No. 866,981. PATENTED SEPT. 24, 1907.

J. H. TEMPLIN.

PNEUMATIC TOOL.

APPLICATION FILED SEPT. 24, 1904.

5 SHEETS—SHEET 1.

fig. 3.

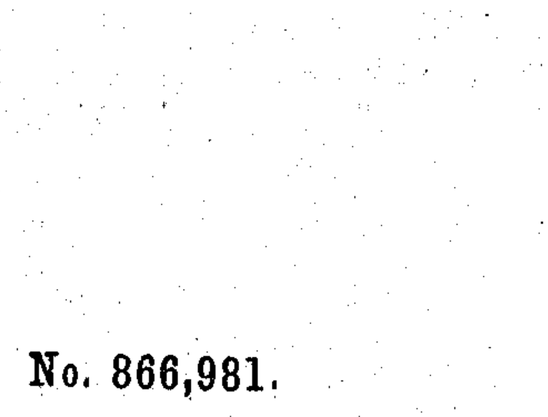


fig. 1.

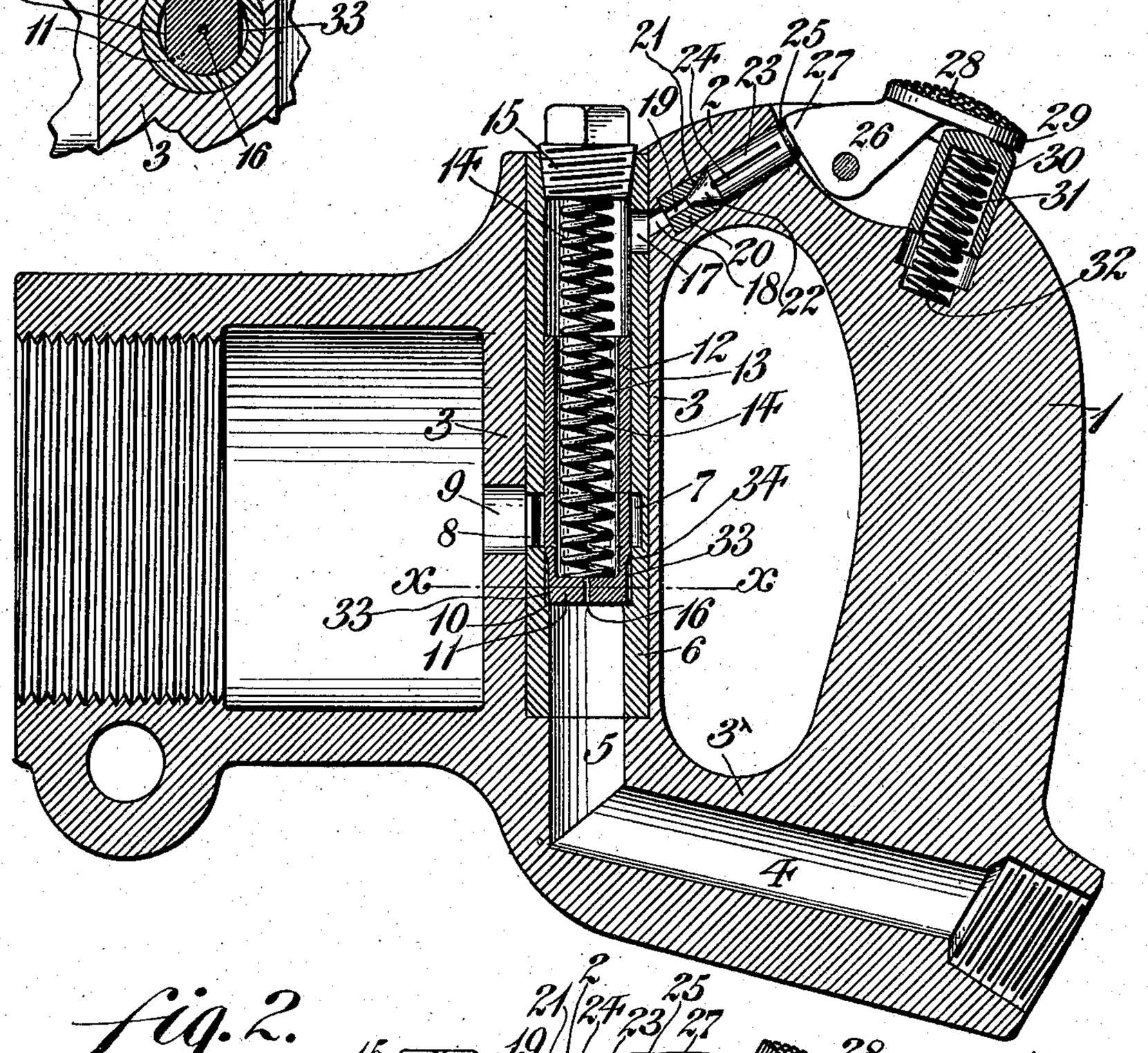
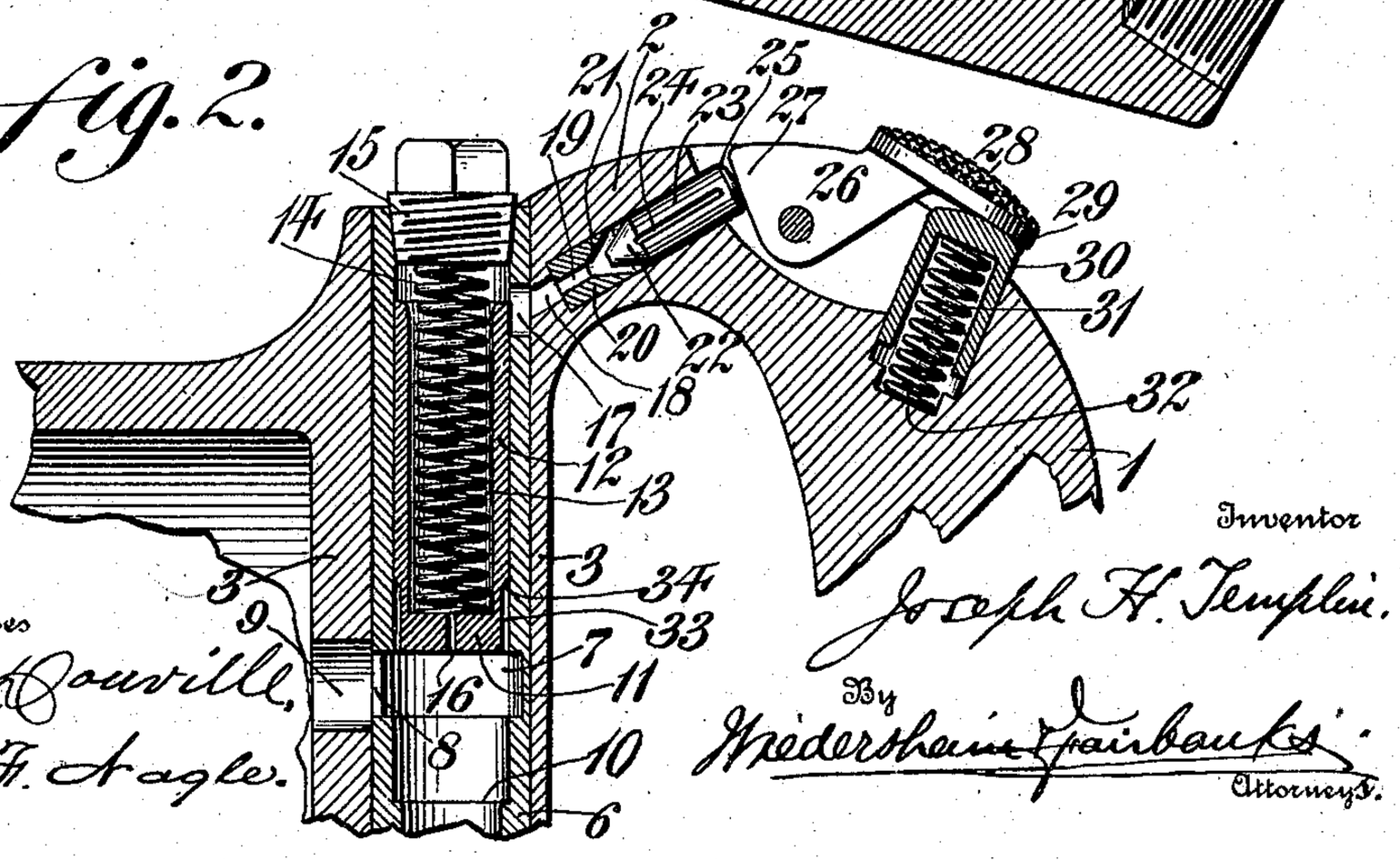


fig. 2.



Witnesses

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5 SHEETS—SHEET 2.

Fig. 4.

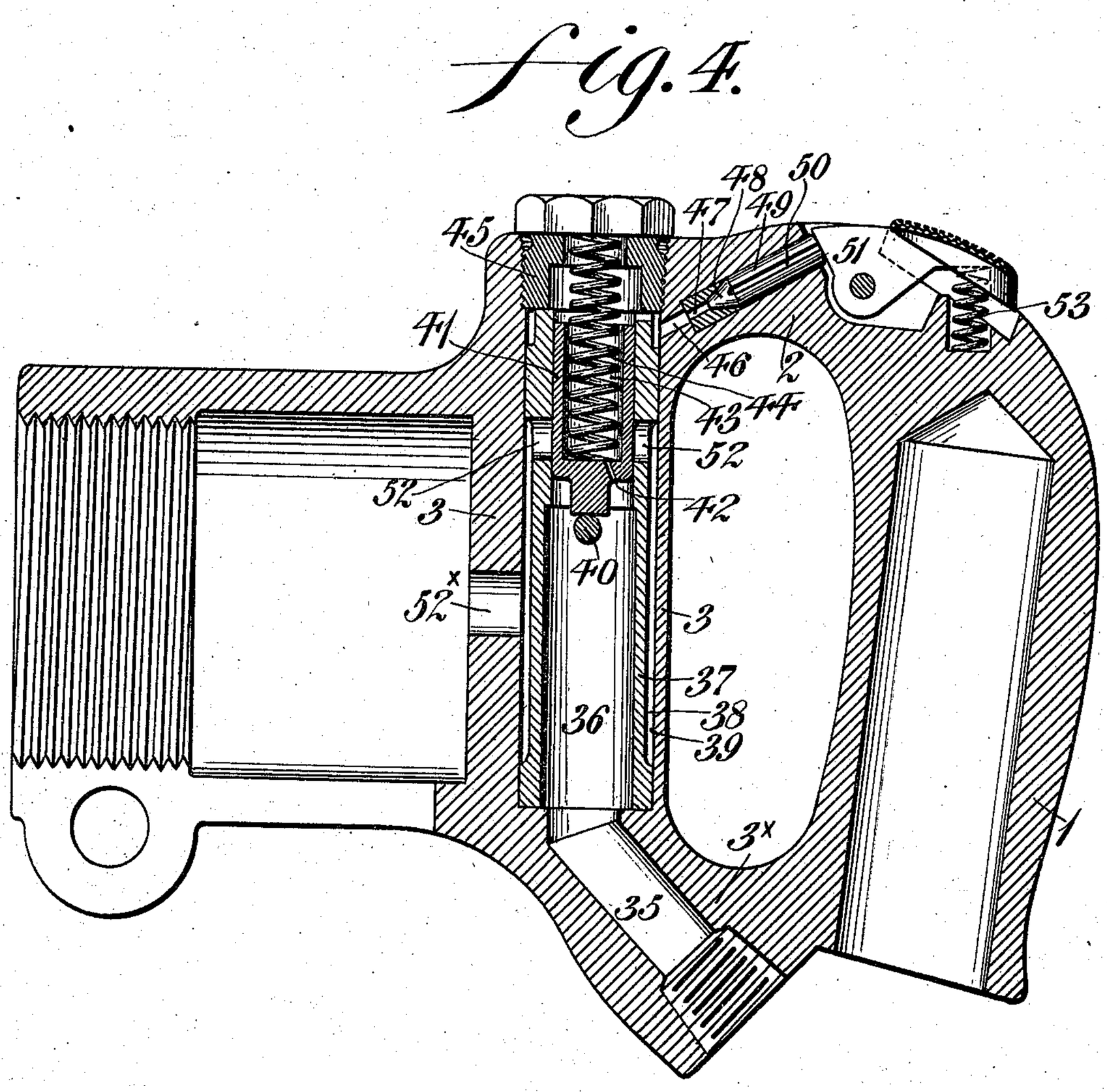
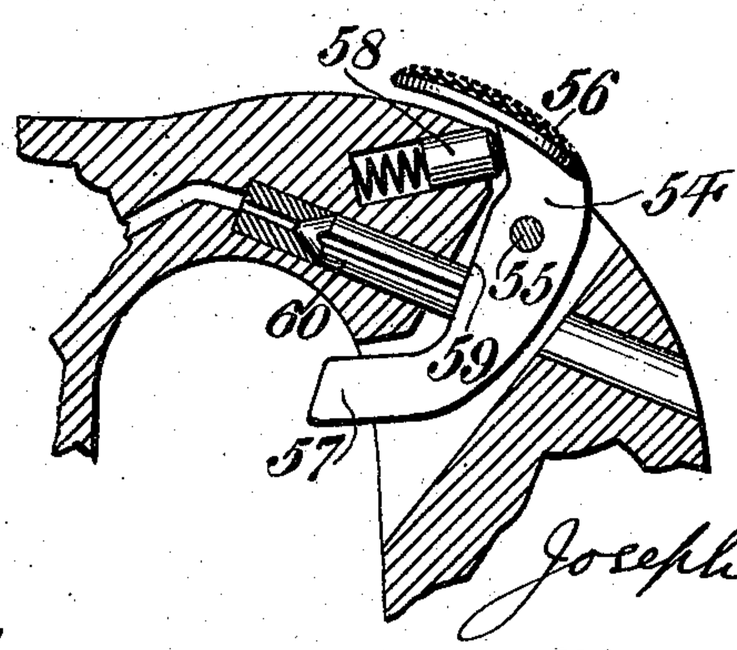


Fig. 5.



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5 SHEETS—SHEET 3.

fig. 6.

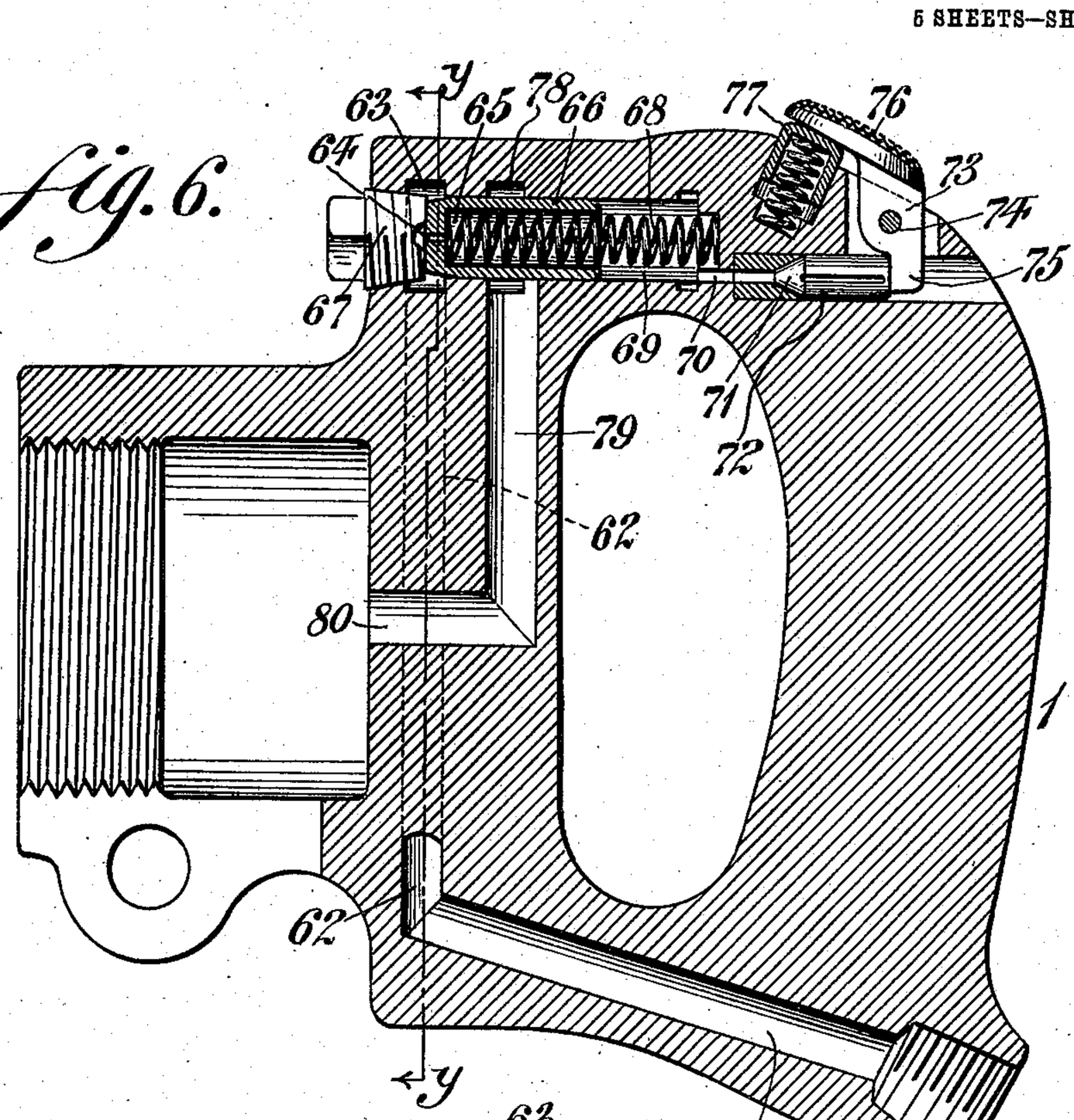
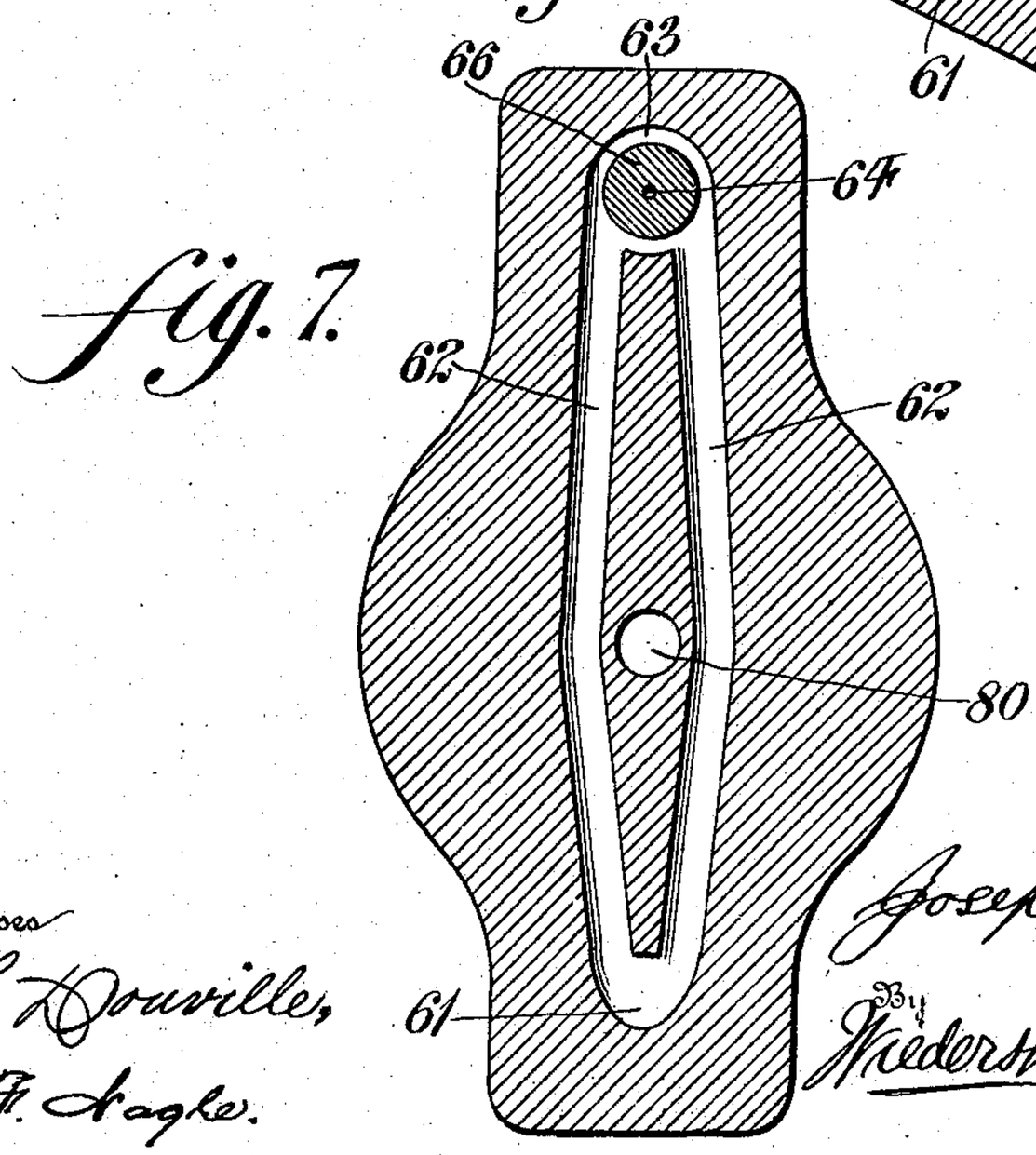


fig. 7.



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5 SHEETS—SHEET 4.

fig. 8.

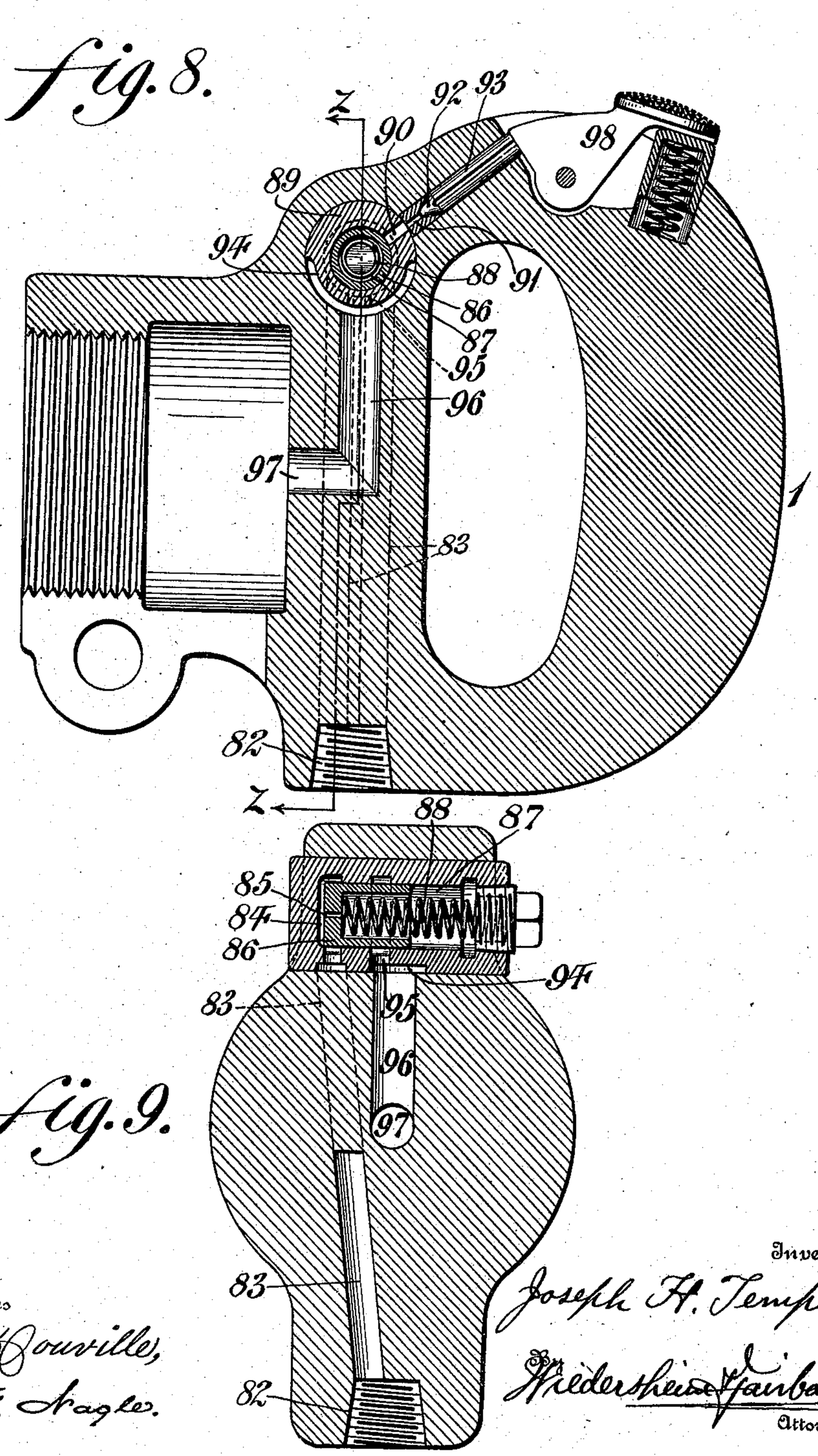

fig. 9.

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5 SHEETS—SHEET 5.

Fig. 10.

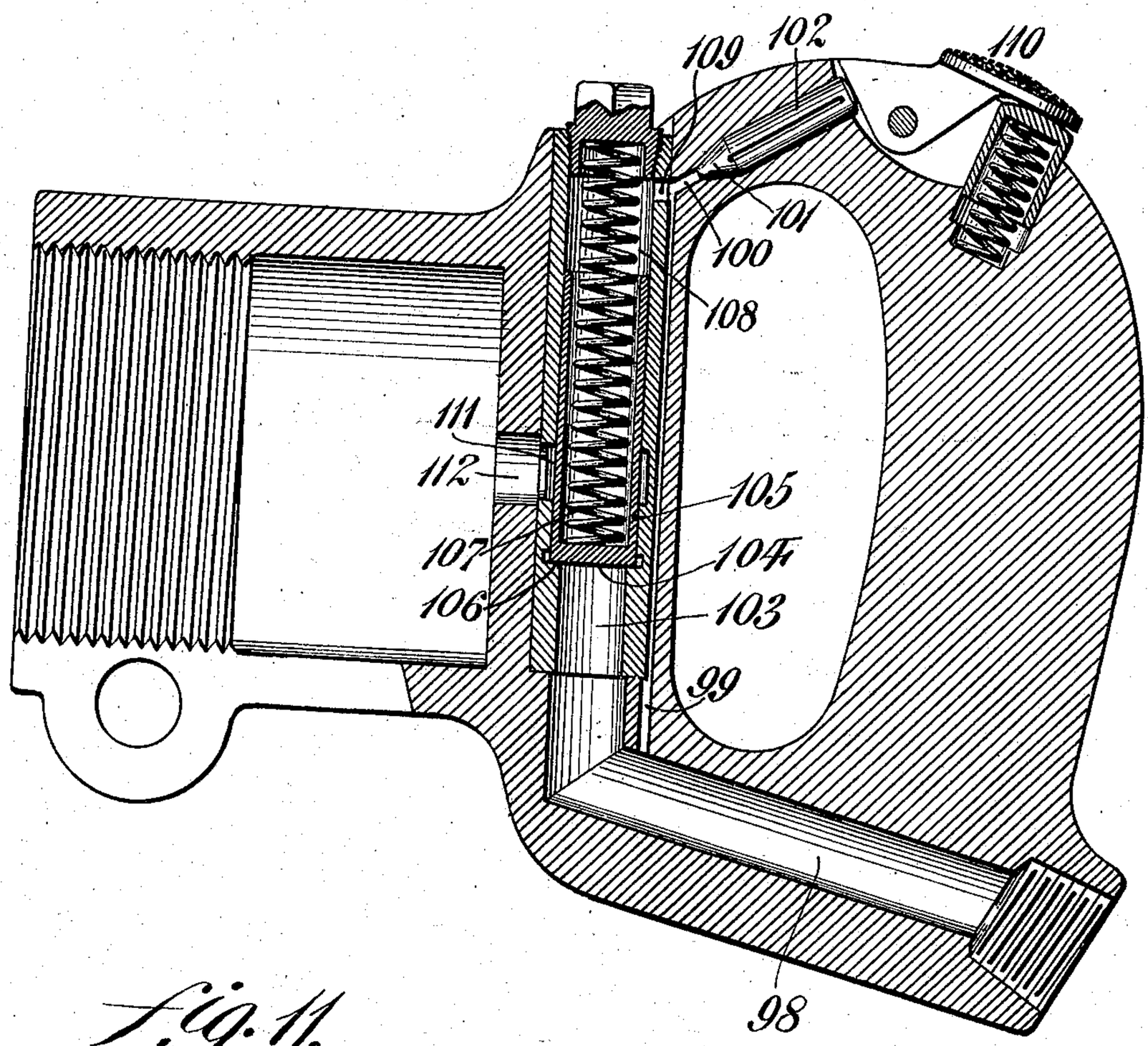
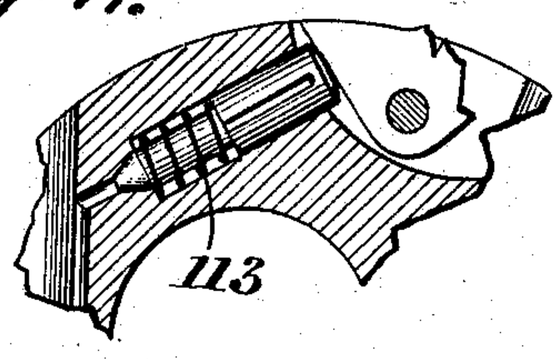


Fig. 11.



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PNEUMATIC TOOL.

No. 866,981. Specification of Letters Patent. Patented Sept. 24, 1907.

Application filed September 24, 1904. Serial No. 225,722.

To all whom it may concern:

Be it known that I, JOSEPH H. TEMPLIN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Pneumatic Tool, of which the following is a specification.

My invention consists of a novel construction, location and manner of operation of a throttle valve adapted to control and regulate the admission of motive fluid to a pneumatic tool, said throttle valve being located outside of the handle or the grasping part thereof, and being operated by fluid pressure through the medium of a manually-operated device also located outside of the handle and the grasping part thereof.

To the above ends, my invention consists of a novel construction of throttle valve, which is opened by the action of fluid pressure alone, said valve and its actuating mechanism being wholly located outside not only of the handle, but the grasping part of said handle.

It further consists of other novel features of construction, all as will be hereinafter fully set forth and pointed out in the claims.

Figure 1 represents a longitudinal sectional view of a pneumatic tool handle and its adjuncts, embodying my invention. Fig. 2 represents a similar sectional view but showing the throttle valve, regulating pin and manually-operated lever in position to effect the starting of the tool. Fig. 3 represents a section on line *x*—*x* Fig. 1. Fig. 4 represents a longitudinal sectional view of a pneumatic tool handle showing another embodiment of my invention. Fig. 5 represents a sectional view of a handle embodying my invention, showing the regulating pin, actuating mechanism as being adapted to be operated by the thumb or finger of the user. Fig. 6 represents a longitudinal sectional view of another embodiment of my invention, showing the throttle valve and its adjuncts in a slightly different location. Fig. 7 represents a section on line *y*—*y* Fig. 6. Fig. 8 represents a longitudinal sectional view of another embodiment of my invention, showing the throttle valve located outside of the handle and actuating transversely thereto. Fig. 9 represents a section on line *z*—*z* Fig. 8, viewed in the direction of the arrows. Fig. 10 represents a longitudinal sectional view of another embodiment of my invention. Fig. 11 represents a sectional view of a slight modification.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings: 1 designates the handle or the grasping part of a handle for a pneumatic tool, said handle having in its upper portion a neck 2, and at its lower portion a neck 3×, whereby said handle or its grasping portion are joined to the head block 3, said lower neck having a pressure supply duct 4 leading therethrough and discharging into the supply passage 5 which extends at an angle thereto through the head block 3.

6 designates a throttle valve bushing which is located in the head block 3, said bushing having a groove 7 therein and an outward port 8 whereby the motive fluid is discharged into the port 9 in the head block 3. The bushing 6 is provided with a shoulder 10, upon which normally rests the lower wall 11 of the throttle valve 12, the latter being hollow and provided with a pocket 13, within which is contained the spring 14, one extremity of the latter abutting against the wall 11, while its other extremity contacts with the plug or closure 15 or some equivalent device.

16 desginates a port or counterbalancing vent, located in the lower wall 11 of the throttle valve and adapted to permit at all times the ingress of a small quantity of live air through and into the interior of the throttle valve for an object to be hereinafter explained.

17 designates a port in the upper portion of the throttle valve adapted to connect with the port 18, which discharges into the passage 19 of the regulating pin bushing 20, the latter being provided with the conical seat 21, which is adapted to co-act with the conical surface 22 of the regulating pin 23 which latter is provided with a groove 24 which extends from a conical surface and terminates in the construction seen in Figs. 1 and 2, a short distance from the extremity 25 of said regulating pin. It will be apparent however, that in some instances, as will be hereinafter explained, the groove 24 in the regulating pin or its equivalent may extend the entire length of the pin, so as to permit a continuous discharge of the motive fluid, but in practice, I prefer to employ the construction seen in Figs. 1 and 2.

26 designates a thumb piece or manually-operated lever which has a nose 27 adapted to bear upon the end 25 of the regulating pin, said device being provided with the thumb piece 28 which has an extension 29 against the under side of which bears the plunger 30, the latter being preferably hollow and containing the spring 31, one end of which abuts against the bottom of the seat 32, while its other end abuts against the under side of the top of said plunger.

The operation is as follows: The parts normally appear as seen in Fig. 1, wherein it will be apparent that the throttle valve is held in position so as to throttle the port 8 by means of a spring 14. It will also be understood that live air can flow through the ducts 4 and 5 through vent 16 and that the space above the throttle valve and in the ports 17 and 19 will also open to live air pressure. Through the medium of the spring 31 the plunger 30 is normally retained in the position seen in Fig. 1, whereby the thumb piece 26 is caused to press the regulating pin 23 against its conical seat so that when the parts are seen as in Fig. 1, no live air can flow

through the groove 24 to the atmosphere. When it is desired to operate the tool it is only necessary for the operator to depress the thumb piece 28, whereupon the live air will flow through the vent 16, ports 17, 18, 19 and port 24 to the atmosphere whereupon the throttle valve 12 will assume the position seen in Fig. 2 and the motive fluid will be permitted to flow through the port 9 to the operative parts of the tool. By varying the pressure of the finger piece 28, it will be apparent that the position of the regulating pin 23 can be varied according to requirements, whereby the throttle valve will be opened or closed to a greater or less extent, as is evident. It will be further apparent that by providing the lower portion of the throttle valve with the flattened faces 33, which terminate at the shoulders 34, the latter when in the position as seen in Fig. 1, effectively throttles the valve but that as soon as the thumb piece 28 is depressed from the position seen in Fig. 1, the instant said shoulder 34 moves upwardly from the position seen in Fig. 1, the motive fluid can pass to a slight extent past the flattened face 33 through ports 8 and 9 into the tool, whereby a limited amount of motive fluid is initially admitted to the tool, said amount being gradually increased by the proper manipulation of the thumb piece and regulating pin, so as to cause the throttle valve to assume the desired position seen in Figs. 1 and 2. When it is desired to cut off the supply of motive fluid to the tool or to the ports 8 and 9, it is only necessary for the operator to remove his thumb from the finger piece 28 upon the spring 31 causing the parts to assume the position seen in Fig. 1, the regulating pin 23 being pressed against its seat, whereupon the tension of the spring 14 causes the throttle valve to assume the position seen in Fig. 1, thereby shutting off the supply of motive fluid to the ports 8 and 9.

In the construction seen in Fig. 4, I employ the same general type of thumb operating mechanism but I have shortened the throttle valve somewhat and have caused its extremity to terminate at a point slightly above the actual center of the tool center or handle. In this construction 35 designates the inlet for the motive fluid which flows upwardly into the chamber 36 of the valve bushing 37, which is provided with the exterior reduced portion 38, whereby the annular passage 39 is created between the inner bore of the head block and the bushing.

40 designates a pin or abutment extending transversely of the bushing 37 and located at a point above the actual line of the handle, said pin serving as an abutment for limiting the downward movement of the throttle valves 40 and 41, which latter has a lower wall provided with a port 42 which discharges into the chamber 43, the latter containing spring 44 one end of which abuts against the lower wall of said chamber and its other end contacts with the closure or equivalent device 45. When the parts are in the position seen in Fig. 4, it will be apparent that the live air pressure is flowing through the inlet 35, passage 36, port 42 into the chamber 43 and thence through the ports 46 and 47 against the conical face 48 of the regulating pin 49, it being apparent that the function of the equalizing port 42 is to permit the pressure on both sides of the throttle valve to be equal. The pin 49 is provided with a groove 50, so that when the thumb piece 51 is depressed from the position shown, the motive fluid acting against the conical face 48 will unseat the regulating pin 49 whereupon a portion of the live air will flow to the atmosphere through ports 46, 47 and groove 50, whereupon by reason of the pressure below the valve 41, the latter will be unseated and will move upwardly from the position seen in Fig. 4, so as to uncover to a greater or less extent the ports 52, whereby the motive fluid is permitted to flow through the latter into the annular chamber 39 and thence out through the port 52× to the operating parts of the tool.

It will be apparent that in the present construction the diameter of the regulating vent 42 is of considerable less area than the diameter of the ports 46 and 47, whereby when said last-mentioned parts are open to the atmosphere by the unseating of the regulating pin a larger quantity of motive fluid will flow through the ports 46 and 47 than through the port 42, whereby the operation of the throttle valve will be positively assured.

It will be apparent that in the construction seen in Figs. 1 and 2, the same action takes place, since the equalizing vent 16 has considerable less area than the ports 17 and 19. It will be apparent from the construction seen in Fig. 4, that the action of the regulating pin, the thumb-operated lever and the spring 53 is substantially the same as the action of the corresponding parts seen in Figs. 1 and 2, and I have therefore deemed it unnecessary to enter into any detailed description of the same.

In the construction seen in Fig. 5, I have shown a thumb or finger-operated lever 54 which is fulcrumed at 55 and provided with an outer thumb piece 56 where the lower extremity of said lever is provided with a finger piece 57 which terminates in proximity to the forefinger of the user. The lever 54 is normally held in the position seen in Fig. 5 by the spring-pressed plunger 58 and the inner face 59 is adapted to contact with the regulating pin 60 whose function is the same as the regulating pin already described. I desire, however, to call special attention to the fact that in the device seen in Fig. 5, the lever 54 can be operated with equal facility by the thumb of the user pressing upon the part 56 or it can be actuated by the forefinger of the user pressing upon the part 57 according to requirements.

As will be apparent to those skilled in this art, it is sometimes necessary and desirable to use tools of the character under consideration in such a position as to render it desirable for the operator to manipulate the lever 54 by the thumb or finger or vice versa, according to requirements, and if desired, either the thumb piece 56 or the finger piece 57 can be omitted according to requirements.

In some instances, I desire to use the construction of throttle valve seen in Fig. 5 in preference to other constructions, since lever 54 being fulcrumed at the point 55 permits the thumb piece to oscillate so as to follow the natural line of movement ot the thumb when said thumb piece is depressed.

Referring now to the construction seen in Figs. 6 and 7, it will be apparent that the motive fluid entering duct 61 flows upwardly through passages 62 to the chamber 63 and thence through the equalizing vent 64 to the chamber 65 of the valve 66, said valve being normally held against the plunger or closure 67 by the

spring 68, it being apparent that the motive fluid flowing through the vent 64 flows into the chamber 69 and port 70 against the conical face 71 of the regulating pin 72, which latter is normally held to its seat by the lever 73, which is fulcrumed at 74 and has the extension 75 contacting with said pin, said lever having the thumb piece 76 whose under portion bears against the spring-actuated plunger 77.

78 designates a recess into which the motive fluid is discharged when the valve is unseated, said recess discharging into the duct 79 which leads to the port 80.

The operation is as follows: The motive fiuid enters the ducts 61 and 62 and flows thence through the equalizing vent 64 through the valve and into the chamber 69 and port 70. When it is desired to start the tool the operator depresses the thumb piece 76, whereupon live motive fluid unseats the regulating pin 72 and thus places the groove 81 therein in communication with the atmosphere, whereupon the valve 66 is moved to the right of the position seen in Fig. 6 so as to admit motive fluid from the chamber 63 into the chamber 78 and thence to the ports 79 and 80 to the interior of the tool. When the operator removes his thumb from the thumb piece 76 it will be apparent that the spring-pressed plunger 77 will cause the parts to again assume the position seen in Fig. 6, whereupon the tension of the spring 68 will cause the valve 66 to assume the closed position seen in Fig. 6.

In the construction seen in Figs. 8 and 9, 82 designates the inlet for the motive fluid flowing through the ducts 83 into the chamber 84 and thence through the equalizing vent 85 of the valve 86 to the chamber 87, said valve being retained normally in the position seen in Fig. 9 by means of the spring 88. From the chamber 87 contained within the bushing 89 leads the port 90 to the passage 91, whereby the live motive fluid is conducted to the conical face 92 of the regulating pin 93, which is operated by the lever and its adjuncts, substantially similar to the thumb lever seen in Figs. 1 and 2. The underside of the bushing 89 is recessed as indicated at 94 and has a port as indicated at 95, which discharges into the passage 96, which leads to the port 97, whereby the motive fluid is directed into the interior of the tool.

The operation is as follows: When the lever 98 is depressed the live motive fluid flowing through the passages 83, equalizing vent 85, chamber 87 and ports 90 and 91, will unseat the regulating pin 93 thus permitting the motive fluid to flow to the atmosphere, whereupon the valve 86 will be moved to the right of the position indicated in Fig. 9 and the motive fluid will flow from the chamber 84 through the port 95 and passages 96 and 97 to the interior of the tool. When the operator removes his thumb from the pressure on the lever 98, the spring-actuated plunger thereunder will cause the parts to assume the position seen in Fig. 9 again by reason of the tension of the spring 88, as is evident.

In the construction seen in Fig. 10, I show another embodiment of my invention wherein the equalizing vent is located in a slightly different position, the construction and manner of operation of the regulating pin and its adjuncts being substantially as already described.

98 designates an inlet to the motive fluid a portion of which latter passes upwardly through the equalizing passage 99 to the port 100 against the conical face 101 of the grooved regulating pin 102. The main supply of the motive fluid passes from the duct 98 into the passage 103 and against the lower wall 104 of the throttle valve 105, the latter being held against the shoulder 106 by the spring 107, as is evident, said spring being contained within the cavity 108 with which communication is had from the equalizing passage 99 by means of the port 109, so that the pressure on both sides of the valve 105 is balanced.

It will be apparent that when the thumb piece 110 is depressed the live motive fluid flowing through the equalizing passage 99 and port 100 will cause the conical face 101 of the regulating pin to be unseated thereby permitting the motive fluid to flow to the atmosphere whereby the main supply of motive fluid pressing against the wall 104 will unseat the valve 105 and move the same outwardly so as to permit the motive fluid to flow through the ports 111 and 112 to the interior of the tool. When the operator removes his thumb from the thumb piece 110, it will be apparent that the parts will assume the position seen in Fig. 10 again, the pressure of the spring 107 forcing the valve 105 to its seat.

It will be apparent that in all the various embodiments of my invention, I have shown the throttle valve in every instance as located not only outside of the grasping part of the handle but wholly outside of the handle itself, so too the regulating pin in every instance as well as the manually-operated lever which permits the actuation of the regulating pin is located wholly outside of the grasping part of the handle in every instance.

It will be apparent that the type and contour of the throttle valve may be varied according to requirements and that the same may be arranged transversely, longitudinally or even diagonally in the head block without departing from the spirit of my invention.

It will be further apparent that in lieu of the springs employed to effect the actuation of the throttle valve, I may use other suitable or equivalent devices such as will be apparent to those skilled in the art.

It will also be apparent that the equalizing vent may be located either in the throttle valve, as seen in Figs. 1 to 9 inclusive, or it can be located in any suitable part of the head block or other part of the implement, as seen in Fig. 10, without departing from the spirit of my invention.

It will be apparent that the regulating pin in all instances is located wholly outside of the grasping part of the handle and that the desired action or unseating of said pin may be permitted or effected by any suitable device actuated by the thumb or finger of the operator, as may be desired.

It will be apparent that in my present invention there is no loss or waste of air when the parts are in the position seen in Figs. 1, 4, 6, 8, and 10, since the slight escape of motive fluid to the atmosphere, which takes place only during the period when the tool is in operation, which is ordinarily but for a comparatively brief period especially in riveting and the like.

I am aware that it is a common right to locate the

throttle valve in the grasping portion of a pneumatic tool handle, since such a construction is shown in the British Patent to Low, No. 1778, of 1865, and also in the United States patent to Drawbaugh, No. 479,061, granted July 19, 1892, since in said Drawbaugh and Low patents, particularly the latter, the throttle valve is shown as being located not only in the handle but in the portion thereof naturally grasped between the thumb and finger of the operator in the application of the tool to its work. My present invention is also differentiated from the construction seen in Boyer patent No. 537,629, since in that device the throttle valve is located in the grasping portion of the handle, whereas in my device as above explained, the throttle valve is wholly in every instance outside not only of the handle but of the grasping portion thereof and the main pressure supply duct in every instance is also located wholly outside not only of the handle but of the grasping portion thereof.

It will be further apparent that the handle can be secured to the tool cylinder in any suitable manner other than that shown, and while I have shown as a preferred form a threaded sleeve preferably integral with the head block, other constructions may be employed without departing from the general spirit of my invention.

So far as I am aware, I am the first in the art to employ a fluid-actuated throttle valve mechanism wherein the regulating pin or its equivalents of the character described is used in conjunction with the equalizing vent located outside of the throttle valve, and my claim to these and other features are therefore to be interpreted to corresponding scope.

In Fig. 11 I have shown a suitable spring 113 in conjunction with the pin which I may employ in order to assist the air in raising the pin if I so desire.

It will be apparent to those skilled in the art that still further changes may be made which come within the scope of my invention, and I do not therefore desire to be limited in every instance to the exact construction herein shown and described.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In a pneumatic tool handle, a balanced valve, a counter-balancing port therethrough, an exhaust passage, a regulator therein, a manually operated lever, one end of which bears against said regulator and a plunger having a spring therefor bearing against the other end of said lever, whereby the exhaust port is normally closed.

2. In a pneumatic tool handle, a valve whose end and the passage therefor have a slight variation in size throughout a portion of the travel of the end and a relatively great variation throughout the remainder of its travel.

3. In a pneumatic tool handle, a balanced valve, a counter-balancing port therethrough, an exhaust passage, a regulator therein, a manually operated lever, one end of which bears against said regulator, and a chambered plunger having a spring therefor bearing against the other end of said lever whereby the exhaust port is normally closed.

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