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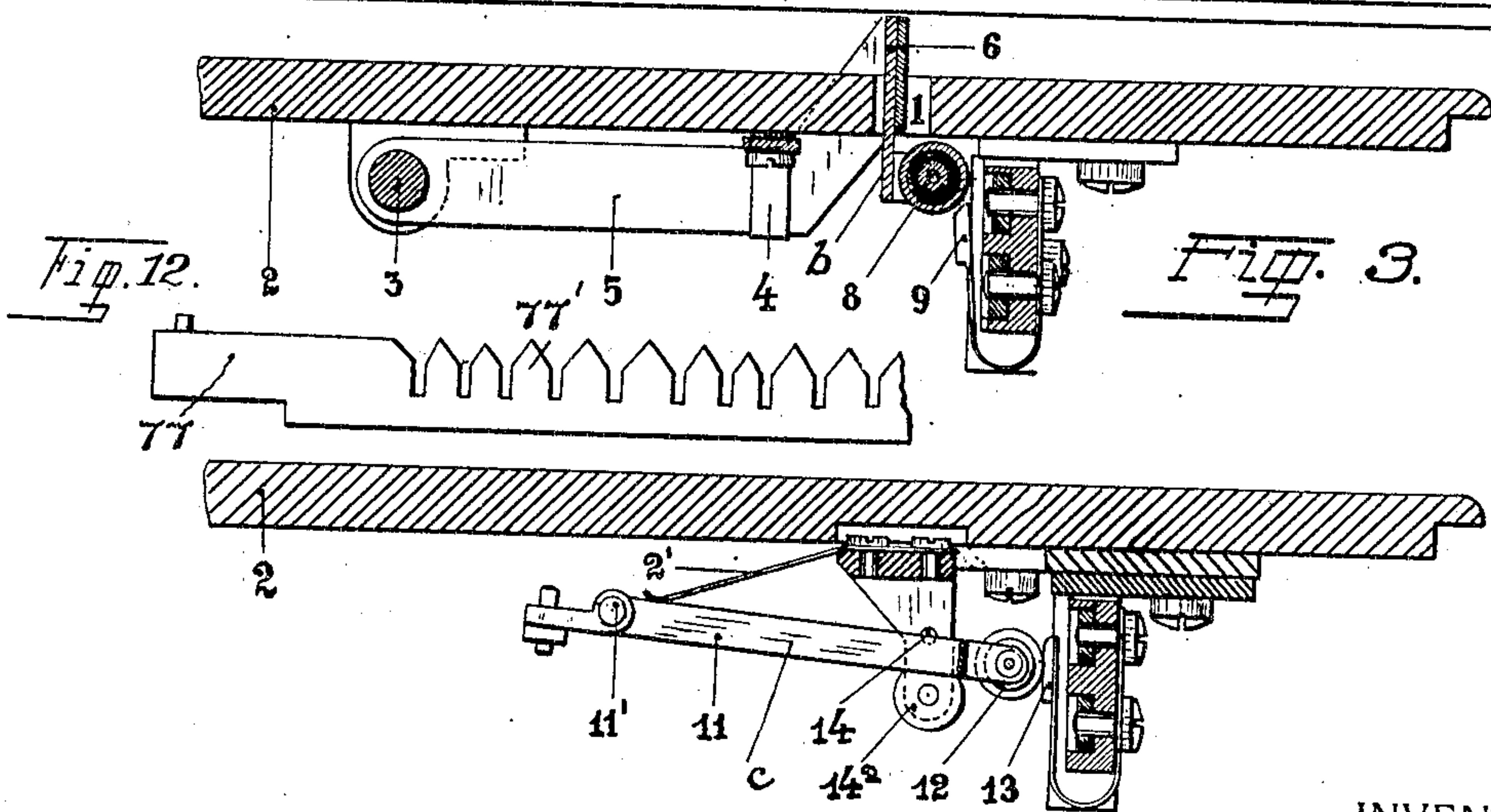
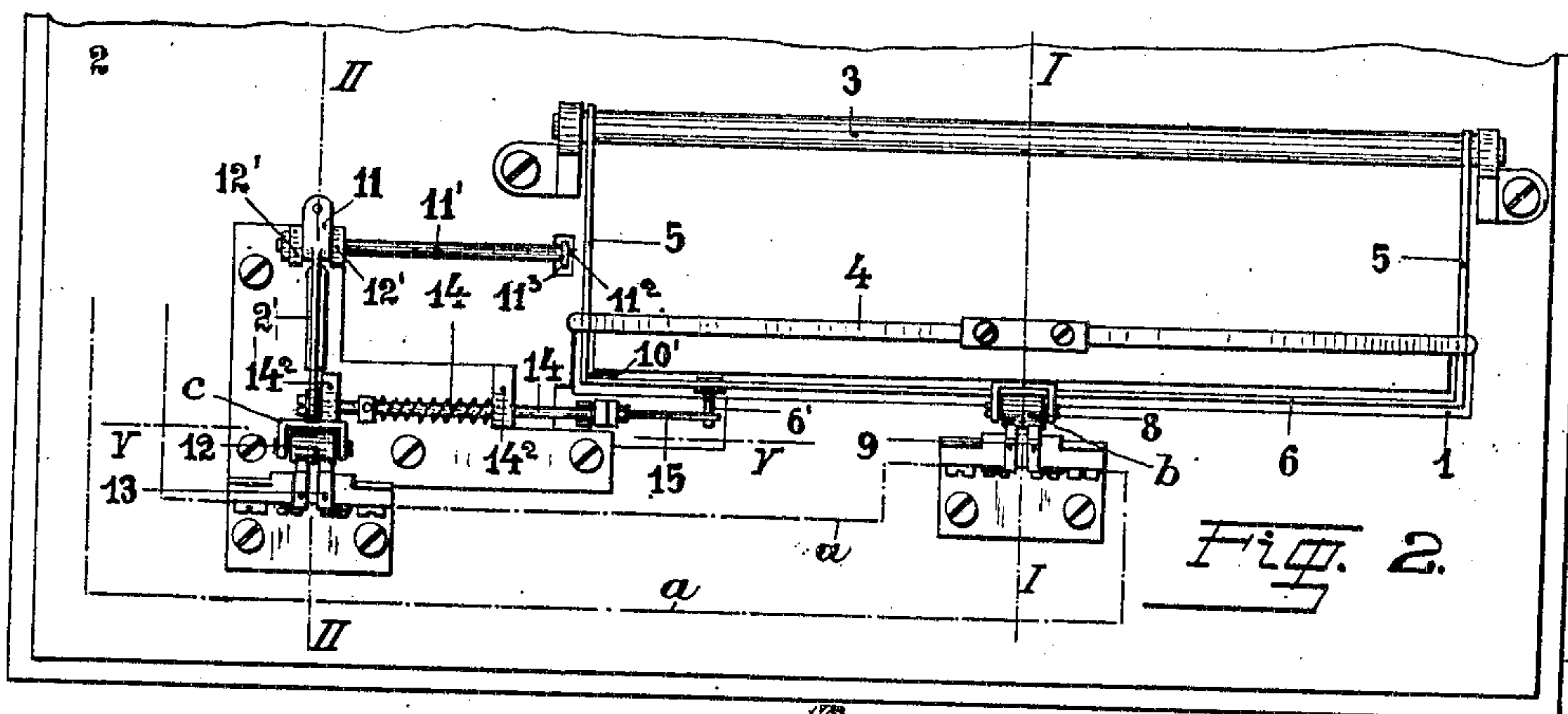
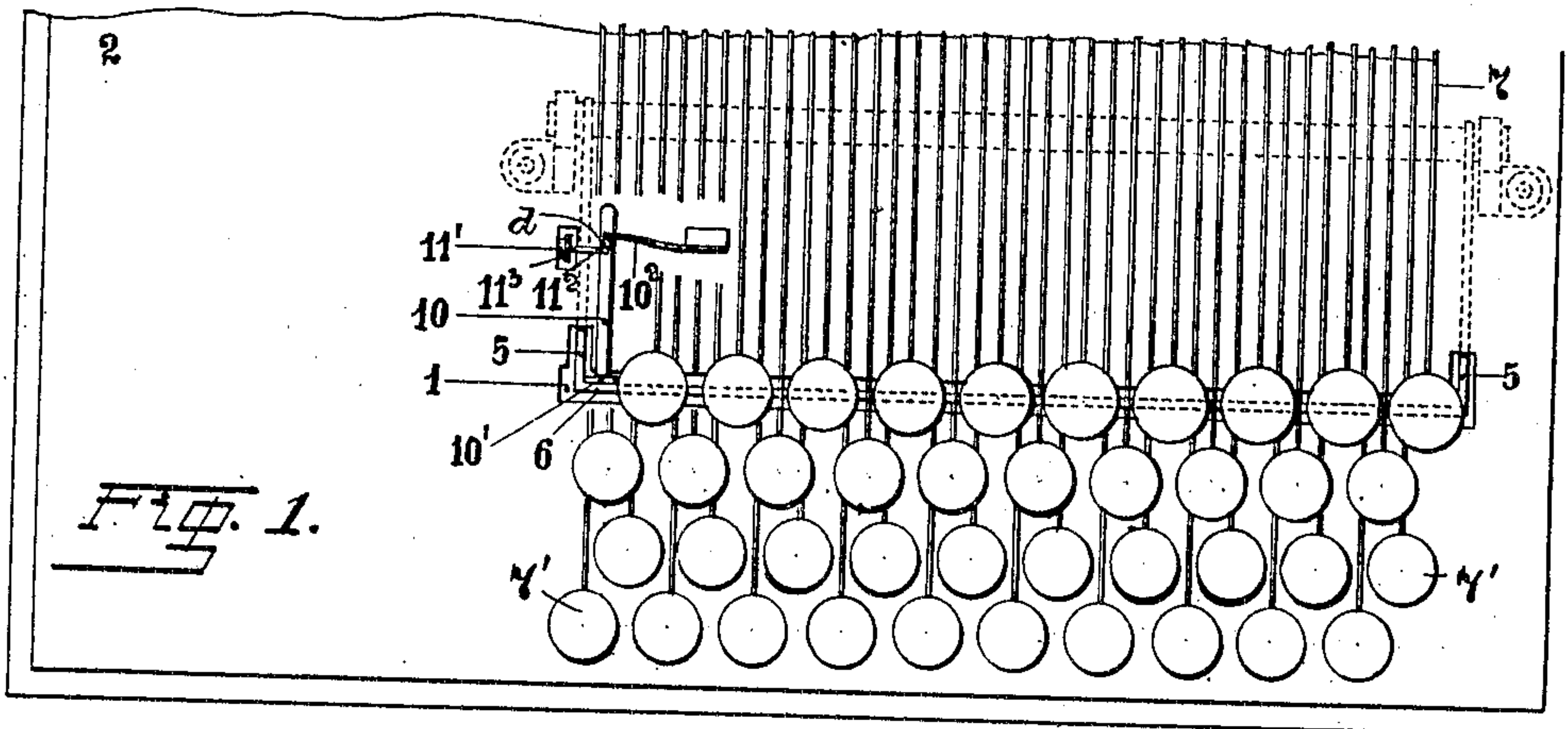
PATENTED AUG. 28, 1906.

A. POLLÁK.

APPARATUS FOR PERFORATING PAPER STRIPS OR THE LIKE.

APPLICATION FILED JUNE 30, 1906.

3 SHEETS—SHEET 1.



WITNESSES: Fig. 4.

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No. 829,932.

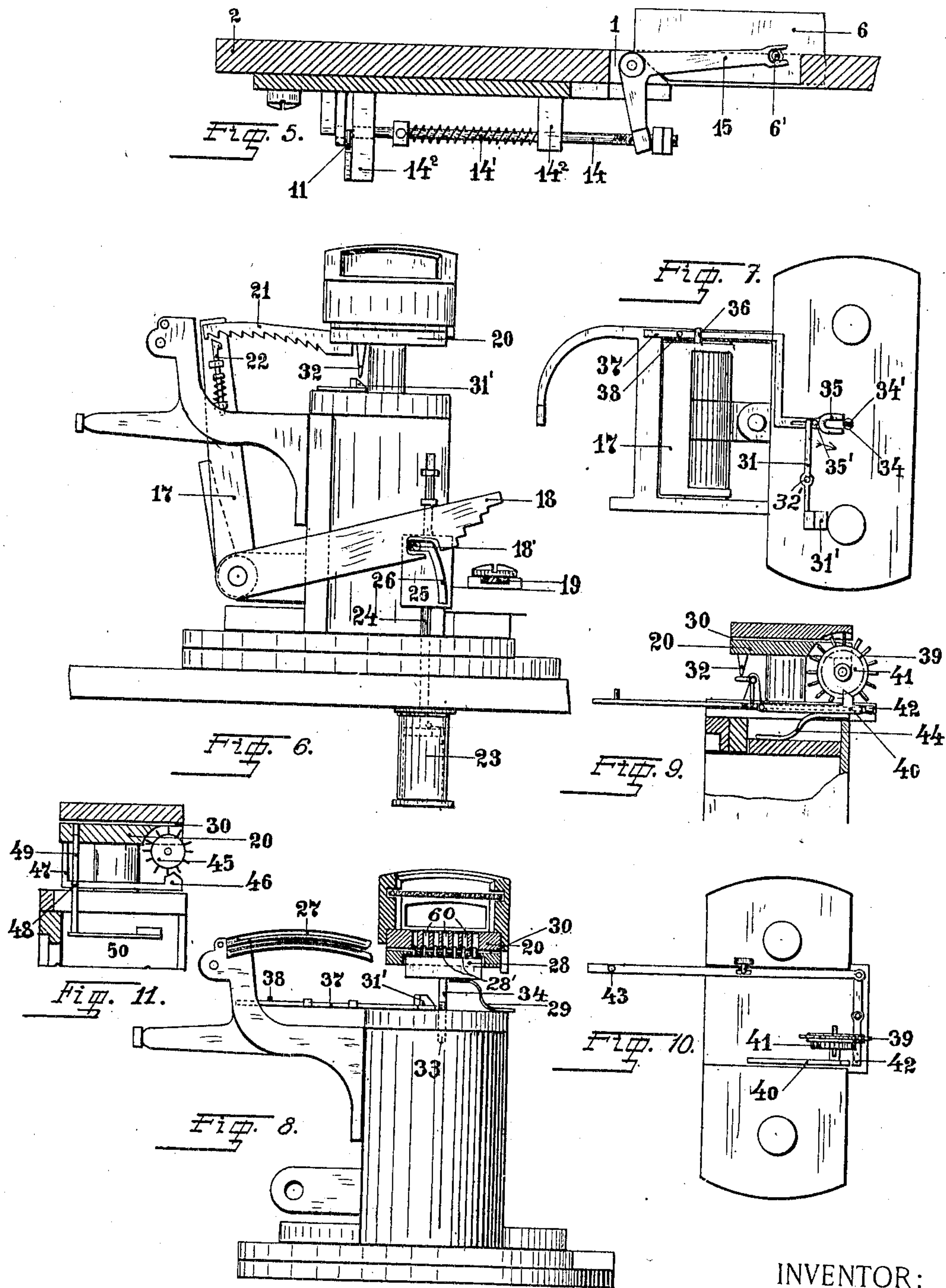
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3 SHEETS—SHEET 2.



WITNESSES:

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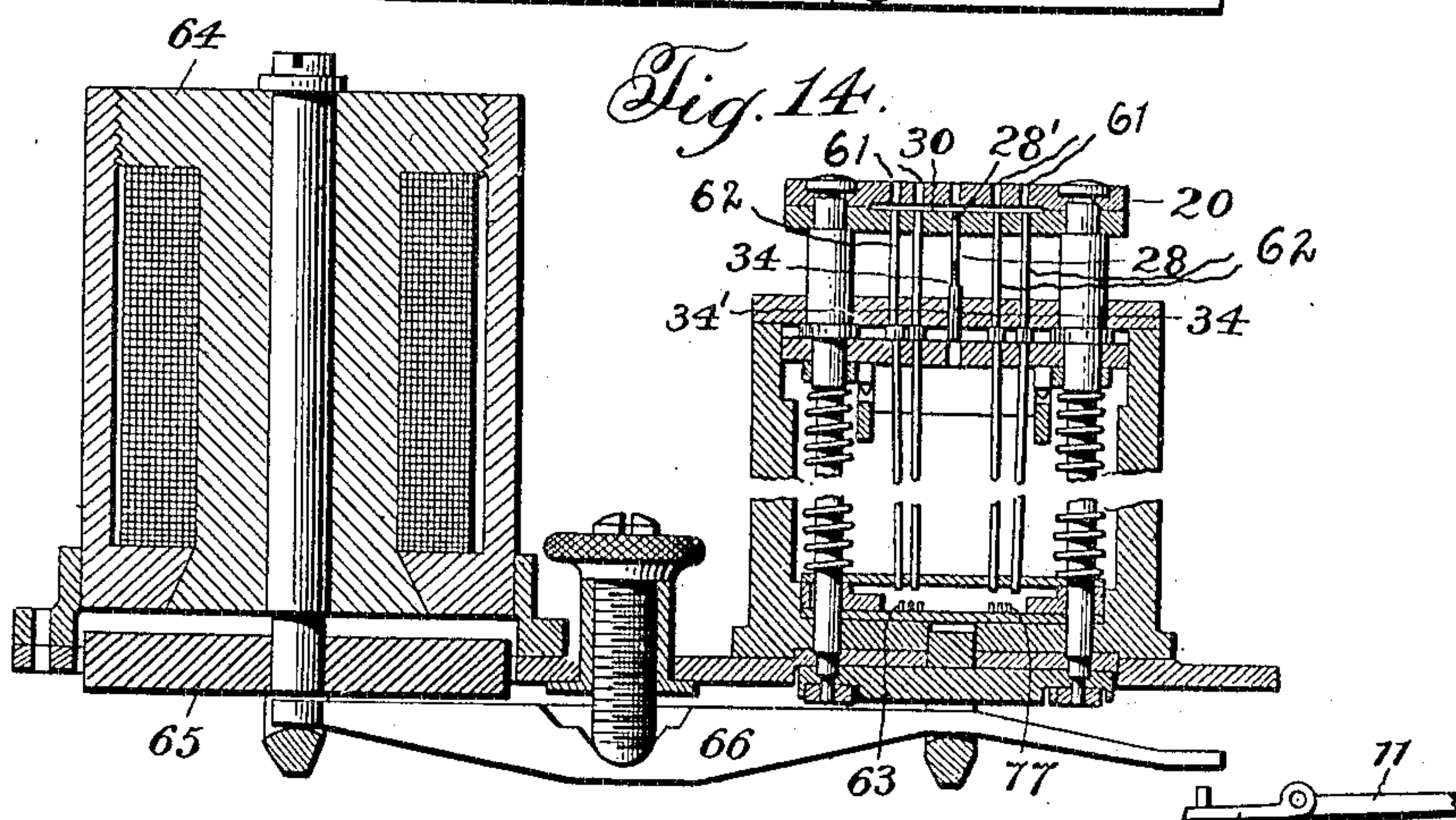
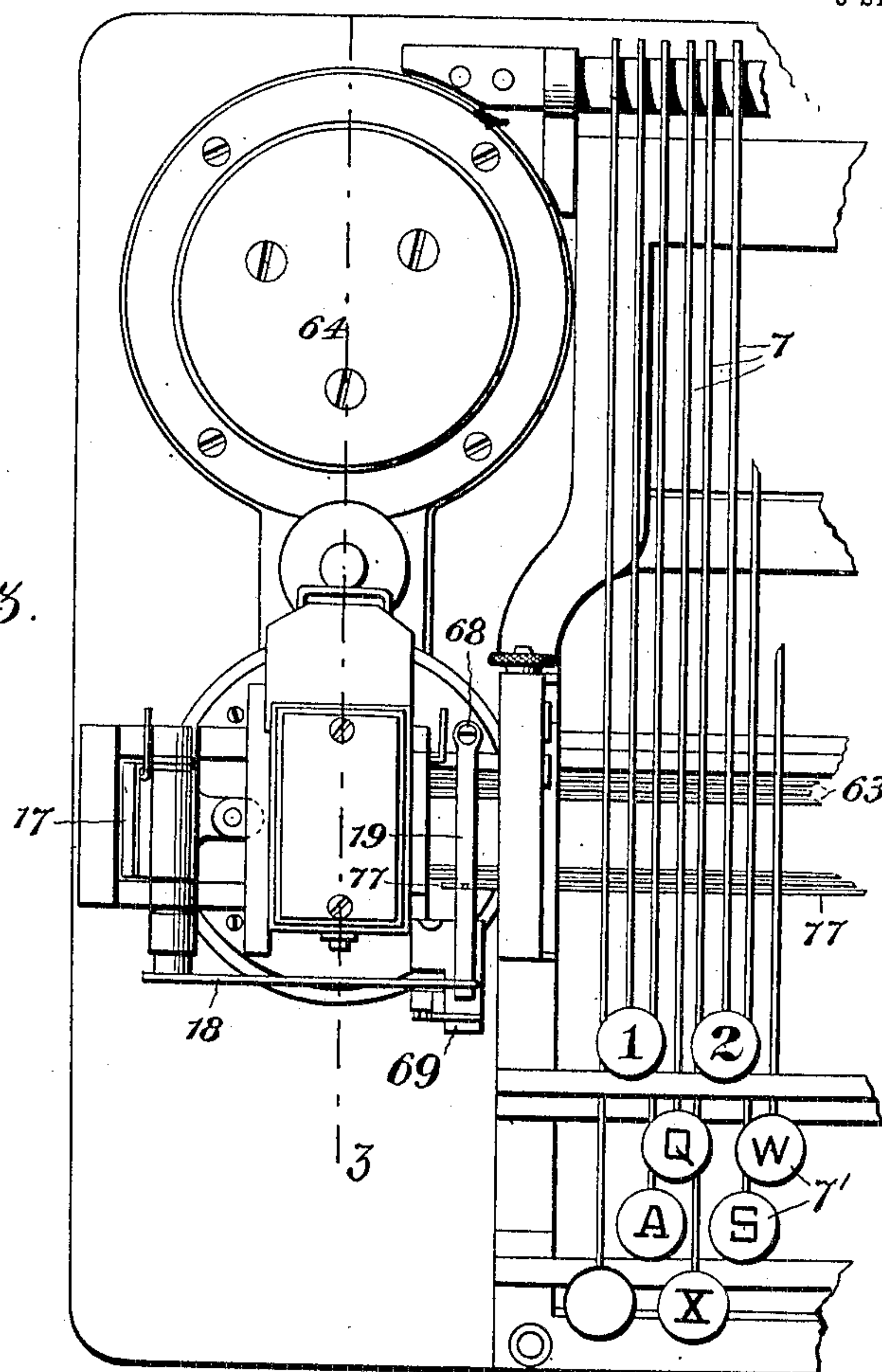
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APPLICATION FILED JUNE 30, 1906.

3 SHEETS—SHEET 3.

Fig. 13.



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# UNITED STATES PATENT OFFICE.

ANTON POLLÁK, OF PARIS, FRANCE.

## APPARATUS FOR PERFORATING PAPER STRIPS OR THE LIKE.

No. 829,932.

Specification of Letters Patent.

Patented Aug. 28, 1906.

Application filed June 30, 1906. Serial No. 324,115.

*To all whom it may concern:*

Be it known that I, ANTON POLLÁK, a subject of the Emperor of Austria-Hungary, residing in Paris, France, have invented certain  
5 new and useful Improvements in Apparatus for Perforating Paper Strips or the Like, of which the following is a specification.

The present invention relates to improvements in apparatus for perforating paper  
10 strips and the like covered by Letters Patent No. 736,775, granted to me August 18, 1903.

The main object of the present invention is to increase the certainty of the apparatus,  
15 to render possible the operation of the same by as small use of power as possible, and to avoid all shakings of the apparatus which might produce an irregular forward movement of the paper strip. The invention further  
20 comprises an arrangement for the perforation of paper strips such as are employed in the Wheatstone telegraph and which are previously provided with a row of guiding-holes. In this type of strip it is necessary  
25 that the perforations should be in alinement with the previously-made guide-holes in such a way that the center points lie perpendicular to the side edges of the strip.

In the accompanying drawings, Figure 1 is  
30 a plan view with parts of the apparatus omitted, illustrating a new form of switch device. Fig. 2 is a view from beneath of the parts of the switch device. Fig. 3 is a section on the line 1 1 of Fig. 2. Fig. 4 is a section on the  
35 line 2 2 of Fig. 2. Fig. 5 is a detail in section on the line *vv* of Fig. 2. Fig. 6 is a detail view showing the punching mechanism and strip-advancing mechanism with certain of my improvements applied thereto. Figs. 7  
40 and 8 are detail views illustrating a device for adjusting and holding the paper strip, as applied to the punching mechanism. Figs. 9 and 10 are detail views illustrating a modification of the device for adjusting and hold-  
45 ing the paper strip. Fig. 11 is a detail view illustrating another modification of the device for adjusting and holding the paper strip. Fig. 12 is a detail view of the reciprocatory selector-bar. Fig. 13 is a plan view.  
50 Fig. 14 is a section taken on the line 3 3 of Fig. 13, certain details being omitted from this view to prevent confusion.

The present apparatus includes punching  
55 mechanism comprising a die 20, having groups of apertures 61 and a number of punches 62, corresponding in size and position to the apertures in the die, a series of se-

lector-bars 63 for selecting various pins or groups of pins, a series of keys 7' to operate the selector-bars, and strip-advancing mechanism comprising a swinging frame 17, provided with an arm 18. By means of the keys and the selector-bars a desired punching pin or group of pins is selected out of the total number, and the strip is punched with  
60 the pins selected. The punching is performed by holding fixed the pins selected and (the strip being arranged between the die and the ends of the pins) pressing the die and strip against the ends of the pins, so that the  
70 strip is punched by the pins, which are held fixed. The work of punching is performed by an electromagnet 64, having an armature 65, connected by a lever 66 with the die 20. Dotted lines *a a*, Fig. 2, serve to illustrate the  
75 conductors of an electric circuit, in which is interposed a normally open key-operated switch *b* and a normally closed switch *c* and which, though not shown, lead from said switches to a suitable electric-current supply  
80 and the electromagnet 64. The movement of the key selects—that is to say, renders operative—a particular punching-pin or group of punching-pins and completes the electric circuit through the magnet, which acts sub-  
85 sequently to the selection of the pins and brings the die down on the punching-pins and punches out perforations with the pins which have been selected, also drawing back-  
90 ward the oscillating strip-advancing mechanism and then breaking its own circuit. On the breaking of the circuit the parts return to their original positions, the strip-advancing mechanism in its return forward movement carrying the strip with it.

With the exception of the switches *b* and  
95 *c* and the changes hereinafter pointed out all of the mechanism hereinbefore referred to is substantially the same as that fully set forth in my prior patent referred to and con-  
100 stitutes no part of the present invention. These parts will therefore only be described generally or to such an extent that, coupled with a detailed description of the improve-  
105 ments contemplated, the present invention may be readily understood and appreciated.

In the accompanying drawings, Figs. 1 to  
110 5, inclusive, show a new switch device which prevents the premature interruption of the circuit closed on the depression of a key and by which the electromagnet operating the punching mechanism is actuated. The device shown in these figures consists, essentially, of a frame 5, oscillating about a shaft 3



in a slot 1 of the base-plate 2 of the perforating apparatus and constantly pressed upward by a spring 4. The key-levers 7 lie across the longitudinal sides 6 of the frame 5, and on the depression of any of the keys 7' the frame 5 6 also swings downward, whereby the circuit is closed by a contact-roller 8, mounted on the longitudinal side 6 of the frame and the contact-springs 9. In this position—that is to say, as soon as the projection 10' has passed the lower edge of the bolt 10—the frame is locked by the bolt 10, which is constantly pressed by a spring 10<sup>2</sup> against the projection 10' and the bolt 10 is only withdrawn to release the frame 5 6 after the punching operation has been completed under the influence of the electromagnet. At this moment the circuit is broken at another place, and simultaneously the bolt 10 is withdrawn to release the frame 5 6 and locked in its retracted position. The withdrawal of the bolt 10 is brought about when the shaft 11' is turned by a crank 11<sup>3</sup>, rigidly connected therewith, drawing back against the action of the spring 10<sup>2</sup>, a pin 11<sup>2</sup> on said crank engaging a lug *d*, provided on the bolt 10. As soon as the punching operation is completed the circuit is broken by means of the following mechanism: The free end of the lever 66, connected to the armature 65 of the electromagnet, extends above the end *a'* of a lever 11, Fig. 14 of the drawings. As soon as the armature 65 has approached the magnet so closely as to complete the punching operation the free end of the lever 66 engages the end *a'* of the lever 11 and forces the same downward, whereby the lever 11, mounted in the bearings 12', oscillates, and the contact between the contact-roller 12 of the lever 11 and the contact-springs 13 is broken. The lever 11 is rigidly connected with the shaft 11', so that when said lever oscillates the shaft 11' is turned, whereby the above-mentioned withdrawal of the bolt 10 from the projection 10' is accomplished and the frame 5 6 released. In this position—that is, when the contact-roller 12 is removed from the springs 13—the lever 11 is fixed by a spring-controlled catch device. This consists of a bar 14, which may be moved to and fro in bearings 14<sup>2</sup> and is constantly pressed against the sides of the lever 11 by a spring 14', Figs. 4 and 5. Now when the lever 11 oscillates the bar may be forced inwardly under the lower edge of the lever 11 by the spring 14', and the lever 11 and the contact-roller 12 are held in an elevated position until the bar is drawn out by the two-armed lever 15. This lever 15 shares in the oscillation of the frame 5 6. As already stated, however, the bolt 10 and the frame 5 6 are released, whereby the latter under the influence of the spring 4 is returned to its original position. Hereby, however, the locking device 14 14' is released by the elbow-lever 15 being caught by a pin 6', arranged

on the frame 5 6, so that the lever 11 under the influence of the spring 2' returns to its position of repose and then closes contact between the rollers 12 and the springs 14. The whole arrangement is now again in its normal position of repose and is ready for the next punching operation.

In order to prevent a return oscillation of the frame 17 from moving forward the paper on the engagement of the step-formed end of the arm 18 with a stop 19, hereinafter described, before the locking devices (not shown) of the strip-advancing mechanism have seized the paper strip, a curved rack-bar 21, Fig. 6, movable upward and downward with the perforating die or matrix 20, is arranged, while on the frame 17, which moves forward the paper, a spring-controlled pawl 22 is fixed, which on the swinging of the frame 17 to the right slides unimpededly on the curved rack-bar 21 and cannot swing back before the rack-bar 21 with the perforating-die 20 has returned to its position of repose after the punching operation is completed. In order on the swinging back of the frame 17 to lessen the momentum of the same on the close of its return movement and to thus prevent sudden contact between the frame 17 and its stop, effecting an irregular forward movement of the paper strip, I provide a retarding means, shown in this instance as a dash-pot 23. On the piston-rod 24 of the pump a slide 25 is fixed, said slide being provided with a guide-groove 26. A pin 18', carried by the arm 18, engages the guide-groove, the formation of which is such that the pump on large movements of the frame 17, as well as on small movements of the same, acts as a brake, but only on the conclusion of the return movement of the frame when the pin 18' passes from the curved part of the guide 26 into the horizontal part of the same.

Figs. 7 and 8 illustrate a device for adjusting and holding a paper strip that has been previously provided with guide-holes during the punching operation in such a way that the center points of the holes to be perforated and the center points of the corresponding guide-holes of the strip fall in a line perpendicular to the side edges of the strip. Said device comprises a comb 28, supported by a spring 29 and having a row of pins 28' and a shank 33, slidably engaging a slot 34', formed in the top plate of the casing for the punching mechanism. In addition to the groups of apertures 61 the die 20 is provided with a row of apertures 60, corresponding in number and position to the pins 28', which are adapted to enter said apertures when the die is depressed. The pins of the comb 28 enter immediately before the perforating under the influence of the spring 29 into the guide-holes of the paper strip, guided through the opening 30 of the perforating-die, and hold the same against



any displacement. In order during the forward movement of the paper strip to hold the pins of the comb 28 away from the paper strip and to facilitate the moving forward of the paper strip, the locking-lever 31 is arranged to be operated by a suitable projection 32, carried by the die, and on the depression of the die 20 said locking-lever holds fast the shank 33 by its beveled or notched part 34 in its depressed position by means of a fork 35 thereon. The mode of action of this device is as follows: The comb 28, the pins of which lying in the guide-holes of the strip fix the same against any displacement, is during the punching operation also depressed downward by the depressed perforating-die 20 in such a way that on the completion of the punching operation the beveled or rear undercut part 34 of the shank 33 lies in front of the fork 35. Now as the perforating-die 20 in its descent or the projection 32, Fig. 6, connected with the die, also presses on the inclined plane 31' of the lever 31, Fig. 7, pivoted on the pin 32', the lever 31 is turned in the direction indicated by the arrow in Fig. 7, while by means of the pin 35' the fork 35 is moved against the shank 33, or rather against the beveled part 34 of the same. In this position of the fork 35 the spring 29 cannot press the comb 28 upward—that is to say, the pins are held away from the paper strip and cannot enter the guide-holes of the strip and the paper strip can be pushed forward unhindered. As soon as the moving forward of the paper strip is ended the fork 35 is drawn to the left by a pin 36 on the moving forward of the frame 17, which strikes another pin 38 on the lever-arm 37, and the comb 28 can now move forward under the influence of the spring 29 and enters the guide-holes of the paper strip. The curved guide 27 (shown in Fig. 8) serves to protect the perforated paper strip from being creased or turned during the advance of the same.

According to the form of construction shown in Figs. 9 and 10, the same object—that is, the adjustment and fixing of the strip—is attained by a pin or spiked wheel 39, moved upward and downward with the perforating-die 20. This wheel on the moving forward of the paper strip rotates with its pins constantly in the guide-holes of the paper strip, whereby the latter is properly adjusted. During the stoppage and descent of the die the wheel 39 is, however, locked by a spring-pawl 40, which engages a ratchet-wheel 41 connected thereto, and thereby the paper strip is fixed. In the depressed position of the die this pawl is held fast in a similar way to the comb 28 in Figs. 7 and 8 by a locking-lever 42, so that on the upward movement of the perforating-die the pin or spiked wheel 39 is loosely revoluble on its axis and the moving forward of the paper strip is not prevented. After the moving forward of the

paper strip is completed the pin 36 of the frame 17 on moving forward comes into operation and draws back the locking-lever 42 by means of its pin 43, and the pawl 40 under the action of the spring 44 engages the ratchet-wheel 41, which locks the spiked wheel 39, so that the pins or spikes of the same hold fast the paper strip.

Fig. 11 is another form of construction of the device for adjusting the paper strip and preventing the displacement of the paper strip during the punching operation. A spiked wheel 45, adapted to be moved up and down with the die, is also here employed. A two-armed pawl 46 47 has its pivot 48 on a spindle 49, the upper part of which is guided in the die 20, while the lower end of the spindle rests on a spring 50. The arm 47 of the pawl is curved upward in such a way as to encounter the die 20, while the arm 46 or a stop-tooth or roller on the same lies beneath the spiked wheel and allows it to move freely when the die 20 and the spiked wheel 45 stand in their upper non-working position. Now if the die 20 be depressed the catch-tooth of the arm 46 enters between two pins of the spike-wheel 45, adjusts the paper strip, and locks the spiked wheel in such a way that the displacement of the paper strip is entirely prevented.

The present apparatus also includes means for regulating the distance through which the frame 17 swings and the distance to which the strip is advanced in accordance with the key which is depressed, so that thereby a greater space is made for long letters than for short letters. Said means comprises a reciprocatory selector-bar 77, (shown in detail in Fig. 12,) provided with teeth 77', which vary in width and are beveled in both directions, the edges of different teeth being of different inclinations. Upon the pressing of the keys 7' the operating-arms 7 thereof will engage the teeth and slide the selector-bars 77 to the right or left, as the case may be. This selector-bar 77 is operated on the pressing down of each key and carries at its end a stop 19, pivoted at 68. The movable end of the stop rests on a small table or plate 69. According to the inclination of the edge of the tooth which is struck by the key-arm, the stop 19 is moved a greater or less distance and operates in the path of an arm 18, the end of which is inclined, preferably, in steps and which in the backward movement of the frame 17 moves downward, so that its end according to the position of the stop 19 moves a greater or less distance, and thus regulates accurately the length of the movement of the frame 17 and the distance which the strip advances. The stop 19 and the arm 18 are substantially the same and cooperate in the same manner as that set forth in my prior patent referred to. It is to be noted, however, that in the present arrange-



ment by providing the selector-bar 77 with teeth beveled in both directions the movement of said bar either into or out of operative position is accomplished by the operating-keys, thus dispensing with the use of the spring to draw back the bar after each punching operation into its position of repose, whereby the disadvantages incident to the use of a spring is avoided and the apparatus simplified.

The constructions described represent forms of constructions of the improvements to be protected which have been practically tested. However, as will be readily understood, the same may be altered in many ways without departing from the spirit of the invention.

What I claim is—

1. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of a series of punching-pins, means for selecting various pins or groups of pins, a series of keys to operate said means and electrically-operated mechanism for punching a strip with the pins selected, said mechanism including a normally open electric circuit, an electromagnet, an armature for the magnet and a circuit-closer comprising two contacts, and a movable frame carrying a bridging contact and adapted to be operated by the keys to close the circuit.

2. In an apparatus for punching a strip with various perforations or groups of perforations the combination of a series of punching-pins, a series of selector-bars, a series of keys to operate said selector-bars, and electrically-operated mechanism for punching a strip with the pins selected, said mechanism including a normally open electric circuit, an electromagnet, an armature for the magnet and a circuit-closer comprising two spring-supported contacts and a swinging member carrying a contact-roller for coöperation with the spring-supported contacts and adapted to be actuated by the keys to close the circuit.

3. In an apparatus for punching a strip with various perforations or groups of perforations the combination of a series of punching-pins, means for selecting various pins or groups of pins a series of keys to operate said means and electrically-operated mechanism for punching a strip with the pins selected, said mechanism including a normally open electric circuit, an electromagnet, an armature for the magnet and a circuit-closer comprising two contacts, an oscillating frame carrying a bridging contact-roller for coöperation with said contacts, a spring for normally holding said frame in the path of movement of the keys, and said frame being adapted to be actuated by the keys to close the circuit.

4. In an apparatus for punching a strip

with various perforations or groups of perforations the combination of a series of punching-pins, a series of selector-bars, a series of keys to operate said selector-bars, electrically-operated mechanism for punching a strip with the pins selected, said mechanism including a normally open electric circuit, an electromagnet, an armature for the magnet, and a circuit-closer comprising two contacts and a movable frame carrying a bridging contact and adapted to be operated by the keys to close the circuit; and automatic means to lock said frame when in a position to close the circuit.

5. In an apparatus for punching a strip with various perforations or groups of perforations the combination of a series of punching-pins, a series of selector-bars, a series of keys to operate said selector-bars, an electrically-operated mechanism for punching a strip with the pins selected, said mechanism including a normally open electric circuit, an armature for the magnet, and a circuit-closer comprising two contacts, and a movable frame carrying a bridging contact and adapted to be operated by the keys to close the circuit; means to lock said frame when in a position to close the circuit and mechanism for automatically disengaging said locking means when the punching operation has been completed.

6. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of a series of punching-pins, a series of selector-bars, a series of keys to operate said selector-bars, electrically-operated mechanism for punching a strip with the pins selected, said mechanism including a normally open electric circuit, an electromagnet, an armature for the magnet and a circuit-closer comprising two contacts and a movable frame carrying a bridging contact and adapted to be operated by the keys to close the circuit; a switch actuated by the armature at the completion of the punching operation to break the circuit, means to lock the switch in its open position and means actuated by said frame for releasing said locking means.

7. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of a series of punching-pins, a series of selector-bars, a series of keys to operate said selector-bars and electrically-operated mechanism for punching a strip with the pins selected, said mechanism including a normally open electric circuit, an electromagnet, an armature, a circuit-closer adapted to be actuated by depressing the keys, means for automatically locking said circuit-closer when in a position to close the circuit, a normally closed switch actuated by the armature at the completion of the punching operation to break the circuit, means for automatically locking said switch in its open



position, and means whereby the circuit-closer in returning to its normal position releases the switch-locking means.

8. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of a series of punching-pins, a series of selector-bars, a series of keys to operate said selector-bars, and electrically-operated mechanism for punching a strip with the pins selected, said mechanism including a normally open electric circuit, an electromagnet, an armature for the magnet, a circuit-closer adapted to be operated by depressing the keys, means for locking the circuit-closer when in a position to close the circuit, a normally closed switch actuated by the armature at the completion of the punching operation to break the circuit, means for locking said switch when it has been moved to an open position, and means whereby the switch-locking means will not be released until the circuit-closer returns to an open position.

9. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of a series of punching-pins, a series of selector-bars, a bar for regulating the distance the strip is advanced, a series of keys adapted to operate said selector-bars and the last-mentioned bar, said bar being provided with teeth beveled in both directions whereby the movement of said bar either into or out of operative position is accomplished by said keys.

10. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of a series of punching-pins, a series of selector-bars, keys for operating the selector-bars, punching mechanism for punching a strip with the pins selected, means operated by said punching mechanism for advancing said strip comprising a swinging frame, and a bar for regulating the amount of movement of said swinging frame, said bar being provided with teeth beveled in both directions and adapted to be moved into or out of operation by said keys.

11. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of means for advancing the strip, a reciprocable selector-bar, the distance of movement of which controls the distance to which said strip is advanced, operating-keys, and operating-arms connected thereto, said selector-bar being provided with teeth to be engaged by said arms, said teeth being of different widths and beveled in both directions, whereby said bar is moved different distances by different keys and is adapted to be moved into or out of operative position by said keys.

12. In an apparatus for punching a strip

with various perforations or groups of perforations, the combination of a series of punching-pins, means for selecting various pins or groups of pins, a reciprocating die for punching a strip with the pins selected, a rack-bar carried by said die, a swinging frame for advancing the strip operated by the movement of the die, and a pawl carried by said frame for coöperation with the rack-bar, whereby the paper-moving frame can swing forward but is prevented swinging back before the die returns to its normal position.

13. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of a reciprocating strip-advancing device and means including a dash-pot for retarding the same at the conclusion of its return movement.

14. In an apparatus for punching a strip having guiding-apertures with various perforations or groups of perforations, a series of punching-pins, punching mechanism, means for advancing the strip and means independent of the punching mechanism for engaging the guiding-apertures in the strip to adjust the same and prevent displacement thereof during the punching operation.

15. In an apparatus for punching a strip having guiding-apertures with various perforations or groups of perforations, a series of punching-pins, punching mechanism, and means independent of the punching mechanism for intermittently engaging the guiding-apertures in the strip to adjust the same and prevent displacement thereof.

16. In an apparatus for punching a strip having guiding-apertures with various perforations or groups of perforations, a series of punching-pins, punching mechanism, means for intermittently advancing the strip and means independent of the punching mechanism for engaging the guiding-apertures therein when the strip is not being advanced.

17. In an apparatus for punching a strip having guiding-apertures with various perforations or groups of perforations, a series of punching-pins, a reciprocating punching-die, a spring-supported member provided with a plurality of pins, said member being depressed and the pins engaging the guiding-apertures in the strip as the die is moved downward in the punching operation and means actuated by the movement of the die to lock said member in its depressed position until after the strip has been advanced.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ANTON POLLÁK.

Witnesses:

AUGUSTUS E. INGRAM,  
C. K. FRASER.