, a series of upright links pivoted at their upper ends to said toothed levers and at their lower ends to said key-levers, and a platen arranged in rear of said type-bars.

2. In a type-writing machine, the combination of a type-bar provided with an eccentric gear, and a supplementary eccentric gear meshing therewith and actuating the same.

3. In a type-writing machine, the combination of a key, a type-bar, and an intermediate lever connected with the type-bar by eccentric toothed gearing and also connected with the key.

4. In a type-writing machine, the combination of a platen, actuating-keys, type-bars pivoted in front of and below the level of the printing-point of the platen and flaring upwardly and outwardly, and intermediate levers connected directly with the type-bars by toothed gearing and also connected with the keys, said intermediate levers and type-bars being all arranged radially of the printing-center.

5. In a type-writing machine, the combination of a platen, actuating-keys, type-bars pivoted in front of and below the level of the printing-point and flaring upwardly and outwardly, levers intermediate the keys and type-bars and connected with the type-bars by eccentric toothed gearing and also connected with the keys.

6. In a type-writing machine, the combination of a series of finger-keys arranged in transverse rows, a series of levers arranged side by side and moving in vertical planes and operated by said keys, a series of type-bars concentrically arranged over said key-

levers, said type-bars having toothed hubs, a series of pivoted bell-levers each provided at one end with teeth to mesh with its associated type-bar-hub teeth, said type-bars and said toothed bell-levers all extending radially of the printing-point, and the axis of each toothed lever being substantially parallel with the axis of its associated type-bar, and connections extending from said bell-levers to said key-levers.

7. In a type-writing machine, the combination of a key, a type-bar, a bell-lever located between the bar and the lever and connected with the type-bar by eccentric toothed gearing and connections between the bell-lever and the key.

8. In a type-writing machine, the combination of a platen, actuating-keys, type-bars pivoted in front of and below the printing-point and flaring upwardly and outwardly, bell-levers located between the type-bars and the key-levers and connected with the type-bars by eccentric toothed gearing arranged to afford a maximum leverage on the type-bars at the beginning of printing strokes and a minimum leverage at the end of said strokes, with connections between said bell-levers and key-levers.

9. In a type-writing machine, the combination of a platen, keys, type-bars pivoted at the front of and below the level of the printing-point and flaring upwardly and outwardly of the machine, bell-levers arranged with their fulcrum below the fulcrum of the corresponding type-bars and connected with the type-bars by eccentric gearing arranged to afford a maximum leverage on the type-bar at the beginning of printing strokes and a minimum leverage at the ending of said strokes, and connections between said bell-levers and the keys.

10. In a type-writing machine, the combination of a platen, key-levers fulcrumed at their rear ends, type-bars pivoted in front of and below the level of the printing-point and flaring upwardly and frontwardly, bell-levers connected by eccentric toothed gearing with said type-bars, said gearing being arranged to afford a maximum leverage on the type-bar at the beginning and a minimum leverage at the ending of printing strokes thereof and the fulcrum of said bell-levers being rearward of and below the fulcrum of the type-bars and one arm of each of said bell-levers extending forwardly of the machine, and connections between said forwardly-extending arms and the key-levers.

11. In a type-writing machine, the combination of a series of finger-keys arranged in straight transverse rows, a series of levers arranged side by side and moving in vertical planes and bearing said keys at their forward ends, a series of type-bars, a hanger for each type-bar, the type-bar being pivoted to the hanger at one portion thereof, a lever pivoted upon the hanger at another portion thereof

and engaging the type-bar by toothed gearing, a series of upright links pivoted at their upper ends to said toothed levers and at their lower ends to said key-levers, and a platen arranged in rear of said type-bars.

12. In a type-writing machine, the combination of a platen, key-levers pivoted at their rear ends, type-bar hangers, type-bars pivotally connected with said hangers, bell-levers also pivotally connected with the hangers and each bell-lever having one arm connected with the corresponding type-bar by toothed gearing and having its other arm extending radially frontward, and connections between said last-named bell-lever arms and the key-levers.

13. In a type-writing machine, the combination of a platen, key-levers pivoted at their rear ends, type-bar hangers, type-bars pivotally connected with said hangers, bell-levers pivotally connected with the hangers and each bell-lever having one arm connected with the corresponding type-bar by eccentric toothed gearing arranged to afford a maximum leverage on the type-bar at the beginning and a minimum leverage at the end of the printing strokes thereof and having its other arm extending radially frontward, and connections between said last-named bell-lever arms and the key-levers.

14. In a type-writing machine, the combination of a pivoted type-bar having gear-teeth eccentrically arranged relatively to its pivot, an actuating-lever having a set of teeth intermeshing with those on the type-bar and arranged eccentrically with respect to the pivot of the said actuating-lever, and a key-lever connected to said actuating-lever.

15. In a type-writing machine, the combination of a pivoted type-bar having gear-teeth arranged at gradually-increasing distances from its pivot, a pivoted actuating-lever having gear-teeth arranged at gradually-increasing distances from its pivot, and arranged reversely with respect to the teeth on the type-bar, and a finger-key connected to the said actuating-lever.

16. In a type-writing machine, the combination of a pivoted type-bar having gear-teeth arranged at gradually-increasing distances from its pivot, a pivoted actuating-lever having gear-teeth arranged at gradually-increasing distances from its pivot in a direction the reverse of the increasing distances of the gear-teeth on the type-bar and intermeshing therewith, and said parts being arranged in normal positions to have the maximum leverage upon the type-bar whereby the initial movements of the type-bar are relatively slow and the type thereon attains its greatest speed at the moment of impact, and a finger-key connected to the said actuating-lever.

17. In a type-writing machine, a printing mechanism comprising in combination a series of pivoted type-bars arranged in front of the platen, bell-cranks engaging the type-bar hubs by eccentric toothed gearing, levers ar-

ranged side by side below the type-bars and extending longitudinally of the machine and bearing keys at their forward ends, and connections between said bell-cranks and said
5 key-levers.

18. In a type-writing machine, the combination of a key-lever, a type-bar, and an intermediate lever connected with the type-bar by eccentric toothed gearing and with the
10 key-lever by a connecting-rod.

19. In a type-writing machine, the combination of a platen, type-bars pivoted in front of the platen and below the level of the printing-point, key-levers, and levers intermediate said levers and said type-bars, said intermediate levers being connected with the type-bars by eccentric toothed gearing.
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20. In a type-writing machine, the combination of a platen, type-bars pivoted in front of the platen and below the printing-point, key-levers, and bell-levers located between the type-bars and the key-levers and connected with the type-bars by toothed gearing in such a manner as to afford a maximum leverage on the type-bars at the beginning of the
25

printing strokes, and a minimum leverage at the termination of said strokes.

21. In a type-writing machine, the combination of a type-bar, a hanger to which said type-bar is pivoted, a lever pivoted to another
30 part of the hanger and connected with the type-bar by eccentric toothed gearing, and means for operating said lever.

22. In a type-writing machine, the combination of a platen, key-levers, type-bars pivoted in front of the platen and below the level of the printing-point, hangers in which said type-bars are pivoted, intermediate levers also pivoted in said hangers and connected with the type-bars by eccentric toothed gearing, and connections from said key-levers to said intermediate levers.
35 40

Signed at the borough of Manhattan, city of New York, in the county of New York and State of New York, this 27th day of January, 45
A. D. 1899.

BYRON A. BROOKS.

Witnesses:

GEO. K. GILLULY,
E. M. WELLS.