

No. 736,775:

PATENTED AUG. 18, 1903.

A. POLLÁK.
APPARATUS FOR PUNCHING STRIPS.

APPLICATION FILED SEPT. 26, 1902.

NO MODEL.

5 SHEETS—SHEET 1.

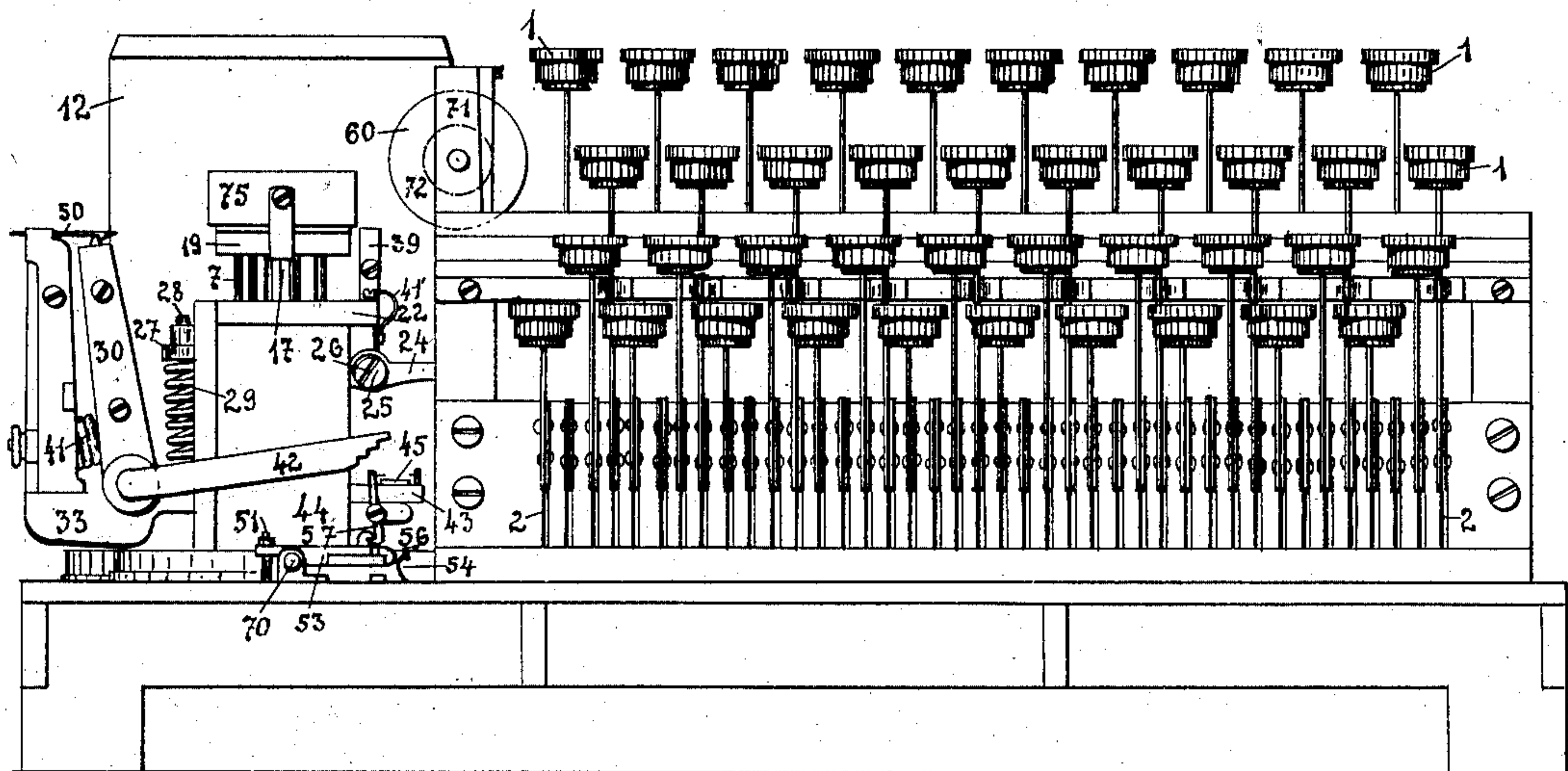


Fig. 1

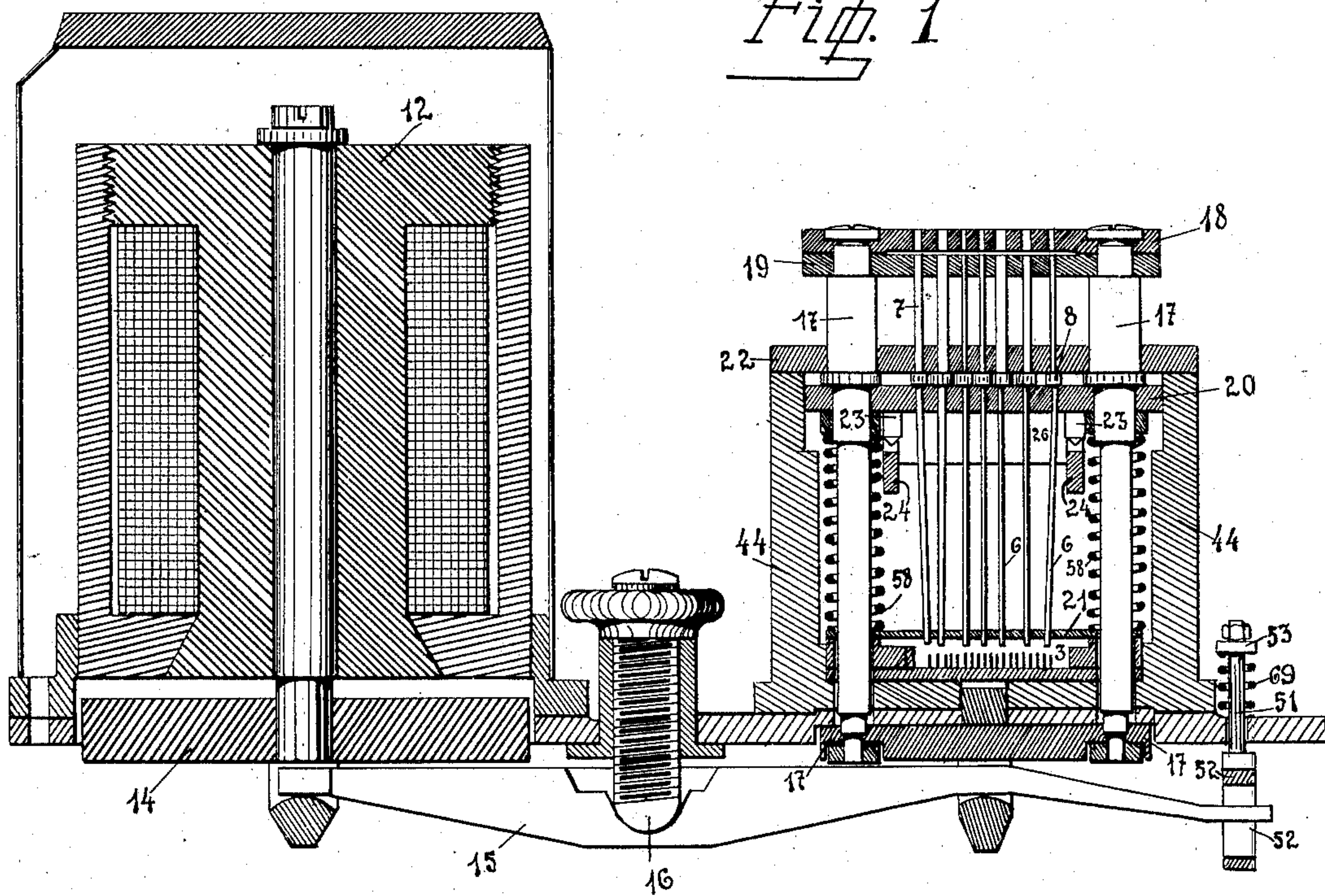


Fig. 3

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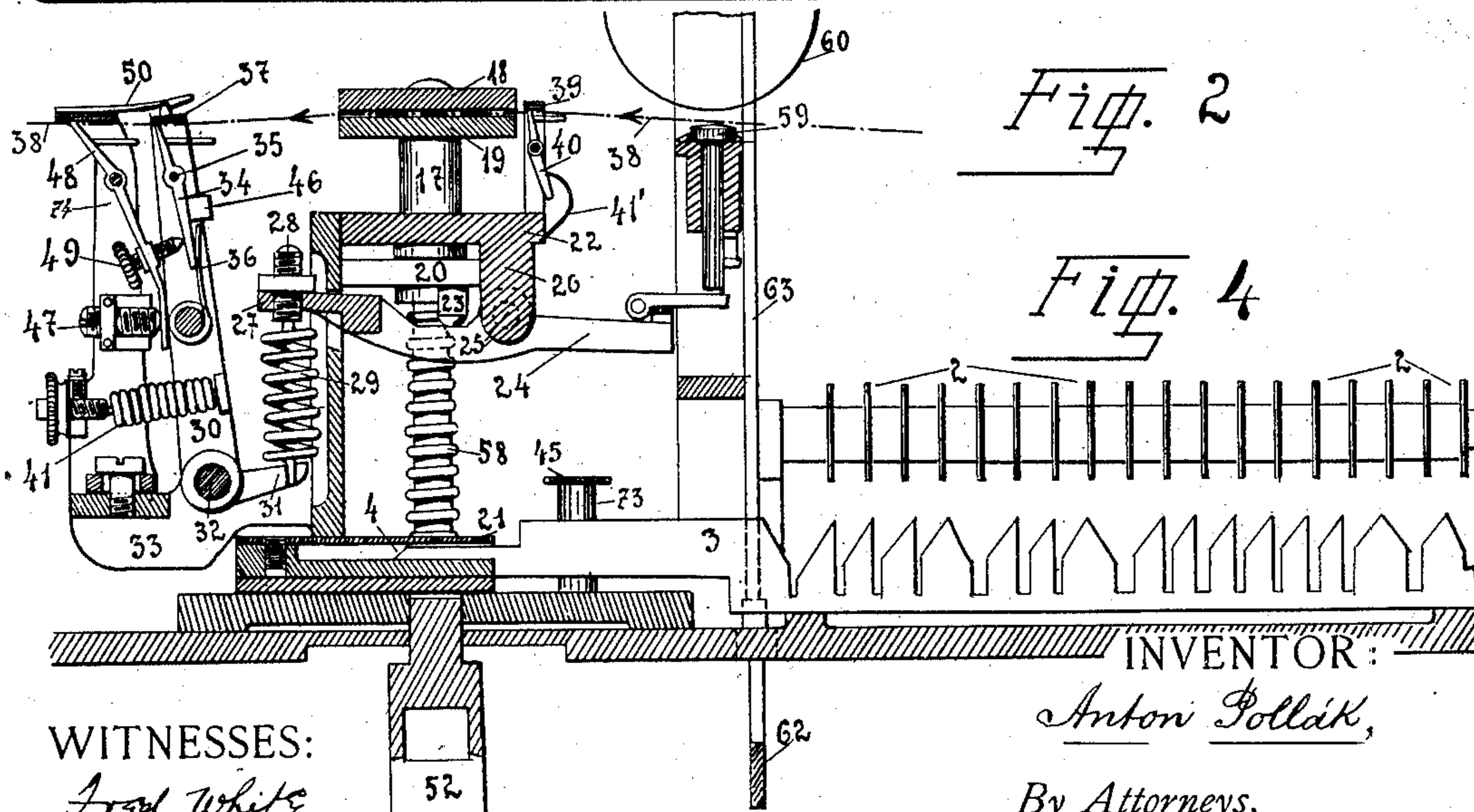
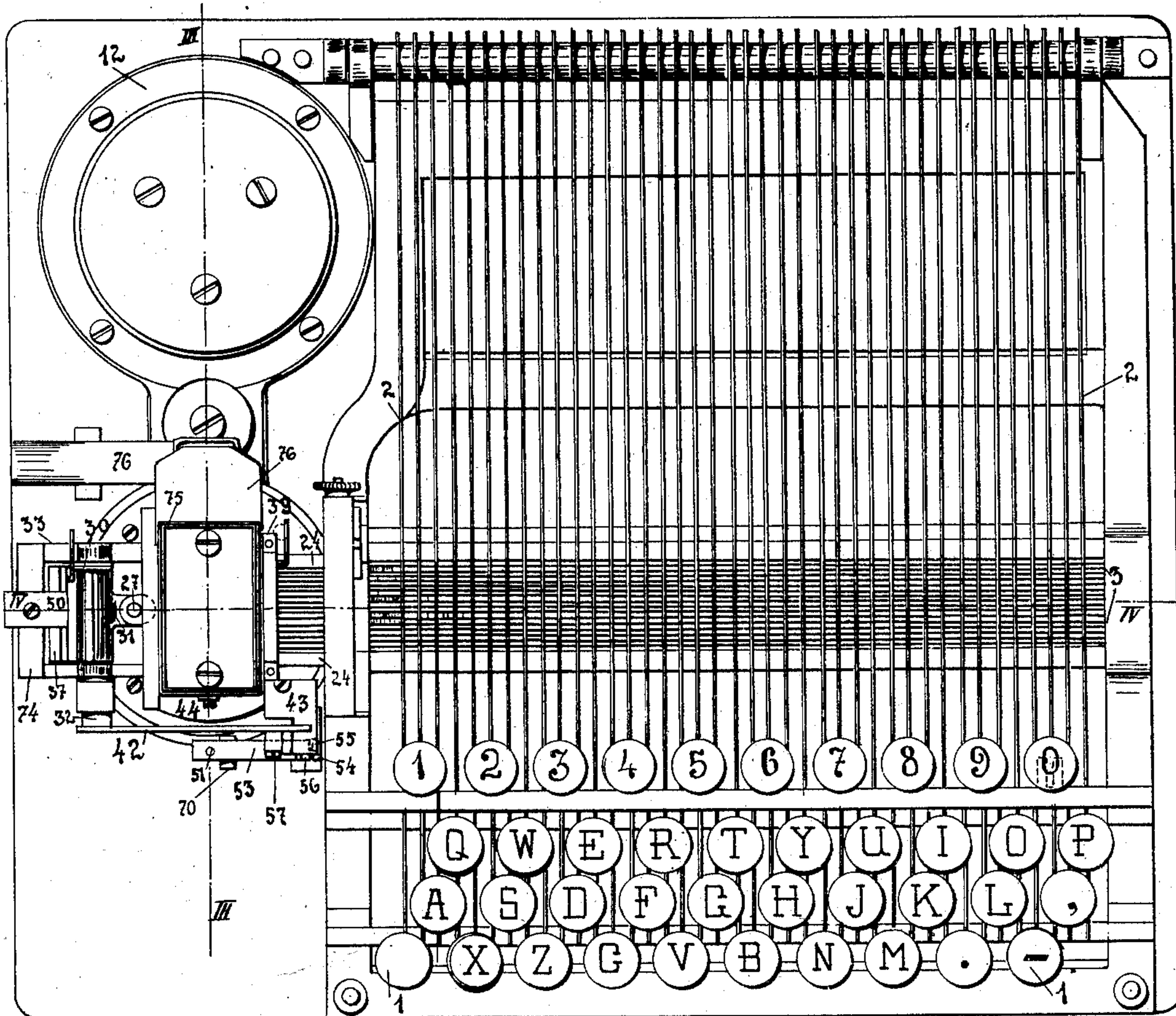
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5 SHEETS—SHEET 2.



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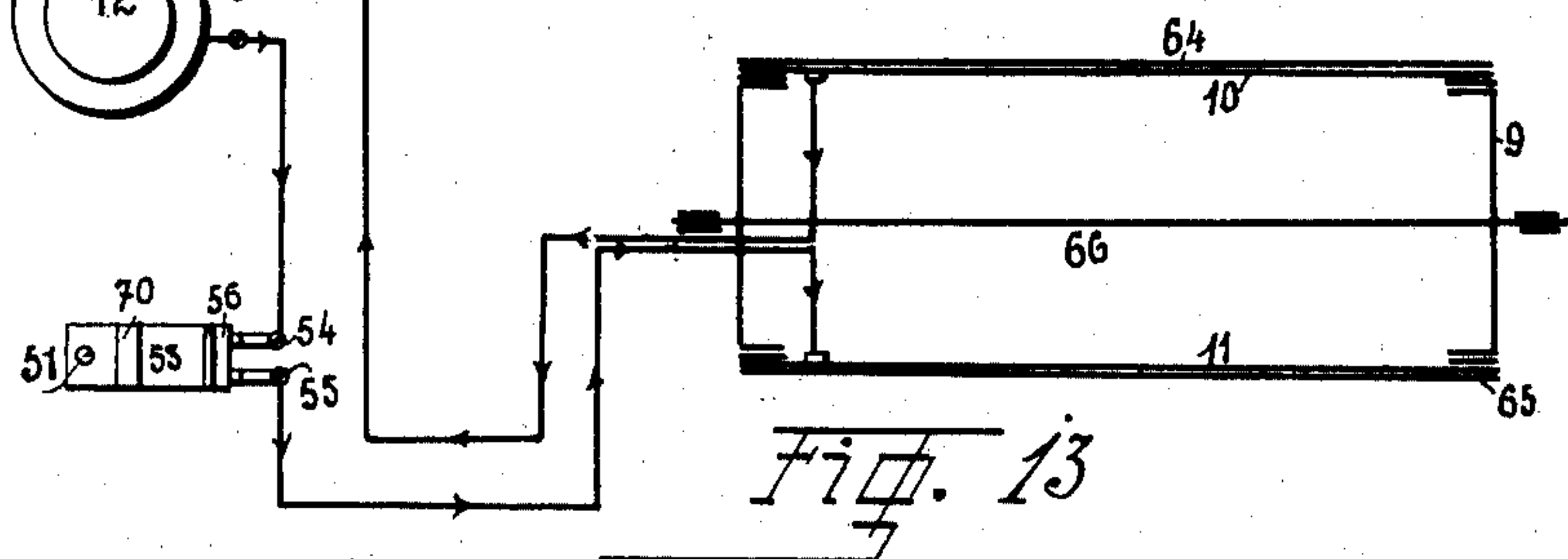
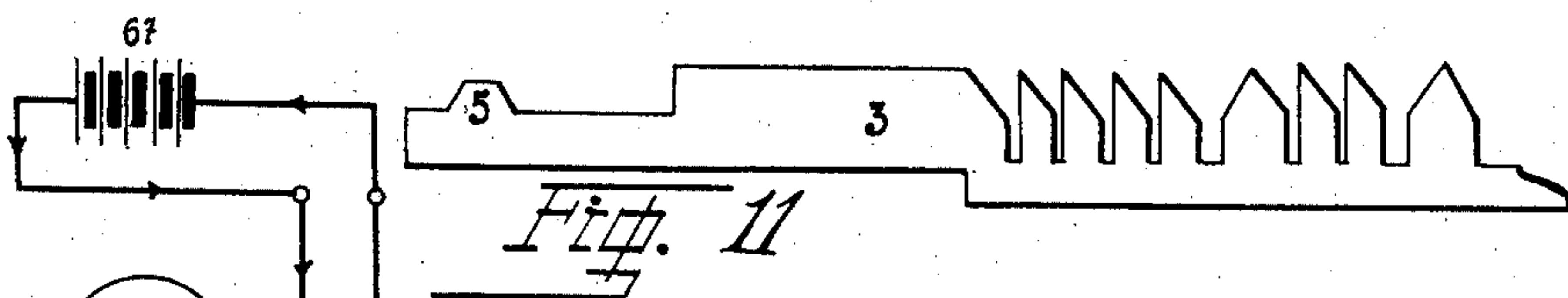
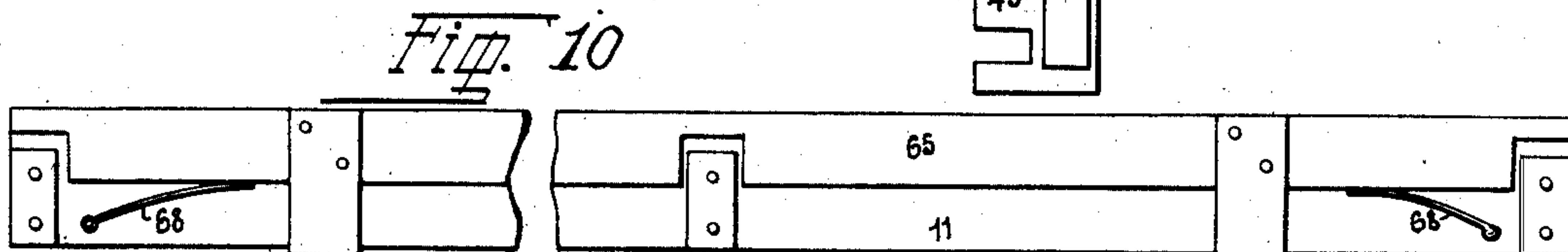
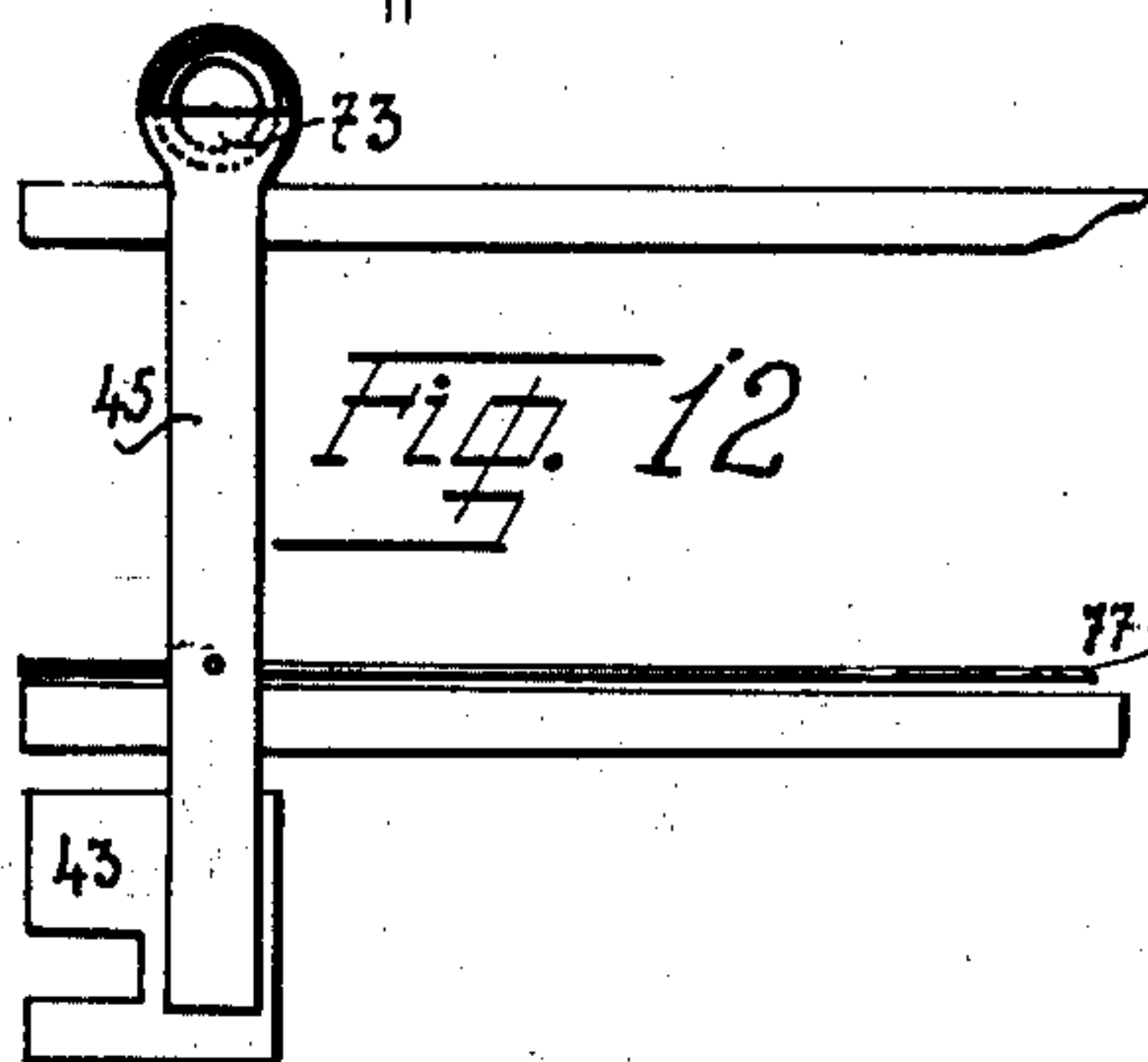
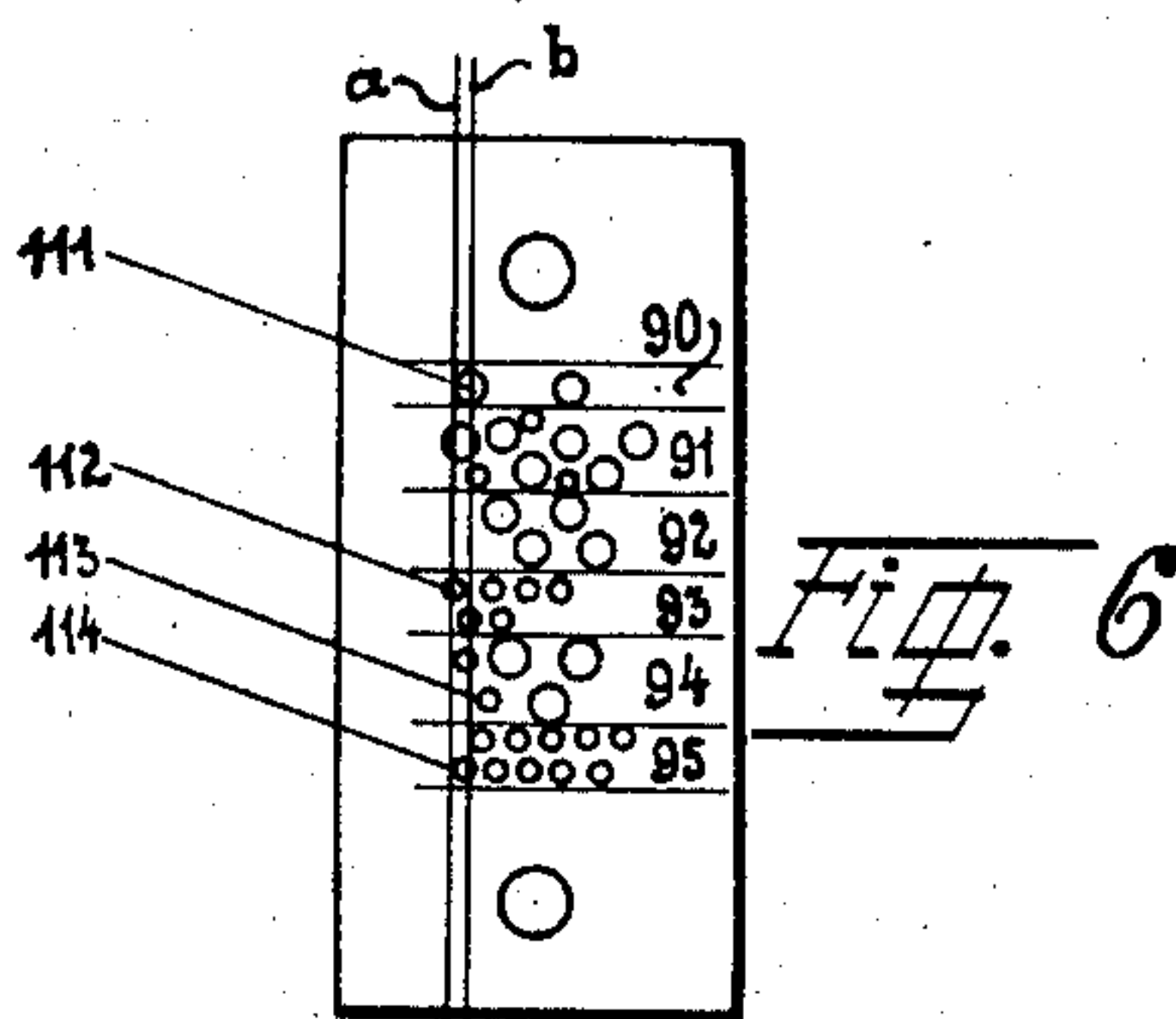
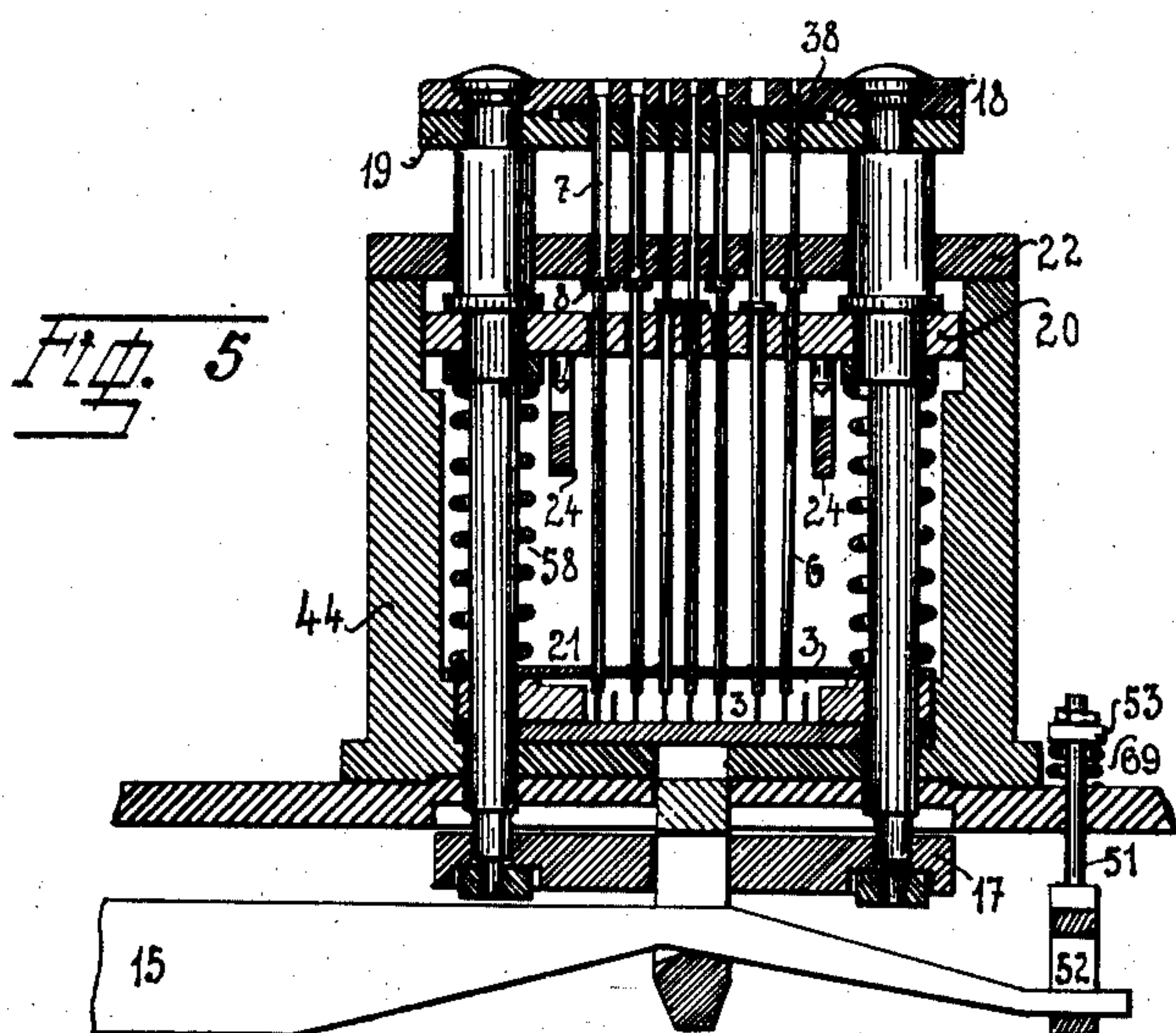
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5 SHEETS—SHEET 3.



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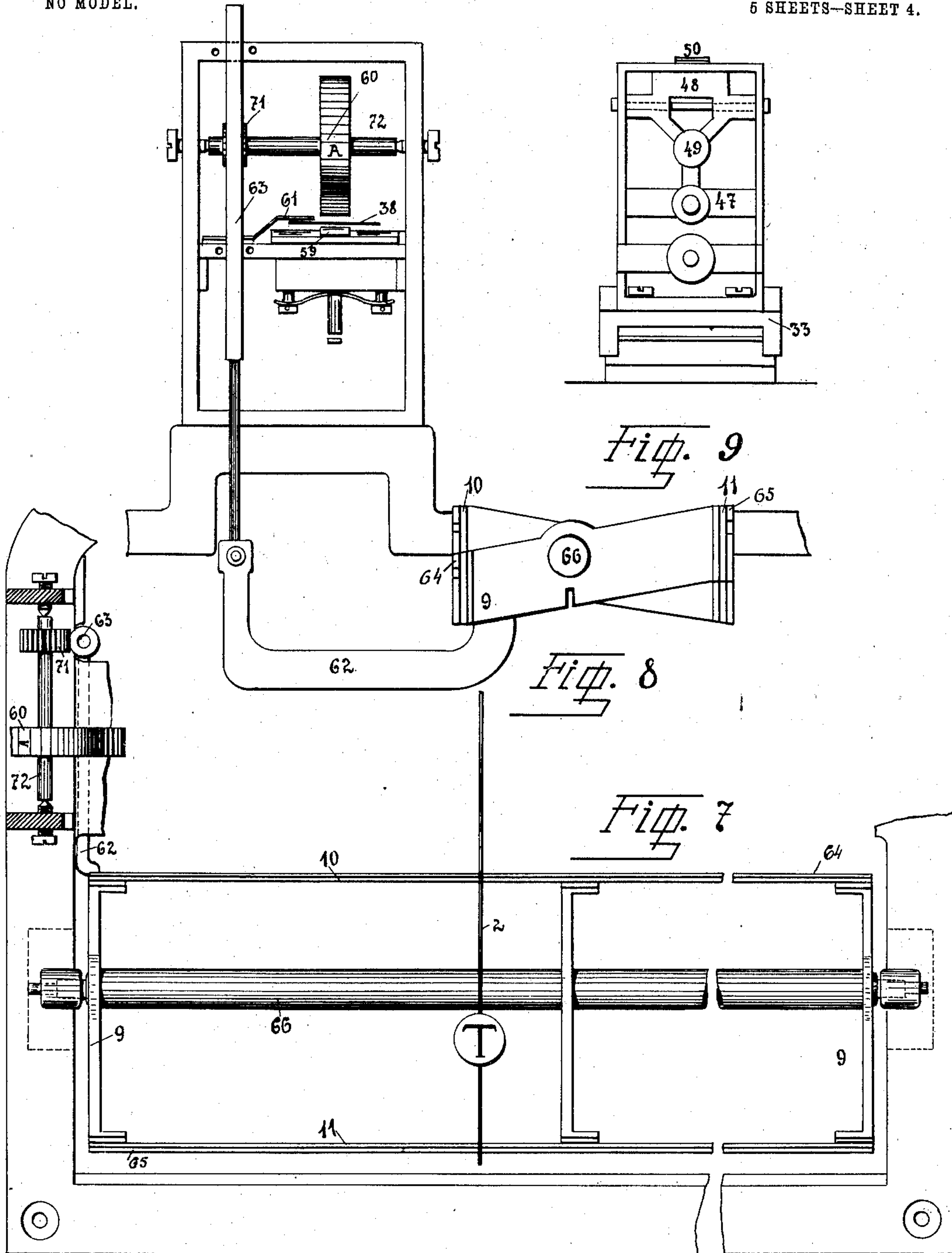
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5 SHEETS—SHEET 4.



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NO MODEL.

5 SHEETS—SHEET 5.

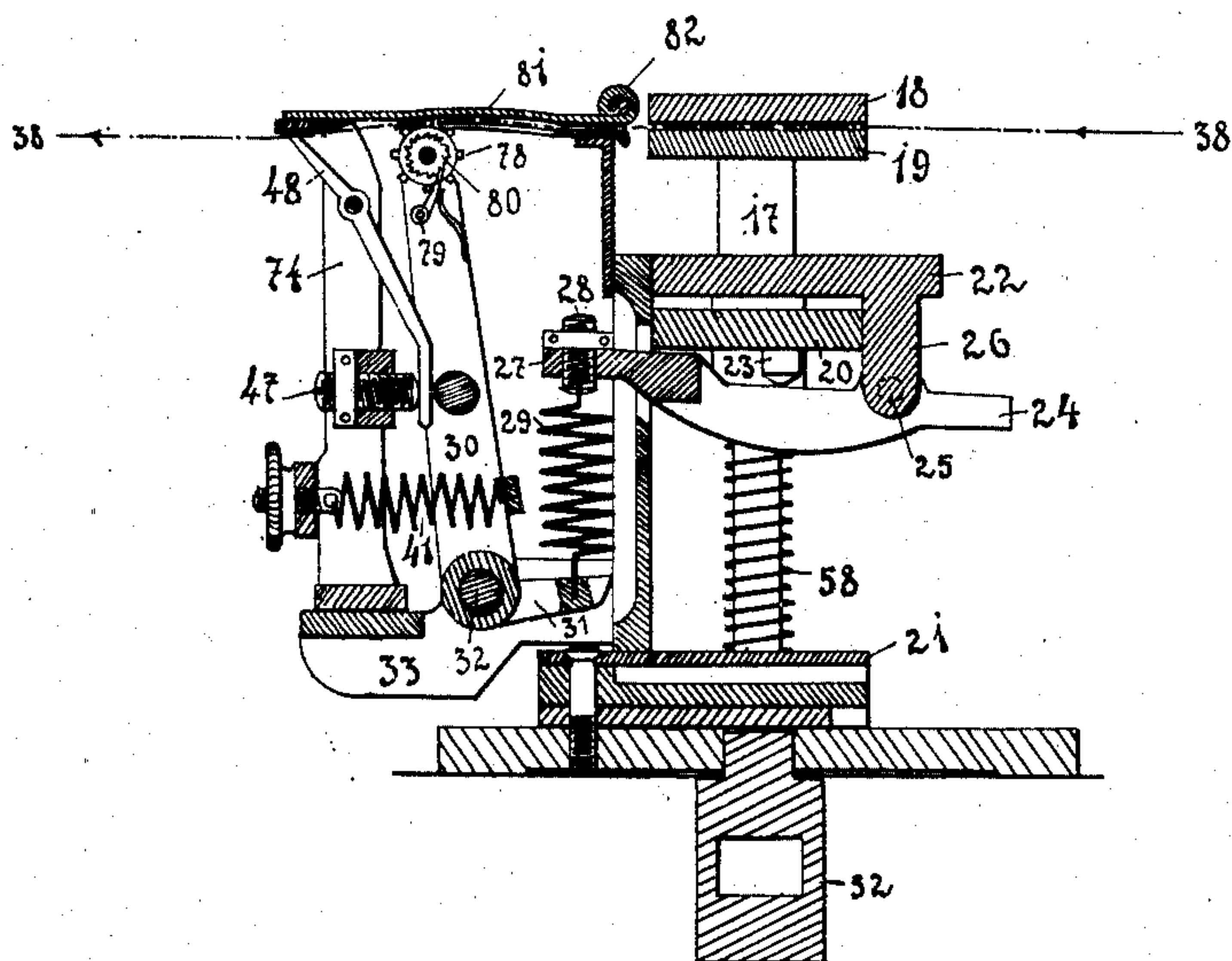


Fig. 14

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PUNCHING STRIPS.

SPECIFICATION forming part of Letters Patent No. 736,775, dated August 18, 1903.

Application filed September 26, 1902. Serial No. 124,970. (No model.)

To all whom it may concern:

Be it known that I, ANTON POLLÁK, a subject of the Emperor of Austria-Hungary, residing in Budapest, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Apparatus for Punching Strips, of which the following is a specification.

The object of this invention is to provide a machine for punching strips of paper or the like, such as are used in the operation of various machines, and especially to punch a strip adapted for use in automatic rapid-teleggraphy systems, such as are described in the patent of Pollak and Virag, No. 675,495, dated June 4, 1901. My invention provides for this purpose a machine which is very simple in construction and very easy and rapid to operate.

My invention provides a machine having also various other advantages in detail, as set forth hereinafter.

In the accompanying drawings, illustrating an embodiment of the invention, Figure 1 is a front elevation of the complete machine. Fig. 2 is a plan of the same. Figs. 3 and 4 are sections on the lines III III and IV IV of Fig. 2, certain details being omitted for the sake of clearness. Fig. 5 shows a portion of the mechanism shown in Fig. 3, with the parts in the position assumed during operation. Fig. 6 is a plan of a die, illustrating a suitable arrangement of the punches. Figs. 7 to 12 illustrate various details of the machine. Fig. 13 is a schematic illustration of the electric circuit. Fig. 14 illustrates another form of the mechanism for advancing the strip.

My improved apparatus may be by obvious variations adapted for the punching of strips in various ways. In the form which I have shown it is adapted for making most complicated groups of perforations in a strip; but where simpler systems of perforating are desired the same principle may be employed in whole or in part by varying the proper details of the mechanism.

In the rapid-teleggraphy system referred to it is sometimes necessary for transmitting a single character that there should be a group of perforations extending one after another, both lengthwise and transversely across the sheet, and in some cases of different sizes.

To provide for all the perforations and relative positions thereof which may be needed, I propose to use a die having the groups of apertures shown in Fig. 6 and a number of punches corresponding in size and position to the apertures in this die. By means of a keyboard and suitable intermediate mechanism a desired punching-pin or group of pins is selected out of the total number and the strip is punched with 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 strip is punched by the pins, which are held fixed. Preferably the work of punching is performed by a motor, the actual work performed in pressing the keys being only that necessary to select and hold fixed the desired pin or group.

An advantageous feature of the embodiment illustrated is the use of selector-bars, which are moved both into and out of operative position by the keys, thus avoiding the use of springs or the like for this purpose.

Another advantageous feature shown in the present machine is the means for printing a character corresponding to the group of perforations punched, so that the operator will see at once whether or not he has punched a proper group of perforations and may correct the same, if necessary. It has been a very objectionable feature of machines of this general class that the operator could not discover a mistake until the actual use of the strip in the machine which it controls. By the simultaneous printing of the character corresponding to the key pressed this difficulty is obviated.

Another advantageous feature of this machine is in the regulating of the distance to which the strip is advanced in accordance with the key which is pressed down, so that thereby a greater space is made for long letters than for short letters.

In the complete machine, as illustrated, the sequence of operations is as follows: The movement of a key selects—that is to say, renders operative—a particular punching-pin or group of pins and turns a type-wheel to bring into operative position a type corresponding to the key pressed and also com-

pletes an electric circuit through a magnet, which acts subsequently to the selection of the pins and the type and brings the die down on the punching-pins and punches out perforations with the pins which have been selected, also impressing the operative type on the strip and drawing backward an 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. The movement of the key also adjusts the position of a stop which controls the amount of backward movement of the strip-advancing mechanism, so as to control the distance to which the strip advances. With the mechanism shown the selection of the pins and type and the adjustment of the stop controlling the strip-advancing mechanism is accomplished by the first part of the movement of the key and the punching and printing and strip-advancing operations by a later part of such movement. It is not essential, however, that the movement of the key should be so divided, but only that the several mechanisms referred to should operate in proper sequence. For example, with the electric motor illustrated the self-induction delays the operation for an appreciable interval after the closing of the circuit, which interval is sufficient for setting the several organs referred to in proper position for the action of the motor, and consequently the keys may operate to close the circuit simultaneously with the setting of said organs in position.

Referring now to the drawings, the operating-keys 1 are mounted on operating-arms 2, which in their downward movement engage the oblique edges of the slitted selector-bars 3. These selector-bars are provided, as shown, with slits the outer portions of which have oblique edges in either or both directions, Figs. 4 and 10, so that upon the pressing of the proper key they will be slid in the proper direction to the right or left. The ends of the selector-bars are either downwardly tapered, as at 4, Fig. 4, or provided with raised portions 5, Fig. 10. The ends of the selector-bars project under a series of rods 6, Figs. 3 and 5, which in turn support the punching-pins 7. Normally the pins 7 and rods 6 are supported in a raised position, Fig. 1, just clear of the upper edges of the selector-bars 3. The pressing of the key and the shifting of the appropriate selector-bars to the right or left moves the high parts of the selector-bars under various rods to fix the same and the corresponding pins 7, the horizontal portions of the ends of the selector-bars serving as supporting-points for the rods 6. The punching-pins 7 may be, as shown, of different diameters and the supporting-rods 6 all of the same diameter. The selecting action takes place during the movement of the operating-arm 2 over the oblique portion of the edge of

the slit in the selector-bar. As soon as the operating-arm 2 in its further downward movement enters the vertical portions of the slits in the selector-bars it comes into contact with two opposite points of the long sides 10 and 11 of a frame 9 or the like swinging on an axis 66. These sides 10 and 11 run obliquely to the axis of the frame in opposite directions for a purpose to be hereinafter explained. The operating-arm may of course be made to operate any other suitable circuit-closing device instead of the side bars 10 and 11, and any other means may be used to limit the downward movement of the operating-arms. The operating-arm or, as stated, any suitable circuit-closing device operated thereby closes a circuit, Fig. 13, which extends from a source of current 67 through an electromagnet 12 and through a switch 53, which is used to break the circuit in a manner hereinafter described. From the terminal 55 of this switch the circuit runs to one insulated bar 11 of the frame 9 and from there over the proper operating-arm 2 to the other insulated bar, 10, and then back to the source of current, or the current runs from the terminal 55 of the switch 53 over a special switch which may be substituted for the bars 10 and 11.

The electromagnet 12 is operated by the passage of the current through it. In order, however, that the magnet shall be started in operation before the key is fully pressed down and in order that the operation of the magnet shall not cease as soon as the pressure is taken off the key, the bars 10 and 11 of the frame 9 are provided with sliding contact-pieces 64 and 65, movable in guides on the bars 10 and 11 and pressed upward by means of springs 68. These contact-pieces normally stand above the sides 10 and 11, and therefore come into contact with the operating-arm sooner than the latter. Since the contact-pieces 64 and 65 are in connection with the side bars 10 and 11, the circuit is therefore closed before the operating-arms engage the bars 10 and 11. As these contact-pieces are pressed downward they come eventually to positions level with the bars 10 and 11. On the release of the key the contact-pieces 64 and 65, under the influence of the springs 68, move upward for a certain length of time in contact with the operating-arm, and thus prolong the duration of the current passing through the electromagnet 12. The electromagnet 12, Fig. 3, attracts the armature 14 and therewith one end of a lever 15, attached to the armature and turning about an adjustable fulcrum 16. Thereupon the other arm of the lever is moved downward, carrying with it a frame 17, arranged to reciprocate in the casing 44, which incloses the punching-pins and connected parts. Springs 58 serve to return the frame 17 to its normal upper position when the current is cut off from the electromagnet. The frame 17 carries at its top two plates 18 and 19, between which the strip lies and which are provided with perforations corresponding to the pat-

tern shown in Fig. 6 or any other desired pattern. The plate 19, which is fast on the frame 17, and the plate 22, which is mounted on the top of the casing 44, serve as guides for the punching-pins 7, each of which is provided on its lower end with a small head 8. On the frame 17 there is also a perforated plate 20, which serves as a guide for the supporting-rods 6, and the lower ends of these supporting-rods are guided in a fixed perforated plate 21. Thus the punching-pins 7 and supporting-rods 6 are capable only of longitudinal and not of any lateral movement. The upper end of each supporting-rod 6 is under the lower end of a corresponding punching-pin 7. The lower ends of the rods 6 lie each in the plane of a selector-bar 3, the end of which, reciprocating in a groove between two plates, slides in such a direction as to bring its high part under the rod 6 upon the pressing of the appropriate key—that is to say, those selector-bars which are provided with a raised portion 5 move from left to right, while those which are provided with a downwardly-tapering end 4 move from right to left. When, following the operation of the electromagnet, the frame 17 is drawn downward, it carries with it the plates 18, 19, and 20, together with the strip lying between the plates 18 and 19, so that the supported punching-pins 7, Fig. 5, passing through the strip between the plates 18 and 19, enter the corresponding apertures in the plate 18, while the unsupported pins 7 oppose no resistance to the pressure of the strip and are pressed downward thereby. As soon as the current is broken the frame 17 and the plates 18, 19, and 20 are returned by the springs 58 to their original position, the heads 8 of the punching-pins 7 serving to withdraw from the strip those which have passed through the same. The portions of the strip punched out are collected in the receptacle 75, Fig. 2, from which they are withdrawn through the conduit 76. The perforated strip is automatically advanced after each punching operation a distance preferably depending upon the character or group of perforations formed. On the downward punching movement of the frame 17 the tappets 23, Figs. 3, 4 and 5, on the under side of the plate 20 bear down on a lever 24, pivoted at 25 to a projecting portion 26 of the immovable plate 22. The lever 24 is provided at its outer end 27 with a bolt 28, to which is attached one end of a spiral spring 29, the other end of said spring bearing on an arm 31 of a swinging frame 30. The axis 32 of the swinging frame 30 and arms 31 is carried on the fixed frame 33. At the upper end of the frame 30 is a tongue or pawl 34, pivoted on an axis 35 and normally pressed against a top plate 37 of the frame by means of a light spring 36. The strip 38 passes through the frame between the pawl 34 and the plate 37. In the rear—that is, the entrance—end of the plates 18 19 there is a frame similar to the frame 30, but not movable, through which the strip passes between a top

plate 39 and a pawl 40. The pawl 40 is so arranged that it permits the passage of the strip only in the direction of the arrows shown. By reason of this construction when in the operation of the machine the plate 20 is moved downward the lever 24, the springs 29, and the arm 31 are pressed downward, so that the frame 30 swings backward (toward the plates 18 19) and the pawl 34 slides backward over the strip, the strip being at the same time held immovable by means of the pawl 40. The pawl 34 only engages the strip operatively when the frame 30 is at rest or is moving forward. As soon as the punching operation is performed and the frame 17 and plate 20 move upward a spring 41, fastened on a frame 74, supported on the parts 33, draws the swinging frame 30 back to its original position, the latter carrying with it the strip by reason of the engagement of the pawl 34 therewith. The distance to which the strip advances is obviously proportional to the distance through which the frame 30 swings. The greater the movement of the frame 30 toward the plates 18 and 19 the greater the distance to which the strip is advanced on the return movement of the frame 30.

The means for regulating the distance through which the frame 30 swings (shown in plan in Fig. 12) comprises a selector-bar 77, operating on a principle similar to the other selector-bars, 3, and the edges of the slits of which are of varied inclinations, though preferably they are all inclined in the same direction. This selector-bar 77 is operated on the pressing down of each key and carries at its end a stop 45, pivoted at 73. The movable end of the stop rests on a small table or plate 43. According to the inclination of the edge which is struck by the key-arm the stop 45 is moved a greater or less distance from the casing 44. A spring arranged on the axis 73 turns the stop 45 and its selector-bar 77 back to their original positions after each operation. The stop 45 operates in the path of an arm 42, Figs. 1 and 2, the end of which is inclined preferably in steps and which in the backward movement of the frame 30 moves downward, so that its end, according to the position of the stop 45, moves a greater or less distance, and thus regulates accurately the length of the movement of the frame 30 and the distance which the strip advances. When the arm 42 strikes the stop 45, the swinging of the frame 30 is interrupted and this interruption tends to produce an opening and closing of the pawl 34, whereby the regularity and exactness of the movement of the strip are injuriously influenced. In order to neutralize this tendency, the pawl 34 is weighted—as, for example, by the attachment of a small weight 46 to its lower arm.

Instead of using a single swinging pawl 34 I may use the construction shown in Fig. 14, in which a wheel 78 is mounted on the swinging frame 30 and carries on its periphery a

series of pins or pawls and which by means of a ratchet-wheel 80 and pawl 79 on the frame is allowed to turn during the backward movement of the frame, so as not to affect the strip, but is held rigid during the forward movement of the frame, so as to carry the strip with it. The pawls on the periphery of the wheel 78 may engage the strip frictionally or the latter may be provided with a row of perforations at intervals corresponding to the distance of the pawls from each other and providing a more secure engagement of the strip and pawls. Above the wheel 78 I may provide a guide-passage 81, which on its under face is provided with a slit through which the pawls project and the upper part of which is carried on a hinge 82 in order to facilitate the introduction of the strip into the guide-passage.

When the frame 30 is drawn forward by the spring 41, Fig. 4, it is stopped by the adjustable screw-stop 47, which is mounted on the frame 74. At the same time the lower end of a clamp 48 on the frame 74 is caught between the screw-stop 47 and the frame 30 and simultaneously engages the strip, while the screw-stop 49, also on the lower part of the clamp 48, strikes and opens the pawl 34. Thus further forward movement of the strip is prevented. As a result of the contact of the two frames the swinging frame 30 has a tendency to swing backward, which makes it difficult to regulate the advance of the strip. In order to prevent this backward rebound, there is arranged at the upper part of the frame 74 an automatic spring-catch 50 which holds the frame 30 in its position.

As soon as the punching operation is completed the current is broken by means of the following mechanism: The free end of the lever 15, connected to the armature 14 of the electromagnet, extends into a loop 52 for operating a switch, Fig. 3. As soon as the armature 14 has approached the magnet so closely as to complete the punching operation the lever 15 engages the lower part of the loop 52 and draws down the rod 51 against the pressure of the retracting-spring 69, and thus lifts the switch-arm 53, Fig. 1, which is pivoted at 70, so that the terminal 56 thereof is removed from the terminals 54 55 of the line, and by the breaking of the circuit the armature 14 is freed from its magnet 12. At the same time the switch-arm 53 is caught in its upper position by a pawl 57 and a further closing of the circuit is rendered impossible until, following the return of the pressed key and the stop 45 to their positions of rest, the pawl 57 is withdrawn. Thereupon the terminal 56 of the switch-arm 53 connects together the two terminals 54 and 55; but the circuit is not completed between the operating-arm and the two sides 10 and 11 of the frame 9 or the similar switching device to be operated by the operating-arm, and the electromagnet remains without current.

The mechanism for printing a legible—that

is, a common—character on the strip is as follows: The lever 24 is extended in the rearward direction from the projecting portion 26 of the casing, and at the instant of punching of the strip this extension of the lever 24, by means of an intermediate system of levers, pushes upward a pad 59, upon which the strip 38 runs, and presses the same against the type carrier or wheel 60. The latter may be provided with ink in any known or suitable way. The spring 61, Fig. 8, after the removal of the pressure withdraws the strip and the pad 59 from the type-wheel. The type-wheel 60 carries on its periphery a series of characters corresponding to the several characters of the keyboard, and these are turned into operative position, according to the key which is pressed and before the upward movement of the pad 59. As previously explained, the sides 10 and 11 of the swinging frame 9 are parallel to each other in approximately vertical planes, but are inclined one downward to the right and the other downward to the left. (See Fig. 9.) According, therefore, as a key pressed downward lies near one or the other end of the frame 9 the latter swings on its axis 66, whereby it swings upward or downward an arm 62 on one of the ends of the frame. This arm on the pressing of the middle key lies horizontal, and the measure of its movement up or down depends upon the distance of the key which is pressed from the middle key. The arm 62 carries with it a rack-bar 63, which is attached thereto, and the latter, by the intermediation of pinion 71 on the shaft 72 of the type-wheel 60, turns the latter in one or the other direction and to a greater or less distance according to the key pressed in order to bring the corresponding character over the strip 38.

In the patents of Pollák and Virag, Nos. 675,495 and 675,496, for which the specific apparatus illustrated is designed, sending-strips are described the perforations of which are so arranged longitudinally and transversely that by means of such strips current impulses are sent by a suitable telegraphic sender of suitable direction, intensity, and duration and in such order that the receiver influenced by these impulses writes the single letters in a continuous line. The die shown in Fig. 6 serves for the making of sending-strips for the purpose of operating the receiver in such a way as to cause the latter to make ordinary Latin script letters. For this purpose, as shown in Fig. 6, the thirty-six die-apertures are arranged in two principal zones for impulses corresponding to horizontal or vertical movements, respectively, of the receiver, and these principal zones are again divided each into three subzones. The first principal zone includes the subzones 90, 91, and 92, whose apertures serve to produce impulses occasioning vertical movements of the receiver of varied intensity, direction, and duration. The apertures in the subzones 93, 94, and 95, on the other hand, serve for the production of

impulses of different intensities, directions, and durations for securing horizontal movements of the receiver. The relative arrangement of the apertures from left to right is such that four impulses occasioning vertical movements of the receiver (as is necessary, for example, in making the letter "W") may be provided in proper relative order and distance from each other. The relative arrangement of the apertures above and below each other is such that the impulses occasioning the horizontal movements can be brought into such relation to the impulses for the vertical movements as the form of the letter under consideration requires. Thus, for example, the horizontal impulse may begin by means of the perforation caused by the aperture 112. A little later, after about one-half the duration of such impulse, there is a second horizontal impulse through the perforation corresponding to the aperture 114, accompanied at the same time by a vertical impulse through the perforation corresponding to the aperture 111, while the horizontal impulse corresponding to the aperture 113 begins after half the length of the vertical impulse 111 and continues to the end thereof. The relative positions of these several apertures is shown by the lines *a b*. The size of the individual perforations is determined so as to regulate the duration of the corresponding impulse.

Though I have described with great particularity of detail a complete apparatus embodying the several improvements of my invention, yet I am not to be understood as limiting the invention to the particular apparatus shown and described. Various modifications thereof are possible to those skilled in the art without departure from the invention.

What I claim, therefore, is—

1. 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 for selecting various pins or groups of pins, a series of keys adapted by their movement to operate said selector-bars and means controlled by the movement of said keys and acting subsequently to the operation of said selector-bars for punching a strip with the pins selected.

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 for selecting various pins or groups of pins, a series of keys adapted by their movement to operate said selector-bars, mechanism for punching a strip with the pins selected, a motor for operating said mechanism and means controlled by the movement of said keys for setting said motor in operation subsequently to the operation of said selector-bars.

3. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of a series of punch-

ing-pins, a series of selector-bars for selecting various pins or groups of pins, a type-carrier bearing characters corresponding to the several groups of perforations, means for controlling the distance to which the strip is to be advanced, a series of keys adapted by their movement to operate said selector-bars and said distance-controlling means and to move said type-carrier to bring into operative position a character corresponding to the group of pins selected, mechanisms for punching a strip with the pins selected, for pressing the type-carrier and strip together to print the operative character and for advancing the strip, a motor for operating said mechanisms and means controlled by the movement of said keys for setting said motor in operation subsequently to the operation of said selector-bars.

4. 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, and rendering them operative in turn by the same mechanism, an electrically-operated mechanism common to all said pins for punching a strip with the pins selected and means for automatically completing the circuit of said mechanism to cause it to operate after the operation of said selecting means.

5. 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, electrically-operated mechanism for punching a strip with the pins selected and means controlled by said mechanism for breaking its own circuit when it has performed its work.

6. 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, punching mechanism for punching a strip with the pins selected, means operated by said punching mechanism for advancing the strip, and means operated by said punching mechanism for printing on the strip a character corresponding to the group of perforations punched.

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, operating-keys, and operating-arms connected thereto, said bars having oblique edges at points to be engaged by said arms and certain of said edges being oblique in each direction whereby the movement of said bars either into or out of operative position is accomplished by said keys.

8. In an apparatus for punching a strip with various perforations or groups of perforations the combination of a series of punching-pins and a series of selector-bars therefor,

some of said bars being provided with downwardly-tapering ends 4 and others with raised portions 5.

9. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of a series of punching-pins, a printing mechanism, a series of keys adapted by their movement to select various pins or groups of pins and to select a corresponding character to be printed, and means controlled by the movement of said keys and acting subsequently to the selection of said pins and character for punching the strip with the pins selected and for printing the corresponding character.
10. 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, punching mechanism for punching a strip with the pins selected and means operated by said punching mechanism for advancing the strip.
11. 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, punching mechanism for punching a strip with the pins selected, and means operated by said punching mechanism for advancing said strip comprising a swinging frame, means for engaging said frame with the strip in the forward movement of said frame, and means for disengaging the same from the strip in the rearward movement thereof.
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, punching mechanism for punching a strip with the pins selected, and means operated by said punching mechanism for advancing said strip comprising a swinging frame, means for swinging the same, and a pawl thereon arranged to slide over the strip and advance the same during the forward movement of the frame.
13. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of a swinging frame, means for swinging the same varying distances, and a pawl thereon arranged to slide over the strip in the rearward movement of said frame and to engage the strip and advance the same during the forward movement of the frame, and a fixed pawl constantly engaging the strip to at all times prevent rearward movement and permit forward movement thereof.
14. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of mechanism for advancing the strip by steps of varying lengths, a clamp 48, and means brought into operation by said strip-advancing mechanism at the end of each step forward for bringing

said clamp into engagement with the strip to prevent excessive movement thereof.

15. In an apparatus for punching a strip with various perforations or groups of perforations the combination of a swinging frame for advancing the strip and an automatic catch for preventing a rebound of said frame at the end of a forward movement.
16. In an apparatus for punching a strip with various perforations or groups of perforations the combination of a swinging frame, means for swinging the same, and a pawl thereon arranged to slide over the strip in the rearward movement of said frame and to engage the strip and advance the same, during the forward movement of the frame, said pawl being weighted so as to steady it and make its operation more accurate.
17. In an apparatus for punching a strip with various perforations or groups of perforations, the combination of means for advancing the strip, operating-keys corresponding to the several groups, and means controlled by the operating-keys for controlling the distance to which said strip is advanced.
18. 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 having oblique edges of different inclinations at points to be engaged by said arms whereby said bar is moved different distances by different keys.
19. In an apparatus for punching a strip with various perforations or groups of perforations the combination of mechanism for advancing the strip by steps of varying lengths, an oscillating arm connected to said mechanism, a stop in the path of said arm to limit the movement of said arm and the distance to which said strip advances, keys corresponding to the several groups of perforations, and means controlled by said keys for regulating the position of said stop, so as to determine the distance which the strip advances in accordance with the perforations made.
20. In an apparatus for punching a strip with various perforation or groups of perforations the combination of operating-arms for selecting the desired group of perforations, mechanism for advancing the strip a step after each perforation, an oscillating arm connected to said mechanism and provided with a tapering portion, a stop in the path of said tapering portion to limit the movement of said oscillating arm and the distance to which said strip advances, and a bar engaging said stop and provided with oblique edges in the paths of said operating-arms and of different inclinations so that said stop is moved to different points by different operating-arms.
21. In an apparatus for punching a strip with various perforations or groups of perforations the combination of operating-keys,

and arms connected thereto, electrically-operated mechanism, a terminal in the circuit of said mechanism and in position to be engaged by said arms and springs pressing said terminal toward said arms to hold the same in contact therewith during a prolonged period.

22. A die for the punching of sending-strips for writing-telegraphs transmitting impulses to produce vertical and horizontal lines, having a group of apertures which is divided into two principal zones for current impulses producing vertical and horizontal lines respectively, and having each principal zone divided into three subzones for different current

strengths and directions, the apertures in the two principal zones being so distributed that the impulses occasioned by the perforations corresponding to the apertures in one principal zone can begin before, simultaneously with, or after the impulse occasioned by the perforations corresponding to the die-apertures of the other principal zone.

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

ANTON POLLÁK.

Witnesses:

BERNARD G. ELLIOT,
LOUIS VÁNDORY.