F. J. DOUGLASS.

STEAM RADIATOR.

APPLICATION FILED MAY 11, 1918.

1,298,186.

Patented Mar. 25, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

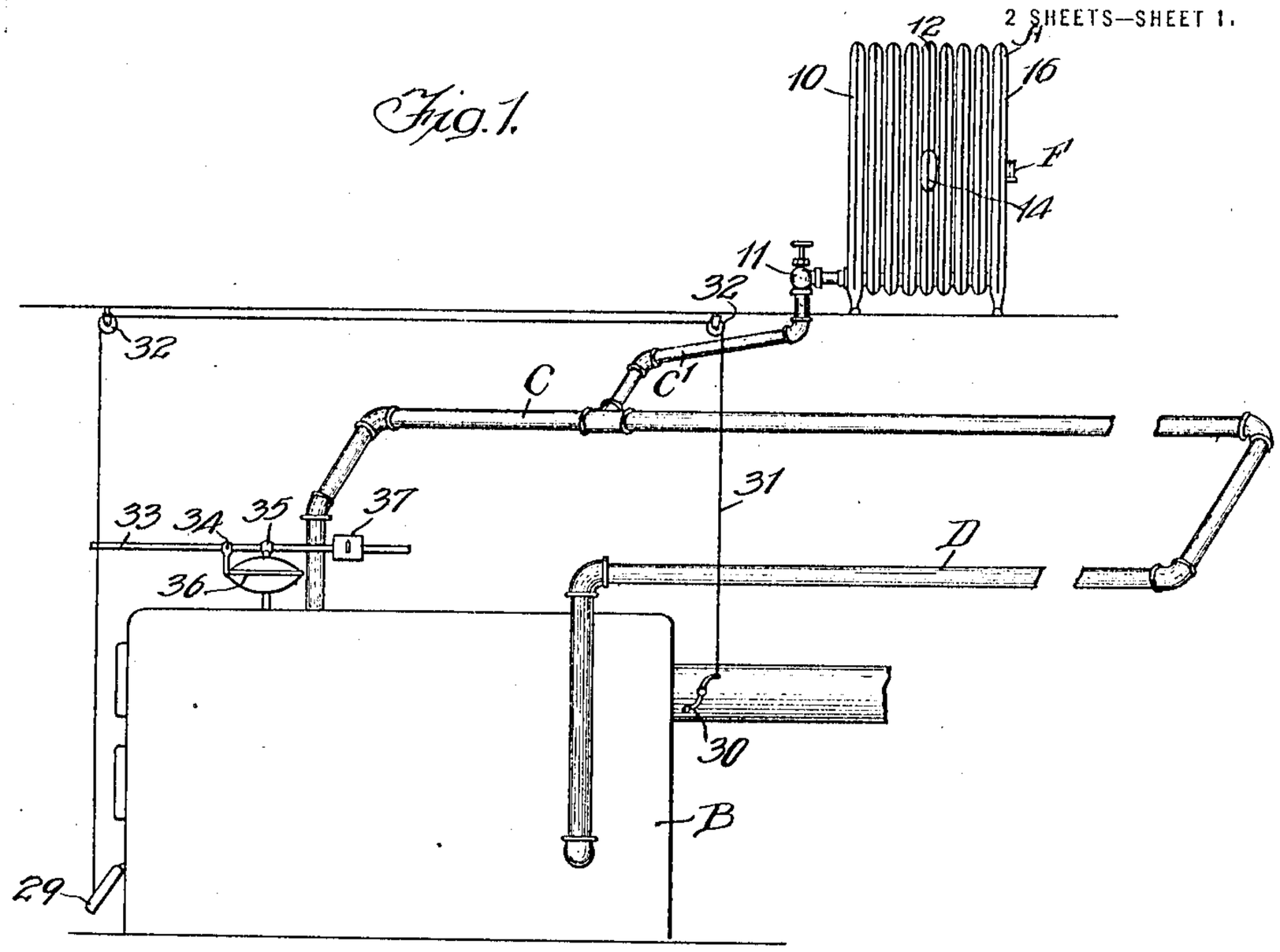


Fig. 5.

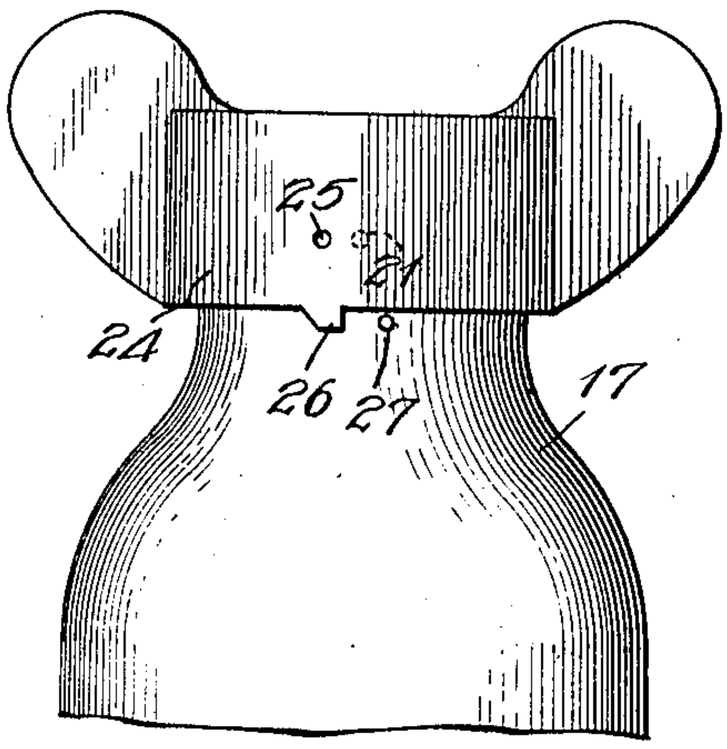
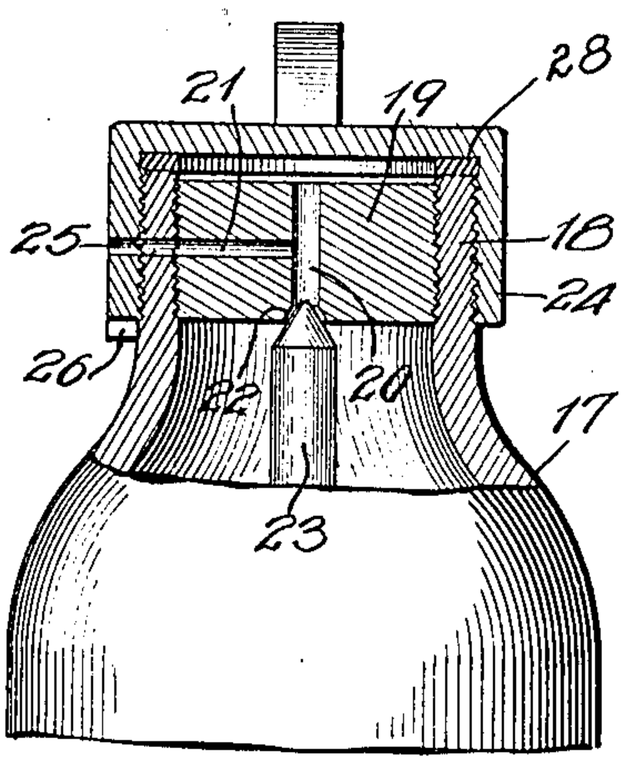


Fig. 6.



Witnesses:
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Harry R. L. White

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2 SHEETS—SHEET 2.

Fig. 2.

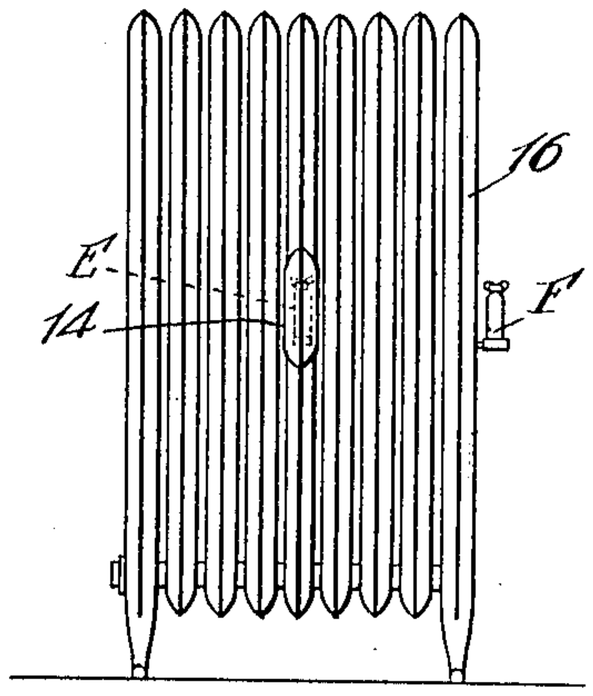

Fig. 3.

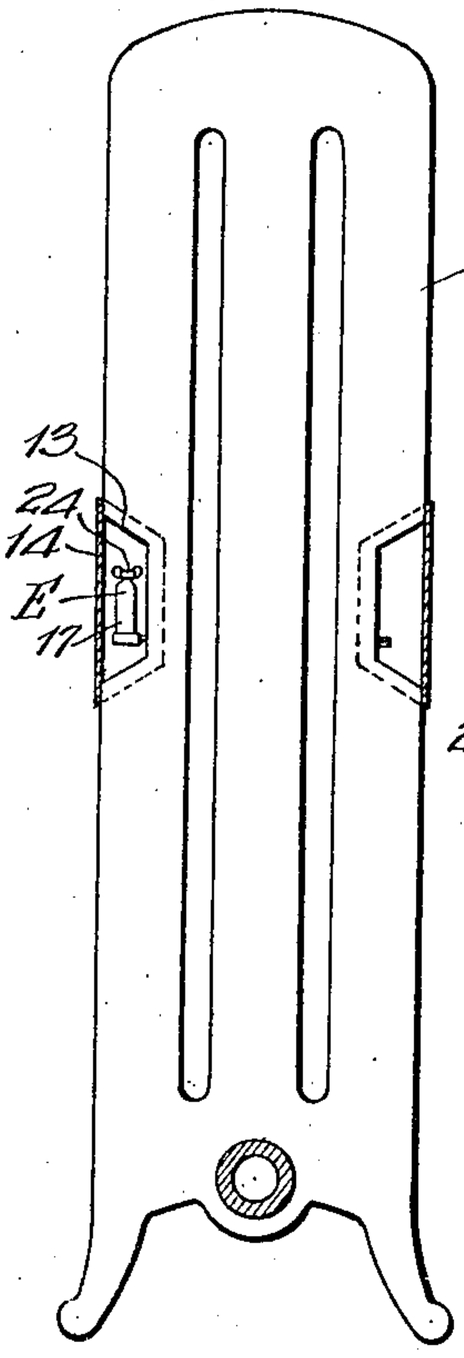

Fig. 4.

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UNITED STATES PATENT OFFICE.

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STEAM-RADIATOR.

1,298,186. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed May 11, 1918. Serial No. 233,907.

To all whom it may concern:

Be it known that I, FRANK J. DOUGLASS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam-Radiators, of which the following is a specification.

My invention relates to a radiator, and the principal object of the invention is to provide simple and effective means, which will be positive and certain in its operation, whereby the amount of radiating surface under the influence of the steam may be varied so as to vary the quantity of heat delivered to the apartment in accordance with the requirement or taste of the occupant.

A further object of the invention is to provide certain novel arrangements and devices in connection with a radiator, which may otherwise be of ordinary construction, to adapt the radiator for use in a heating system having the aforementioned capacity for regulation.

The invention consists of the new and improved constructions, arrangements and devices to be hereinafter described and claimed for carrying out the above stated objects, and such other incidental objects as will appear from the following description of a preferred embodiment of the invention.

This embodiment is illustrated in the accompanying drawings, wherein:

Figure 1 is a somewhat diagrammatic view, illustrating the heating system as a whole;

Fig. 2 is a side elevation of the preferred form of radiator employed in the system;

Fig. 3 is a vertical sectional view showing the construction of one of the intermediate radiator sections;

Fig. 4 is a fragmentary sectional plan of this intermediate section, with the adjacent sections;

Fig. 5 is a view in elevation of a preferred form of adjustable air valve associated with the end radiator section remote from the steam inlet pipe; and

Fig. 6 is a vertical broken sectional view of the air valve.

Like characters of reference designate like parts in the several figures of the drawings.

Referring to the drawings, A indicates a radiator which may be of ordinary construction, except for certain features which will be hereinafter referred to. B is a steam generator, C the steam supply pipe having branch pipe C′ leading to the radiator, and D the return pipe which conducts water of condensation back to the generator.

The radiator sections, it will be understood, are connected together in the usual manner, and the steam enters the radiator through the end section 10, the pipe C′ being provided preferably with a shut-off valve 11. One of the intermediate radiator sections 12 has associated therewith an automatic air valve E which is preferably of the thermostatic type, and may be of any ordinary construction. In order that this valve may not project out from the radiator so as to be in danger of being knocked off or bent, or otherwise injured, this section of the radiator is preferably formed with a recess 13 in which the air valve is located; and for convenience the section is formed with a recess on each side, in case the air valve is located on the side of the section, so that the radiator when assembled may be placed either way against the wall of the room with a recess on the side away from the wall for the air valve. There is an incidental advantage in having the air valve located in a recess in the radiator section. In case of sputtering or leakage the water is likely to be vaporized by contact with the heated metal of the radiator. With the proper operation of the valve no such sputtering should take place. Preferably these recesses are covered by shield plates 14 which prevent dust from collecting in the recesses.

Associated with the radiator section 16, remote from the steam inlet pipe C′, is an automatic air valve F, so constructed that it may be manipulated to prevent the outflow of air from the radiator. I prefer to employ in this connection an air valve constructed substantially as shown in Figs. 5 and 6. The casing 17 of the device is formed with a neck 18 externally and internally

threaded, in which is arranged a valve seat plug 19 having a vertical port 20, a horizontal port 21 communicating therewith, and a seat 22 for the thermostatic valve member 23. Screwed upon the exterior threading of the neck 18 is a cap 24 having a port 25 adapted to aline with port 21. With the parts in the position shown in Fig. 6, air from the radiator may escape to the atmosphere through ports 20, 21, 25. In this position of the parts the device operates as an ordinary thermostatic air valve. By turning the cap to the position shown in Fig. 5, port 25 is out of alinement with port 21 and the air is consequently trapped in the radiator. In order to assure the proper alinement of ports 25 and 21, a suitable stop arrangement is provided. For example, the cap may be formed with a lug 26 which is adapted to stop against a pin 27 on the casing 17 of the valve. A gasket 28 may be interposed between the top of the neck 18 and the cap 24.

Instead of the ordinary air valve E I may of course employ in connection with section 12 an air valve having the shut-off feature of valve F, but this is not essential where only one of the intermediate sections of the radiator is provided with an air valve. With the valve F adjusted so that it operates as an ordinary thermostatic air valve, the entire radiator will be active. That is to say, the incoming steam, when the steam is turned on, will force all of the air in the radiator out through the valves E and F, which will be closed as soon as steam comes into contact with their thermostatic valve members. By putting the valve F out of operation, that is, by turning the cap 24 of the device so that air cannot escape from the radiator at this point, a body of air will be trapped between the intermediate radiator section 12 and the end radiator section 16, and only the portion of the radiator between the intermediate section 12 and the other end section 10 will be active. It will be obvious that two or more of the intermediate sections of the radiator might be provided with air valves, thereby making it possible to further vary the amount of heat delivered. In such case the additional air valves, except the one nearest the inlet pipe, would have to be provided with the shut-off feature of air valve F.

It is an important, if not essential, feature of my invention to regulate steam pressure in the system so that the pressure in the radiator will be relatively low. If the pressure is say, from three to six pounds per square inch, which is customary in house heating systems, except those of the vapor type, the body of air in the radiator will be compressed or the air mixed with the steam to such an extent that the intended regulation may be frustrated or practically so. The best results can be obtained by limiting the pressure to substantially one pound per square inch although it may run somewhat higher; and to illustrate this point I have shown in connection with the diagram, Fig. 1, a common form of damper regulating apparatus which may be set to prevent the pressure from exceeding the desired maximum. The fire box and smoke pipe dampers 29, 30, are connected by a cord 31 extending over pulleys 32 attached to a lever 33 pivoted at 34 and connected at 35 to a pressure operated device 36 which is in communication with the steam chamber of the generator B, the lever being divided by the weight 37 which may be adjusted to vary the steam pressure at which the apparatus will be operated to slow down the fire by closing dampers 29, 30. Any suitable means may of course be employed for maintaining the pressure in the system at the proper point.

While I have described my invention in certain preferred embodiments, it will be understood that modifications might be made without departure from the principles of the invention. Therefore I do not wish to be understood as limiting the invention to the precise construction shown or described, except so far as the claims hereto appended may be specifically so limited.

I claim:

1. A radiator for a one-pipe pressure steam heating system having the usual supply and return pipe, said radiator comprising upright radiator sections communicating with each other at the bottom, with one end section of which said supply and return pipe is connected, in combination with a thermostatic air valve immediately attached to a section at the opposite end of the radiator from the supply and return pipe adapted to discharge air from the radiator to the atmosphere and to be automatically closed by the presence of steam in said section, and a thermostatic air valve immediately attached to an intermediate radiator section adapted to discharge air from the radiator to the atmosphere and to be closed automatically by the presence of steam in said section; said first named air valve adapted to be manipulated to prevent the outflow of air from the radiator at this point whereby all or part of the radiator may be made active.

2. A radiator for a one-pipe pressure steam heating system having the usual supply and return pipe, said radiator comprising upright radiator sections communicating with each other at the bottom, with one end section of which said supply and steam return pipe is connected, in combination with a thermostatic air valve immediately attached to a section at the opposite end of the radiator from the supply and return pipe adapted to discharge air from the radiator

to the atmosphere and to be automatically closed by the presence of steam in said section, one of the intermediate radiator sections being formed with a recess, and a thermostatic air valve arranged in said recess attached immediately to the radiator section adapted to discharge air from the radiator to the atmosphere and to be closed automatically by the presence of steam in said section; said first named air valve adapted to be manipulated to prevent the outflow of air from the radiator at this point whereby all or part only of the radiator may be made active.

FRANK J. DOUGLASS.