

H. F. BICKEL.
PRESSURE RETAINING VALVE.
APPLICATION FILED NOV. 9, 1907.

962,545.

Patented June 28, 1910.

Fig. 1.

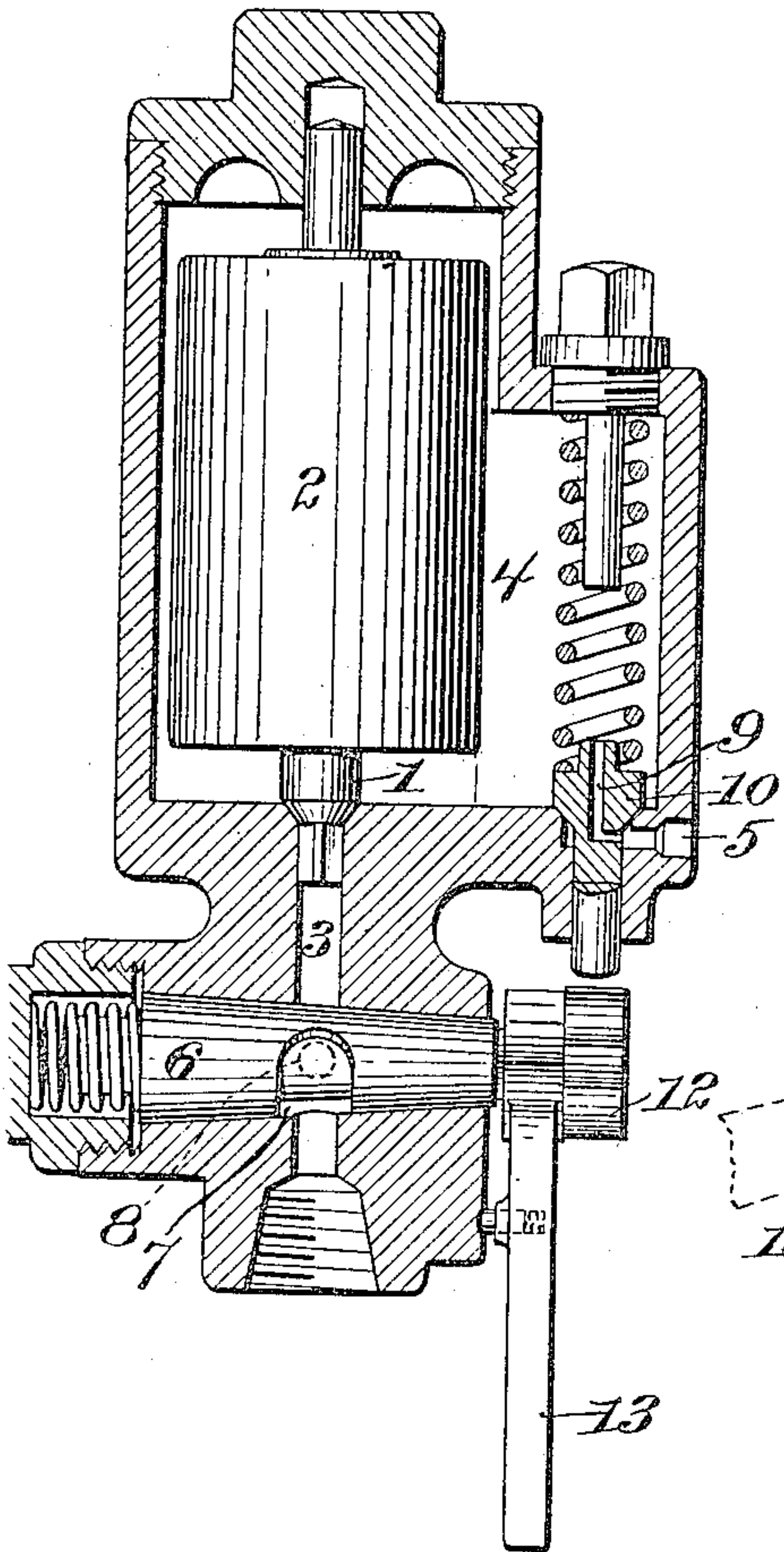


Fig. 2.

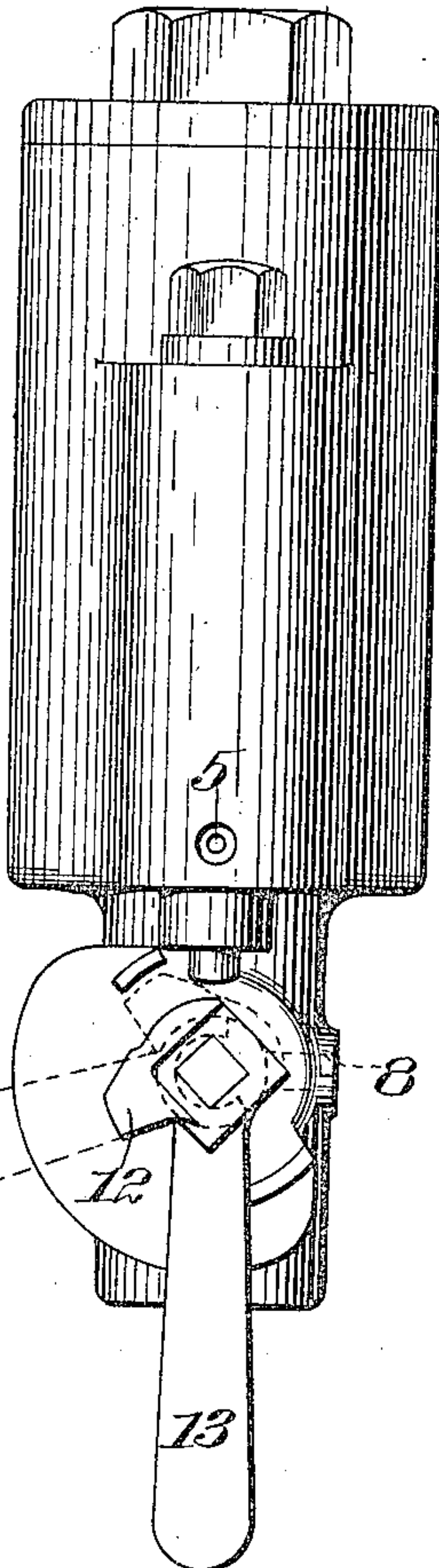


Fig. 3.

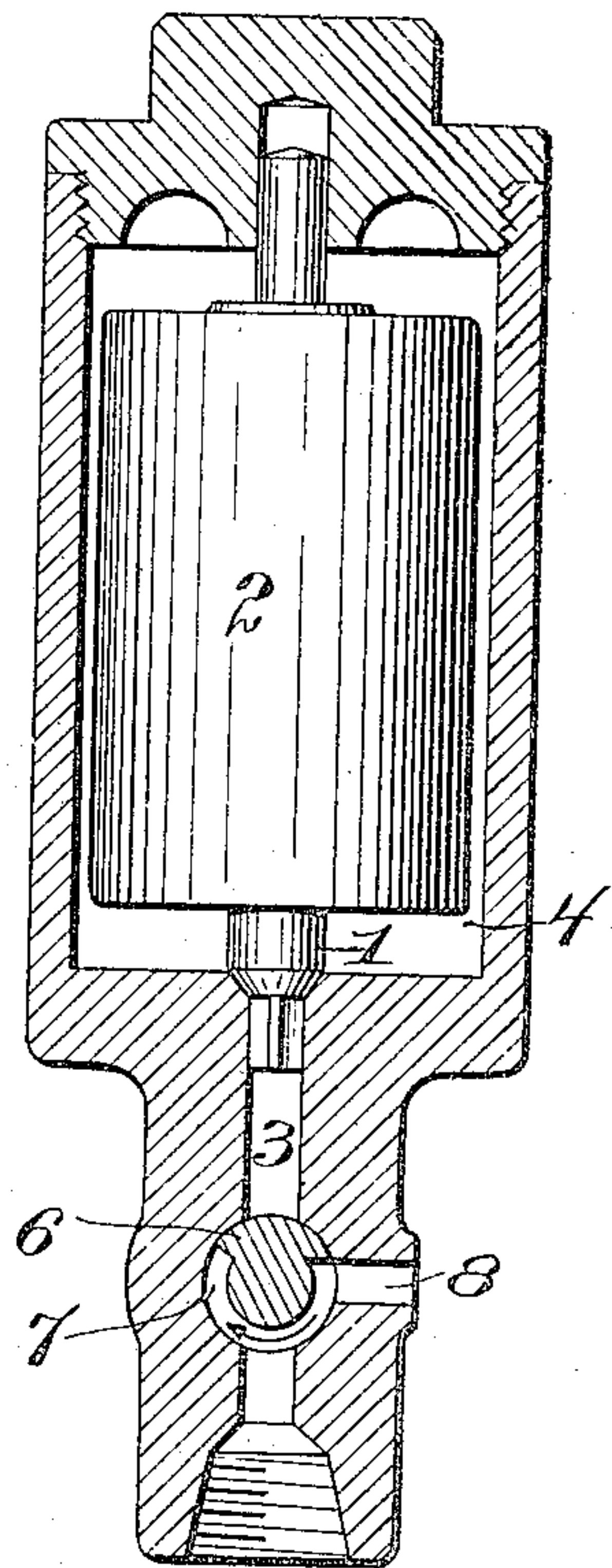


Fig. 4.

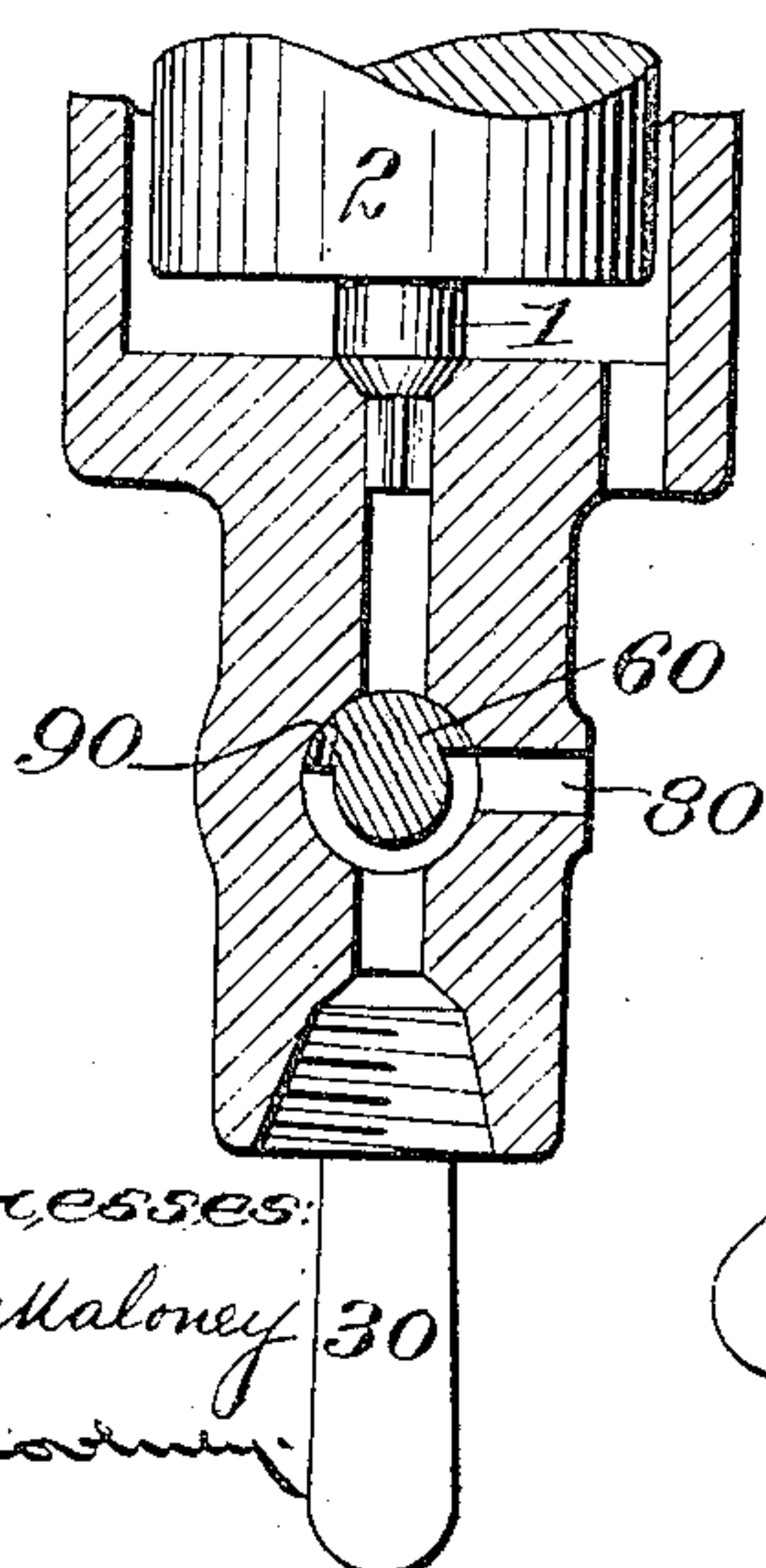


Fig. 5.

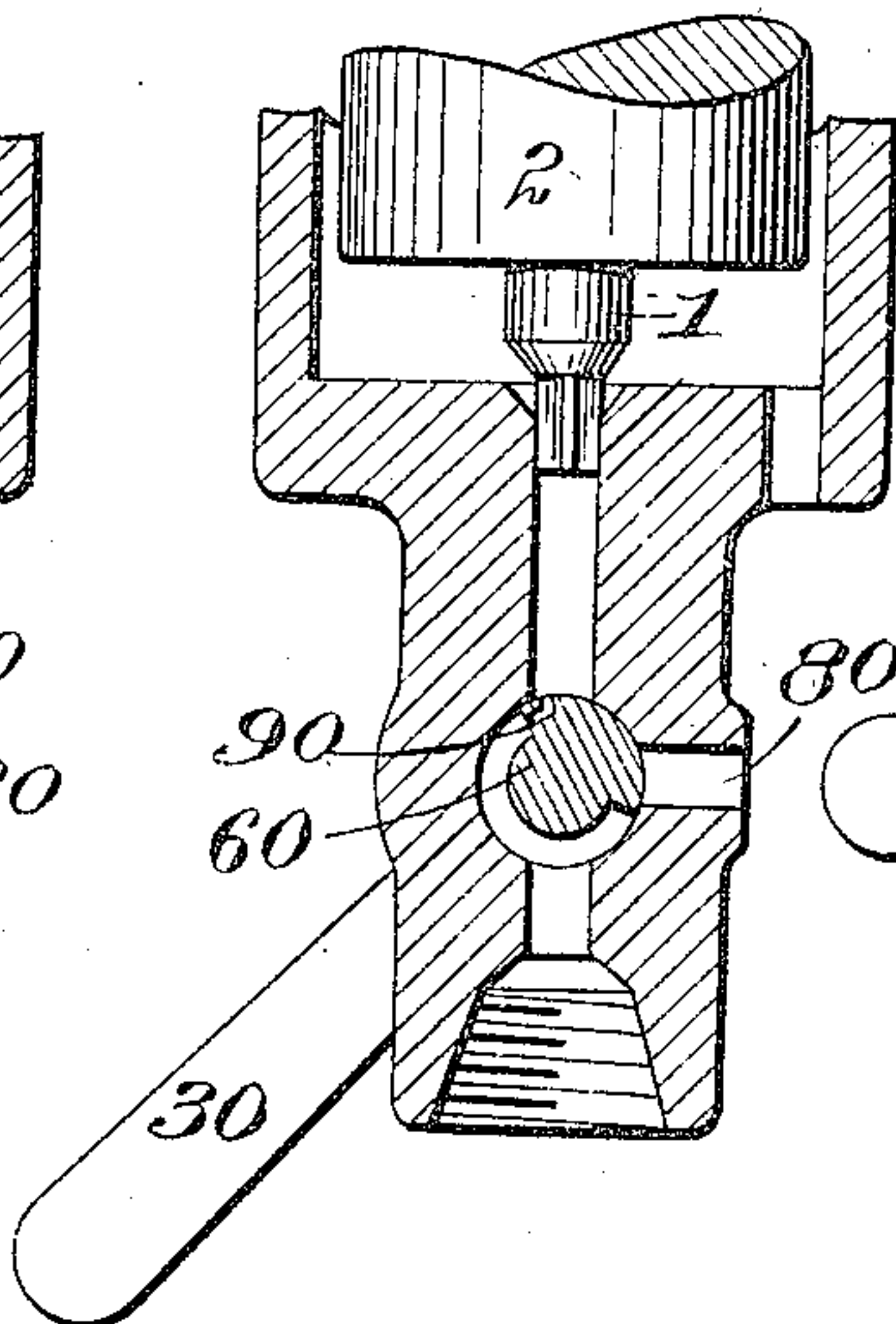
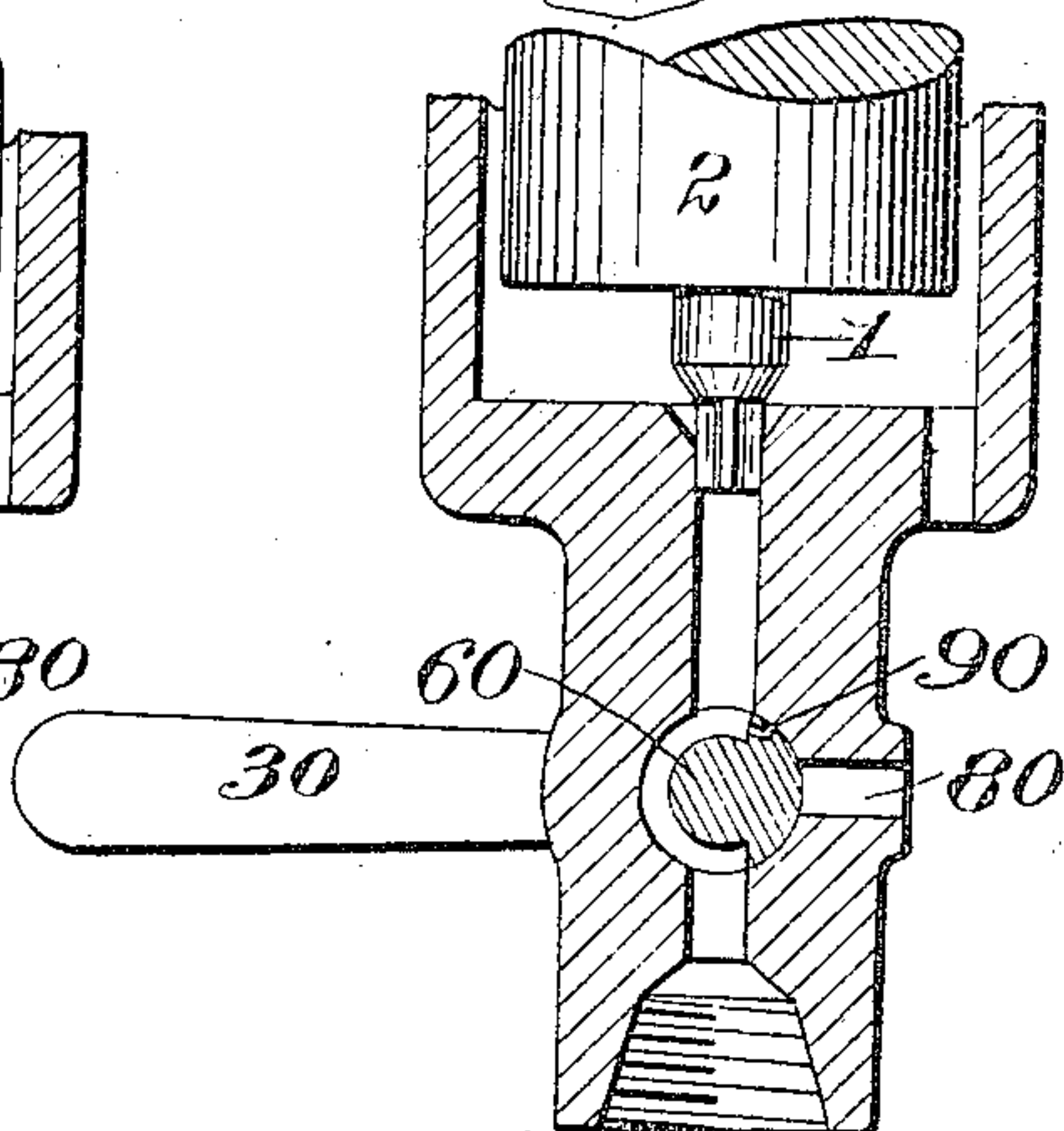


Fig. 6.



Witnesses:

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UNITED STATES PATENT OFFICE.

HENRY F. BICKEL, OF NEW YORK, N. Y., ASSIGNOR TO NEW YORK AIR BRAKE COMPANY, A CORPORATION OF NEW JERSEY.

PRESSURE-RETAINING VALVE.

962,545.

Specification of Letters Patent. Patented June 28, 1910.

Application filed November 9, 1907. Serial No. 401,410.

To all whom it may concern:

Be it known that I, HENRY F. BICKEL, a citizen of the United States, residing in New York, in the county of New York and State of New York, have invented an Improvement in Pressure-Retaining Valves, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

The present invention relates to a pressure retaining valve and is embodied in a valve of that class commonly used in connection with the so-called automatic air brake system, especially as applied to freight trains where long grades are encountered. In this connection, pressure retaining valves are employed to retain a certain amount of pressure in the brake cylinders of the cars so as to keep the brakes set while recharging the brake pipe and auxiliary reservoirs when it becomes necessary to do so. It has been found necessary to retain a higher pressure for a longer time in the brake cylinders of loaded cars than is retained in cylinders of empty cars. This is done to obtain sufficient braking power to control the mixed train of empty and loaded cars, and avoid sliding wheels on empty cars, and this result is accomplished in accordance with the present invention by introducing what may be termed a timed controlling element, which will retain excess pressure for a certain length of time, at the end of which time the pressure is the same throughout, so that the pressure when reapplied is built up in the brake cylinders from substantially the same point on all the cars, in which the pressure retaining valve has been put into operation. This result would be obtained on normal grades. As the grades become steeper the times of application and release become more frequent. Therefore, a proportionately higher excess will be in the brake cylinder of the loaded car which is necessary to help control the train on very steep grades. The action of the pressure-retaining valve is controlled by means of an actuating device or handle capable of being set in three different positions, the retaining valve being arranged, as usual, in the exhaust passage from the brake cylinder through the triple valve, the actuating device being adapted to let the air exhaust directly from the triple valve or through the normal pressure retain-

ing device, or through the excess pressure retaining devices.

In accordance with the invention, the normal pressure retaining device consists of a loaded valve such as has been heretofore commonly employed, adapted, for example, to retain a pressure of fifteen pounds to the square inch in the brake cylinder when the said loaded valve is interposed between the triple valve and the exhaust.

In the construction shown, the load on the valve is in the form of a weight. In accordance with the invention, the said valve is supplemented by means for checking the free exhaust from the valve cylinder, so that the lowering of the brake cylinder pressure is materially retarded, as pressure in excess of that determined by the load on the valve is thus retained for a predetermined time. When, therefore, it is desired to retain pressure greater than that determined by the loaded valve, and for a longer time, as is the case, for example, with loaded cars, the appliance is so set as to operate the means for checking the exhaust. The means for controlling the operation of the pressure retaining device consists in a valve which is arranged to establish communication between the triple valve and the atmosphere, or between the triple valve and the weighted valve chamber, the actuator for said valve also operating means for restricting the free flow of exhaust from the brake cylinder, so that a pressure in excess of that determined by the load on the valve can be temporarily retained. When, therefore, the device is in use, the actuator may be set for free exhaust or restricted exhaust, subject to the action of the weighted valve, according to the amount of pressure it is desired to retain.

Figure 1 is a vertical section through the pressure retaining valve embodying the invention; Fig. 2 is a side elevation showing the actuating cam for the supplemental valve; Fig. 3 is a section through the valve portion of the controlling member; and Figs. 4, 5 and 6 are sectional views showing a modification.

The main pressure retaining device consists of a valve 1 which is provided with a weight 2, which may be such as heretofore commonly employed, the said valve controlling a duct 3 which leads from the triple valve of the brake mechanism. In the construction shown in Figs. 1 to 3, the valve 1

is located in a closed chamber 4 having an outlet duct 5 controlled, as will be hereinafter described. The duct 3 is provided with a two-way valve 6 herein shown as a taper valve having a port 7 so arranged that by turning the valve communication is established through the duct 3 with the chamber 4, or with a duct 8 which leads directly to the atmosphere. In Fig. 3, the valve is shown as in its normal position so that the exhaust from the triple valve leads directly to the atmosphere, the brakes being solely under the control of the triple valve.

By turning the valve 6 in the direction of the arrow (Fig. 3) the duct 8 will be cut off and communication established from the triple valve to the chamber 4, so that the exhaust from the triple valve is subject to the action of the pressure retaining valve 1. If, therefore, the weight 2 is such as to retain a pressure of about fifteen pounds to the square inch, that amount of pressure will be retained in the brake cylinders beyond the influence of the triple valve. The chamber 4 is provided, as stated, with a controllable outlet duct 5 which, when open, establishes communication with external air of such capacity that when the valve 1 is lifted from its seat, the air will escape rapidly, so that the pressure comes down in a relatively short period of time to that determined by the action of the weight 2; but, in order to retain an excess pressure for a longer period, when desired, the device is provided with means for throttling or reducing the capacity of the outlet so as to render the escape of the air relatively slower, the chamber being provided with a supplemental, restricted outlet 9 which may be of any dimensions desired, the purpose being to retain the entire brake cylinder pressure subject to slowly diminishing; the rate of diminution being determined by the size of the supplemental duct 9. As herein shown, the said duct 9 is in the form of a passage through a valve 10 which controls the outlet 5, so that when the said valve is closed, the duct 9 affords the only port through which the air can escape.

In order that the action of the pressure retaining device may be readily controlled by a single actuator, the valve handle is provided with a cam 12 which is arranged to act upon the stem of the valve 10 so as to lift the same from its seat in response to the action of the said handle.

In the construction shown, the port 7 is of sufficient size to admit of two positions of the handle, while the duct 3 is open to the chamber 4, and the exhaust passage 8 is closed. As indicated in Fig. 2, if the handle 13 is turned to the dotted line position, it will cut off the exhaust passage 8 at the same time leaving the valve 10 closed, so that the brake cylinder pressure is controlled through the

action of the restricted outlet duct 9. This position, therefore, retains the excess pressure for the longer period as is necessary for loaded cars. A further movement of the said handle in the same direction, however, brings the cam 12 under the stem of the valve 10, lifting the said valve from its seat, so that the pressure is relatively quickly reduced to that determined by the action of the weighted valve 1.

While the location of the relatively small outlet in the chamber which contains the weighted valve, as above described, is a practical expedient, it is obvious that the same result can be obtained by any equivalent expedient for checking the free exhaust from the brake cylinder.

In the construction shown in Figs. 4, 5 and 6, for example, the relatively small outlet which relatively delays the exhaust from the brake cylinder down to the pressure controlled by the weighted valve is shown as located between the brake cylinder and the said weighted valve, the appliance being provided with a free outlet beyond the valve. For the purposes of control, the said outlet may be located in the valve 60 which is the equivalent of the valve 6 shown in Figs. 1 and 3, there being a small port 90 formed in the valve 60 which, in one position of the said valve affords the sole means for the escape of pressure from the brake cylinder. The pressure retaining device constructed in this way is operated, as previously described, by an actuating handle 30 capable of being placed in three different positions, as indicated in the drawings. In Fig. 4 the position of the actuating handle is such that the pressure retaining device is not in operation, the cylinder pressure exhausting freely through the duct 80. The intermediate position shown in Fig. 5 is the equivalent for the dotted line position shown in Fig. 2, and provides for the longer retention of pressure in excess of that determined by the load on the valve 1. In this case the exhaust from the cylinder passes through the relatively small duct 90 to the weighted valve 1, thus temporarily retaining a pressure in excess of that which is sufficient to unseat the said valve. In Fig. 6 the position is such that the cylinder pressure is admitted freely to the valve 1, so that the cylinder will exhaust promptly down to the pressure controlled by said valve.

Claims.

1. A pressure retaining appliance for brake cylinders comprising a controlling valve located in the exhaust passage from said cylinder and adapted to selectively control two outlet ducts, one of said ducts being open; a loaded valve controlling the other duct; and a supplemental, relatively small outlet duct from the brake cylinder also controlled by the operation of said controlling valve.

2. In a pressure retaining device for brake
cylinders, a two-way valve adapted in ac-
cordance with its position to establish com-
munication between the brake cylinder and
5 the air, or between the brake cylinder and a
supplemental duct; a loaded valve control-
ling said supplemental duct; a chamber be-
yond said valve provided with two outlets,
one of which is relatively small and nor-
10 mally open, and the other relatively large
and normally closed; a valve controlling

said relatively large outlet; and means op-
erated in conjunction with the two-way valve
for opening said relatively large outlet, sub-
stantially as described.

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In testimony whereof, I have signed my
name to this specification in the presence of
two subscribing witnesses.

HENRY F. BICKEL.

Witnesses:

C. E. LEACH,

E. A. JOHNSON.