No. 671,082. Patented Apr. 2, 1901.

B. GREVE.

TYPE WRITING MACHINE.

(Application filed Apr. 21, 1900.)

(No Model.)

5 Sheets—Sheet 1.

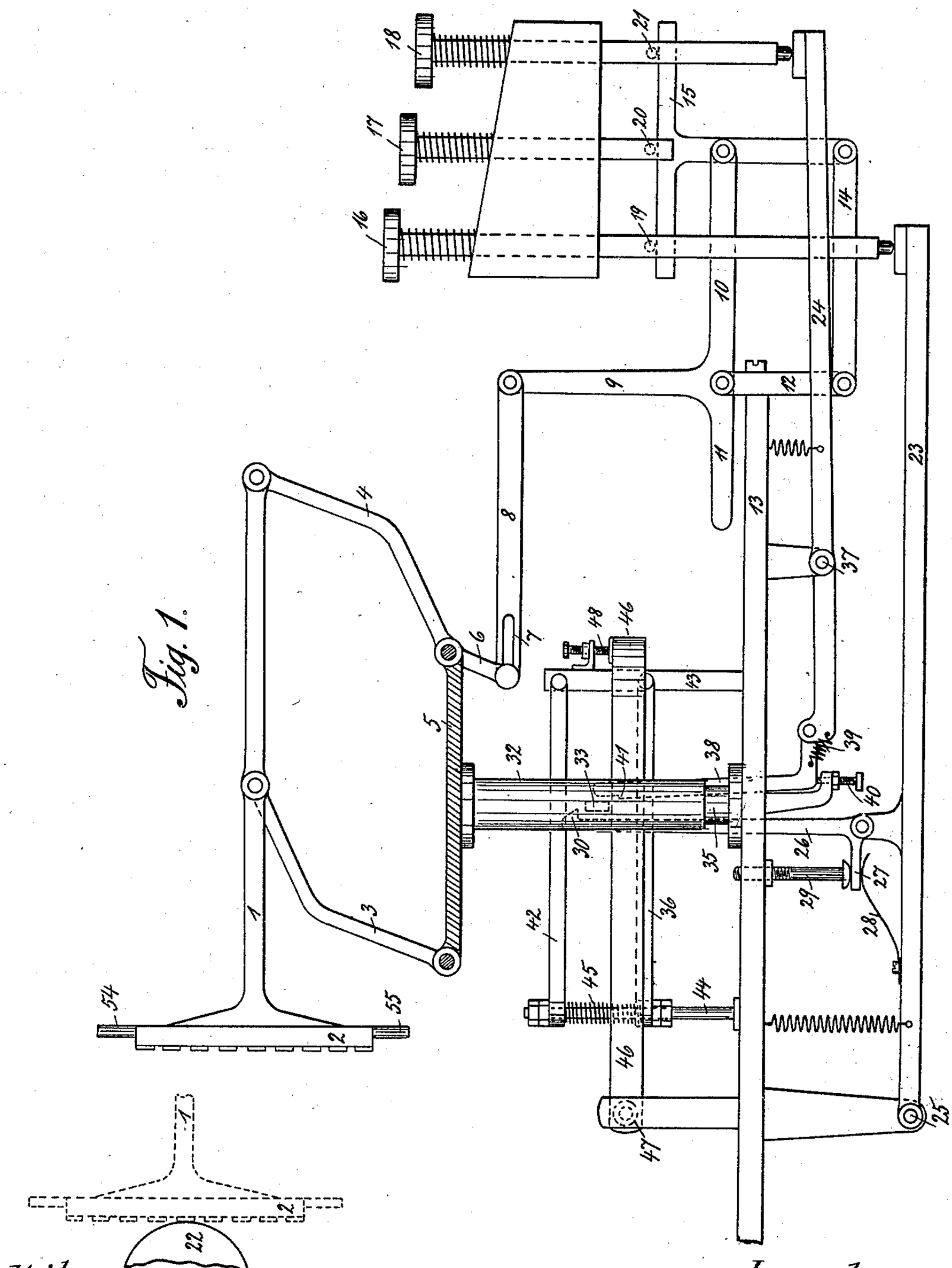

Fig. 1.

Witnesses
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TYPE WRITING MACHINE.

(Application filed Apr. 21, 1900.)

(No Model.) 5 Sheets—Sheet 2.

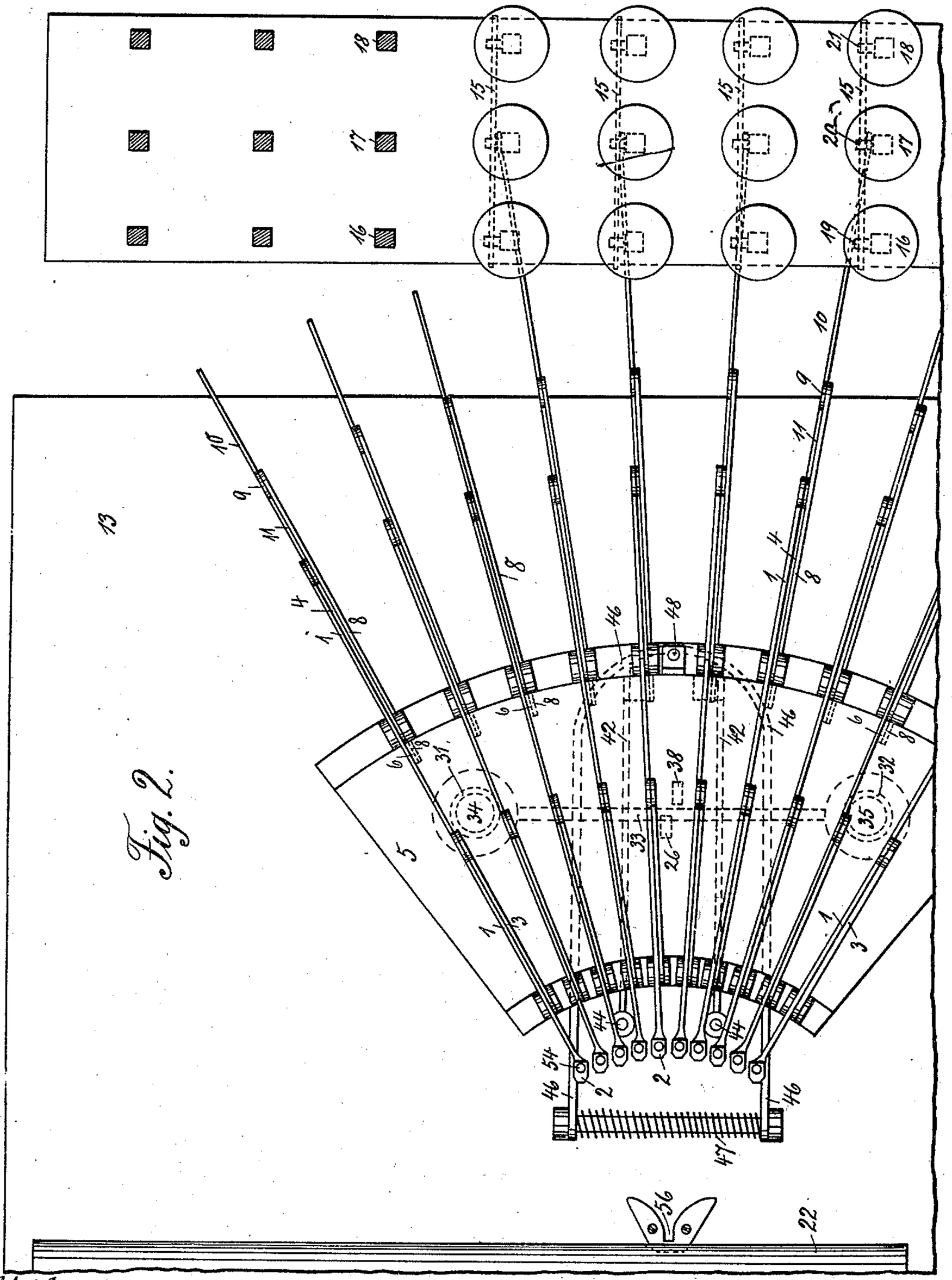

Fig. 2.

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(No Model.)

5 Sheets—Sheet 3.

Fig. 3.

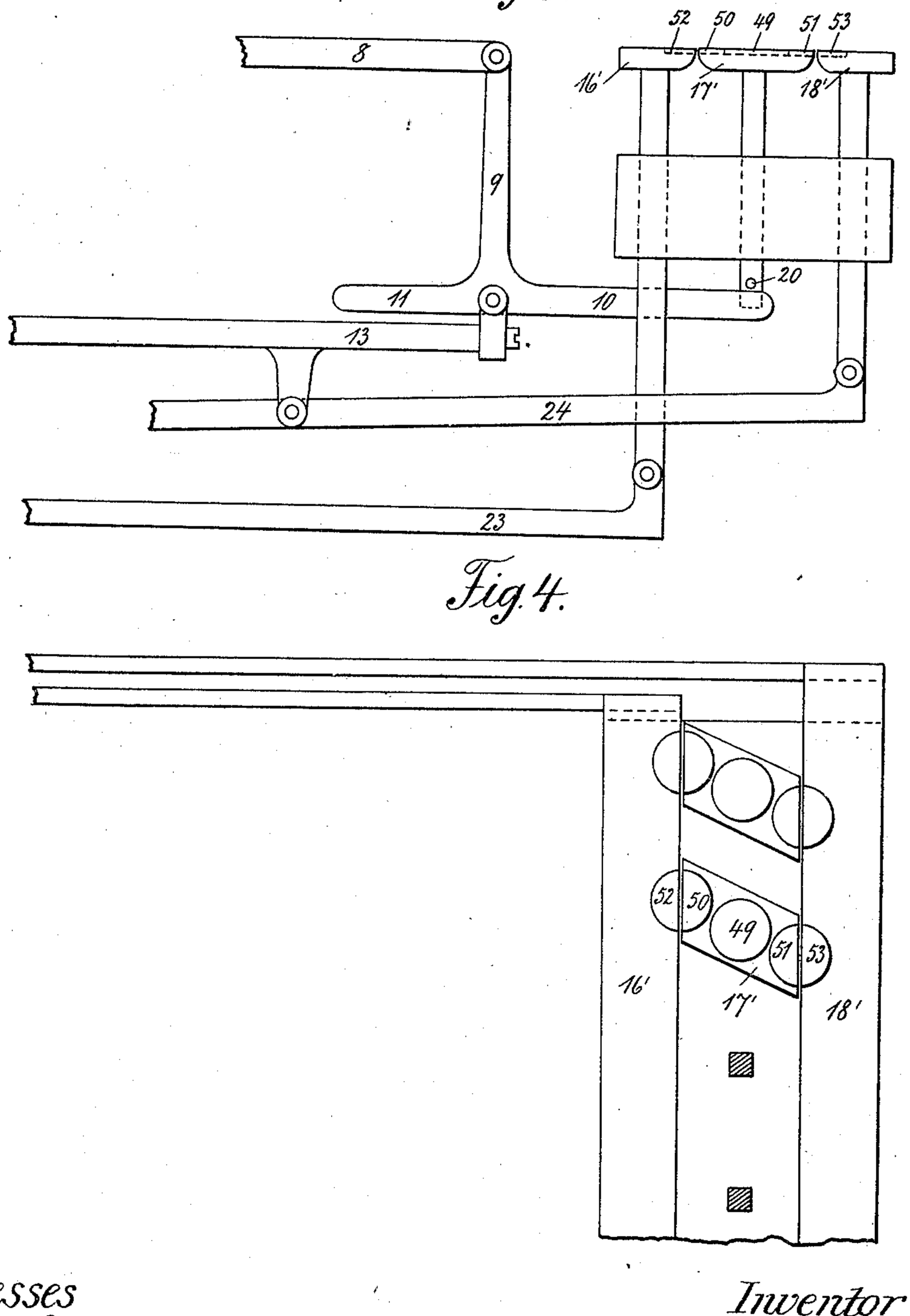

Fig. 4.

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TYPE WRITING MACHINE.

(Application filed Apr. 21, 1900.)

(No Model.) 5 Sheets—Sheet 4.

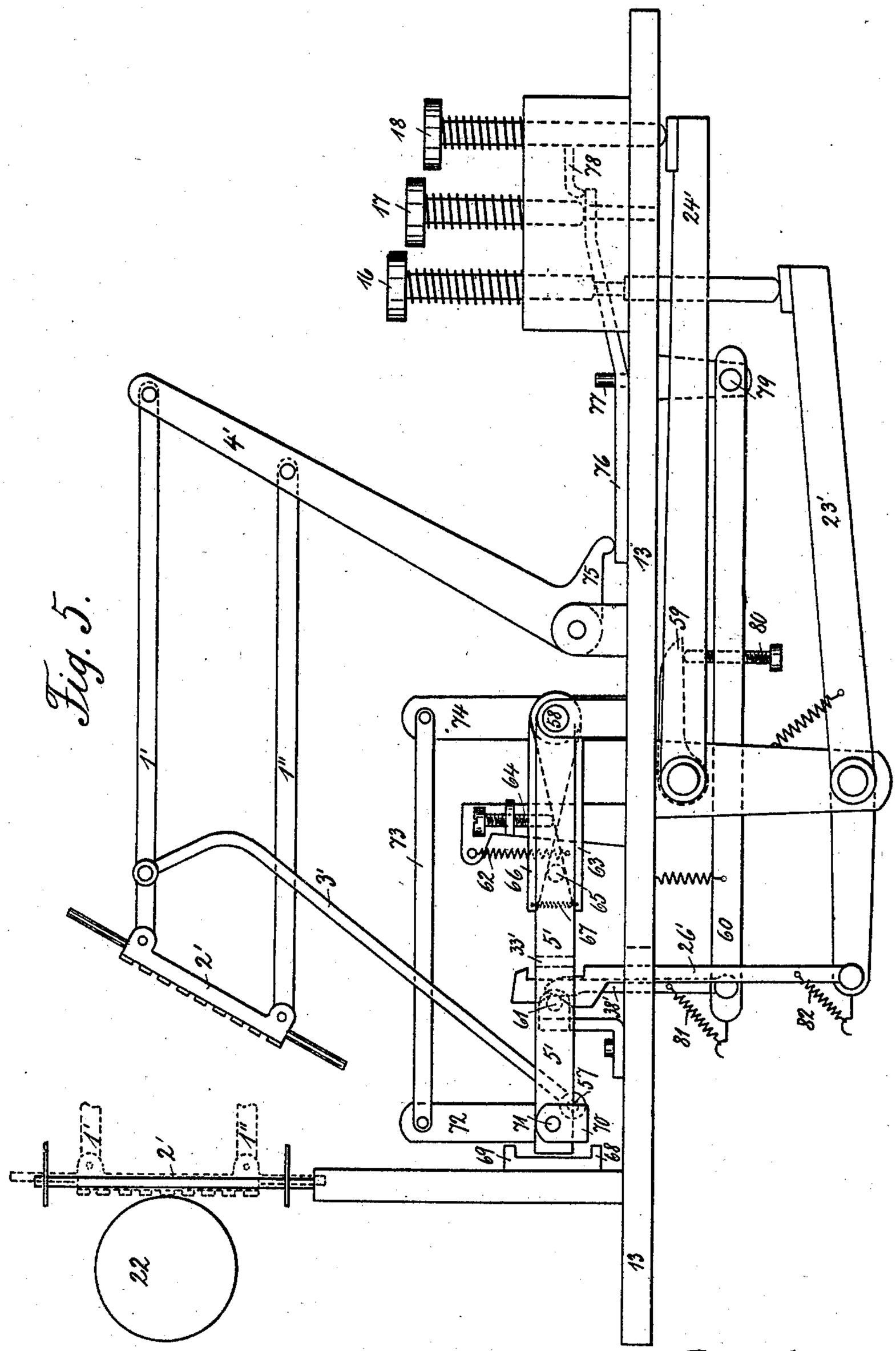

Fig. 5.

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B. GREVE.

TYPE WRITING MACHINE.

(Application filed Apr. 21, 1900.)

(No Model.) 5 Sheets—Sheet 5.

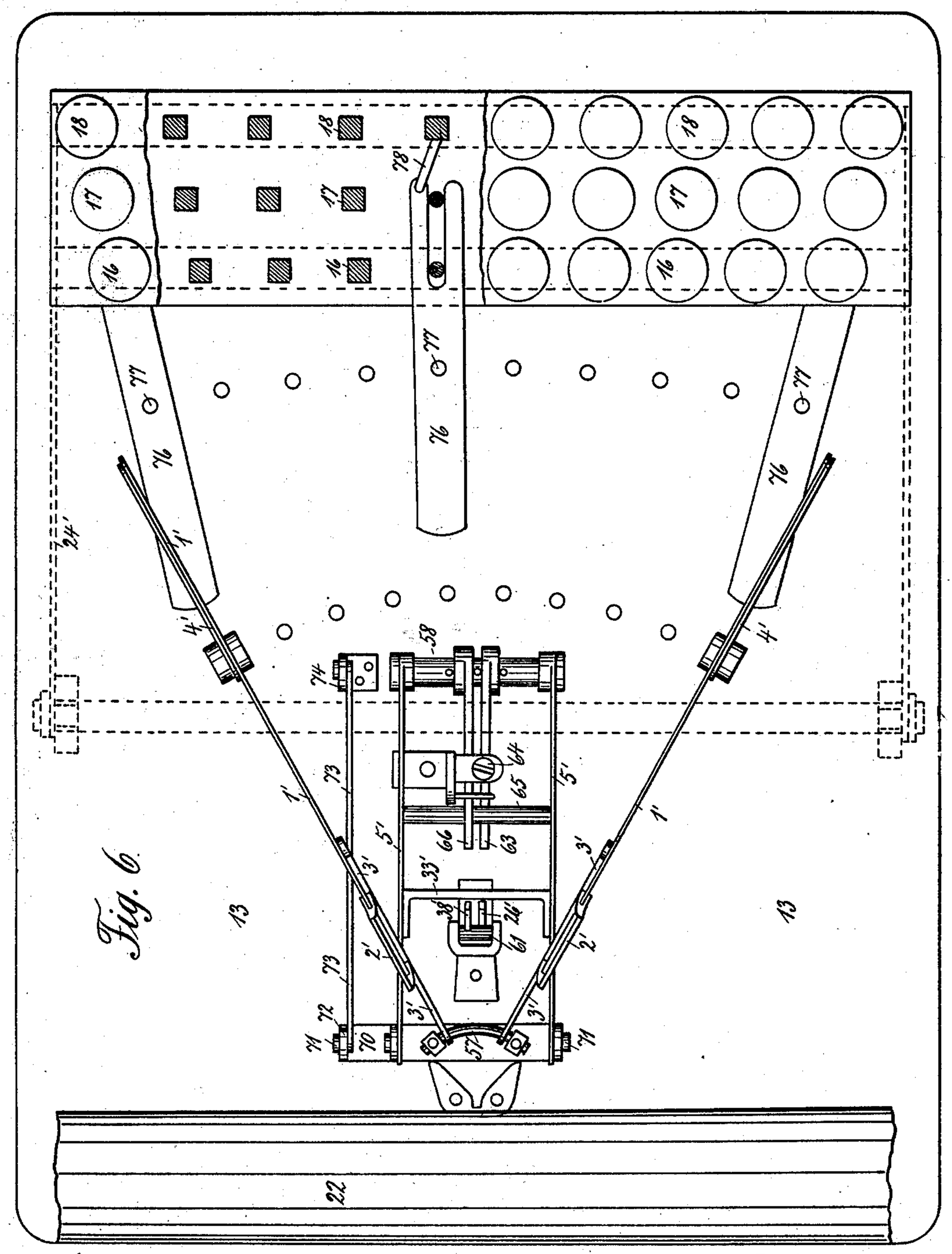

Fig. 6.

Witnesses
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C. W. Clement.

Inventor
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UNITED STATES PATENT OFFICE.

BERNHARD GREVE, OF BERLIN, GERMANY.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 671,082, dated April 2, 1901.

Application filed April 21, 1900. Serial No. 13,803. (No model.)

To all whom it may concern:

Be it known that I, BERNHARD GREVE, a subject of the German Emperor, residing at Berlin, Germany, have invented new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to that class of type-writing machines known as "bar" machines, and has for its objects, first, to provide a cheap, durable, and efficient machine; second, to reduce the number of type-bars to the least practicable number, whereby the outermost bars of the series, as well as those nearer the middle, will strike the platen squarely, and, third, to connect the type-bars to swinging levers, so that they will freely move toward and from the platen. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatical side view, partially in section, of a portion of a type-writer constructed in accordance with my invention. Fig. 2 is a corresponding diagrammatical top view, partially broken away. Figs. 3 and 4 are respectively a side view and a top view of a modified keyboard arrangement; and Figs. 5 and 6 are respectively a side view and a top view of a modification of my invention corresponding to Figs. 1 and 2, respectively.

In the several drawings I have represented only such parts of the type-writing machine as are needed to fully explain my invention.

Referring first to Figs. 1 and 2 of the drawings, the type-bars 1 are provided with a headpiece 2, carrying a plurality of type, preferably nine, as represented, such type forming three groups, each including three type. The type-bars are loosely connected to levers 3 4, which are pivoted to a table 5, so as to form a jointed parallelogram. A downwardly-projecting arm 6 on each of the levers 4 is connected by a rod 8 to a three-armed lever 9 10 11, which is pivoted to an arm 12, fixed to the frame-plate 13, the arm 6 having a pin or stud extending into the walls of a slot 7 in the rod 8.

It will be understood that there is a separate type-carrying frame of the character above described for each of the type-bars and that each of said frames is connected with a separate rod 8 and lever 9 10 11. Levers 14, pivoted to the lower ends of arms 12, extend parallel to and are of the same length as lever-arms 10. Levers 10 and 14 are pivotally connected to T-shaped pieces 15. The operating-keys are arranged in three rows corresponding to the three groups of type on the bar-heads 2, there being one in each row 16 17 18, associated with and adapted to operate each of the type-carrying frames, each having a pin 19 20 21, adapted to act on the T-pieces 15 of its coacting lever mechanism. By these means when depressing a key the corresponding type-bar is swung from the normal position represented in full lines in Fig. 1 to that represented by dotted lines in the same figure, so as to strike against the platen and perform the printing by the medium of an ink-ribbon or any other well-known means. It will be seen that owing to the slot connection at 7 and by timely stopping the key-stroke the type-bar is allowed to perform freely the last portion of its movement against the platen, which is the best means to produce a sharp and clear impression and to give the most convenient impact for manifolding. The dotted lines in this figure represent in connection with the full lines of said figure the position of the type-bar after it has been moved by a key capable of adjusting said bar both vertically and horizontally, as will be hereinafter described.

The keys of the middle row 17 perform no other function than that above described, while the stems of keys 16 and 18 are prolonged or extended to act on swinging lever-frames 23 and 24, pivoted to the framework at 25 and 37, respectively. Lever-frames 23 and 24 serve the purpose of respectively lowering and raising the table 5 a distance of two consecutive type on the type-head 2, so that if the platen 22 occupies the position shown in Fig. 1—that is, opposite to the middle group of type—the uppermost type of this group will be printed when depressing key 16 and the lowermost type when depressing key 18 of the group of keys appropriated to that type-bar, while the middle type of this group is printed when depressing the key 17, no vertical adjustment of the table being produced by that key. The platen itself may be of any suitable construction and is supposed to be capable of being lowered and raised by the well-known and therefore not represented

shifting-keys. Therefore it will be clear that the platen can be adjusted into alinement with either of the groups of type and different type of the alined group printed from by proper manipulation of the keys.

The means for effecting the vertical adjustment of the type-carrying frame will now be described.

Lever-frame 23 is provided with a pawl 26, bearing with its arm 27 against a slight spring 28, fixed to the frame, and against an adjustable stop 29. When frame 23 is depressed by a key 16, the hook-shaped end 30 of pawl 26 will be swung toward the right of Fig. 1 owing to the pressure of spring 28 and brought into position to engage with a cross bar or rod 33, extending between and connected with sleeves 31 32. The latter are fixed to and depend from the table 5 or the type-carrying frame and at their lower ends receive studs 34 35, extending upward from the frame-plate 13. By further depressing key 16 pawl 26, engaging with cross-bar 33, draws the type-carrying frame and the type-bar of said frame downward until cross-stay 33 is stopped by an abutment-rod 36 at the termination of the key-stroke.

Lever-frame 24 is provided with a pawl 38, actuated by a spring 39, to bear against an adjustable stop-pin 40. As the frame is depressed by a key 18 the stepped end 41 of the pawl engages with the stay 33 and then moves said stay and the type-carrying frame upwardly until the stay 33 contacts with an abutment-rod 42.

The abutment-rods 36 42 are both pivoted at one end to an upright 43 and have their other ends adjustably mounted on a stud 44 by means of nuts, a spring 45 holding them in contact with the nuts. The middle position of the type-carrying frame is secured by a swinging frame 46, which is kept against an adjustable stop 48 by means of a spring 47, coiled on its rock-shaft, and supports the type-carrying frame by means of the cross-stay 33. Thus when the table 5 or type-carrying frame is lowered frame 46 swings likewise downward. Lever-frames 23 and 24 are kept in and restored again to their normal position by the springs represented.

The arm 11 of the three-armed lever 9 10 11 may be made use of for moving the paper-carriage and the ribbon by any well-known means.

The heads 2 of the type-bars are provided with pins 54 55 to engage with guides 56 for securing the exact position of the type to be printed.

In the modified form of the keyboard, Figs. 3 and 4, the keys 16 and 18 are replaced by a single key-bar 16′ and 18′, respectively, bar 16′ being connected to the above lever-frame 23 and bar 18′ to the frame 24. The T-pieces 15 of Figs. 1 and 2 are dispensed with, the keys 17′ of the middle row acting directly on the lever-arms 10. The finger-plates of the keys 17′ are enlarged, so as to extend between the bars 16′ and 18′, each plate being denoted with characters in its middle portion 49 and on its ends 50 51. By depressing a key on the middle portion 49 the table 5 will be maintained in its normal position and the middle type of the group printed; but by depressing the same key on its end portions 50 or 51 and at the same time the key-bar 16′ or 18′ by overlapping the portions 52 or 53 with the finger the same type-bar will be actuated, but table 5 simultaneously lowered or raised, and therefore the uppermost or lowermost type of the group will be printed.

Figs. 5 and 6 represent a modification of my invention in which the raising and lowering of the type-bars are effected by a swinging movement of the type-bar-supporting table, this table, or preferably a swinging frame, at the same time carrying only half the number of type-guiding levers in order to reduce the resistance met with in the shifting of such table. The type-carriers 2′ are pivoted to pairs of bars 1′ 1″, which are pivotally connected to levers 4′, supported by the frame-plate 13. The bars 1′ are loosely connected and supported by levers 3′, which are movably mounted on a curved rod 57, provided in a swinging frame 5′ on a rock-shaft 58, as fully appearing from Fig. 6. Frame 5′ is rocked by lever-frames 23′ 24′, corresponding to the above-described lever-frames 23 and 24, and by means of pawls 26′ 38′, engaging with a cross-stay 33′ of frame 5′ when the keys 16 or 18 are depressed. However, in the present instance lever-frame 24′ does not act immediately, but by the medium of a lever 60, pivoted at 79 and actuated by a lever 59, firmly connected to the rock-shaft of frame 24′, lever 60 being actuated by a spring so as to bear with an adjustable stop 80 against lever 59. The pawls 26′ 38′ are kept out of engagement with the cross-stay 33′ by springs 82 81, engaging by their recessed rear sides with a stop-pin 61. When the frames 23′ 24′ are rocked, the pawls are first rocked toward the cross-stay 33′, so as to engage with the same, and then move with the frame 5′. Frame 5′ is secured in its middle position by a spring 62, fixed to a support on the frame-plate 13, and connected with its other end to a lever 63, which is movably mounted on the rock-shaft 58 and stopped in its upward movement by an adjustable stop 64, lever 63 supporting frame 5′ by means of a cross-pin 65, connecting the frame sides. Another lever 66 is movably mounted on rock-shaft 58 and connected by a spring 67 to lever 63, so as to bear against the cross-pin 65. By these means frame 5′ can be rocked upward and downward and will be restored again to its middle position by springs 62 and 67, the action of the latter being assisted by the weight of the frame and the parts supported by the same and its rocking movement being stopped by abutments 68 69. As the parts 1′ 1″ 2′ 4′ form a jointed parallelogram in the working position of the type-carrier

2′, (represented by dotted lines, in which lever 4′ assumes a vertical position,) the type-carrier will likewise assume a vertical position, as required for exact work, whatever the position of frame 5′ may be; but the curved rod 57 would perform a swinging movement with respect to the rock-shaft 58, and the alinement of the printed characters would therefore be irregular if rod 57 were rigidly connected to frame 5′. In order to avoid this and to impart a parallel movement to rod 57, this rod is supported by a piece 70, which is journaled in the frame at 71 and provided with a bent arm 72, the latter being connected by a link 73 to an upright 74 on the frame-plate 13. Thus the parts 5′ 72 73 74 form a jointed parallelogram, the link 72 of which moves always vertically. Hence rod 57 always occupies a position parallel to that shown. The levers 4′ are provided with short arms 75 and bear with these arms against the ends of bent metal strips 76, riding on studs 77 and engaging by their forked other ends with reduced portions of the key-stems. Thus by depressing a key the corresponding strip 76 performs a swinging movement on its pivot and imparts a swinging movement to the type-bar parallelogram toward the platen. Each strip 76 must be actuated by all the keys controlling one and the same type-bar. This can be accomplished by arranging the keys of each group so that they can be all engaged by the forked end of strip 76, as shown in Fig. 5 with respect to two keys 16 17 of a group, or, when preferring the usual arrangement of the keyboard, by providing the key-stem with a projection 78, extending above strip 76, as shown in Fig. 5 with respect to a key 18. In the case of using the keyboard represented in and described with respect to Figs. 3 and 4 the strips 76 are to be connected only to the middle row of keys 17. The levers 4′ must not be supported by the frame-plate 13. They can, like the levers 3′, be journaled in the swinging frame 5′, using, if necessary, the same means as described with respect to the latter in order to provide a parallel displacement of their swinging centers. However, these means can be dispensed with, and frame 5′ would not be essentially overcharged when disposing their swinging centers in close proximity to the rock-shaft 58.

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

1. In a type-writing machine, the combination of a platen, a type-carrying frame at one side of the platen, including two parallel, substantially horizontal, members, a lever pivotally connected to both said members of the type-carrying frame, a type-bar connected to said frame, three keys each adapted to actuate said lever to move the type-bar toward and from the platen, and connections between two of said keys and one member of the type-carrying frame for adjusting said frame and the type-bar relative to the said lever.

2. In a type-writing machine, the combination of a platen, a type-carrying frame, including two parallel members, a type-bar carried by said frame, a lever pivotally connected to both said members of the type-carrying frame and adapted to move the type-bar toward and from the platen, and a key adapted to simultaneously adjust said frame and type-bar relative to the lever and to move said type-bar toward the platen.

3. In a type-writing machine, the combination of a platen, a series of type-carrying frames, each having one member, 5, common to all of the others, a type-bar connected to each of said frames, a lever connected with each type-carrying frame, a series of keys connected with each lever and each adapted to adjust its associated type-carrying frame to move the type-bar thereof against the platen, and a supplemental connection between some of said keys and the member 5 of the type-carrying frames, whereby the type-bars can be adjusted to either of several positions before being moved against the platen.

4. In a type-writing machine, the combination of a platen, a type-carrying frame having parallel upper and lower sides pivotally connected together, a type-bar carried by the said frame and having a series of groups of type on its face, a lever connected with said frame, a series of keys, corresponding in number to the number of type on each group on the type-bar, and each adapted to actuate said lever to bring the type-bar into contact with the platen, and supplemental connections between some of said keys and the type-carrying frame for moving said frame vertically relative to the platen to bring predetermined type in each group into proper position.

5. In a type-writing machine, the combination of a platen, a support, 5, a series of type-carrying frames each pivotally connected to and having one member extending parallel to said support, a lever connected with each of said frames, a series of keys each connected with said lever and adapted to adjust the same about its pivots to move the type carried thereby toward the platen, sleeves, 31, 32, depending from the support 5 and surrounding stationary guides on a base-plate, and connections between some of said keys and the support, 5, whereby the latter can be adjusted vertically simultaneously with the adjustment of the type-carrier toward the platen.

6. In a type-writing machine, the combination of a jointed parallelogram carrying a plurality of type and having two pivots, means for swinging the parallelogram on its pivots by the key-stroke, a movable support loosely connected to the said parallelogram for shifting the same, a pair of swinging frames actuated by the key-stroke and provided with pawls, means for engaging the pawls with and disengaging the same from the movable support to raise and lower the same, and means for restoring the said support to its middle position after having been raised or lowered,

substantially as and for the purposes described.

7. In a type-writing machine, the combination of a jointed parallelogram carrying a plurality of type and supported by two levers, means for swinging the parallelogram on the pivots of said levers by the key-stroke, a swinging plate or frame supporting the said parallelogram for shifting the same, a pair of swinging frames actuated by the key-stroke and provided with pawls, means for engaging the pawls with and disengaging the same from the swinging supporting-frame to raise and lower the same, and means for restoring the swinging supporting-frame to its middle position after having been raised or lowered, substantially as and for the purpose described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

BERNHARD GREVE.

Witnesses:

WOLDEMAR HAUPT,

HENRY HASPER.