

No. 817,112.

PATENTED APR. 3, 1906.

A. HARRISON.
AUTOMATIC RELIEF VALVE AND TRAP.

APPLICATION FILED JULY 29, 1905.

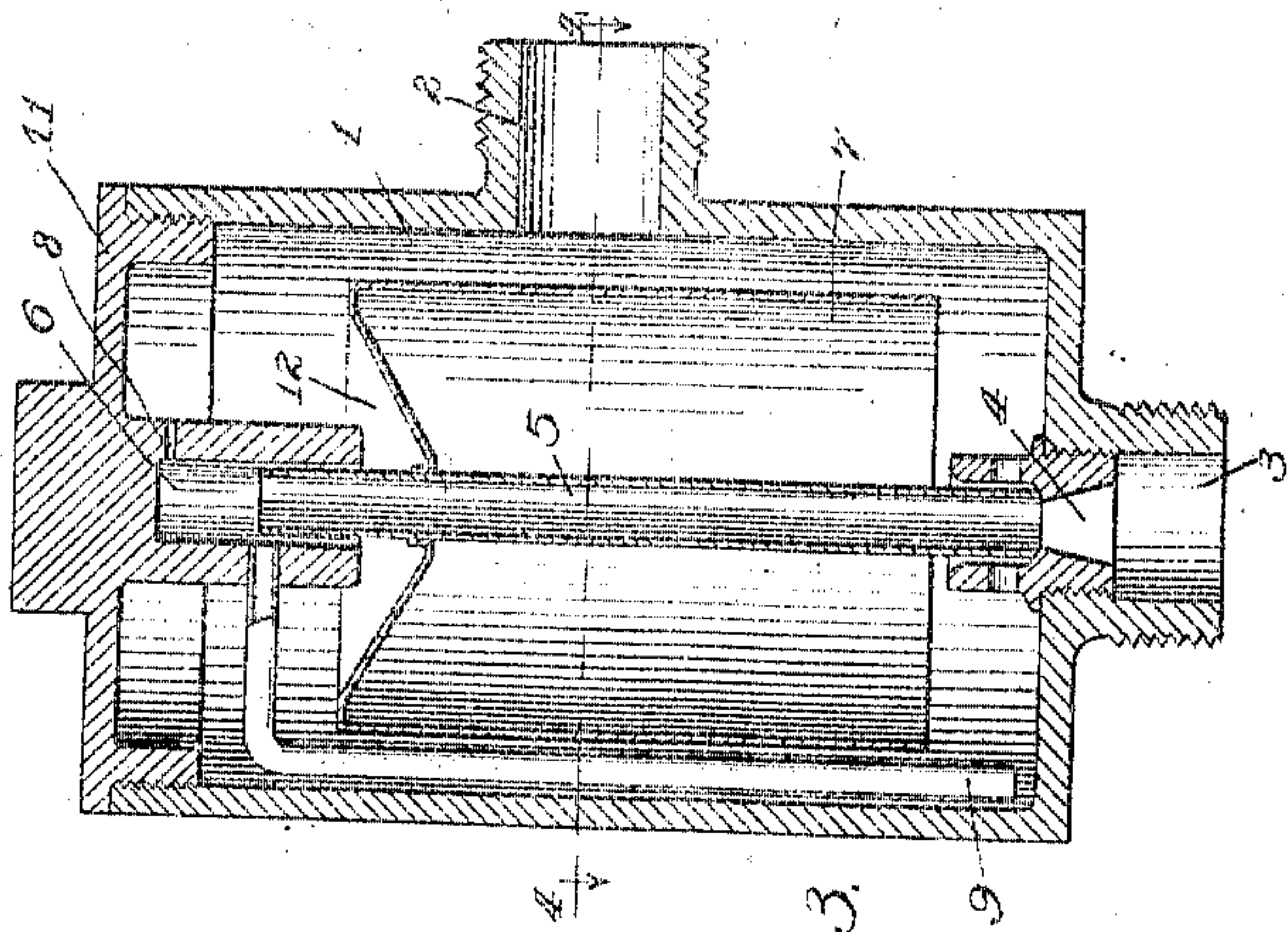


Fig. 3.

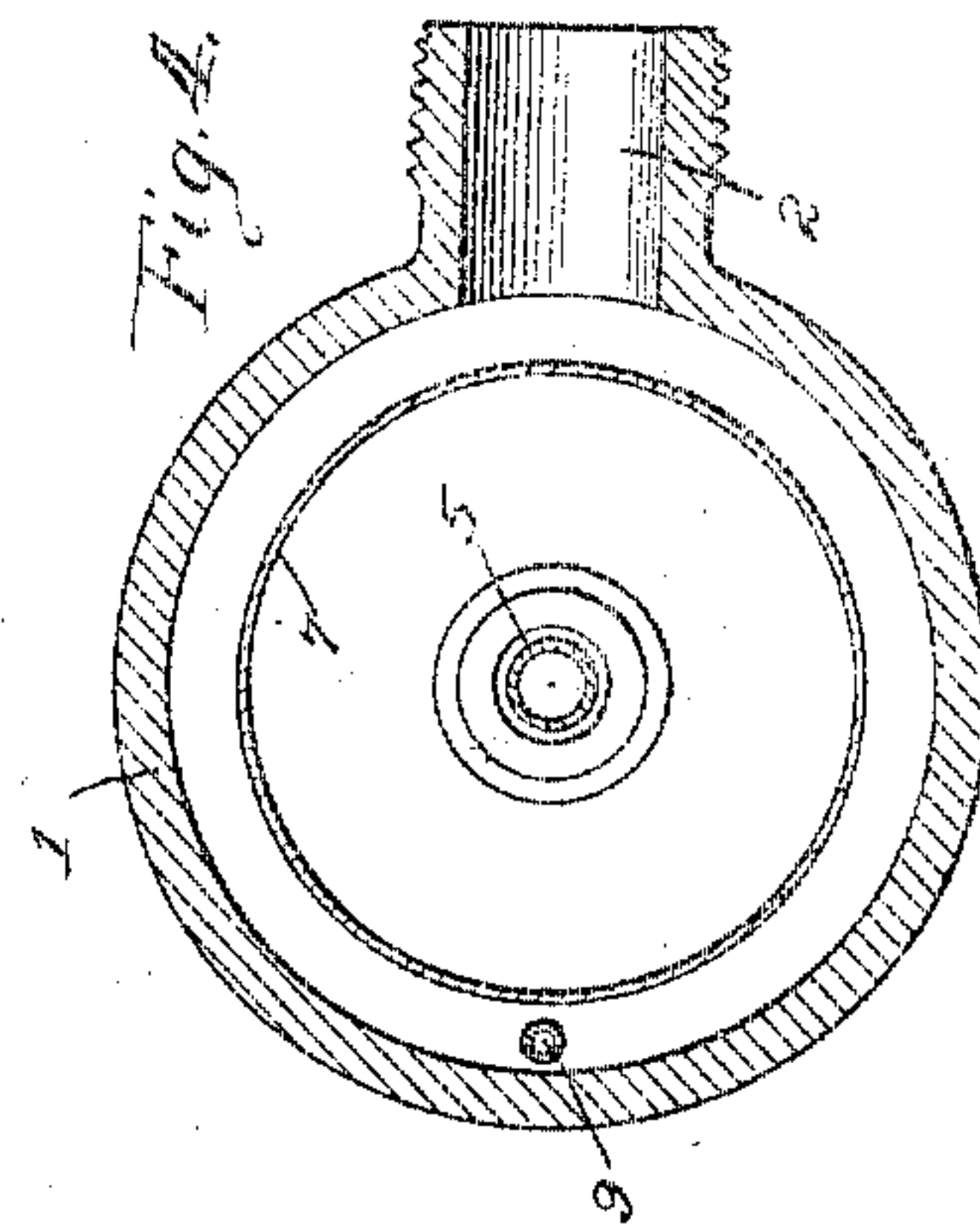


Fig. 4.

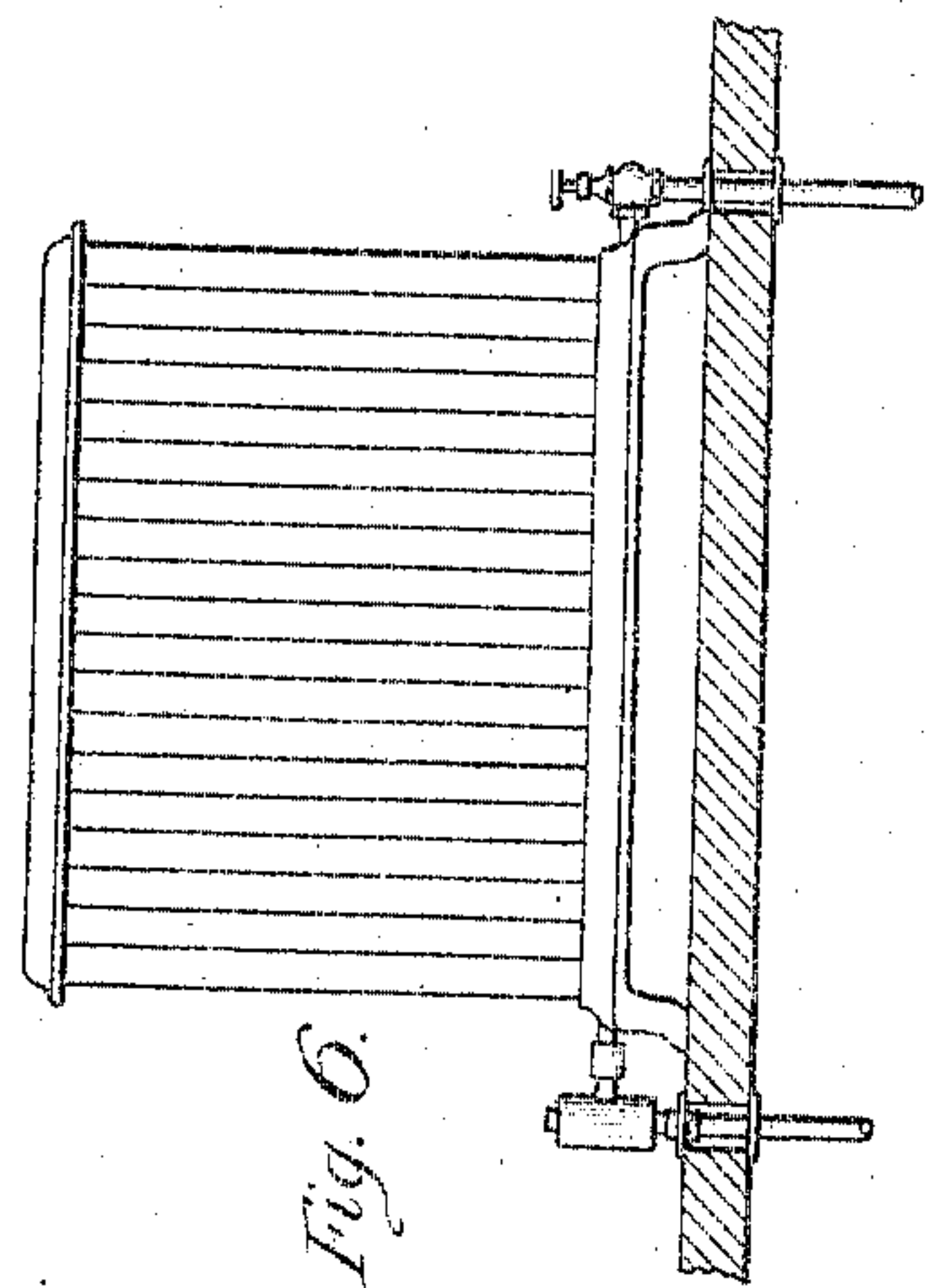


Fig. 6.

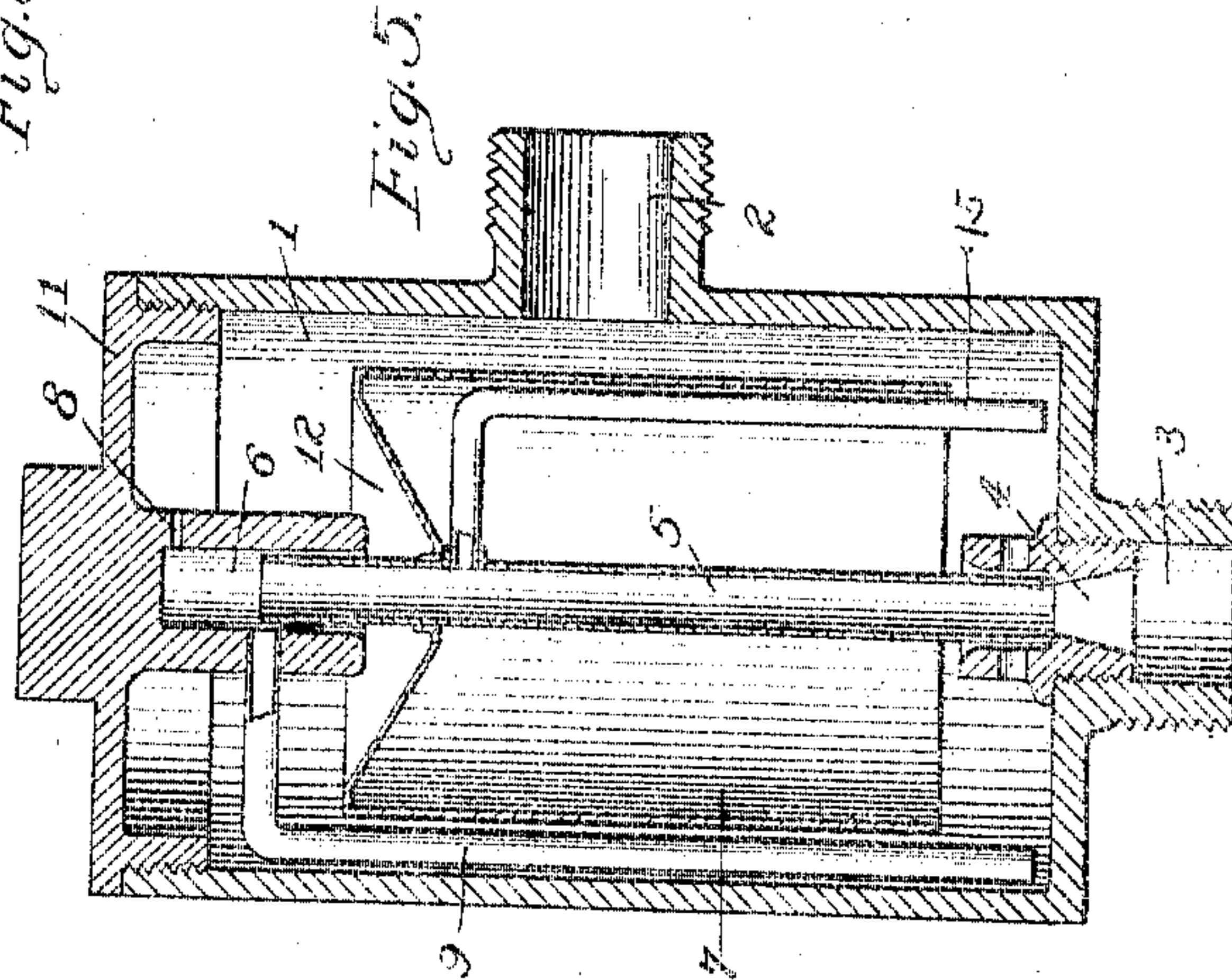


Fig. 5.

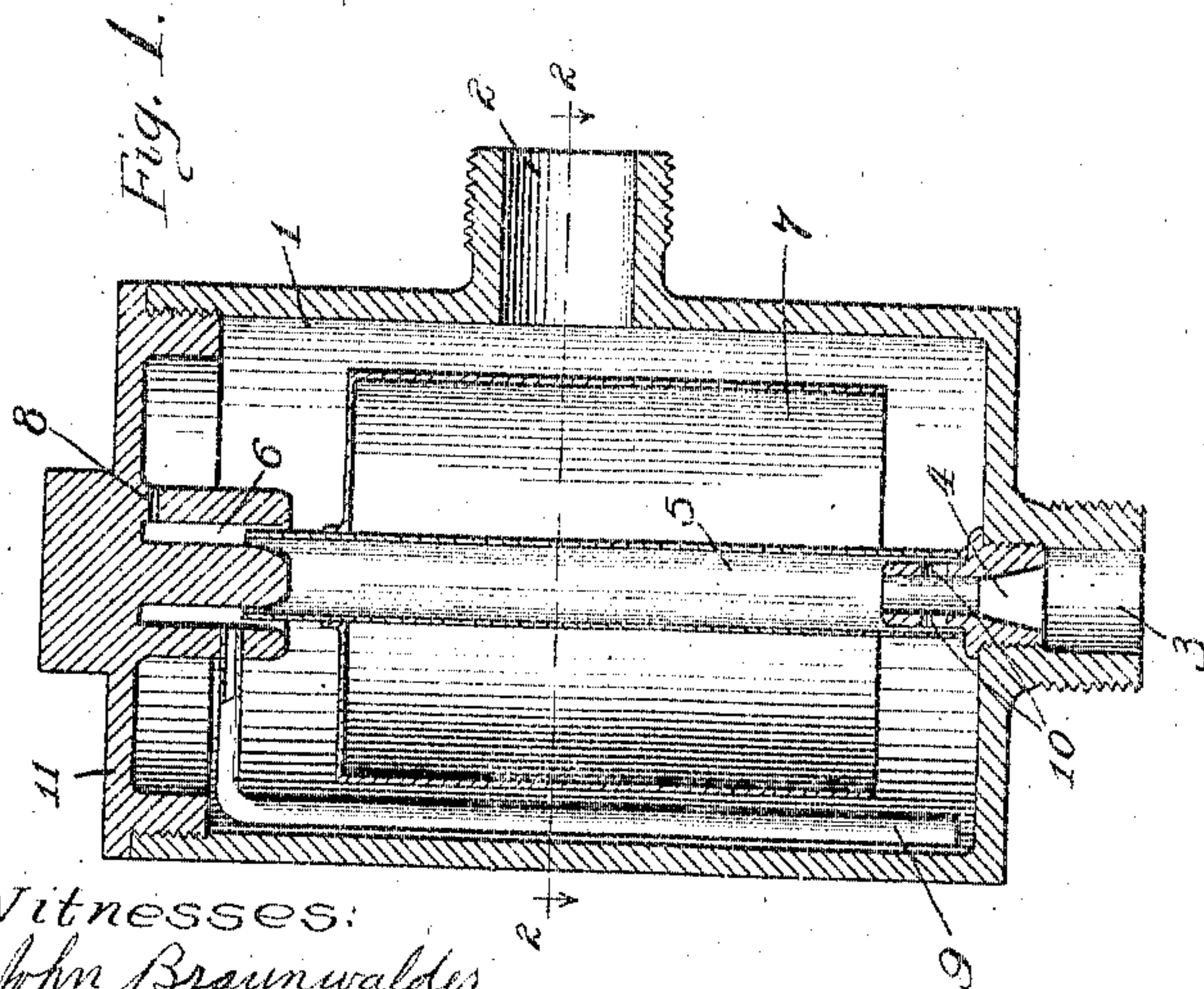


Fig. 1.

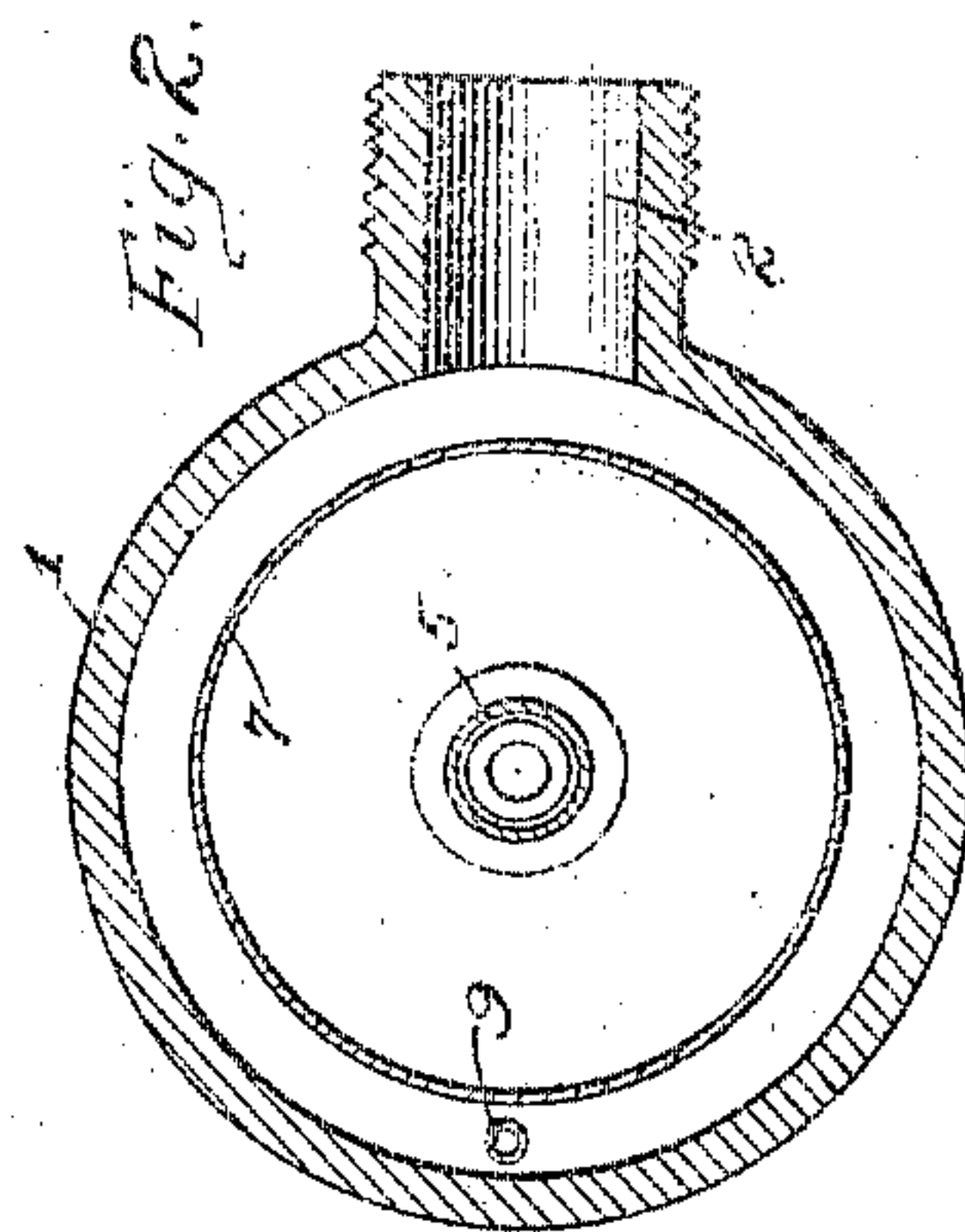


Fig. 2.

Witnesses:
John Braunwalder
Charles I. Cobb.

Inventor:
A. Harrison
By Hill & Hill
Attys.

UNITED STATES PATENT OFFICE.

AMOS HARRISON, OF CHICAGO, ILLINOIS.

AUTOMATIC RELIEF-VALVE AND TRAP.

No. 817,112.

Specification of Letters Patent.

Patented April 3, 1906.

Application filed July 29, 1905. Serial No. 271,740.

To all whom it may concern:

Be it known that I, AMOS HARRISON, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Automatic Relief-Valves and Traps, of which the following is a description.

My invention relates to that class of devices known as "traps" or "water-relief valves" employed upon various parts of a steam system to discharge the water of condensation without the unnecessary waste of steam.

The object of my invention is to produce a valve of the class described simple and durable in construction, reliable in operation, and one not liable to become clogged and inoperative in use through incrustation or accumulations of dirt or foreign material within the valve.

To this end my invention consists in the novel construction, arrangement, and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings, wherein like or similar reference characters indicate like or corresponding parts, Figure 1 is a vertical diametrical section of my valve. Fig. 2 is a section taken substantially on line 2 2 of Fig. 1. Fig. 3 is a view similar to Fig. 1, but showing a modified form of my device. Fig. 4 is a section taken substantially on line 4 4 of Fig. 3. Fig. 5 is a view similar to Figs. 1 and 3, showing another modification; and Fig. 6 is an elevation of a radiator, showing one of my valves applied in operative position thereto.

In the preferred form of my device shown in the drawings 1 is a shell or outer casing of my trap, having an inlet-opening 2 arranged in its side, as shown, and adapted for connection with the discharge-opening of a radiator or other portion of a steam system from which the water is to be drained. A discharge-opening 3 is also provided, preferably arranged in the bottom of the casing 1, and means are provided within the casing to control the escape of fluid from the casing through the opening. The opening 3 is provided with means for attaching a pipe for conducting away the fluid as it is discharged. The controlling means preferably consists of a tubular valve-seat 4, positioned at the en-

trance of the outlet-opening 3, and a tubular valve 5, open at both ends, arranged to co-operate with the valve-seat and extending upward from the same to a suitable recess 6, formed in the top of the casing 1. A float 7 of any suitable form or style is attached to the tubular valve 5, so that the liquid within the casing 1 may control the relative position of the valve to the valve-seat.

Where desirable, a vent 8 may be provided near the upper part of the case 1 to permit air or gas entrapped in the casing passing into the tubular valve 5 and thence to the outlet 3.

In the preferred construction an open tube 9 extends from near the bottom of the casing 1 upward and connects to the recess 6, or, if preferred, a similar tube 15 may be attached to the tubular valve 5, as shown in Fig. 5, or in some cases two such tubes may be provided, one attached to the recess 6 and the other to the valve 5, as shown, the object being to permit a small constant discharge of liquid from the casing 1 into the outlet 3 at all times when the device is in operation, thus among other advantages providing for automatically draining the device when the steam-supply is cut off.

The tubular valve-seat 4 may be formed in any desired manner to coöperate with the tubular valve 5 and control the outlet-opening 3.

As shown in Fig. 1, the valve-seat is arranged to project within the tubular valve 5, the upward movement of which exposes the openings 10, permitting fluid to pass through the outlet. In Figs. 3 and 5 a similar arrangement is provided, except that the end of the valve projects into the valve-seat. Obviously, however, the operation in each form is substantially the same. In the form shown in Fig. 1 also the recess 6 is formed as an annular groove formed in the cap 11 of the casing 1, while in Figs. 3 and 5 a plain cylindrical opening is provided. Obviously the operation in either case is substantially the same, although in the form shown in Fig. 1 there would be slightly less leakage around the tube 5 at this point. In the form shown in Figs. 3 and 5 a cup or depression 12 is formed on the top of float 7, wherein water may accumulate, and thus tend to form a seal to prevent leakage at the entrance to the recess 6.

The operation of the device is obvious from the foregoing and a further description is deemed unnecessary, it being evident from the description that my trap is absolutely
 5 balanced under all conditions and operates entirely by flotation without differential effect at any time and that by the downward projection of the walls of the chamber 6 into
 10 the cup 12 a water seal is quickly formed at the top of the float, which assists in preventing the escape of steam into the upper end of the tubular valve 5.

Having thus described my invention, it is obvious that various immaterial modifica-
 15 tions may be made in my device without departing from the spirit of my invention. Hence I do not wish to be understood as limiting my myself to the exact form and construction shown.

20 What I claim as new, and desire to secure by Letters Patent, is—

1. A device of the kind described, comprising an inclosing casing provided with an inlet and an outlet opening, a recess formed in said
 25 casing opposite said outlet-opening, and means for connecting said casing into a steam system, in combination with a tubular valve-seat positioned to control said outlet-opening, a tubular valve extending from said valve-
 30 seat into said recess, adapted to cooperate with said valve-seat and by its position to control the flow of fluid therethrough, and an inverted-cup-shaped float attached to said valve and arranged to control its position by
 35 the amount of liquid in said casing.

2. A device of the kind described, comprising an inclosing casing provided with inlet and outlet openings, and means for connect-
 40 ing said casing into a steam system, in combination with an open tubular valve-seat arranged to control said outlet-opening, a tubular valve adapted to cooperate with said valve-seat and by its position control the flow
 45 of fluid therethrough, a float provided with a seal at its top attached to said valve and arranged to control its position by the amount of liquid in said casing.

3. A device of the kind described, comprising an inclosing casing provided with inlet
 50 and outlet openings, and means for connecting said casing into a steam system, in combination with an open tubular valve-seat positioned to control said outlet-opening, a tubular valve arranged to cooperate with said
 55 valve-seat and by its position partially controlling the flow of fluid therethrough, an inverted-cup-shaped float attached to said valve and arranged to control its position by the amount of liquid in said casing, and
 60 means for constantly directing a portion of the liquid in said casing into said valve.

4. A device of the kind described, comprising an inclosing casing provided with inlet

and outlet openings, and a recess formed in said casing opposite to said outlet-opening, in
 65 combination with an open tubular valve-seat provided with one or more openings in its side, positioned to control said outlet-opening, a tubular valve open at both ends extending from said valve-seat into said recess,
 70 adapted to cooperate with said valve and by its position to control the flow of liquid therethrough, and an inverted-cup-shaped float attached to said valve and arranged to control its position by the amount of liquid in
 75 said casing.

5. A device of the kind described, comprising an inclosing casing provided with inlet and outlet openings, and means for connect-
 80 ing said casing into a steam system, in combination with an open tubular valve-seat provided with one or more openings through its side, positioned to control said outlet-opening, a tubular valve open at both ends adapt-
 85 ed to cooperate with said valve-seat and by its position to control the flow of fluid therethrough, and a float provided with a seal at its top attached to said valve and arranged to control its position by the amount of liquid in
 90 said casing.

6. A device of the kind described, comprising an inclosing casing provided with inlet and outlet openings, and means for connect-
 95 ing said casing to a steam system, in combination with an open tubular valve-seat, provided with one or more openings through its side, positioned to control said outlet-opening, a tubular valve arranged to cooperate
 100 with said valve-seat and by its position to partially control the flow of liquid therethrough, an inverted-cup-shaped float attached to said valve and arranged to control its position by the amount of liquid in
 105 said casing, and means for constantly directing a portion of the liquid in said casing into said valve.

7. A device of the kind described, comprising an inclosing casing provided with an inlet and outlet opening, a recess provided with a
 110 depending wall formed in said casing opposite said outlet-opening, and means for connecting said casing into a heating system, in combination with a tubular valve-seat provided with one or more openings through its
 115 side and positioned to control said outlet-opening, a tubular valve extending from said valve-seat into said recess, adapted to cooperate with said valve-seat and by its position to control the flow of liquid therethrough, an
 120 inverted-cup-shaped float attached to said valve and arranged to control its position and provided with a cup at its top adapted to cooperate with said wall to form a seal for the upper end of said valve.

8. A device of the kind described, comprising an inclosing casing provided with an inlet

and outlet opening, a recess provided with a depending wall formed in said casing opposite said outlet-opening, and means for connecting said casing into a steam system, in combination with a tubular valve-seat provided with one or more openings through its side, positioned to control said outlet-opening, a tubular valve extending from said valve-seat into said recess and adapted to control the flow of fluid therethrough, an inverted-cup-shaped float attached to said valve and arranged to control its position by the amount of liquid in said casing, and means for maintaining a seal at the top of said float and constantly directing a portion of liquid in said casing into said valve.

9. A device of the kind described, comprising an inclosing casing provided with inlet and outlet openings, and means for connecting said casing into a heating system, in combination with an open tubular valve-seat provided with one or more openings in its side, and positioned to control said outlet-opening, a tubular valve adapted to cooperate with said valve-seat and by its position control the flow of fluid therethrough, a float provided with a seal at its top attached to said valve and arranged to control its position by the amount of liquid in said casing, and means for constantly directing a portion of the liquid in said casing into said valve.

10. A device of the kind described, comprising an inclosing casing provided with inlet and outlet openings, a recess provided with a depending wall formed in said casing opposite said outlet-opening, and means for connecting said casing into a steam system, in combination with a tubular valve-seat provided with one or more openings through its side, and positioned to control said outlet-opening, a tubular valve extending from said valve-seat into said recess, adapted to cooperate with said valve-seat and by its position to control the flow of fluid therethrough, a float attached to said valve and arranged to control its position by the amount of liquid in said casing, a cup provided at the upper end of said float adapted to cooperate with said wall to seal the upper end of said valve, and means for constantly directing a portion of the liquid in said casing into said valve.

11. A device of the kind described, comprising an inclosing casing provided with an inlet and outlet opening, a recess provided with a depending wall formed in said casing opposite said outlet-opening and means for connecting said casing into a steam system, in combination with a tubular valve-seat positioned to control said outlet-opening, a tubular valve extending from said valve-seat into said recess, adapted to cooperate with said valve-seat and by its position to control the flow of fluid therethrough, a float at-

tached to said valve and arranged to control its position by the amount of liquid in said casing, and a cup provided at the top of said float adapted to cooperate with said depending wall to seal the upper end of said valve.

12. A device of the kind described, comprising an inclosing casing provided with an inlet and an outlet opening, a recess formed in said casing opposite said outlet-opening, and means for connecting said casing into a steam system, in combination with a tubular valve-seat positioned to control said outlet-opening, a tubular valve extending from said valve-seat into said recess and adapted to cooperate with said valve-seat, and by its position to control the flow of fluid therethrough, an inverted-cup-shaped float attached to said valve and arranged to control its position by the amount of liquid in said casing, and means for constantly directing a portion of the liquid in said casing into said valve.

13. A device of the kind described, comprising an inclosing casing provided with inlet and outlet openings, and means for connecting said casing into a steam system, in combination with an open tubular valve-seat arranged to control said outlet-opening, and tubular valve adapted to cooperate with said valve-seat and by its position to control the flow of fluid therethrough, and an inverted-cup-shaped float provided with a seal near its top attached to said valve and arranged to control its position by the amount of liquid in said casing, and means for constantly directing a portion of the liquid in said casing into said valve.

14. A device of the kind described, comprising an inclosing casing provided with inlet and outlet openings, a recess provided with a depending wall formed in said casing opposite said outlet-opening, and means for connecting said casing into a steam system, in combination with a tubular valve-seat positioned to control said outlet-opening, a tubular valve extending from said valve-seat into said recess and adapted to cooperate with said valve-seat and by its position to control the flow of fluid therethrough, a float attached to said valve and arranged to control its position by the amount of liquid in said casing, a cup formed at the upper end of said float adapted to cooperate with said depending wall to seal the upper end of said valve, and means for constantly directing a portion of the liquid in said casing into said valve.

15. A device of the kind described, comprising a casing provided with inlet and outlet ports and means for connecting the same into a steam system, in combination with a balanced valve arranged to control the flow of fluid from said casing, and a float provided

with a water seal at its top arranged to control the flow of fluid through said valve.

16. In a device of the kind described, a balanced valve, a float attached to the movable portion of said valve, and a water seal at the top of said float to reduce leakage through said valve.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

AMOS HARRISON.

Witnesses:

BURTON U. HILLS,
CHARLES I. COBB.