S. DE W. CHAPMAN.

RADIATOR RETURN VALVE.

APPLICATION FILED MAY 10, 1911.

1,006,629. Patented Oct. 24, 1911.

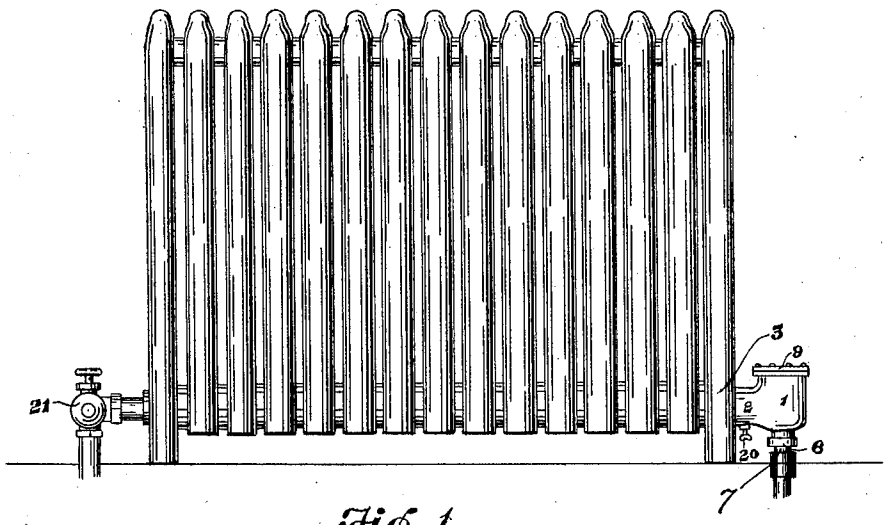

Fig 1

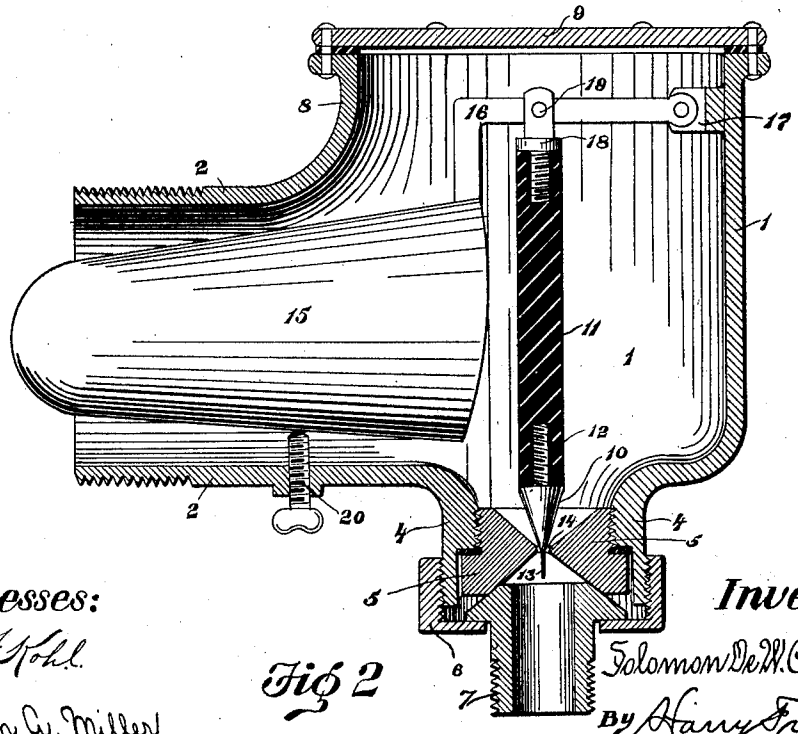

Fig 2

Witnesses:

R. H. Kohl.

Ruth C. Miller

Inventor:

Solomon De W. Chapman

By Harry Grease.

Attorney

UNITED STATES PATENT OFFICE.

SOLOMON DE WITT CHAPMAN, OF CANTON, OHIO.

RADIATOR RETURN-VALVE.

1,006,629. Specification of Letters Patent. Patented Oct. 24, 1911.

Application filed May 10, 1911. Serial No. 626,390.

To all whom it may concern:

Be it known that I, SOLOMON DE WITT CHAPMAN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a certain new and useful Radiator Return-Valve, of which the following is a specification.

The invention relates to a valve for draining water and air from the return end of a steam radiator or the like, and the object of the improvement is to provide a valve which will operate automatically and efficiently, irrespective of the relative pressure in the heating system and the return line, which will permit a free flow of water and air when the parts are cold, and which will automatically open and close when the parts are heated—depending upon the height of the water of condensation in the valve. These general objects are attained by combining or connecting a normally open float valve with thermostatic means for closing the valve when heated, and a preferred embodiment of the invention, thus set forth in general terms, is illustrated in the accompanying drawing, forming part hereof, in which—

Figure 1 is a side elevation of a radiator showing the improved valve connected therewith; and Fig. 2, an elevation section of the valve showing the interior details.

Similar numerals refer to similar parts throughout the drawing.

The case 1 of the valve is provided with the lateral tubular extension 2 forming an inlet opening and adapted to be connected as by screwing into the lower portion of the return end of the radiator 3; with the downward tubular extension 4 in which the seat block 5 is adapted to be secured as by screwing, and to which the union follower 6 which carries the tail piece 7 for the return pipe connection is adapted to be secured as by screwing; and preferably with the upward open extension 8 normally closed by the cover 9, through which ready access is given to the valve chamber formed by the case by removing the cover.

The inverted cone valve 10 is secured to the lower end of the stem 11 as by means of the screw 12, and is preferably provided with the axial guide pin 13 in extension of its apex, so that the valve will always be guided into the seat aperture 14 forming an outlet from the case, which aperture is properly shaped to fit the valve when the same is inserted therein; and the seat block is preferably conically hoppered above and below the aperture so that the up and down movement of the valve and the flow of water through the aperture will clear the same of obstructions.

The float 15 is preferably elongated and may be located in and extend beyond the lateral extension 2, which float is provided with the lever or arm 16 having its end fulcrumed to the case 1 as by the lug 17, to which lever arm is connected the valve stem 11 as by means of the screw head 18 and the pivot 19, so that a sinking of the float tends to close the valve in its seat. The screw 20 is provided in the lower side of the case, and serves as an adjustable stop to limit the downward movement of the float.

The valve stem 11 is made of hard rubber or other suitable material adapted to be expanded or extended endwise by the action of heat, and the parts are so arranged and adjusted that when the radiator is cold, and the float is resting upon its stop, the valve will be slightly open, as shown in Fig. 2; and that the extensibility of the stem will close the valve when the parts are heated, the stop being adjusted so that the extension of the stem will close the valve in its seat at any desired temperature. By this arrangement and adjustment it is evident that the buoyancy of the float 15 is only brought into play to open the valve when the stem 11 thereof is extended to close the valve, or when a greater quantity of water of condensation flows into the case than can pass through the partially open outlet aperture 14 when the valve stem is contracted.

In use of the valve, the adjustable stop 20 is set to sustain the float so that the outlet aperture 14 will be partly open when the parts are cold, and it is evident that when steam is admitted into the radiator through the inlet valve 21, the steam will rise to the upper portion of the radiator and the air therein will drop to the bottom portion thereof and drain downward through the outlet aperture; that when the air is expelled from the radiator and the steam flows into the valve, the heat thereof will extend the stem and close the valve; that when sufficient water of condensation accumulates in the radiator and flows into the valve to raise the float from its abutment, the upward movement of the float will carry the connected cone valve with it to open the valve and permit the water to flow through the

outlet aperture into the return pipe, until the height of the water in the case is reduced and the float drops downward upon its abutment; and finally, that when the radiator is cooled by stopping the flow of steam through the inlet valve or otherwise, the valve stem will shrink to open the valve, thus permitting all the water of condensation which may be in the case to flow through the outlet aperture.

It is not intended to limit the scope of the present invention to the particular form, construction, arrangement and connection of the parts herein set forth, as it is believed this inventor is the first one to combine or connect a normally open float-valve with thermostatic means for closing the valve when the parts are heated, to control the flow of water as well as air. And it will be understood that the use of the term cold herein is intended to mean the normal temperature of the parts when there is no steam in the radiator; and that the term heated is intended to mean the temperature of the parts when there is more or less steam in the radiator.

I claim:

1. A valve, a float tending to close the valve by sinking, a stop for the float holding the valve open when cold, and thermostatic means for closing the valve when the float is stopped.

2. A valve, a float associated with the valve and tending to close it by sinking, a stop for the float holding the valve open when cold, and thermostatic means associated with the valve for closing it when the float is stopped.

3. A case forming a chamber and having an apertured seat forming an outlet from the lower end of the chamber, a valve in the chamber adapted to close the outlet, a float connected with the valve, a stop for the float to hold the valve open when cold, and thermostatic means associated with the valve for closing the outlet by the same valve when the float is stopped.

4. A case forming a chamber and having an apertured seat forming an outlet from the lower end of the chamber, a valve in the chamber adapted to close the outlet, a float connected with the valve, a stop for the float to hold the valve open when cold, and thermostatic means for closing the outlet by the same valve when the float is stopped.

5. A case forming a chamber and having an apertured seat forming an outlet from the lower end of the chamber, a float, a valve adapted to close the outlet having a stem connected with the float, a stop for the float to hold the valve open when cold, the stem being extensible by heat to close the outlet by the same valve when the float is stopped.

6. A case forming a chamber and having an apertured seat forming an outlet from the lower end of the chamber, a float having a lever fulcrumed to the case, a valve adapted to close the outlet associated with the lever, a stop for the float to hold the valve open when cold, and thermostatic means for closing the outlet by the same valve when the float is stopped.

7. A case forming a chamber and having an apertured seat forming an outlet from the lower end of the chamber, a float having a lever fulcrumed to the case, a valve adapted to close the outlet having a stem connected with the lever, and a stop for the float holding the valve open when cold, the stem being extensible by heat to close the outlet by the same valve when the float is stopped.

8. A case forming a chamber and having an apertured seat forming an outlet from the lower end of the chamber, a float having a lever fulcrumed to the case, a valve adapted to close the outlet associated with the float, a stop for the float to hold the valve open when cold, one of the elements being extensible by heat to close the outlet by the same valve when the float is stopped.

9. A case forming a chamber and having an apertured seat forming an outlet from the lower end of the chamber, a fulcrum in the case, a float having a lever connected with the fulcrum, a valve adapted to close the outlet associated with the float, a stop for the float to hold the valve open when cold, one of the elements being extensible by heat to close the outlet by the same valve when the float is stopped.

SOLOMON DE WITT CHAPMAN.

Witnesses:
RUTH A. MILLER,
HARRY FREASE.