

F. M. PATTERSON.
VALVE.

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Patented Feb. 28, 1911.

2 SHEETS—SHEET 1.

985,444.

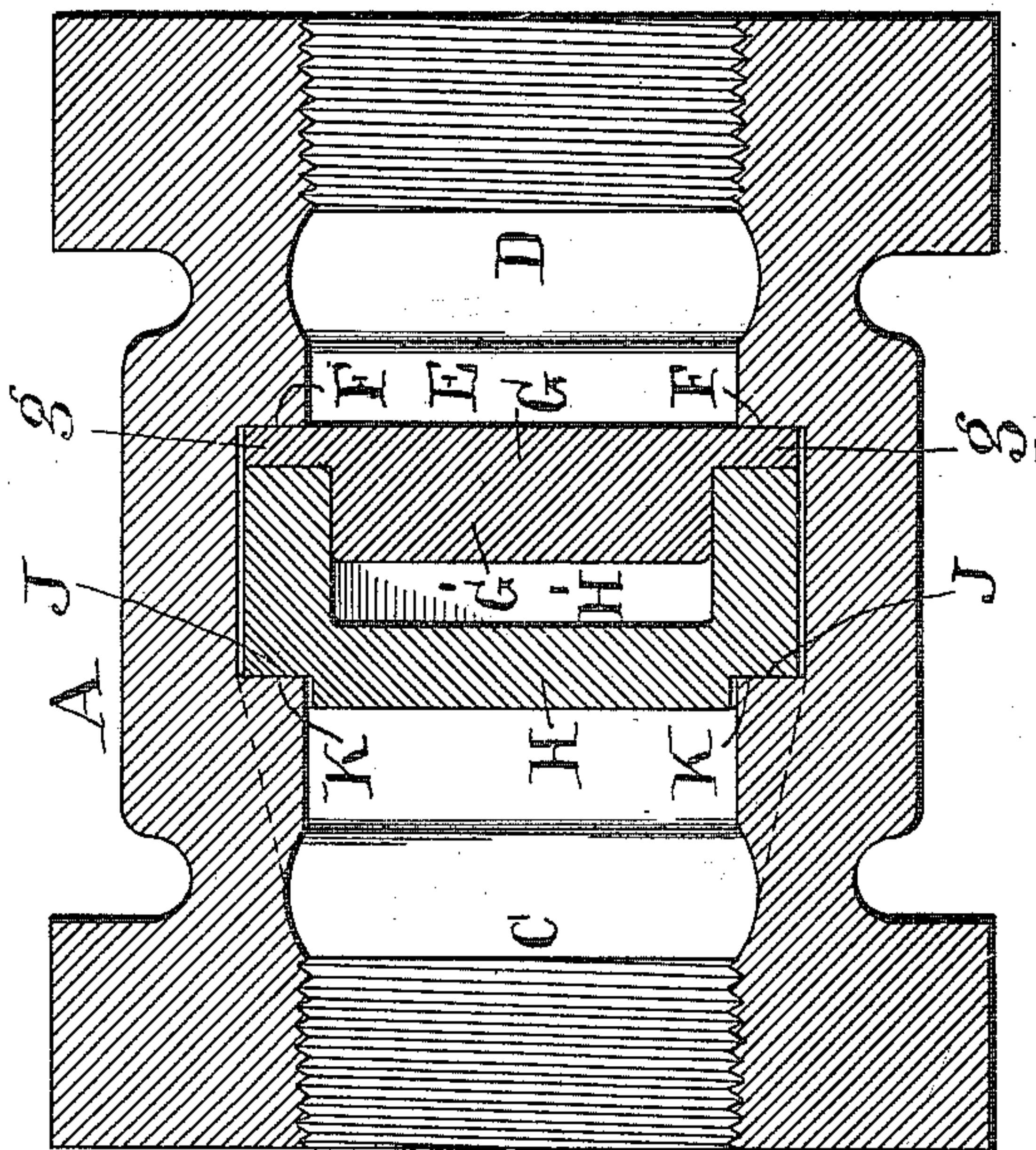


Fig. 2

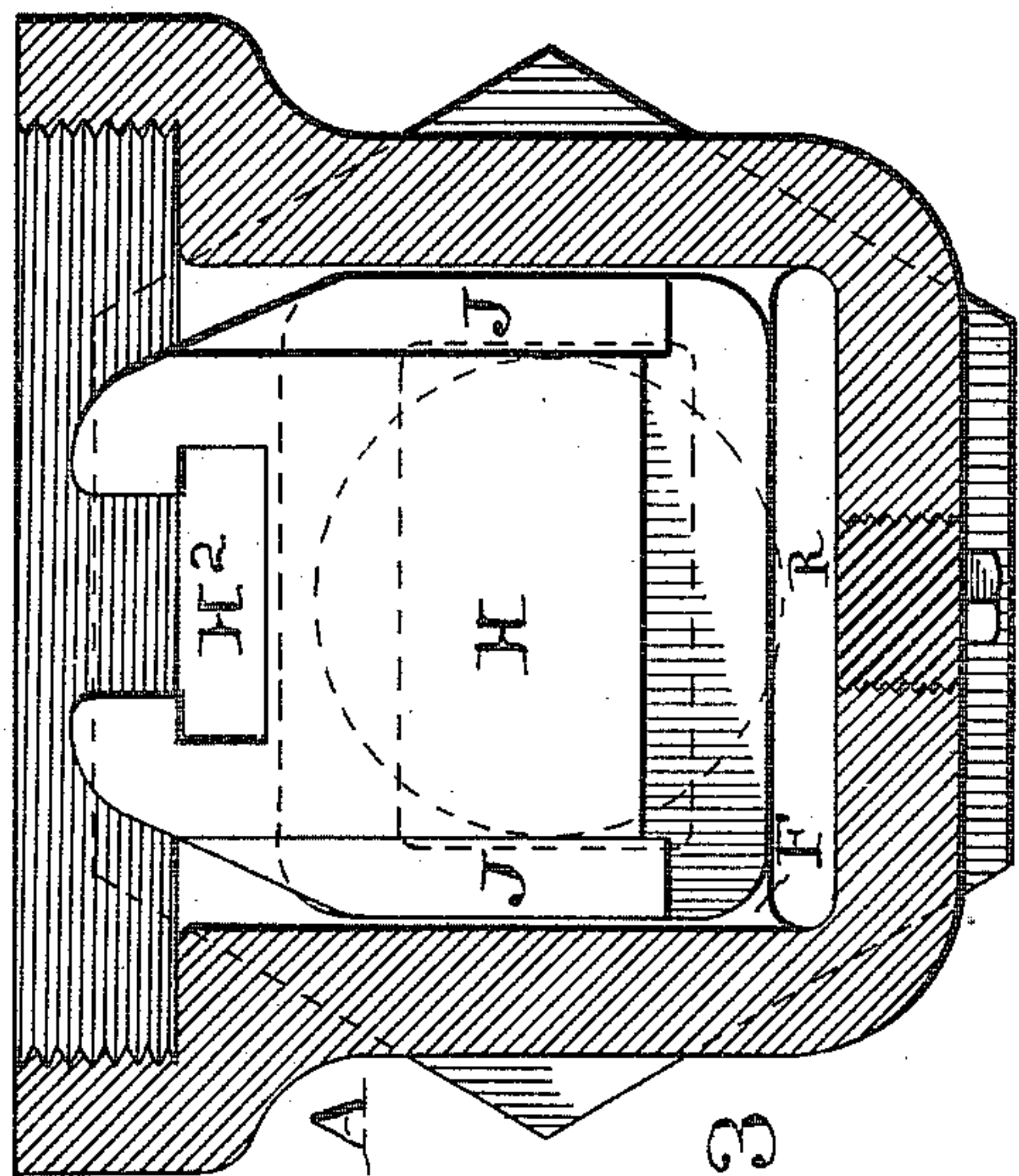


Fig. 3

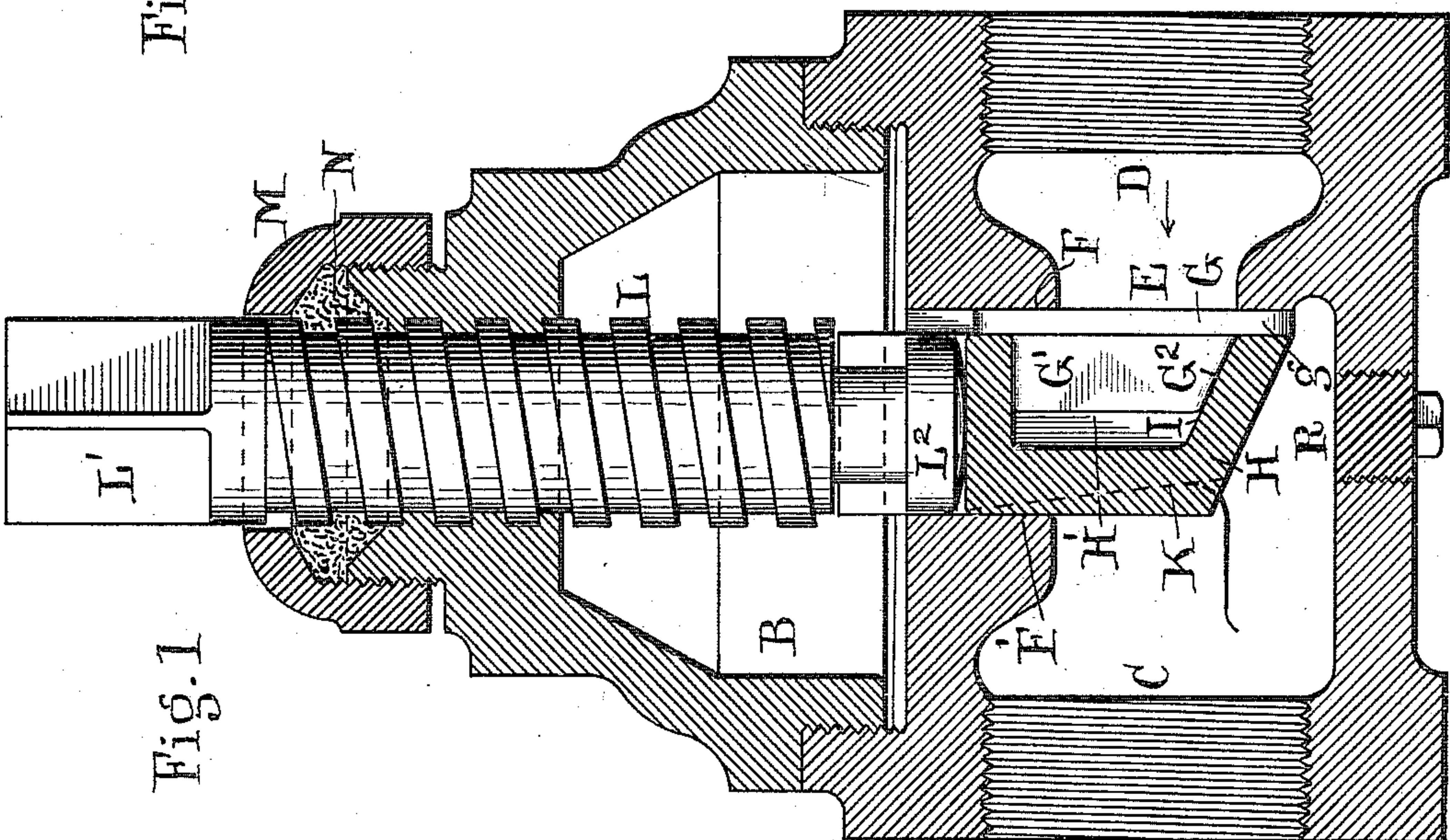


Fig. 1

Witnesses

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UNITED STATES PATENT OFFICE.

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VALVE.

985,444.

Specification of Letters Patent.

Patented Feb. 28, 1911.

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To all whom it may concern:

Be it known that I, FRANKLIN M. PATTERSON, a citizen of the United States, and a resident of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Valves, of which the following is a specification.

My invention has reference to valves, and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to provide a construction of through valve which shall embody simplicity and durability and be so constructed that the sliding valve-piece shall at all times maintain a close sliding contact with the valve-seat.

My invention consists of a valve-body having a through passage formed with a transverse valve-seat and opposed cam guides, combined with a sliding valve-piece movable over the valve-seat, and a carrier for the valve-piece guided in the valve-body and having cam parts to engage the cam guides and a cam surface for acting upon the valve-piece to cause it to press against its seat when the valve is being opened, whereby dirt is prevented from lodging between the valve-piece and seat.

My invention also consists in providing a valve-body such as above mentioned with a valve-piece and carrier so constructed that they are normally guided as a unit within the valve-body between a valve-seat and an opposed parallel guide surface and said carrier and valve-piece having a cooperating union that they tend to spread apart when opening the valve, whereby the valve-piece is at all times kept tightly upon its seat and prevents dirt lodging between the seat and valve-piece.

My invention also consists in providing a body with ports in alinement and separated by a middle valve chamber having guide surfaces one of which surfaces forms a valve seat and the other of which surfaces provides irregular shaped parts facing the valve-seat but without obstructing the through passage formed between the inlet and outlet ports, combined with a vertically adjustable valve structure working in contact with the valve-seat and the irregular

shaped parts of the middle chamber, and a cleaning bonnet or removable part to the body below the valve chamber and valve for discharging the collections from below the valve.

My invention also comprehends details of construction which, together with the features above specified, will be better understood by reference to the drawings, in which:—

Figure 1 is a sectional elevation of my improved valve; Fig. 2 is a sectional plan view of the same in the plane of the valve-piece and through passage; Fig. 3 is a vertical cross section of the valve-body showing the valve-piece and carrier in position; Fig. 4 is a vertical sectional view of my improved valve slightly modified for larger size; Fig. 5 is a sectional plan view of Fig. 4; and Fig. 6 is a vertical cross section of the valve shown in Figs. 4 and 5.

A is the valve-body and is provided with the inlet port D and outlet port C in line and separated by the valve port E having the valve-seat F. Facing the valve-seat and parallel to it is the guide surface F', thereby forming a vertical slot or valve chamber opening upward into the bonnet or hood B which is screwed or otherwise attached to the body as shown in Fig. 1 or solid with it as in Fig. 4. The sides of this slotted part or valve chamber are provided with the inclined or cam guide surfaces K K, cast solid with the body as in Figs. 1, 2 and 3 or detachable therefrom as in Figs. 4, 5 and 6 as at K'.

G is the valve-piece and works against the valve-seat F and is provided with a rear projection G' which is inclined or cam shaped on the bottom as at G². The valve-piece G is carried by the carrier H which has a flat face resting against the flange of the valve-piece G and a recessed part H' into which the projection G' of the valve-piece extends, the lower wall of this recessed part being inclined or cam shaped as at I to cooperate with the inclined part G² of the valve-piece. The carrier H is also provided at each side with inclined guide surfaces J J which make contact with the guide surfaces K K in the valve-body, and is further made at the top with the inverted T slot H² for receiving the head

L² of the adjusting screw L. This adjusting screw L extends upward and works in the upper portion of the bonnet or hood B; it has its top made square at L' for receiving a key, hand-wheel, lever or other means to rotate it; and is made water or steam tight by packing N clamped around the screw L by the screw cap M which is screwed upon the bonnet. As the packing N is upon the discharge side of the valve-piece, it need not be formed around a cylindrical portion of the valve stem as an extension of the screw L, but may be about the screw itself to reduce the height of the bonnet. I, however, do not restrict myself in this respect as any suitable means for operating the carrier and valve-piece may be employed.

In the construction shown in Figs. 1 to 3, the parts are made in form suitable for smaller sizes of valves and in this case the cam guides K are shown as cast integral with the body for cheapness, but for larger sizes of the valve I prefer to form these cam guides separate and detachable as shown at K' in Figs. 4 to 6, said parts being secured in position by screws S, and in practice these detachable cam guides K' may be made of steel, phosphor bronze or other metal of durable quality while the body may be of cast iron. In the manufacture of the valve with the removable cam guides K', the faces or walls F and F' as well as the side walls for the cam guides are trued in a slotting or shaping machine and then the cam guides K' applied, thereby giving a most accurate construction and at a reasonable cost. In these valves, the construction is such that there is a large clearance below the valve piece the moment the port E begins to open, and moreover the direction of the current of water is downward with the result of loosening and driving out any sediment or collections in the body below the valve. The lower part of the carrier H is inclined so that, while making a clear opening for the flow of water at all times, it will act as a wedge for loosening or discharging any objectionable materials within the body and below the valve. This is important because in the use of blow off valves, it frequently happens that rivet heads, bolts, nuts, or other solid substances are forced into the valve-body and are liable to become lodged in the same. By my construction, the valve tends to clear itself of all such obstructions.

To enable the valve to be cleaned without disconnecting it, a removable bottom below the valve chamber is provided. In Figs. 1 to 3, this removable bottom is shown as a screw plug R, but in Figs. 4 to 6, it is shown as a detachable plate or bonnet R which may be clamped in place by screws r. In this latter case, the opening is large so

as to enable the tool for shaping to enter and also to permit the insertion of the valve and its carrier.

The operation of the valve is as follows: The downward pressure of the screw stem L upon the carrier H causes the coöperation of the inclined cam surfaces K J and a resulting lateral pressure by the carrier H upon the valve-piece G to cause it to fit tightly to its seat F. If the valve is to be opened, the screw L is rotated and raises the carrier H, causing it, together with the valve-piece, to be guided freely between the valve-seat F and the guide surface F'; and the upward movement of the carrier H causes the cam surface I thereof to coact with the inclined surface G² of the valve-piece, as a couple, to force said valve-piece toward the valve-seat and maintain a tight sliding joint therewith to prevent dirt or scale lodging between the valve-piece and seat, the presence of which dirt or scale would abrade or injure the surfaces of the valve-piece and seat. The inclination of the cam surfaces I G² may be varied to suit the amount of pressure required for any given area of valve port.

The general operation of the parts H and G is such that they constitute a compressible couple on the downward thrust and an expansible couple upon the upward pull, but in all cases forcing the valve-piece G against its seat F.

It is immaterial to my invention how the carrier H may be reciprocated and consequently I do not restrict myself to the means shown. The discharge side of the valve port E is so shaped as to give large clearance when the valve is opening so that the resistance to the flow of water or other fluid is low and thereby permits free flow through the valve with a maximum rate of discharge during the opening of the valve.

While I have shown my valve in the form which I have found most excellently adapted for the objects of my invention, I do not limit myself to the details thereof as these may be modified without departing from the spirit of the invention.

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

1. In a valve, a body having a valve-seat and opposite to said valve-seat a parallel guide surface and cam portions, combined with a carrier guided against the guide surface and cam portions, and a valve-piece carried loosely by the carrier and having a cam part acted upon by the carrier to force said valve-piece against its seat when the valve is being opened.

2. In a valve, a body having a valve-seat and opposite to said valve-seat a parallel guide surface and cam portions, combined

with a carrier guided against the guide surface and cam portions, a valve-piece carried loosely by the carrier and having a cam part acted upon by the carrier to force said valve-piece against its seat when the valve is being opened, a bonnet for the valve-body, a screw stem extending through the bonnet for operating the carrier, and means for forming a liquid tight joint between the stem and bonnet.

3. In a valve, a body part having a valve chamber with a valve seat on one face and cam portions on the sides of the chamber and directed toward the seat, combined with a carrier in the valve chamber guided parallel to the valve seat and having cam portions upon it for coöperation with the side cam portions in the valve chamber for forcing the carrier toward the valve seat when depressing it in closing the valve, and a valve piece carried by the carrier and coöperating with the valve seat and provided with cam means operated on by the carrier for forcing the valve piece against the valve seat only when the carrier is being raised as when opening the valve.

4. In a valve, a body part having a valve port and valve-seat surrounding it, a valve-piece coöperating with the valve-seat, and a carrier guided in the body parallel to the valve-seat and having cam means operating upon the valve-piece for forcing it against its seat when opening the valve whereby dirt is prevented from finding lodgment between the valve-piece and valve-seat and said carrier also having means for causing it to move toward the valve-seat when closing the valve.

5. A rectangularly shaped valve piece carrier having one face recessed and the recessed portion provided with an inclined bottom and the opposite face provided with parallel cam portions, combined with a rectangularly shaped valve-piece having an extended rim against which the recessed face of the carrier rests and an extension which fits into the recess of the recessed face provided with an inclined lower part coacting with the inclined bottom of the recess, and a rotatable screw stem for reciprocating the carrier.

6. A valve having a valve-body provided with a valve-seat, combined with a valve-piece, and cam means to move the valve-piece and simultaneously press it against its seat only when opening the valve.

7. A valve having a valve-body provided with a valve seat, combined with a valve piece, means to move the valve-piece and having cam devices coacting with the body to press the valve piece against its seat when closing the valve, and also having cam devices coacting with the valve piece to press it against its seat when opening the valve.

8. In a valve, a valve-body having a valve-

seat, combined with a valve-piece adapted to slide over the seat, an operating valve stem, and a carrier for the valve-piece movable by the stem and constructed with cam means to force the valve-piece against the seat only when opening the valve.

9. In a valve, a body part having a through passage with inlet and outlet ports widely separated and a transversely arranged valve-seat F adjacent to the inlet port and also having a valve chamber provided with a guide surface F' parallel with and facing the upper part only of the valve-seat F and said body part having side cam portions J J extending beyond the guide surface F so as to reach points on opposite sides of the through passage, combined with a valve structure coöperating with the valve seat F, the guide surface F' and the cam portions J J and movable transversely across the through passage, and consisting of a carrier guided by the guide surface F' and side cam portions J and a valve piece carried by the carrier and having with it coacting cam portions for forcing the valve piece against the valve seat when the carrier is being raised in opening the valve.

10. In a valve, a body having a valve chamber provided with a port surrounded by a valve-seat and opposite to said valve-seat and out of the line of flow through the port a parallel guide surface and side cam portions, combined with a carrier guided against the guide surface and cam portions only, and a valve-piece carried loosely by the carrier and working in contact with the valve-seat, said valve piece and carrier having coöperating cam portions for forcing the cam piece against the seat when the carrier is being raised in opening the valve.

11. In a valve, a body having a valve chamber provided with a port surrounded by a valve-seat and opposite to said valve-seat to one side of the line of flow through the port a parallel guide surface and side cam portions, combined with a carrier guided against the guide surface and cam portions, and a valve-piece carried loosely by the carrier and working in contact with the valve-seat and having the lower part of the combined carrier and valve-piece structure made with a transverse beveled surface for clearing the valve chamber of obstructions when closing the valve.

12. In a valve, the combination of a valve body having a valve chamber into which the inlet and outlet ports open said valve chamber being provided with a valve seat and an opposing parallel guide surface opposite its upper part and further having the chambered portion extending downward considerably below the inlet port through the valve seat and open freely through the outlet port, combined with a valve piece working against the valve seat and guided thereby, and a rec-

4
5 tangular carrier guided upon the guide which
faces the valve seat and also engaging the
valve piece so as to move the same and be
guided by it and further having its lower
10 surface beveled with the lowest edge extend-
ing to the bottom of the valve piece, and
means for reciprocating the carrier, the con-
struction being such that the valve piece acts
as a guide for the carrier which moves it
and is protected at the lower edge from ob-

structions by the inclined face of the carrier
operating to force the obstructions away
from the valve seat.

In testimony of which invention, I have
hereunto set my hand.

FRANKLIN M. PATTERSON.

Witnesses:

M. F. DRISCOLL,
R. M. KELLY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
