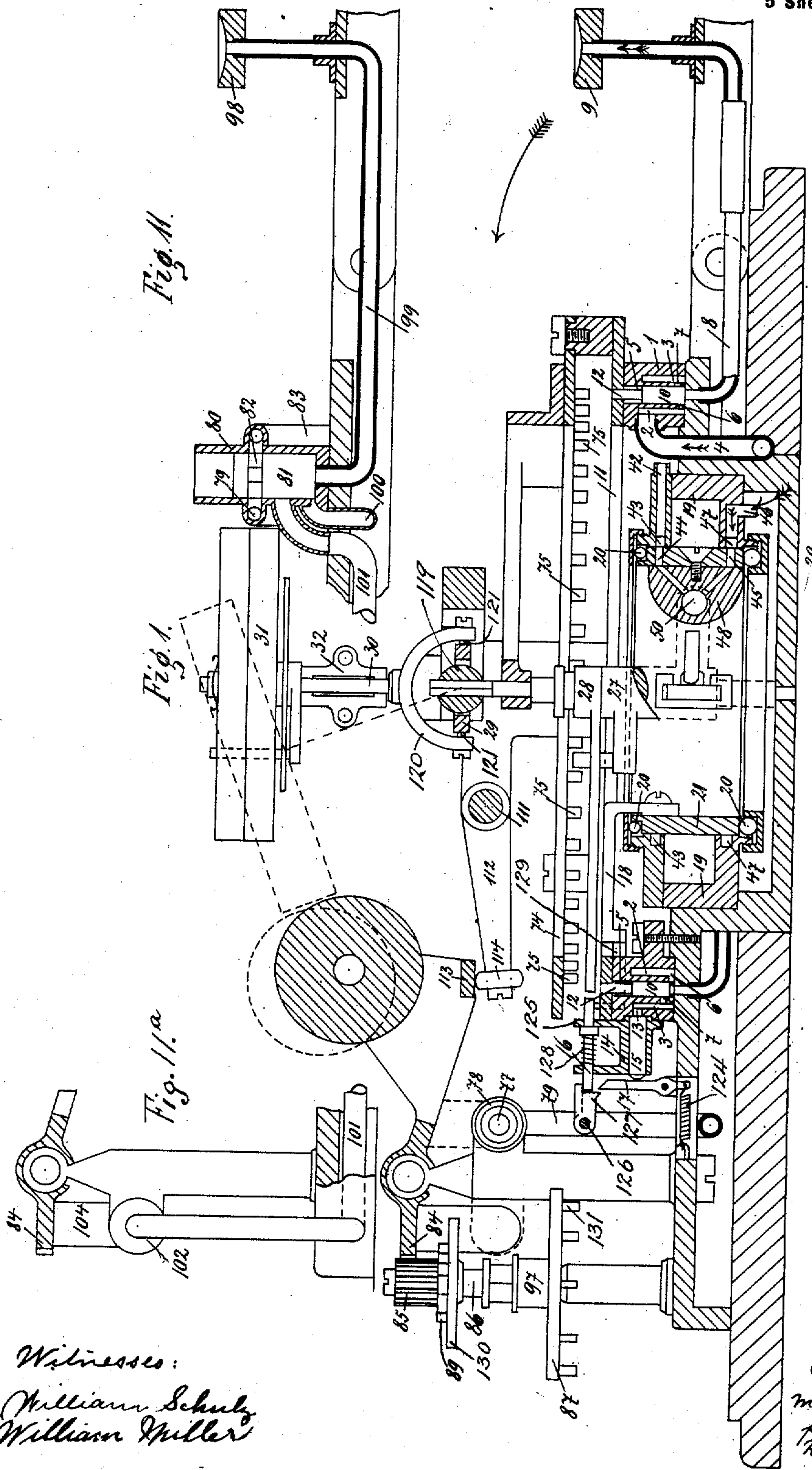


M. SOBLIK.
PNEUMATIC TYPE WRITER.
(Application filed July 11, 1899.)

(No Model.)

5 Sheets—Sheet 1.



Witnesses:
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Inventor:
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per
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No. 659,703.

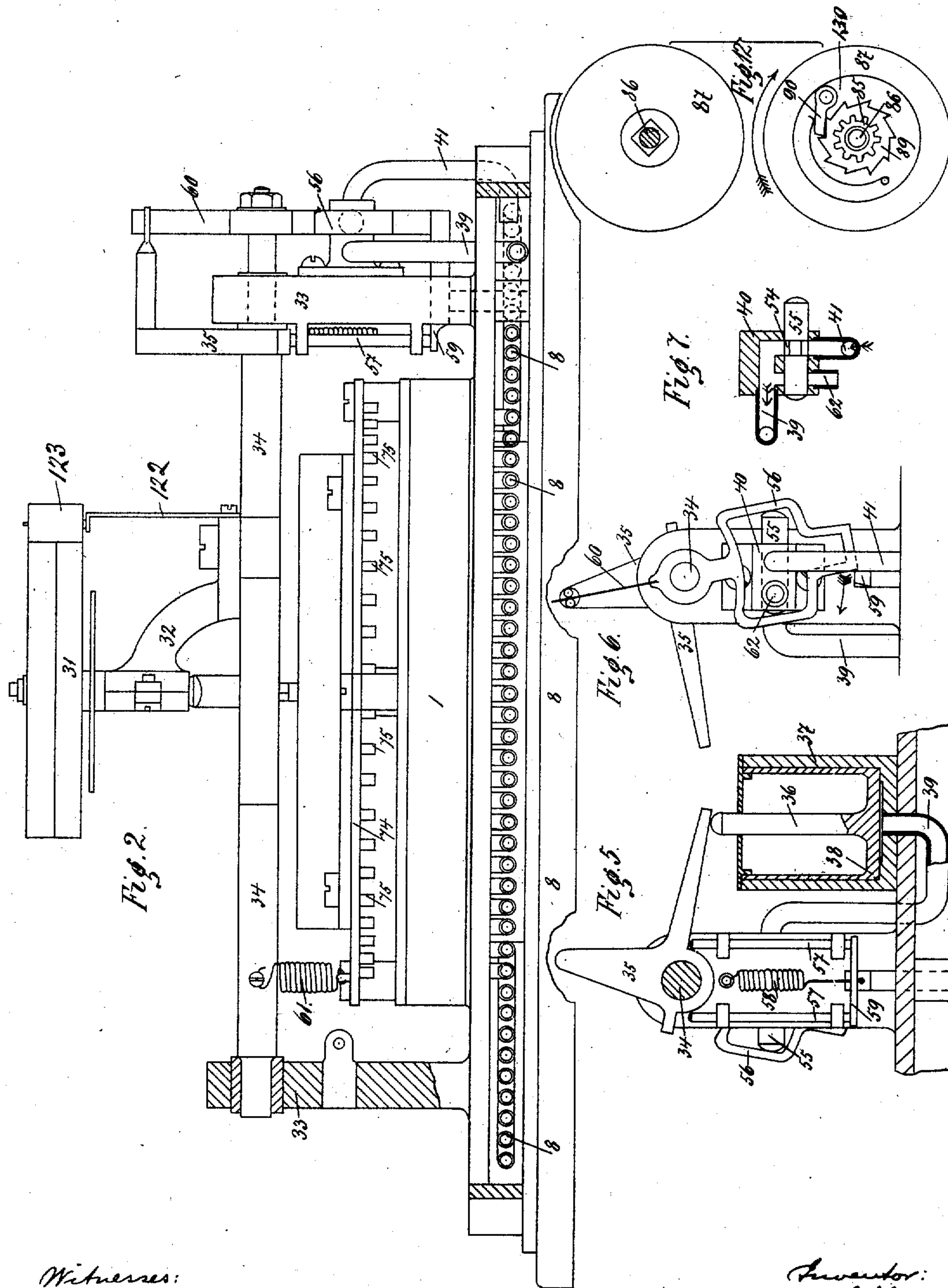
Patented Oct. 16, 1900.

M. SOBLIK.
PNEUMATIC TYPE WRITER.

(Application filed July 11, 1889.)

(No Model.)

5 Sheets—Sheet 2.



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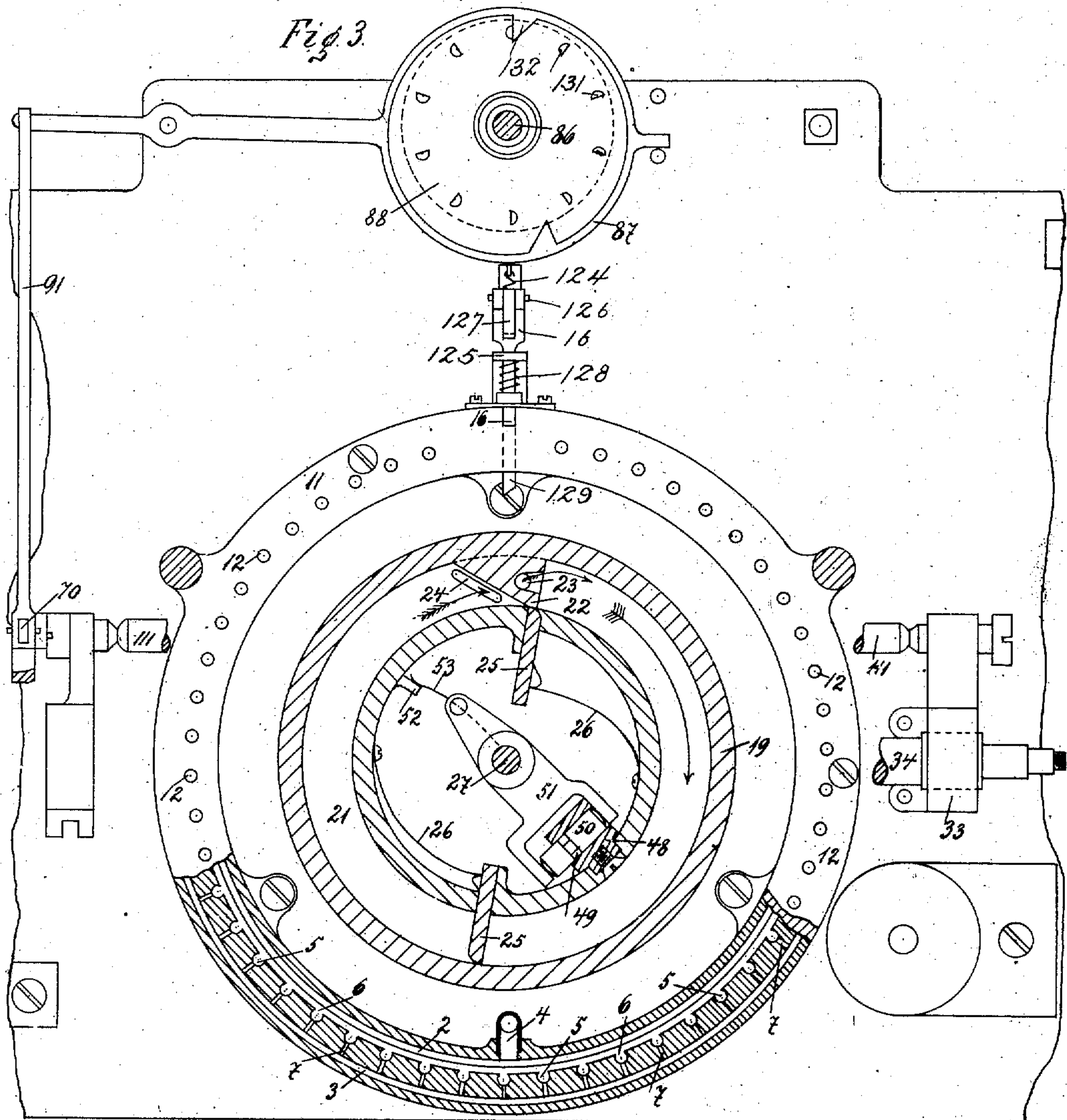
Patented Oct. 16, 1900.

M. SOBLIK.
PNEUMATIC TYPE WRITER.

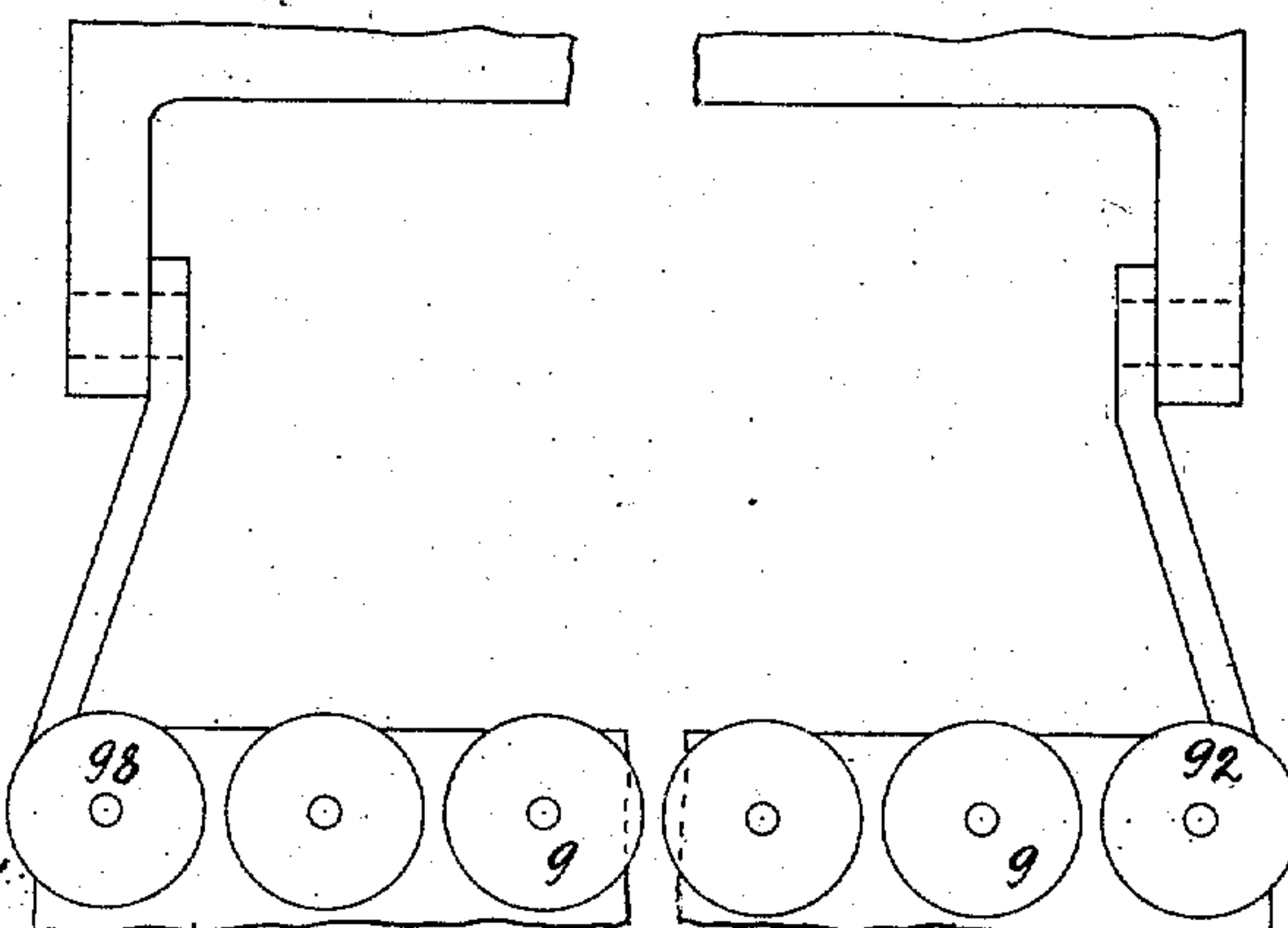
(Application filed July 11, 1899.)

(No Model.)

5 Sheets—Sheet 3.



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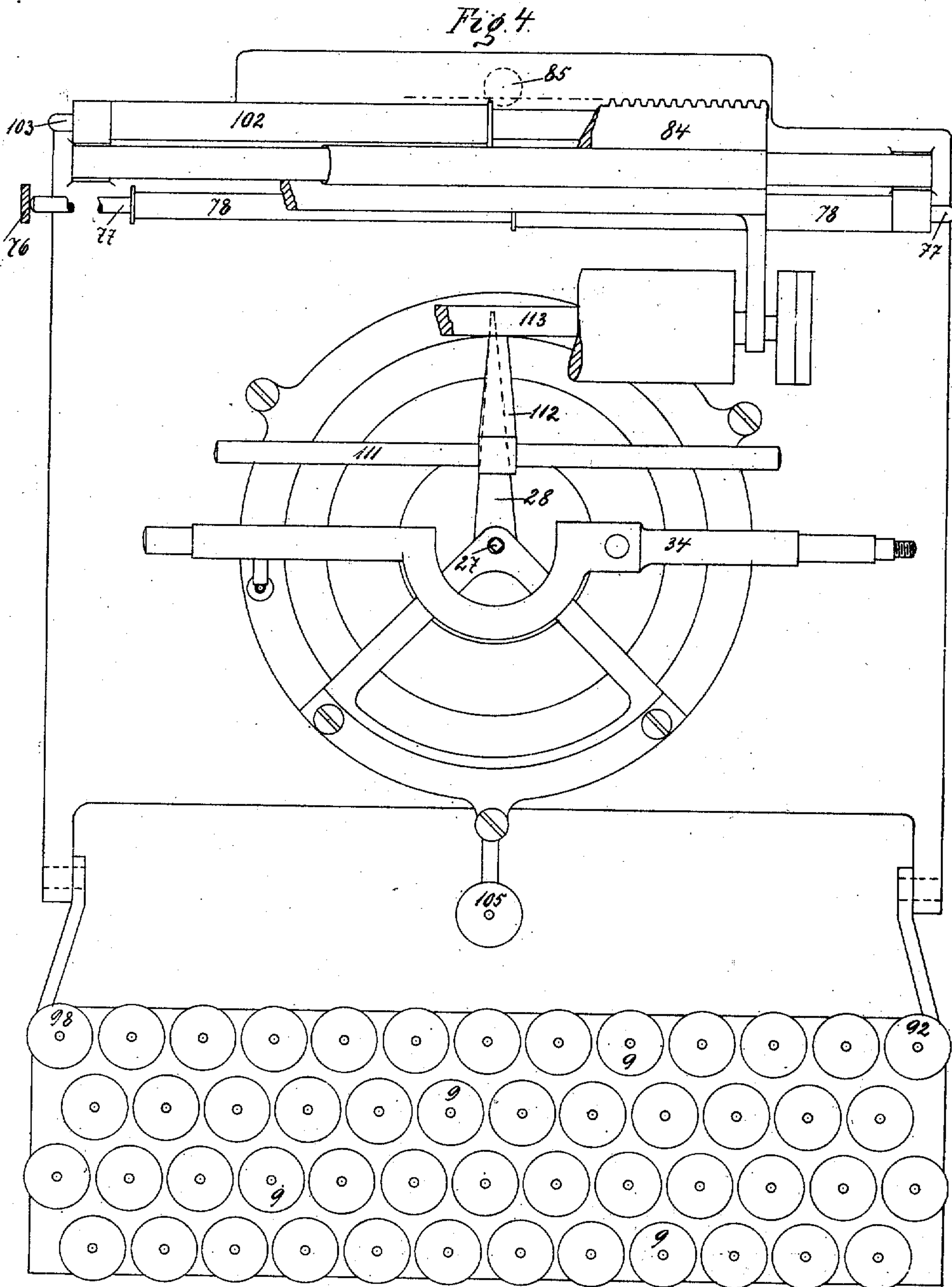
Patented Oct. 16, 1900.

M. SOBLIK.
PNEUMATIC TYPE WRITER.

(Application filed July 11, 1899.)

(No Model.)

5 Sheets—Sheet 4.



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M. SOBLIK.
PNEUMATIC TYPE WRITER.

(Application filed July 11, 1899.)

(No Model.)

5 Sheets—Sheet 5.

Fig. 8.

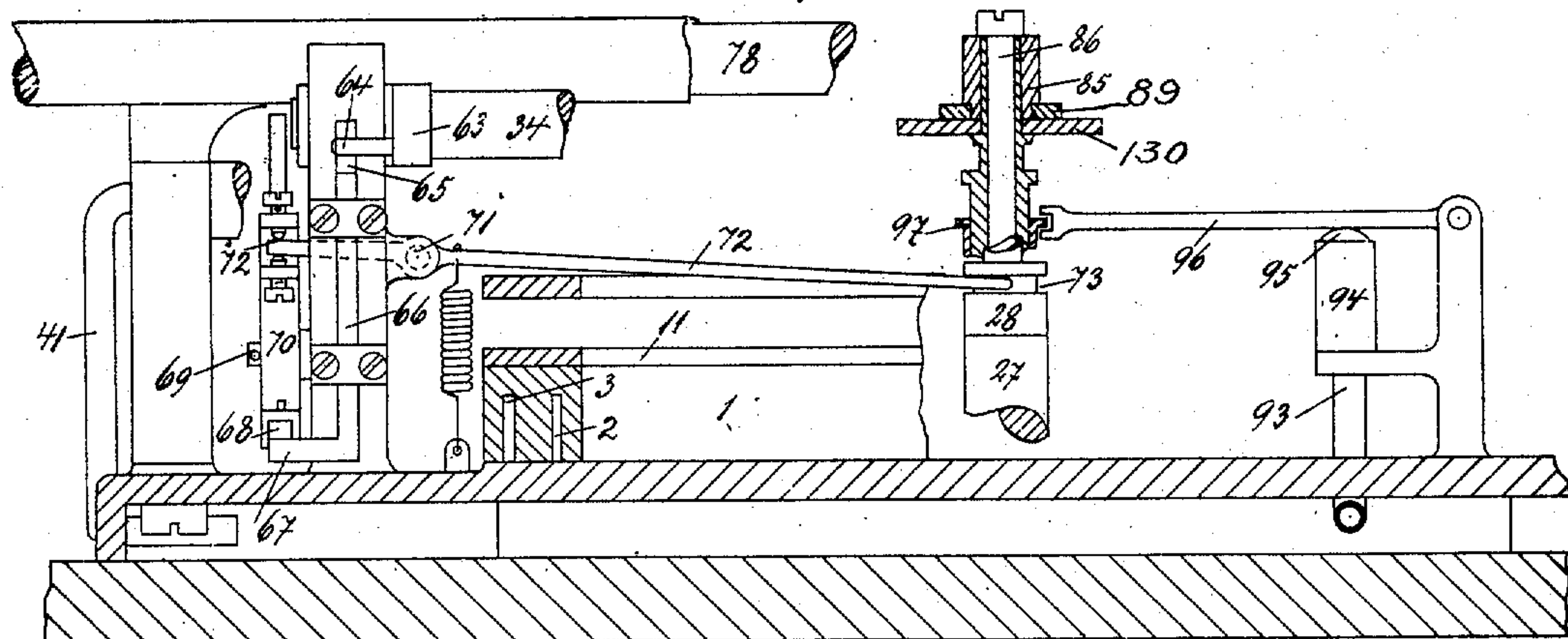


Fig. 10.

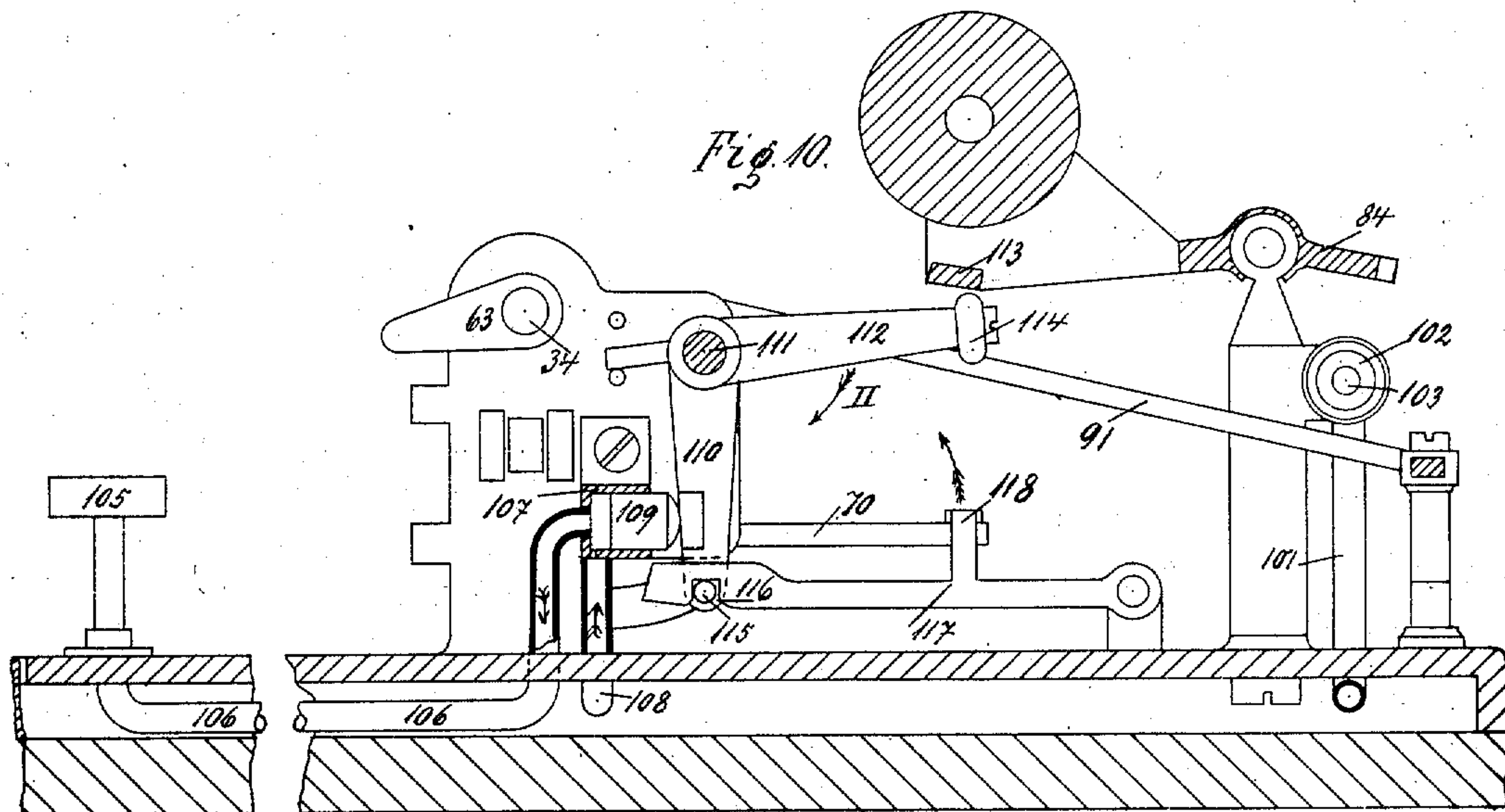
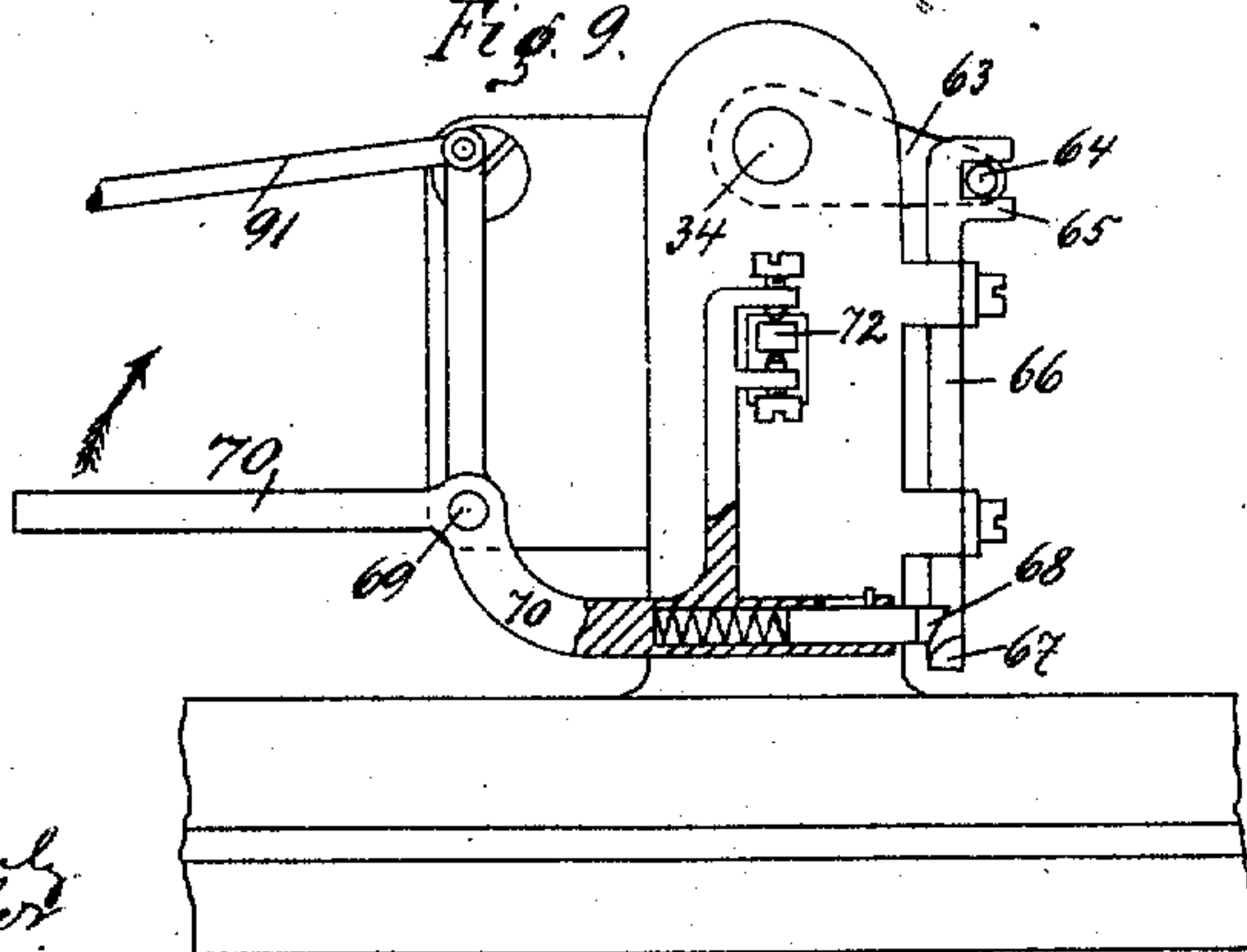


Fig. 9.



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UNITED STATES PATENT OFFICE.

MAXIMILIAN SOBLIK, OF MERXEM, BELGIUM.

PNEUMATIC TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 659,703, dated October 16, 1900.

Application filed July 11, 1899. Serial No. 723,435. (No model.)

To all whom it may concern:

Be it known that I, MAXIMILIAN SOBLIK, a subject of the King of Prussia, Emperor of Germany, residing at Merxem, near Antwerp, Belgium, have invented certain new and useful Improvements in Pneumatic Type-Writers, of which the following is a specification.

This invention relates to a pneumatic type-writer provided with fixed perforated keys that are operatively connected with an air-compressor. If the openings in the keys are closed by the simple touch of a finger, the air within the mechanism of the type-writer will be sufficiently compressed to set the machine in operation. In this way the mechanical labor heretofore necessary for moving the keys is reduced to a minimum, and all objectionable noise is entirely avoided. The machine cannot become inoperative by leakage because the air-ducts are normally open, by which arrangement also the accidental working of any air-chamber by its neighbor is avoided. So, also, the mental strain is considerably reduced, as the operator need only ascertain whether the letters follow in alphabetical order, when he will print several letters during one rotation of the type-wheel.

The machine is represented by the accompanying drawings.

Figure 1 shows it partly in lateral view and partly in section; Fig. 2, in front view; Fig. 3, partly in horizontal section and partly in plan; Fig. 4, in plan, partly or entirely without some upper parts; Fig. 5, showing the device for striking the type-wheel on the paper-cylinder in section and partly in side elevation; Fig. 6, its reversing-gear in side elevation; Fig. 7, a horizontal section across the reversing-cylinder; Fig. 8, a section across the machine to show the device for lifting the stop-lever over the single stop-pins and the device for releasing the escapement of the paper-carriage. Fig. 9 is an elevation, partly in section, of the lifting device, taken at right angles to Fig. 8. Fig. 10 shows the device for lifting the paper-carriage in order to put in the paper-cylinder for the upper type-series of the type-wheel; Fig. 11, the carriage-moving device in section; Fig. 11^a, a sectional detail of the carriage-support, and Fig. 12 the clutch of the carriage-escapement.

The machine consists of an annular case 1, which is provided with two annular grooves 2 and 3, the former of which is connected, through pipe 4, with an air-compressor, (bellows, air-pump, blower, &c.) Between the two annular grooves there are holes 5, provided for as many as half the number of the characters to be printed and connected nethermost by one bore 6 each with the groove 2 and midway by another bore 7 each with the groove 3. To each of these holes a pipe 8, with a key 9 at its end, is joined, and, on the other hand, there are small pistons arranged in the holes, bearing at the upper ends small pins 12, that enter into a plate 11 and allowing in the ordinary course of action the air to escape from the groove 2 through the keys to a moderate extent. For this purpose the lower ends of the pistons are slightly bulged, so that they do not rest with their full base upon the bottom of the cylinder, but permit the air to pass them. If the air-pressure in groove 2 increases for some reason beyond the normal, one or more of the pistons will be slightly lifted, so that the air can escape through the keys without actuating the machine.

With the annular groove 3 communicates by bore 13 a cylinder 14, the piston 15 of which acts upon a pivoted two-armed lever 17, that is drawn against the piston by spiral spring 124. The lever 17 serves to influence a pawl 16, which is longitudinally movable in support 125 and which is provided with a nose 127, rotatable on pivot 126. This nose traverses the path of lever 17 and is taken along by the same when the lever swings toward the left, while when the lever swings toward the right it clears the same by moving upward. The pawl 16 is constantly drawn toward the right by a spiral spring 128 and stops when at rest by an extension 129 an arm 18, which is connected to the rotary part of the type-wheel-turning device. This device ("turbine," as it is called hereinafter) consists of a cylinder-case 19, in which a slightly-conical rotary body 21, that runs between balls 20 for the sake of easiness, is so arranged as to leave between the rotary and fixed part an annular working space, which is divided by a fixed partition 22 into two parts, one of which communicates by the opening 23 in the

bottom of the turbine-casing with the air-compressor and the other by the opening 24, also in the bottom of the turbine-casing, with the outer air. In slots of the rotary part 21, with which, as already mentioned, the brace 18 is connected, there are arranged two sliders 25 which are always pressed outward by springs 26 and separate the working space in any position of the rotary part into a working space and an outlet. The axle 27 of the rotary part 21 carries midway between its ends a lever-arm 28, that can be moved up and down, but not turned, and is connected at its upper end with the axle 30 of the type-wheel 31 by a universal joint. This joint consists of a ball 119, fast on axle 27 and containing a pair of diametrically-placed horizontal sockets engaged by pins that project inwardly from a ring 29. This ring in turn is engaged by the pins 121 of a fork 120, which is carried by a bracket 32, mounted on shaft 34, which is journaled in bearings 33. To bracket 32 is secured a spring 122, the upper end of which carries a revoluble inking-roller 123, that is pressed gently against the type-wheel. The shaft 34 is turned by means of arm 35, that rests on the rod 36 of the piston 38, arranged in the cylinder 37, as soon as the piston is lifted up by a supply of compressed air. To make this supply take place in the right moment—i. e., not before the type-wheel has made its turn, as desired—the cylinder 37 is connected by a pipe 39 with the reversing-cylinder 40, which is fed by the pipe 41, that communicates through the pipe 42 with the circular channel 43, provided for in the turbine-case 19. The channel 43 can be connected by the bores 44 and 45 in the turbine wheel 21, and a suitable reversing mechanism with the annular channel 47 of the turbine-case, which channel is joined by the pipe 46 with the air-compressor. The aforesaid reversing mechanism consists of a cylinder 48, fastened in the turbine wheel and which has an inlet and an outlet in the same vertical plane and a piston-slider 50, with a peripheral groove 49, and is held in position by a fork 51. This fork is arranged loosely on axle 27 of the turbine and is always kept by a spring 53, that strikes against a driver 52, attached to the turbine wheel in such a position as will make the slider prevent the air getting through. The piston-slider 55, arranged in the reversing-cylinder 40, has a peripheral groove 54 and stands always so that the air entering through the pipe 41 can get through that cylinder to the pipe 39. This position is secured by a frame 56, loosely arranged on the shaft 34 and which embraces the ends of the slider and is reversed by the arm 35. For this purpose, on the one hand, small rods 57 are arranged on both sides of the shaft 34 to push alternately a lever 59, which acts as a pawl on the frame and is held by a spring 58, and, on the other hand, the frame is provided with a spring 60, fastened onto a third brace of the arm 35

and which makes the frame turn according to the movements of the arm. For turning back the shaft 34, and thereby also the type-wheel, a spring 61 serves, which operates as soon as the slider 55 is reversed and stands so that the air previously entered can escape through the outlet 62 of the cylinder 40. After a letter has been printed, to enable the machine to go on the stop-lever 28 must be released again without the stop-pin 12, that prevents its working, need change its position, for which purpose the following device has been made: On the shaft 34 there is fastened a crank 63, that enters, with its pin 64, into the fork 65 of the bolt 66, which has at its lower end a catch 67, opposed to a spring-catch 68, which is arranged in a brace 70, pivoted on the pin 69. Between the fork end of the brace there rests a lever oscillating around the pivot 71 and which catches with its front fork end a groove 73 of the nave of the stop-lever 28. To insure that the lever 28 will fall down immediately on passing the stop-pin 12, which is necessary in order to prevent it from passing over subsequent stop-pins, a plate 74 has been arranged above the plate 11 with downwardly-projecting pins 75, which are arranged with their axes in the interval between every two stop-pins, so as to allow the lifted lever to turn only by a fractional part of the distance of two consecutive stop-pins.

Since I have specified the device for operating the type-wheel and its moving and stopping mechanism, I shall, with the following, describe particulars of the carriage movement and the shifting device for printing small letters and capitals or figures.

As for the movement of the carriage, there are three different devices provided for the three different motions of leaping forward by one-letter space each, going farther on, and going back at the end of the line. The letter-spacing movement is done automatically, as with all the other type-writers, every time a letter has been printed, for which purpose the carriage is provided with an adjoined piece 76, behind which the piston 77 of a cylinder 78 works. The space of the cylinder which is behind the piston is connected with a reversing-cylinder 80 by a pipe 79. The piston-slider 81 of the reversing-cylinder stands so, in the ordinary course of action, that its peripheral groove 82 allows the air to get over from the pipe 83, which is connected with the compressor, into the pipe 79. The carriage would thus be continually pushed forward from the right to the left if it were not prevented by the toothed wheel 85, which engages in its rack 84. This toothed wheel is firmly connected to a ratchet-wheel 89 and is mounted, together with the same, loosely upon a shaft 86. This shaft carries a fast disk 130, provided with a pawl 90, that engages the teeth of ratchet-wheel 89. The shaft is also provided with an escapement-wheel 88, having stop-pins 131, and which is normally arrested by an anchor 87, having

two teeth 132. In consequence of this arrangement it is impossible to turn the toothed wheel by the rack that is pushed forward from the right to the left in the direction of the arrow, Fig. 12, unless the escapement-wheel be disengaged, while when the rack goes from the left to the right the toothed wheel can always turn independently of the escapement-wheel. The anchor 87 now is joined by a connecting-rod 91 with the brace 70, by which, when the type-wheel goes back, the escapement is released, so that the paper-carriage can advance by one tooth. To move the carriage farther forward without striking the space-key, a special key 92 is devised, the joint-pipe 93 of which ends in the bottom of a cylinder 94, that communicates with the air-compressor by a second pipe. The piston 95 of that cylinder acts upon a brace 96, which catches with its front fork end the rim of the socket 97, connected with the escapement-wheel 88. If the duct of key 92 is closed, the air in pipe 93 is compressed and lifts the piston 95. This piston in turn lifts the brace 96 and socket 97, together with escapement-wheel 88, so that its pins 131 are raised beyond the path of the teeth 132 of the ratchet-anchor 87. At the same moment the paper-carriage, which is now liberated, will be advanced by the compressed air of pipe 79 until by uncovering the key 92 the previously-raised parts are returned to their position of rest and the carriage will be again arrested. For the retrogradation of the carriage at the end of a line there is designed the key 98, the joint-pipe 99 of which ends in the bottom of the aforesaid reversing-cylinder 80. This cylinder is connected with both the air-compressor by the pipe 100 and by the pipe 101 with the cylinder 102, the piston 103 of which strikes against the adjoined piece 104 of the carriage at the right and pushes the carriage forward on getting out of the cylinder. The platen-shifting device, finally, consists of a key 105, which communicates by pipe 106 with the cylinder 107, that is joined to the compressor by the pipe 108. The piston 109 of that cylinder acts upon a lever 110, which is fixed on a shaft 111, on which a brace 112 is mounted, the utmost end of which is provided with a pulley 114, that acts below the list 113 of the paper-carriage. According to the position of the piston 109 the paper-cylinder is in the lower or upper position, so that when the type-wheel strikes on it a letter of the lower or upper series will be printed. The lower end of the lever 110 is provided with a pin 115, which on the piston going forward catches in a notch 116 of the lever 117 and prevents both the lever 110 from going back and the paper-carriage from falling down, even if the outlet of the shift-key has been opened. The descent of the paper-carriage can only take place after a letter has been printed, because when the type-wheel turns back the above-mentioned brace or

arm 70 will swing in the direction indicated by the arrows in Figs. 9 and 10. As the arm 70 is arranged below the nose 118 of the lever 117, it will thus lift the latter sufficiently to cause the pin 115 to become disengaged from notch 116, and thus the levers 110 and 112 can swing back in the direction of arrow 11, Fig. 10.

The machine works as follows: When it is operated, a constant supply of compressed air from the compressor enters into the pipe 4, and therefrom into the annular groove 2 and the fine bores 6, to escape below the pistons 10 by small quantities through the pipes 8 and the keys 9. If a letter is to be printed, a finger is put on the respective key which will close its outlet. Immediately then the air contained in pipe 8 is compressed so far that the piston 10, with its stop-pin 12, is lifted, and the latter stands out of the plate. When it has gone out completely, its piston will open the fine bore 7. The compressed air enters through groove 3 and the bore 13 into the cylinder 14 and presses out the piston 15, which pushes the lever 17 and causes the same to tilt against the action of spring 124. The lever will thus bear against the nose 127 of pawl 16 and will draw the same back against action of spring 128 to liberate arm 18 and permit the turbine to go into action. This turbine receives, through the hole 13, also a continuous supply of compressed air, which now will make the turbine wheel 21 turn until the stop-lever 28 strikes against the stop-pin 12, that stands out. In the same moment, however, the fork 51, owing to the elasticity of the spring 53 and the *vis viva* of the turbine, will move the slider 50 on until its peripheral groove 49 allows the air to get on from pipe 46, that is fed by the compressor, to the pipe 42, and, further, through the pipe 41 into the cylinder 40, from which it will pass below and push out the piston 38, so as to give the arm 35 and the shaft 34 a turn, by which the type-wheel 31, which is fastened onto the shaft, is caused to strike against the paper-cylinder. After this has been done the arm 35 will press down the bolt 57 at the left, and this, again, the lever 59, so as to release the frame 56, which is then turned by the spring 60 in the direction of the arrow, Fig. 6, thus reversing the slider 55, which is kept in this position by the lever 59, that strikes against the right lower edge, until the compressed air has escaped through the outlet-pipe 62 and the type-wheel has been drawn by the spring 61 into its original position. By this retrogradation of the type-wheel the arm 35 will push the bolt 57 at the right and again release the lever 59, so that the spring 60 can repel the slider into the opened position. The shaft 34 on turning to make the type-wheel strike will lift by the crank 63 the bolt 66, which is caught by its catch behind the spring-catch 68. In the backward motion, however, catch 67 will push the catch

68 and make the brace 70 oscillate so as also to oscillate the lever 72, which is caught by the brace, and to lift the stop-lever 28 over stop-pin 12, that stops it. The turbine will
 5 now turn the type-wheel farther on until either the brace 18 is caught by the pawl 16, or if several keys are struck at the same time the stop-lever 28 is caught by the next stop-pin 12, which is pressed out, whereafter the
 10 aforementioned work will commence again.

What I claim is—

1. In a type-writer, a perforated key, an air-compressor connected therewith, a type-wheel, and means for rotating the type-wheel
 15 by the compressed air when the key is closed, substantially as specified.

2. In a type-writer, a perforated key, an air-compressor connected therewith, a type-wheel, and means for rotating and inclining
 20 the type-wheel by the compressed air when the key is closed, substantially as specified.

3. In a type-writer, a perforated fixed key, an air-duct communicating therewith, a compressed-air pipe, and a piston between said
 25 pipe and the air-duct, all being so constructed that the piston is raised by the air-pressure when the perforated key is closed, substantially as specified.

4. In a type-writer, a perforated fixed key,
 30 an air-duct communicating therewith, a compressed-air pipe, an intervening cylinder and piston, a second cylinder and piston, a compressed-air passage between the cylinders, a turbine, and releasing mechanism for the

turbine which is actuated by the second piston, substantially as specified. 35

5. In a type-writer, a perforated key, and a compressed-air-inlet pipe combined with a turbine, actuated by the compressed air, a surrounding cylindrical case, a partition and
 40 air-ports in the working space between the turbine and the case, and a slide that traverses said space, substantially as specified.

6. In a type-writer, a perforated key, a compressed-air-inlet pipe, a turbine actuated by
 45 the compressed air, a surrounding case having compressed-air ports, a pivoted type-wheel, a cylinder and piston for oscillating the type-wheel, a fork pivoted on the turbine-shaft, and a piston actuated by the fork and
 50 adapted to admit compressed air to the cylinder, substantially as specified.

7. In a type-writer, a perforated key, a compressed-air-inlet pipe, a paper-carriage, a pair of compressed-air cylinders 78, 102, and in-
 55 closed pistons 77, 103, the cylinder 78, being in constant communication with the compressed-air inlet for advancing the carriage, and the cylinder 102, being adapted to be connected to said inlet for returning the car-
 60 riage, substantially as specified.

Signed at Merxem, near Antwerp, Belgium,
 this 23d day of June, A. D. 1899.

MAXIMILIAN SOBLIK.

Witnesses:

AUG. BUPMANN,
 CARL DRALLE.