

A. S. LIGHT.
VACUUM RADIATOR VALVE.
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Fig. 2.

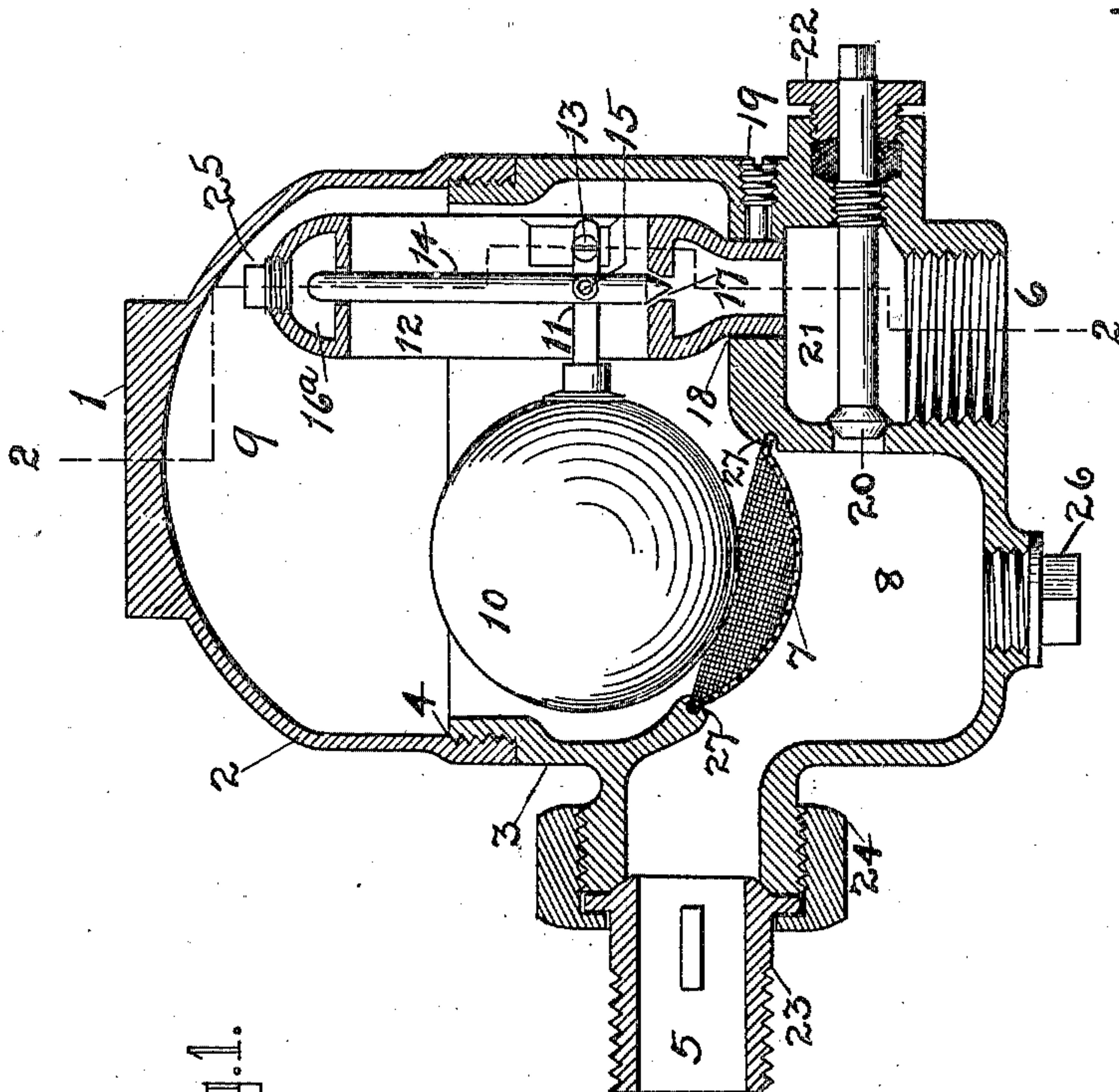
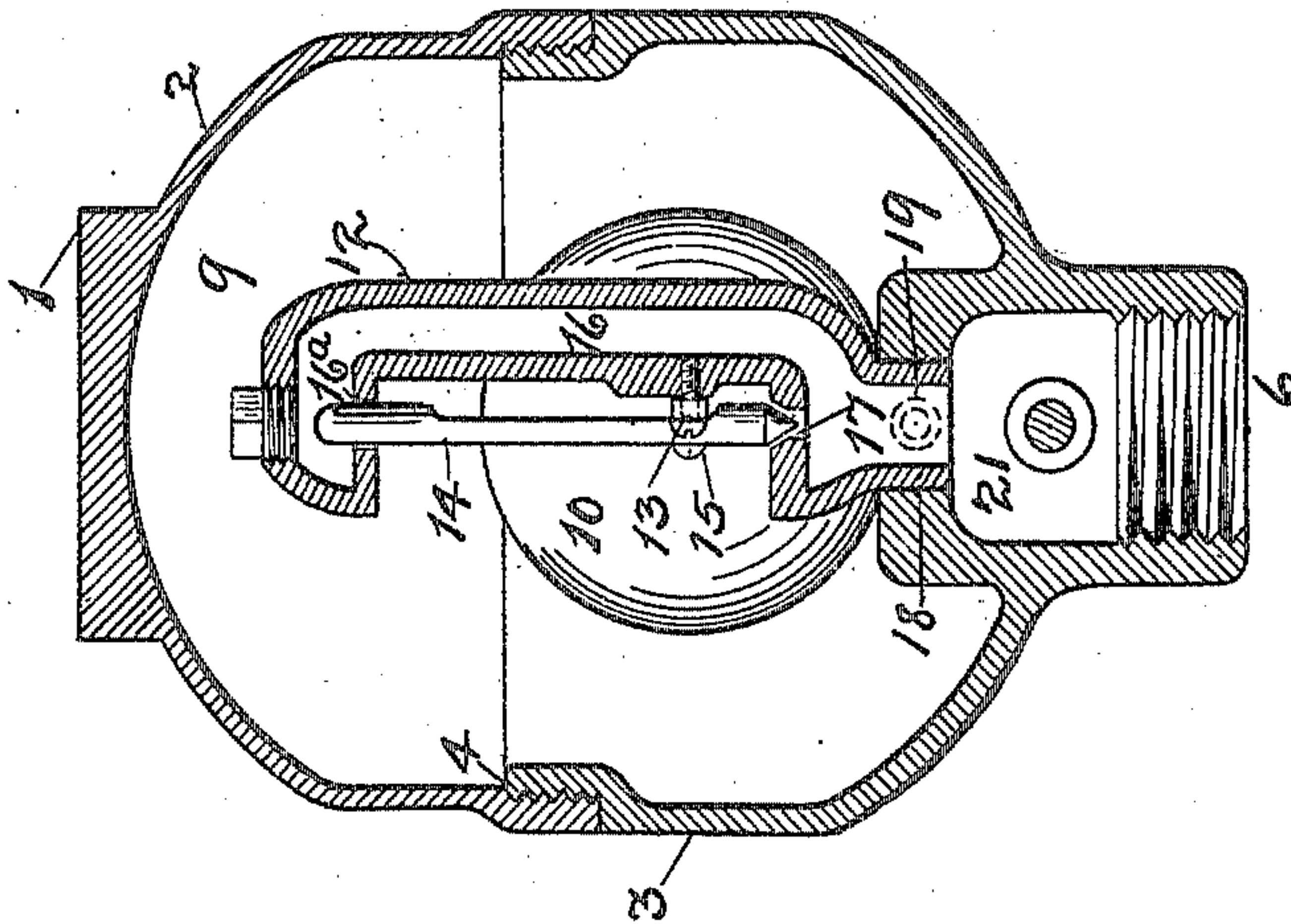


Fig. 1.

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VACUUM RADIATOR-VALVE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ARTHUR SYLVESTER LIGHT, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented a new and useful Vacuum Radiator-Valve, of which the following is a specification.

My invention relates to an automatic valve which is intended to be used on the return end of steam radiators, coils, drying apparatus and other apparatus used in low pressure steam heating, more especially where some degree of vacuum is maintained in return mains and branches to aid in circulating steam through the heating system and in draining air and water from heating surface. In addition to effecting good drainage it at the same time prevents the passage of any considerable amount of steam from radiators and coils into return piping. The valve is placed in the return pipe from each radiating unit, or group of such units, and also in drip pipes from supply pipes. It possesses the following special features, namely, a water passage, a separate air passage, a valve stem which works in both the water and the air passages, a float and lever which is attached to the valve stem and to the valve case, a removable valve case, a strainer, a by-pass for quick discharge of water without passing through the regular valve, a sediment chamber, and other constructive features which will be hereafter described. This valve might be classed as a vacuum trap, or small float trap.

In the drawing Figure 1 is a central, vertical section through the body of the valve showing the inlet port and the outlet port, sediment chamber, float chamber, screen, by-pass, float, lever with fulcrum, valve stem and valve case. Fig. 2, is a vertical section on plane of line 2—2 Fig. 1, showing the outlet port, valve case, valve stem, position of the by-pass valve stem, float, float chamber and valve body.

In both figures 1 indicates the valve as a whole, of which a cap 2 screws on the body 3 so as to form a tight joint at 4. At 5 is shown the inlet port, and at 6 the outlet port.

7 is a brass strainer between the sediment chamber 8 and the float chamber 9.

10 is a copper float fastened to a lever 11, which in turn is fastened to the valve case 12 by means of a screw 13 on which the lever turns as a fulcrum, and to the valve stem 14 preferably by a similar screw 15.

16 is an air passage in the valve case having an air chamber 16^a at its top and a water passage 17 at its lower end for discharge of both air and water into the valve body outlet.

18 is a slip-joint where the removable valve case 12 sets into the valve body 3. The valve case is secured in place by the set-screw 19 which is reached from outside the valve body.

20 is a by-pass for quick opening discharge from sediment chamber 8 into vacuum chamber 21 having the outlet port 6.

22 is a packing nut.

23 and 24 are union pieces for connecting the valve body to a radiator or a coil.

25 is a plug which is adjustable to limit the upward movement of valve stem 14.

The valve stem 14 has a beveled point which seats at passage 17 and makes a perfect stop in water passage 17. The upper end of valve stem 14 is round in cross section and somewhat smaller than the passage in 16^a into which it enters, thereby allowing air and vapor to constantly pass from float chamber 9 to vacuum chamber 21. As it is intended to have some degree of pressure in float chamber 9, and some degree of vacuum in chamber 21, the valve stem is nearly balanced by the vacuum acting equally on both ends of the stem. The float will therefore rise and lower with changes of water level in the valve body with little resistance from the lever and valve stem. Float 10 is hollow, being made preferably with a thin metallic shell having sufficient strength to resist such steam pressure on its outside as it is likely to be subjected to, but also light enough so as to float in water at about its horizontal center. When the float rises with water in chamber 9 the lever 11 raises valve stem 14 and opens the discharge port 17 allowing the water to pass through said port

into vacuum chamber 21 and thence to a receiving tank, or other receptacle, at the end of the heating system. Movement of the valve stem in air passage in 16^a does not
 5 alter the free passage area of the passage, as the stem works like a loose piston. Movement of the stem tends to remove any foreign substance from the passage and so constantly insure circulation of air with some
 10 steam from the valve body 9 into the outlet 6.

The brass strainer 7 fits tightly into a circular base in valve body 3, and is securely held in position by two little lugs 27. This
 15 strainer prevents sand, scale, and any form of solid matter from getting into float chamber 9 and clogging the water passage 17.

The valve case 12 has a slip-joint connection with the valve body 3 and is securely
 20 held in place after being inserted by the set screw 19, and is thus conveniently removable for any purpose.

The float is fastened to lever 11 preferably by a screwed end. The lifting power
 25 of the float is compounded on the valve stem 14 by placing the fulcrum of lever 11 near the valve stem. Clean-out plug 26 affords means of conveniently cleaning out chamber 8. The by-pass valve stem 20 is packed
 30 with suitable material held in place by packing nut 22 which prevents leakage around said valve stem.

In keeping radiators constantly free of air it is necessary to constantly maintain a little
 35 circulation therethrough; hence this valve is designed to constantly pass some air and vapor through passage 16. Air chamber 16^a has a sufficiently large hole on its under side to allow some air and vapor to be drawn by
 40 vacuum into chamber 21 while also acting as a guide to valve stem 14, the free area around said stem being made such as to properly drain the radiator of air, said area being made suitable to the size of radiator
 45 to which it is attached.

The valve stem 14 is made of solid metal and held in vertical alinement with the valve seat by air chamber 16^a at the upper end and by attachment to lever 11 at the
 50 lower end, and made easy of removal by withdrawing the screw 15 which connects it with lever 11.

I do not confine myself to the exact proportions or arrangement of parts shown in
 55 the drawings and described in the specifications, as these can be departed from to some extent while still maintaining the essential conditions of my invention.

Wherever the term "radiator" is used,
 60 and the term "coil" is not mentioned in connection therewith, the first named term is intended to include that last named.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a radiator drainage valve having a
 65 valve body with an inlet port and an outlet port, a valve case wholly within the valve body having an air passage through said valve case and embracing an air chamber at the top of the valve case and a passage at the
 70 lower end of said case below normal water level in the valve body providing for water drainage from the valve body into the otherwise closed outlet thereof; a vertically set valve stem exterior to the valve case which
 75 stem freely enters the air chamber at the top of the valve case and also controls the discharge passage at the lower end thereof; and means for actuating said valve stem so as to discharge water of condensation auto-
 80 matically from the valve body.

2. In a radiator drainage valve having a valve body with an inlet port and an outlet
 85 port, a removable valve case wholly within the valve body adapted to be secured at its lower end by a set-screw accessible from outside the valve body and embracing an air chamber at the top of the valve case, a passage at the lower end of said case below normal water level in the valve body providing
 90 drainage from the valve body into the otherwise closed outlet thereof and an air passage through the case communicating at its upper end with the air chamber therein at the top of the case and at its lower end with the outlet
 95 of the valve body; a vertically set valve stem exterior to said valve case and which freely enters the air chamber at the top of the case and also valves the discharge passage at the lower end thereof; and means for actuating
 100 the valve stem so as to automatically discharge water of condensation from the valve body through rise of water level in the valve body, substantially as set forth.

3. In a radiator drainage valve, the combination of a valve body having an inlet
 105 port for air and water from steam radiators and an outlet port therefrom; a detachable valve case wholly within said valve body having an air chamber at the top of the valve case and a discharge passage at the lower end for discharging water from the valve body into the otherwise closed outlet of the valve body; a vertically set solid valve stem exterior to said valve case adapted for enter-
 115 ing the valve chamber at the top of the valve case and to control the discharge passage at its lower end; and a float with lever and fulcrum for actuating said valve stem to effect automatic discharge of water of condensation from the valve body into the valve body
 120 outlet, substantially as shown and described.

4. In a radiator drainage valve, the combination of a valve body having an inlet port

and an outlet port; a sediment chamber at the inlet of the valve body and on the lower side thereof; a float chamber above the sediment chamber; a strainer between said sediment chamber and said float chamber; a bypass from said sediment chamber to the valve body outlet port; a detachable hollow valve case wholly within the valve body; a solid balanced valve stem set vertically outside the

valve case; an adjustable plug in the top of said valve case for regulating the action of the valve stem; and a float with lever and fulcrum for actuating the valve mechanism, substantially as set forth.

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Witnesses:

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