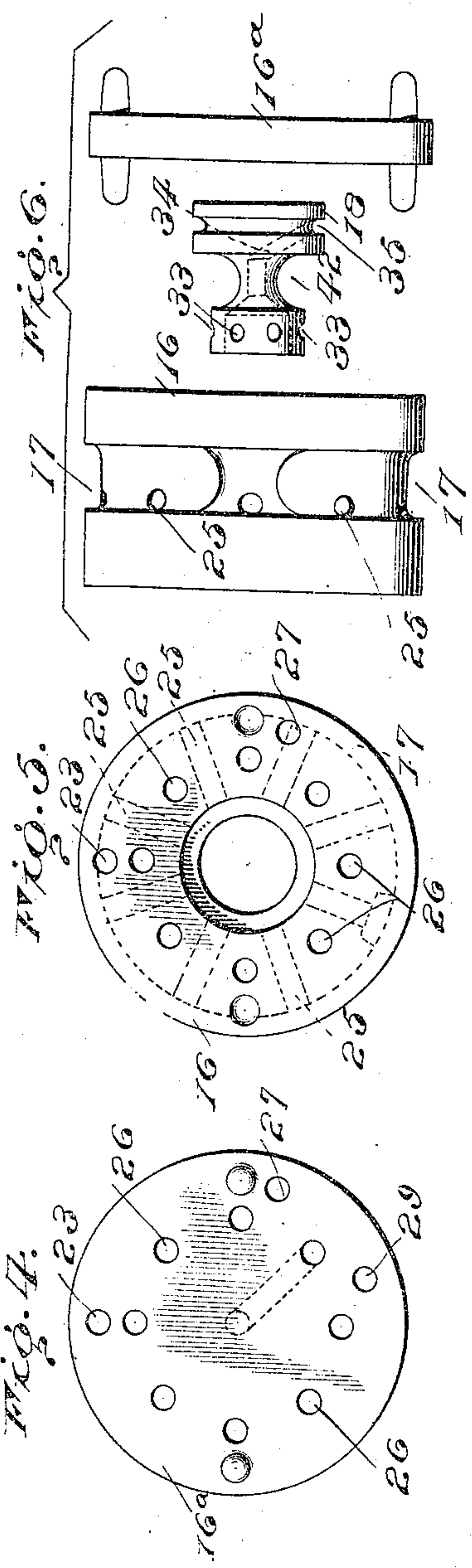
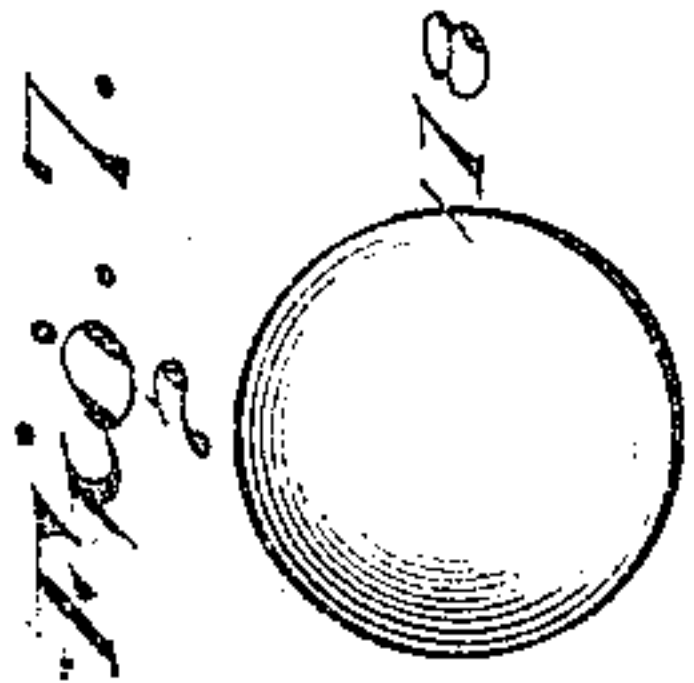
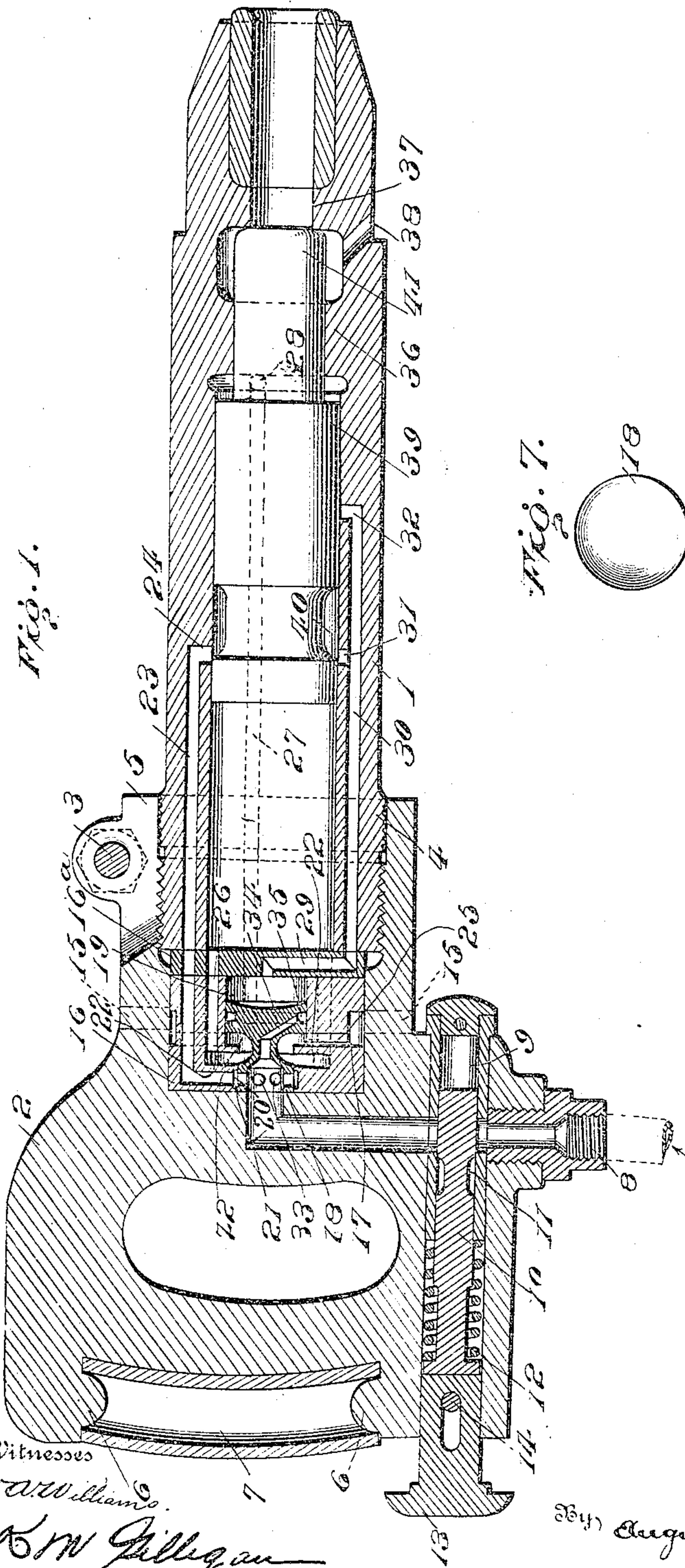


No. 859,242.

PATENTED JULY 9, 1907.

S. OLDHAM.  
PNEUMATIC TOOL.  
APPLICATION FILED APR. 21, 1904.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2.

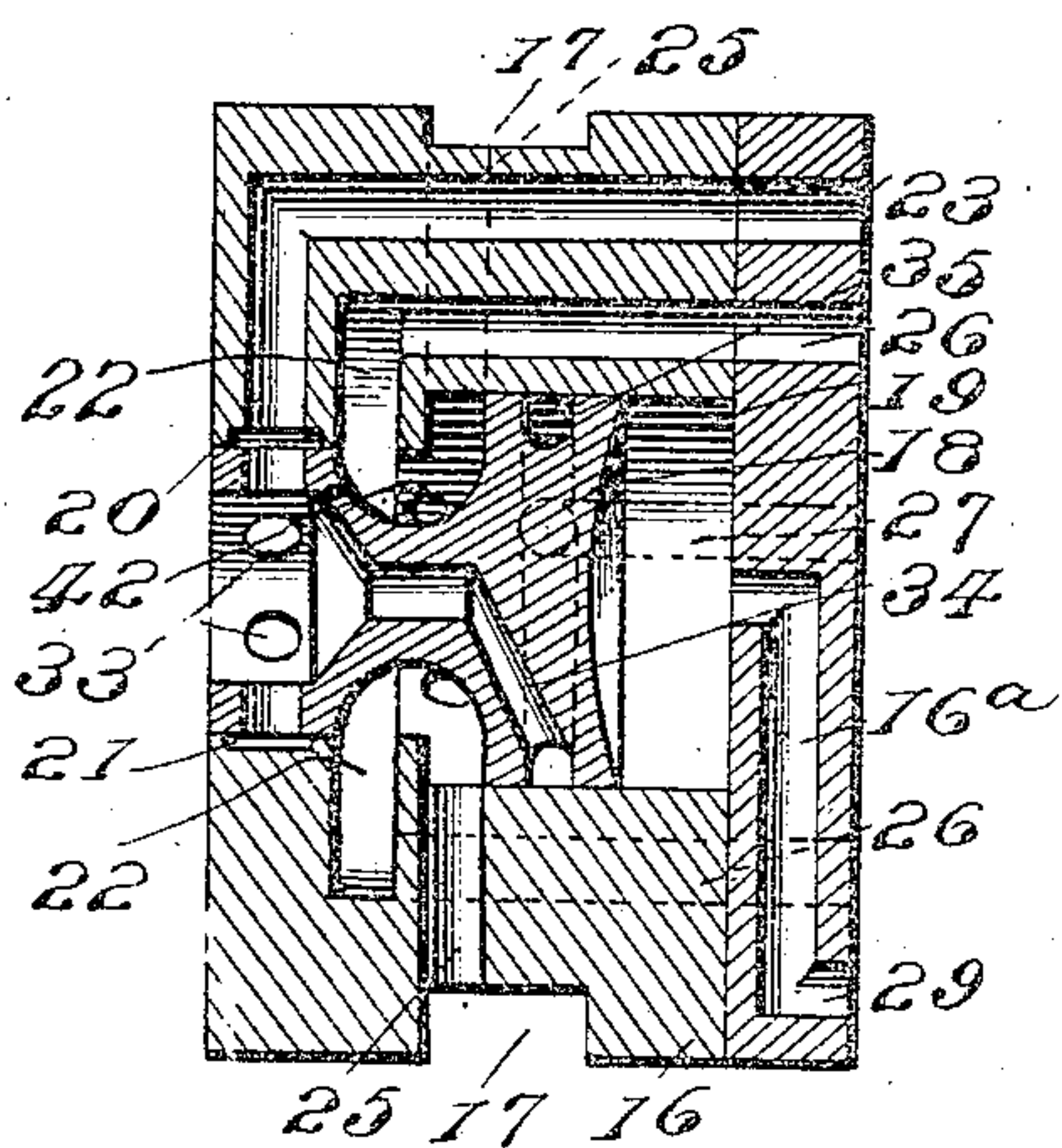


Fig. 3.

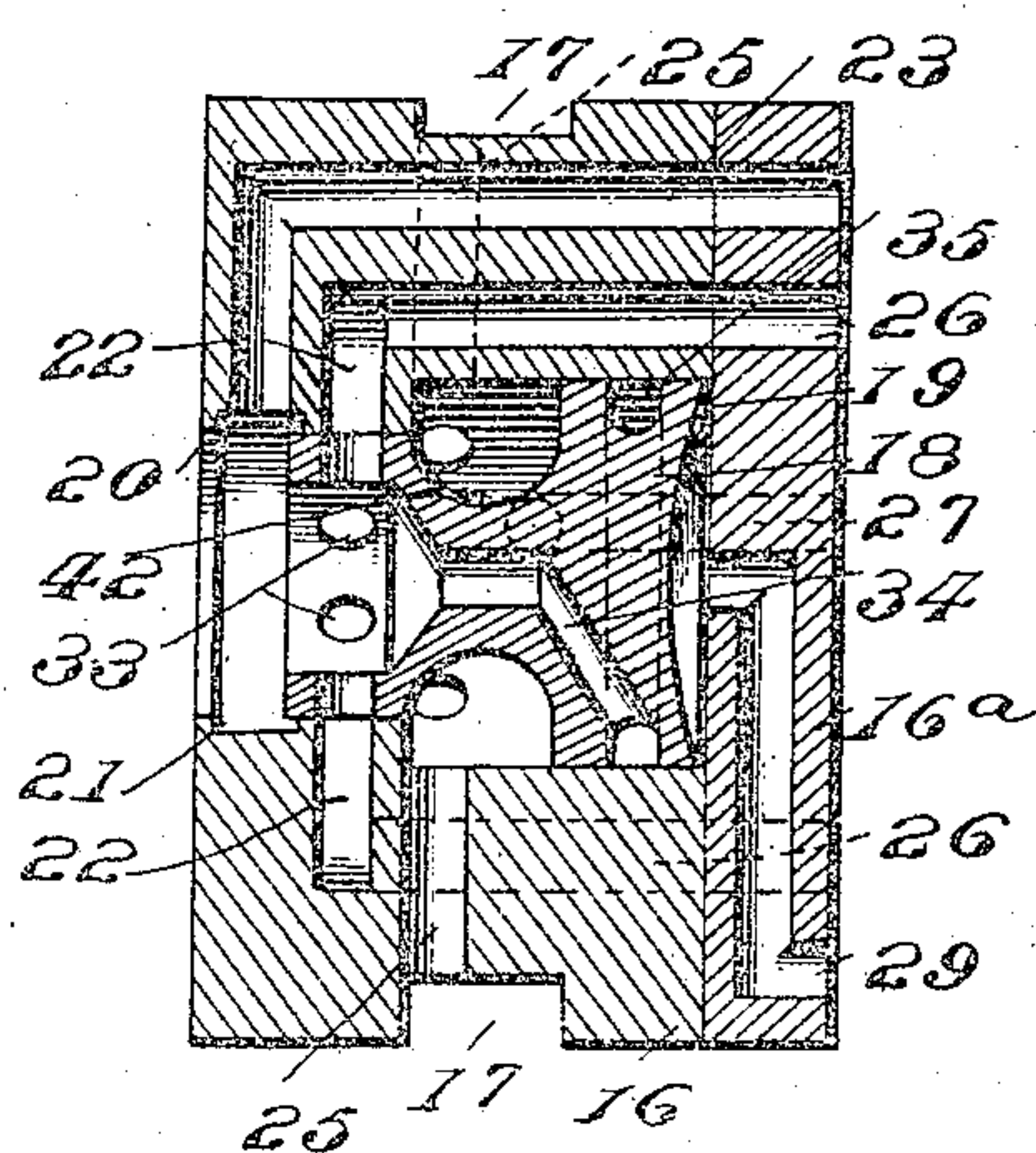
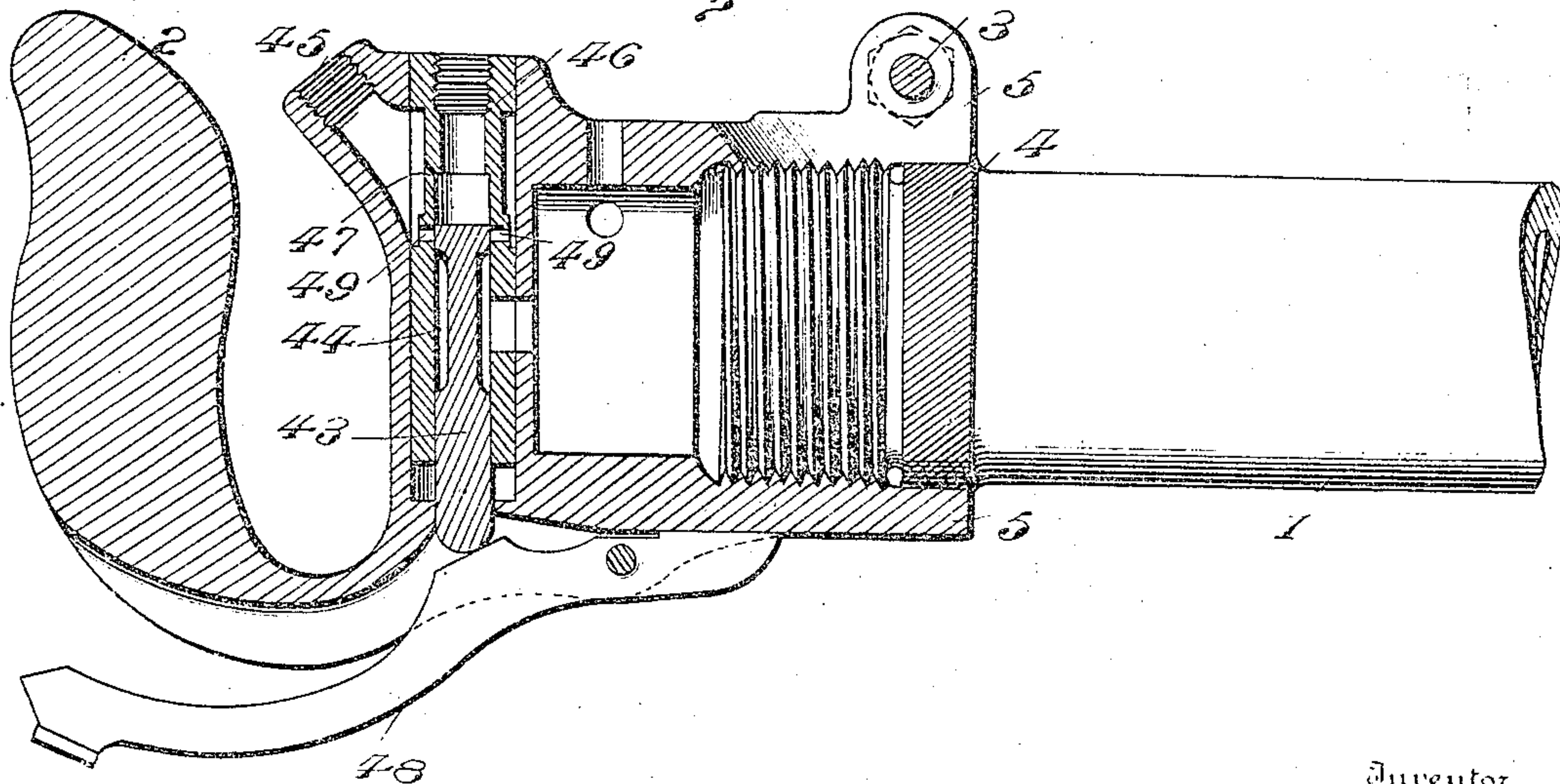


Fig. 8.



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# UNITED STATES PATENT OFFICE.

SAMUEL OLDHAM, OF PHILADELPHIA, PENNSYLVANIA.

## PNEUMATIC TOOL.

No. 859,242.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed April 21, 1904. Serial No. 204,177.

To all whom it may concern:

Be it known that I, SAMUEL OLDHAM, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Pneumatic Tools, of which the following is a specification.

Objects of the present invention are to firmly secure together the handle and the cylinder of the tool so that such disadvantageous features as were heretofore encountered by reason of the relative loosening of these parts may be obviated; to provide a tool that will work comparatively fast with the expenditure of relatively little effort for holding it; to provide a tool which will work satisfactorily, even with a comparatively loose valve; to obtain the advantages incident to the use of larger straight air inlet and exhaust ports; to provide a tool which will strike a comparatively greater number of harder blows than heretofore and to cut down or reduce the vibrations of the tool.

To these and other ends hereinafter set forth the invention stated in general terms comprises the improvements to be presently described and finally claimed.

The nature, characteristic features and scope of the invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof and in which

Figure 1, is a view principally in section of a tool embodying features of the invention. Fig. 2, is a sectional view drawn to an enlarged scale and illustrating the valve in position corresponding with the inward stroke of the plunger. Fig. 3, is a similar view with the valve in position corresponding to the outward stroke of the plunger. Fig. 4, is a face view of the complete valve block. Fig. 5, is a similar view with a portion of the valve block removed to show the valve. Fig. 6, is a detached view illustrating in side elevation the two parts of the block, and the valve. Fig. 7, is a face view of the valve, and Fig. 8, is a sectional view illustrating a modification of the invention.

In the drawings 1, is the cylinder and 2 the handle. The socket of the latter is tapped as usual and split and provided with a bolt 3 by which it can be contracted onto the threaded end of the cylinder 1. However, the cylinder is provided with a knurled collar or band 4 which is gripped by an unthreaded portion 5 of the socket. The effect of interposing a knurl between the socket and cylinder is that when the socket is clamped or contracted the knurl prevents accidental or undue motion of the handle in respect to the cylinder, which is obviously desirable. The handle is provided with a notch fitted with projections 6 so that a piece of flexible tube as rubber 7, may be inserted in the notch with the projection 6 entering its end, so as to hold it to place. The flexible tube 7 relieves the hand of the operator from the effects of vibration and at the same time

affords means for obtaining a firm grasp of the tool. The handle is fitted with an air intake 8 which enters it from the side and leaves it actually at the base of the socket. Lengthwise of the handle and transversely of the air intake is arranged a valve chamber 9 within which is arranged a throttle valve 10 having a peripheral notch 11 cut in it.

12, is a spring which engages a head on the valve 10 and a shoulder on the valve seat 9, so that it tends to shift the valve toward the left in the drawings.

13, is a push button having its shank and elongated slot in which works a pin 14, so that when the push button is pushed toward the right it shifts the valve 10 bringing the notch or groove 11 into more or less perfect alinement with the air intake 8 and thereby controlling and regulating the supply of air. The handle is also provided with openings as 15 for the escape of exhaust air. Within the handle is mounted the valve block 16 which really consists of two parts 16 and 16<sup>a</sup> which are shown as fitted together by means of suitable dowel pins which also serve to guide the complete valve block in respect to the cylinder 1. Externally the valve block is cylindrical and is provided with a groove 17. Internally there is a central opening through the portion 16 which opening receives the valve 18 and is closed by the portion 16<sup>a</sup>. Internally the portion 16 is provided with a cylindrical opening 19 of comparatively large diameter and an opening 20 of comparatively small diameter so as to accommodate the large and small ends of the valve 18. The portion 20 is provided with a groove 21 and a channel 22. There is what may be called a "flip port" 23 which communicates with the groove 21 and extends to the flip hole 24. There are exhaust ports 25 which communicate with the largest portion 19 of the opening in the block and extend radially outward through it. There are ports 26 which extend from the recess 22, generally radially and then forwardly, so as to communicate with the interior of the cylinder 1 and serve both as admission and exhaust ports for it. There is also a port 27 which extends first radially and then lengthwise through the wall of the cylinder from the portion 19 to the opening 28 which communicates with the interior of the cylinder comparatively near the tool and it joins the portion 19 nearer to the tool than the exhaust ports 25. In the portion 16 there is a portion 29 which extends from its face so as to communicate with the chamber 19 radially and then crosswise through it, so as to communicate with a passage 30 that communicates with the interior of the cylinder at 31 and 32. Internally the valve 18 is partially hollowed out at its small end and this hollow portion communicates with radial openings 33 and there is a port 34 within the valve which com-



municates with its open interior and with a groove 35 upon the exterior of its larger end. In all positions of the valve 18 air under pressure reaches the flip hole 24 by way of the opening 23 because when the valve is in the position shown in Fig. 2, the openings 33 are in line with the groove 21 which communicates with the passage 23 and when the valve is in the position shown in Fig. 3, the opening 23 is in direct communication with the groove 20 which is exposed to the incoming air.

The cylinder 1 is internally provided with projections 36 and 37 and it is also provided with an air vent or opening 38. The piston 39 is grooved as at 40 and provided with an end as 41 of somewhat reduced diameter. Referring to Figs. 1 and 2 the piston 39 is moving toward the left. Air under pressure is present at the flip hole 24 and it reaches by way of the reduced portion 40 and opening 31 the passage 30 which leads to the chamber adjacent the larger end of the valve, thus it is tending to hold the valve in the position shown. Air is also traversing the opening 34 in the valve, reaching its external groove 35 and from thence by way of the passage 27 is escaping at the opening 28, thus operating upon the right-hand face adjacent the reduced portion 41 and so impelling the piston toward the left. The openings 26 are in direct communication with the exhaust openings 25 by way of the reduced portion or neck 42 of the valve 18. The piston continues to move toward the left until the reduced projection 41 comes opposite the opening 32 whereupon air escapes from the chamber adjacent the larger end of the valve 18 by way of the passage 30. At this time the portion 39 of the piston is opposite the flip hole 24 and closes it. Thus the valve 18 under the influence of air in the air intake 8 is shifted toward the right into the position shown in Fig. 3. The result of this is that the openings 33 in the valve 18 are brought into line with the recess 22 which in its turn communicates directly with the openings 26 so that air rushes in an unobstructed manner through the openings 26 and drives the piston toward the right, so as to strike the required blow. The vent or opening 38 serves to permit of the free escape of air without retarding the oncoming piston. Upon the completion of this stroke the groove 40 on the piston is again in alinement with the flip opening 24 and opening 31, so that air under pressure by way of the passage 30 reaches the chamber adjacent the larger end of the valve and thus shifts the valve again into the position shown in Figs. 1 and 2 ready for a repetition of the described operation.

Obviously the air inlets and outlets for the passages 26 are comparatively unrestrictive and straight which is manifestly advantageous and since the exhaust ports 25 are located between the smaller and larger ends of the valve it follows that even if the valve should be somewhat leaky any air that escaped past its small end would leave by the exhaust ports without operating upon the larger face of the valve, so that the valve will remain balanced and operative even if somewhat leaky.

Fig. 8 illustrates a modification of the invention, in which there is present a knurl 4 between the split socket and the cylinder and in that figure the air intake valve is somewhat different, in that it is arranged

crosswise of the handle and consists of a valve proper 43 having upon its surface a groove 44. Air enters by way of the intake 45 and part of it reaches the chamber 46 by way of the port 47 and serves to tend to place the valve in the position shown. There is a pivotal handle 48 which operates upon the end of the valve and pushes it against the pressure of air in the chamber 46, so as to control the passage of air through the openings 49 and 50 and groove 44.

It will be obvious to those skilled in the art to which my invention relates that modifications may be made in details without departing from the spirit thereof, hence I do not limit myself to the precise mode of procedure or construction, but

Having thus described the nature and objects of my invention what I claim as new and desire to secure by Letters Patent is

1. The combination of a threaded cylinder, a threaded handle provided with tightening means, and a knurled band or collar interposed between the cylinder and handle and adapted to be engaged by said tightening means, substantially as described.
2. The combination of a handle provided with a tapped split socket having clamping means, a threaded cylinder, and a knurled band or collar interposed between the two, substantially as described.
3. The combination of a handle provided with a split socket of which a portion is tapped and which is provided with a clamping bolt and a cylinder provided with a threaded end and with a knurled collar which is engaged by the socket, substantially as described.
4. In a pneumatic tool a handle provided with a recess having projections, and a flexible tube arranged in the recess with the projections extending into its ends, substantially as described.
5. In a pneumatic tool the combination of a valve block internally provided with chambers of different sizes to accommodate the differential areas of the valve and with a groove and a recess, a port from the groove for the flip opening, ports from the recess for admission and exhaust for striking the blow, ports from the larger internal opening through the curved surface of the block for escape to the atmosphere, a port arranged in advance of the last mentioned ports for effecting the return of the piston, a port from the front plate of the valve block to the larger internal chamber opening to conduct air for operating upon the larger area of the valve, a piston and its cylinder, a valve having a larger and smaller area and being hollow in rear of the larger area and having a contracted neck, radial openings through the smaller part of the valve and a groove on the larger part of the valve in communication with the whole interior thereof, substantially as described.
6. In a pneumatic tool the combination of a valve block having larger and smaller chambers for the accommodation of the differential areas of the valve, a recess in the smaller chamber, a set of ports communicating with the recess and adapted to serve for admission and exhaust, a set of passages communicating with the larger chamber and with the atmosphere, a valve having differential areas connected by a neck and being hollow near the smaller area and provided with radial openings and provisions for shifting the valve whereby its openings are brought into alinement with the admission and exhaust ports to supply air for striking the blow and whereby its neck bridges the last mentioned ports and the passages which communicate with the atmosphere to afford an escape after the blow is struck, substantially as described.
7. In a pneumatic tool, the combination of a valve consisting of a neck portion constituting a groove and which terminates in two cylindrical heads of differential area whereof one is cupped and radially perforated and whereof the other is solid and is externally provided with a peripheral channel in communication with said cupped portion, and a valve block having a closed and an open end and having admission ports and a flip port operatively ar-



ranged in respect to the perforated head and exhaust ports always in communication with said groove and a hammer raising port controlled by said peripheral channel, substantially as described.

- 5 8. In a pneumatic tool the combination of a valve block having two internal chambers of different diameters and whereof the larger one is closed and the smaller one is open at the pressure end, exhaust ports arranged in the wall of the larger chamber and admission ports arranged  
10 in the wall of the smaller chamber, and a valve consisting of a neck provided at its extremities with a closed end and with a tubular laterally perforated end of uniform diameter arranged in the smaller chamber of the block, and co-operating with the admission ports, substantially as de-  
15 scribed.

9. In a pneumatic tool the combination of a partly tubu-

lar valve consisting of a neck terminating in two heads whereof each is of substantially uniform diameter throughout its length and terminates in a substantially flat face or end and whereof one is provided with an annular groove 20 connecting with the tubular part and whereof the other contains the tubular part and constitutes a cut-off for live air, with a valve block having means for admitting live air to the tubular part and conveying it from said groove and from the last mentioned head, and having provisions 25 for conveying exhaust around and past the neck, substantially as described.

In testimony whereof I have hereunto signed my name.  
SAMUEL OLDHAM.

Witnesses:

W. J. JACKSON,  
FRANK E. FRENCH.