

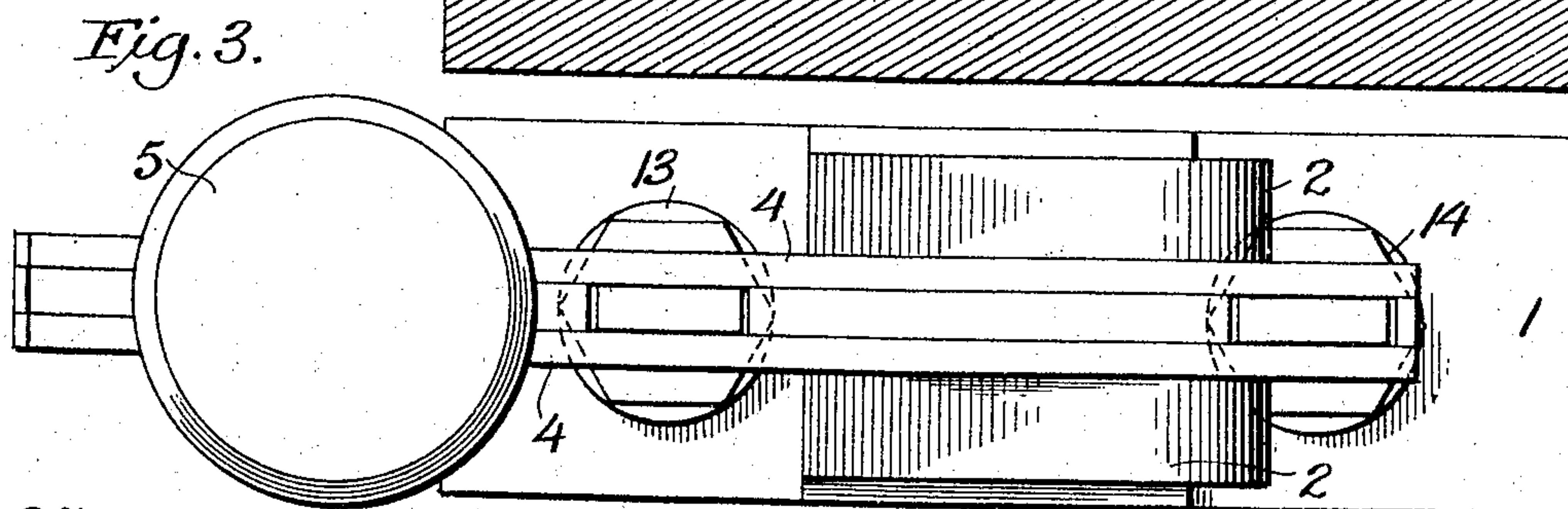
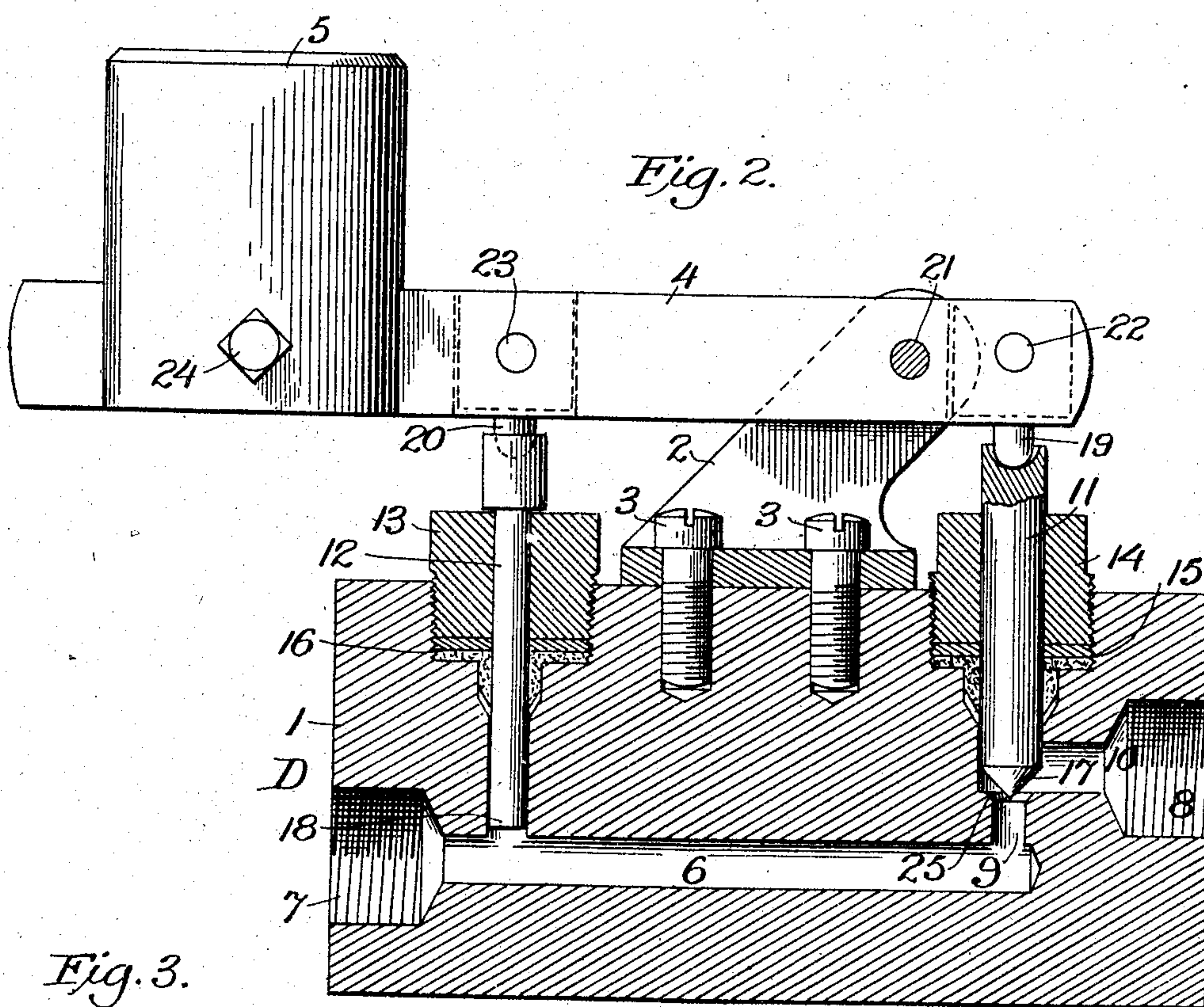
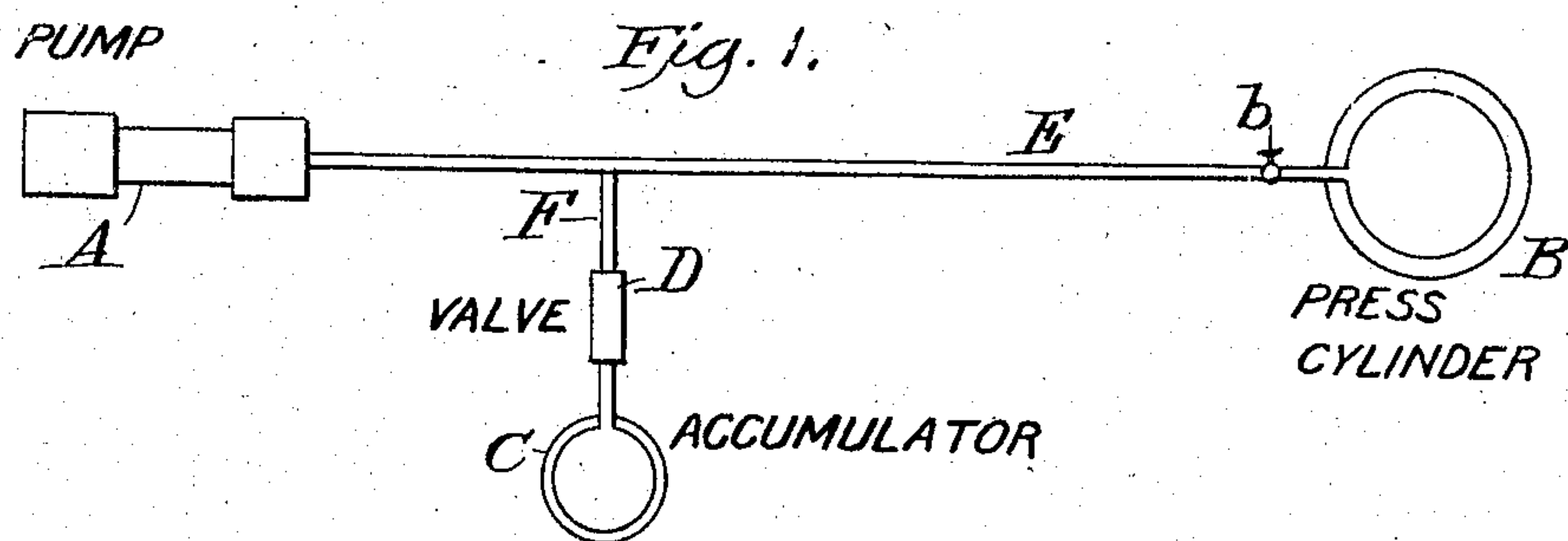
No. 780,614.

PATENTED JAN. 24, 1905.

W. D. NASH.

# ACCUMULATOR VALVE FOR OIL PRESSES OR OTHER MACHINERY.

APPLICATION FILED NOV. 27, 1903.



Witnesses  
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# UNITED STATES PATENT OFFICE.

WALTER D. NASH, OF ATLANTA, GEORGIA.

## ACCUMULATOR-VALVE FOR OIL-PRESSES OR OTHER MACHINERY.

SPECIFICATION forming part of Letters Patent No. 780,614, dated January 24, 1905.

Application filed November 27, 1903. Serial No. 182,710.

*To all whom it may concern:*

Be it known that I, WALTER D. NASH, a citizen of the United States of America, and a resident of Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Accumulator-Valves for Oil-Presses or other Machinery, of which the following is a specification.

This invention relates to certain new and useful improvements in accumulation-valves for use with oil-mill presses and other machinery, the object of the invention being to simplify the operation of a pumping system for oil-presses by discarding the low-pressure pump and pipe-line and substituting in its stead a valve working in conjunction with an accumulator, whereby the system may be operated with greater facility and less cost than usual.

The invention consists, essentially, in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and claimed.

In the annexed drawings, Figure 1 is a diagrammatic view of the several parts of the pumping system of an oil-mill and shows the relative position of my improved accumulator-valve. Fig. 2 is a longitudinal sectional side view of the valve. Fig. 3 is a top plan view of the same.

Similar characters of reference designate corresponding parts throughout the different figures of the drawings.

Referring to Fig. 1, A denotes a pump, preferably a high-pressure pump, and E a pipe-line leading from the said pump to the press-cylinder B of an oil-mill. Pipe E is provided near the cylinder B with a valve or cock *b* for controlling the flow of oil into the cylinder B. A branch pipe F runs from the line E to the accumulator or reservoir C, which amounts simply to a large pocket or receiver for containing an extra store of oil, whose supply will assist in filling the pipe with the requisite pressure when the press-valve is first opened. Adjoining the accumulator C in the pipe F is the valve D, which is shown in detail in Figs. 2 and 3.

The body 1 of valve D consists of a steel

block of suitable shape and size bored with a longitudinal passage 6 and tapped at one end of passage 6 at 7 for the connection of a pipe to the block and tapped also at 8 at the other end of the block for the connection of another pipe-section. Between the passage 6 and the tapped recess 8 is a short passage 9 and another passage, 10, at right angles to passage 9, there being in the end of passage 9 a seat 25, adapted to receive the conical or pointed end of the plunger 11. In the body 1 are two parallel reciprocating plungers 11 and 12. They are packed with leather crimps 15 and 16, held in place by brass nuts 14 and 13, as shown. Plunger 12 has a head whose lower shoulder strikes against the nut 13 to keep the lower end 18 of the plunger from entering too far. Plunger 11 does not need a head of this kind, because of its conical end 17, that works in connection with a beveled seat 25. It will be observed that the areas of the end 18 of the plunger 12 and the end 17 of plunger 11 differ and vary from each other in a certain ratio to be presently explained and that they are both exposed to the oil-pressure in passage 6. To the side of block 1 at a point between the two plungers a bracket 2, either a single ear or a bifurcated piece, is secured by means of screws 3 or other fastening means, and this bracket 2 serves as a fulcrum for a lever 4, which is pivoted thereto by means of a pivot 21. The lever 4 is provided with a weight 5, that is adjustable thereon and is held in any desired position by a set-screw 24. Pivoted to the lever 4 on one side of the fulcrum 21 is a loose link 20, 23 being the pivot which makes the pivotal connection, and the lower end of link 20 loosely entering a cup or socket in the head of the plunger 12. On the other side of the fulcrum is another loose link, 19, pivoted by pin 22 to the end of the lever 4 and having its lower end loosely entering a cup or socket in the upper end of the plunger 11.

At the beginning of the operation the press-valve *b* is closed, the accumulator-valve D is open, and the accumulator C is also open and full of air. The pump A when set into operation will pump oil into the pipe-line and into



the accumulator until the pressure reaches one thousand pounds per square inch, at which point it is necessary to stop the oil from going into the accumulator, because under ordinary circumstances it is found too expensive to construct an accumulator capable of standing a higher pressure than this. When the pressure in the pipe-line and the accumulator has reached one thousand pounds to the square inch, the valve D automatically closes, and thereby holds oil in the accumulator at one thousand pounds pressure, the air in the accumulator having been compressed. By referring to Fig. 2 it will be noted that oil will be forced from pump A into passage 6 of the block 1, and its pressure will there act against the end 18 of plunger 12 and the end 17 of plunger 11. Obviously when the end 17 of the plunger 11 is off its seat 25 oil will flow through passages 9 and 10 into the accumulator C. After the valve D has thus automatically closed the pump A will continue its operation, valve D remaining closed until the pressure in the pipe-line has reached some maximum figure—as, for instance, four thousand pounds per square inch. The system will then be ready for operation with the following conditions prevailing, viz: accumulator-valve D closed, oil in the accumulator under air-pressure at one thousand pounds per square inch, oil in the pipe-line E at four thousand pounds per square inch, press-valve *b* closed, and press-cylinder B empty and press down.

The operation will proceed as follows: First, the press-valve *b* will be opened, whereat oil-pressure will rush into the press; but as the pump A will not supply a volume of oil sufficient to keep up the pressure when the valve *b* is open the pressure in the pipe-line must necessarily at once drop below one thousand pounds pressure, at which time the valve B will open automatically, thereby releasing oil from the accumulator C, which will pass out through the pipe-line into the press-cylinder B. The air-pressure runs the press up at this time in the same manner that a low-pressure pump does until an equilibrium is reached. Then the accumulator will be practically empty. The high-pressure pump continues, however, to pump not only into the press-cylinder B, but also into the accumulator C, the valve D now being open. Hence the action on the press is slow. The pump continues to work and raise the pressure in the pipe-line, press-cylinder, and accumulator to one thousand pounds again, at which point accumulator-valve D will again close and entrap the oil at one thousand pounds pressure with air compressed above in the accumulator. The valve D being again closed, pressure will now again run up in the pipe-line and press-cylinder to four thousand pounds

per square inch. This entire operation is repeated in cycles.

It will be noted that the weight 5 on the end of the lever 4 is adjustable so as to be stationed at different points. The areas of the faces 18 and 17 bear a certain ratio to each other, which will be determinable by practice and will vary as may be required. The oil-pressure in the passage 6 will act concurrently against the two faces 18 and 17. Thus it will be seen that the weight 5 and the pressure on plunger 11 represent two forces acting in the same direction on the lever 4, though on different sides of the fulcrum, and that these two forces are opposed by the force acting against the plunger 12. When the oil-pressure acting against the plunger 12 is sufficient to overcome the pressure acting against the plunger 11 and also the force of the weight 5, a condition which obtains when the pressure in passage 6 reaches one thousand pounds per square inch, the end 17 of plunger 11 will close down upon the seat 25 and shut off the further flow of oil into the accumulator. Obviously the total pressure on the faces 18 and 17 will be regulated by proportioning the areas of these two plungers. When the conical end 17 of the plunger 11 is seated on the seat 25, it is obvious that the effective area exposed to oil-pressure in passages 9 and 6 will be decreased, so that the closing pressure of plunger 11 on its seat will be very great.

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

1. The combination with a pump, a pipe-line into which it delivers, a press-cylinder to which the pipe leads, and an accumulator, of an automatic valve between the accumulator and the pipe-line, said valve consisting of a body having a passage through which fluid-pressure passes from the pipe to the accumulator and then back again, said passage being provided with a valve-seat, two plungers whose ends are of different areas and are both exposed to the pressure in the aforesaid passage, one of the plungers acting as a valve in connection with the valve-seat, and the other being acted upon at times by the pressure to close the valve, and a weighted lever fulcrumed between the two plungers and acted on by both of them, all arranged and operating so that the valve will close when the fluid-pressure reaches a predetermined amount in the accumulator, after which the pressure in the pipe-line will rise to a higher degree.

2. The combination with a pump, a pipe-line into which it delivers, a press-cylinder to which the pipe leads, and an accumulator, of an automatic valve between the accumulator and the pipe-line, said valve consisting of a valve-body having a passage through which fluid-pressure passes from the pipe to the ac-

5 cumulator at times and at times discharges  
back again, said passage having a valve-seat,  
two plungers having different areas both ex-  
posed to the pressure in the passage and one  
acting as a valve to control the flow of fluid  
to the accumulator while the other having an  
end of larger area is acted upon by the pres-  
sure to close the valve, a lever fulcrumed on  
the valve-body between the projecting ends

of the plungers and acted upon by both of  
them, said lever being suitably weighted, sub-  
stantially as described.

Signed at Atlanta, Georgia, this 16th day  
of November, 1903.

WALTER D. NASH.

Witnesses:

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N. M. SHANLIS.