J. P. MARSH.

AUTOMATIC AIR VALVE.

APPLICATION FILED JULY 9, 1908.

941,791. Patented Nov. 30, 1909.

Fig. 1.

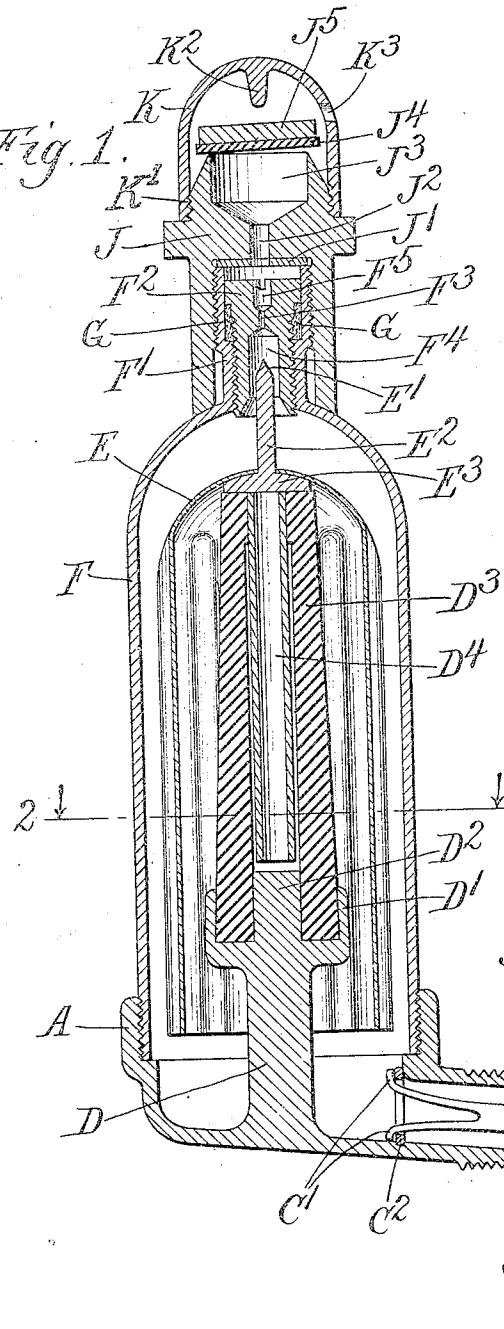


Fig. 2.

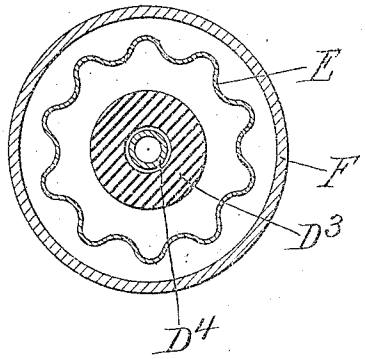
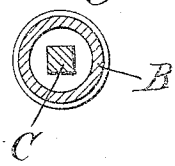


Fig. 3.



Witnesses.
Edward T. Wray.
Lucy A. Falkenberg

Inventor.
James P. Marsh.
by Parker Carter
Attorneys.

UNITED STATES PATENT OFFICE.

JAMES P. MARSH, OF CHICAGO, ILLINOIS.

AUTOMATIC AIR-VALVE.

941,791. Specification of Letters Patent. Patented Nov. 30, 1909.

Application filed July 9, 1908. Serial No. 442,749.

To all whom it may concern:

Be it known that I, JAMES P. MARSH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Automatic Air-Valves, of which the following is a specification.

My invention relates to air valves for radiators. It is illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical section, Fig. 2, a cross section on line 2—2 of Fig. 1; Fig. 3, a cross section on line 3—3 of Fig. 1.

Like parts are indicated by the same letters in all the figures.

A is the base cup shaped in form with a laterally projecting nipple B screw threaded so as to be received into the radiator. In the aperture of the nipple lies a bent rod C preferably square or other than circular in cross section, bifurcated at its inner ends to form the laterally projecting spring holding ends C^1 C^1 and provided if need be with a washer C^2 back of these ends and near the inner end of the aperture. D is a standard in the center of the base with a cup shaped upper portion D^1 and central pin D^2. In this cup shaped portion is placed the expansible material D^3 preferably cylindrical to receive the strengthening tube D^4. E is a float corrugated or fluted as shown and provided with the needle valve E^1 on the stem E^2 which rises from the block E^3 within the float. F is the case which forms the chamber which contains the float and expansion piece. It is provided with the upwardly extending neck F^1 internally and externally screw threaded as shown. F^2 is a valve seat plug screw threaded externally to be received on the internal screw of the neck F^1. It is perforated at F^3, apertured at F^4 to give room for the valve stem E^1 and perforated at F^5 to permit the escape of air or gas from the chamber of the case F. G is packing material about the upper portion of the plug and between it and the neck and intended to make a tight joint between the plug and the neck. J is an extension piece recessed and provided at the bottom with a metallic washer J^1 to impinge upon the end of the neck F^1. This extension piece and washer are perforated at J^2 to permit the escape of the air therethrough into the larger chamber J^3 on the top of which lies the valve disk J^4. Over this washer will be placed if desired the weight J^5. These several parts are contained within the cap K, screw threaded at K^1 on the outside of the extension piece. A pin K^2 projects downwardly within the cap to limit the upward motion of the weight and an escape hole K^3 is formed in the wall of the cap. It will be understood that these parts are intended to be here shown diagrammatically although they do show an operative construction and they may be greatly varied without departing from the spirit of my invention and some of the parts here shown may be omitted and others be substituted therefor.

The use and operation of my invention are as follows: The agitator lies loosely in the nipple aperture and hangs in the pipe connection with the radiator. This rod being other than circular in cross section as it tends to move or rock in the aperture, tends to keep the passage open and a current of water, when water has accumulated, in motion. The object is to facilitate the flow of water from the valve into the radiator or connecting part. This drainage rod is in effect an agitator to keep the passage open. It is held in position by its bifurcated spring end engaging the inner wall of the cup about the nipple aperture and a washer may also be used as shown. Experience shows that when water comes to rest in a narrow passage like that of the aperture in the nipple it is liable to remain at rest but at the slightest motion of this rod as it is other than circular in cross section, the effective cross sectional area of the aperture at one or more points is varied and this causes the water to move. This agitator rod always has a slight tendency to move and hence the water is disturbed and does not come to rest. The float is corrugated and this permits the largest possible float in the smallest possible chamber with a minimum of frictional contact between their opposed walls. The expansible material expands and raises the float, thus closing the valve and preventing the escape of steam when the radiator is properly operated and the valve is full of steam. If the valve is filled with air it cools, the expansible material contracts, the float descends and the air escapes through the apertures at the top intended for that purpose. If water enters the valve it still remains cool, and the expansible material remains in its contracted condition. The float is raised and closes the valve apertures to

prevent the escape of water. Then the agitator operates as above suggested to free the chamber from water. The impurities of the water, whatever they may be, and of the steam and air, tend obviously to accumulate on the opposed walls of float and chamber and if large areas of such surfaces are exposed to each other they are likely, with the accumulation of such foreign matters, to adhere or increase the friction so that the float is not free to move upwardly or downwardly as it ought to move. With the corrugated float here shown diagrammatically, the flutings come to a relatively fine edge and in practice usually not more than one such edge is ever in contact with or in close proximity to the opposed chamber walls and hence there are no extended areas in close relation.

By arranging the cap and valve plug with the two packings I secure a very tight joint to prevent the escape of steam, air or water through the screw threaded connecting parts. The valve aperture rapidly enlarges until the opening at the top of the cap is very large, leaving a free exit for air or steam, when the latter for some short period is free to escape. To close this large opening I employ the disk valve which is no more than a flat disk lying upon the top of the opening. It may be made of any desired material but I preferably make it of compressible material and I preferably employ on top of it a relatively hard weight also in the shape of a disk. This arrangement I find makes a very free and open passage with an easily moving valve. There is no tendency of the valve to stick and no difficulty in placing or retaining it in proper relation. The crown piece does this. The depending pin prevents the parts from rising out of proper relation to each other or the opening.

The drainage rod or agitator tends to keep the passage open and let the water run out of the chamber; the corrugated float has little tendency to stick to the walls of the chamber; the relief passage way from the chamber to the open air is provided at one point along its route with a large opening so as to permit a free discharge of whatever it is desired to eject, and this opening is controlled by a weighted valve which will not easily stick or clog.

I claim:

1. An automatic air valve for radiators comprising a case containing a chamber with a relief aperture at the upper end, a water discharging aperture at the lower end, an expansion piece and a vertically fluted float with a valve thereon in the chamber and adapted to control such relief aperture.

2. An automatic air valve for radiators comprising a case containing a chamber with a relief aperture at the upper end, a water discharging aperture at the lower end, an expansion piece and a vertically fluted float with a valve thereon in the chamber adapted to control such relief aperture and a drainage rod in the water discharging aperture.

3. An automatic air valve for radiators comprising a case containing a chamber with a relief aperture at the upper end, water discharging aperture at the lower end, an expansion piece and a vertically fluted float with a valve thereon in the chamber adapted to control such relief aperture and a drainage rod in the water discharging aperture of a cross section other than circular.

4. An automatic air valve for radiators comprising a case containing a chamber with a relief aperture at the upper end, a discharge passage way leading thence to the open air and having at some place along its length a relatively large cross section, a cap including such cross section, a disk valve lying upon such cross sectional opening, a disk weight on the valve, a water discharging aperture at the lower end of the chamber, an expansion piece, and a vertically fluted float with a valve thereon in the chamber to control such relief valve.

5. An automatic air valve for radiators comprising a case containing a chamber with a relief aperture at the upper end, a discharge passage way leading thence to the open air and having at some place along its length a relatively large cross section, a cap including such cross section, a disk valve lying upon such cross sectional opening, a disk weight on the valve, a water discharging aperture at the lower end of the chamber, an expansion piece, a vertically fluted float with a valve thereon in the chamber to control such relief valve, and a drainage rod in the water discharging aperture of a cross section other than circular.

6. An automatic air valve for radiators comprising a case containing a chamber with a relief aperture at the upper end, a discharge passage way leading thence to the open air and having at some place along its length a relatively large cross section, a cap including such cross section, a disk valve lying upon such cross sectional opening, a disk weight on the valve, a water discharging aperture at the lower end of the chamber, an expansion piece, and a vertically fluted float with a valve thereon in the chamber to control such relief valve, and a drainage rod in the water discharging aperture of a cross section other than circular.

JAMES P. MARSH.

Witnesses:
MINNIE M. LUIDENAN,
EDNA K. REYNOLDS.