

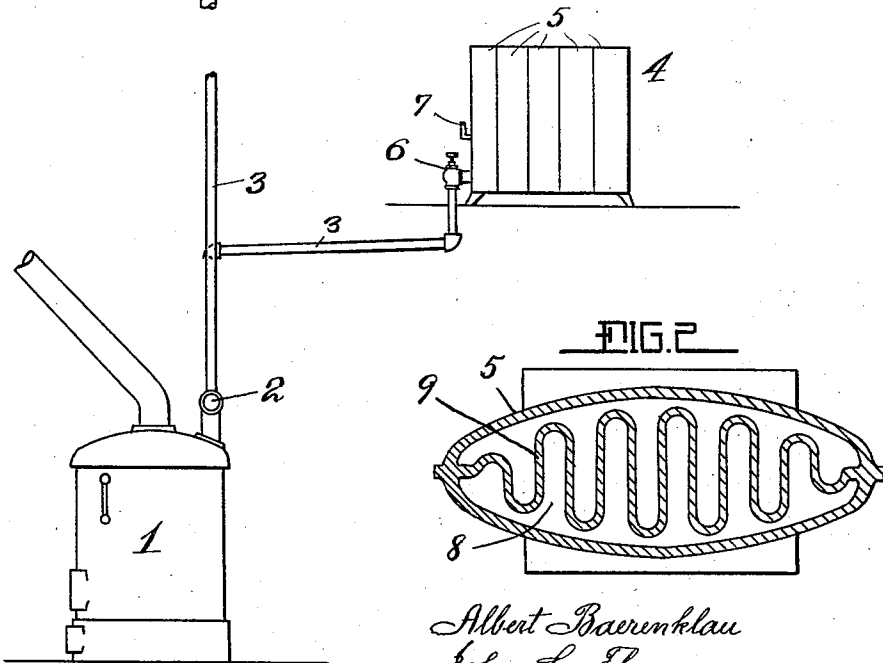
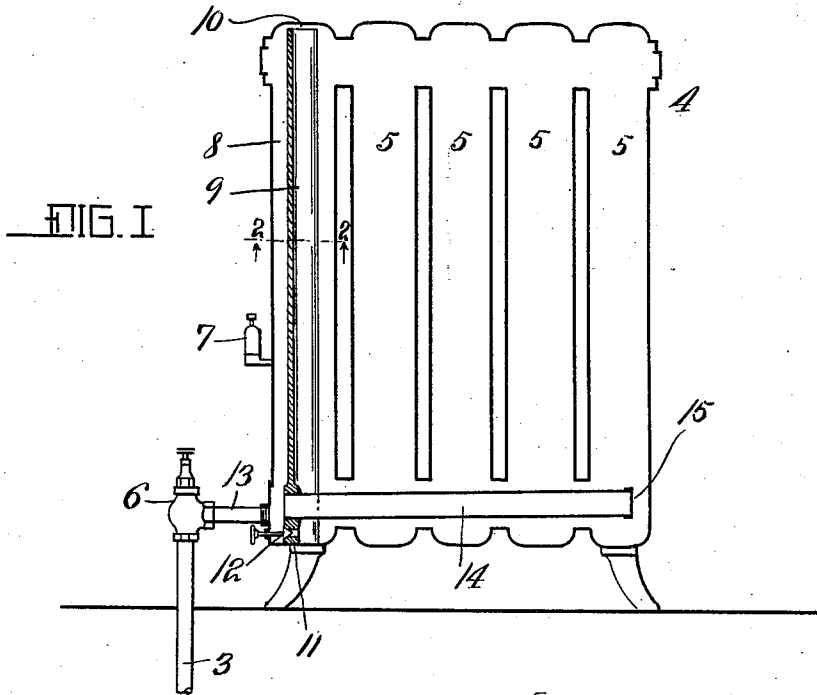
A. BAERENKLAU, J. L. FLANAGAN & J. L. WINTERS.
RADIATOR.

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1,011,880.

Patented Dec. 12, 1911.

2 SHEETS—SHEET 1.



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UNITED STATES PATENT OFFICE.

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RADIATOR.

1,011,880.

Specification of Letters Patent. Patented Dec. 12, 1911.

Application filed April 12, 1907. Serial No. 367,757.

To all whom it may concern:

Be it known that we, ALBERT BAERENKLAU, JOHN L. FLANAGAN, and JAMES LLOYD WINTERS, citizens of the United States of America, and residents of the city of New York, county of Kings, State of New York, have invented certain new and useful Improvements in Radiators, of which the following is a specification.

This invention relates to steam heating systems and has for its object to provide an improved radiator for use in such systems.

Our invention consists in the particular construction of a steam radiator, wherein means are provided for causing the condensation water to accumulate, and means for heating the thus isolated or local body of water by steam. The advantage of such a radiator is this, that a mild soothing heat is obtained similar to the heat produced by a water radiator pure and simple, but that all the apparatus needed in a water heating system is eliminated and a simple steam heating system is installed.

Our invention also provides means whereby the said radiator may be used as a steam radiator only, and provision is made for controlling and regulating the radiator.

Hence, our invention comprises such elements and features of construction as will hereinafter more fully appear, reference being had to the accompanying drawings in which our invention is embodied in a concrete form; but as changes may occur, we reserve the right to all such changes as come within the legitimate scope of the invention and the claims.

In the said drawings:—Figure 1 shows a steam heating system embodying our invention, partly in section, with some elements in diagrammatic form. Fig. 2 is a cross section on line 2—2 of Fig. 1. Fig. 3 is a sectional view of a portion of a radiator provided with a regulating valve embodying our invention. Fig. 4 is a similar view showing a modification.

The reference numeral 1 designates a boiler of conventional type for generating steam, 2 indicates the main header from which the pipes 3 lead to the different radiators 4, which are constructed as usual in so-called loops as 5. Each pipe is provided with the usual valve 6 and each radiator with the usual air valve 7.

In the loop nearest the connecting pipe 3

we provide a separate heating chamber 8 by means of the partition 9. This heating chamber forms a passage and space for the steam, which is employed to heat the water, which will be contained in the radiator proper on the other side of said partition, which preferably is corrugated as shown in order to obtain as much heating surface adjacent the water as possible. To further increase the heating surface and to heat the local body of water at the bottom, a tube 14 is inserted in the partition. The heating chamber communicates with the inlet valve 6 by the connection 13, and with the interior of the radiator by the narrow passage 10 at the top. At the bottom a by pass 11 is provided which is controlled by the valve 12. The tube 14 is closed by the cap 15.

In order to avoid repetition one of the radiators in the system is shown in diagrammatic form, but the radiators are all constructed alike.

When it is desired to use this radiator as an ordinary steam radiator, the operation is as follows: The by-pass valve 12 is fully opened and the steam passes into the radiator both through this by-pass and by way of the heating chamber and passage 10, and also fills the tube 14. As the steam passes in, the air is driven out through the air valve as usual, and the radiator now operates as an ordinary steam radiator, the condensation water passing out through the by-pass and from the tube back to the boiler.

When it is desirable to utilize the radiator as a water radiator, or rather, to obtain a mild steady heat, such as given off by water radiators the by-pass valve 12 is closed, thus leaving the passage 10 as the only communication between the heating chamber and the interior of the radiator. The condensation water will now begin to accumulate and in due time it will stand as high as the partition, while it is being heated by steam which constantly is supplied through the heating chamber and passage 10, and by the steam in the tube 14, which together with the corrugations on the partition afford sufficient heating surface. The heat now given off by the radiator is mild and exactly like the heat obtained from a water radiator, and entirely unlike the intense heat produced by a steam radiator, and whatever overflow there is, as by expansion or condensation of the steam on top of the water, drips into the

heating chamber and back to the boiler. From this it will be understood that by incorporating our improved radiator in a steam heating system, we obtain the advantages of a water heating system. And on the other hand, the disadvantages of the last named system are eliminated. Some of these disadvantages may well be set forth here in order to fully understand the importance of our invention. A water heating system requires "two-pipe work" and larger piping and radiators than a steam heating system. An expansion tank is also needed. Steam heating systems are connected up in the manner known as "one-pipe work," smaller radiators may be used and no expansion tank is required. Moreover, as we heat the water in the radiator by steam within the same we are able to heat the water quickly and to maintain a higher temperature with a smaller radiator than is now possible with water radiators. Another important feature of our construction resides in the fact that steam is introduced on the top of the water whereby the so called "hammering" or noise produced when the water gets boiling is impossible in our radiator. In ordinary water heating systems this noise is very frequent and very objectionable.

If it is desired to use steam only, the by-pass is opened and the water flows out. In cases where a "two-pipe" steam heating system is already installed, the tube 14 will be given a pitch toward and connected to the discharge pipe. The discharge connection is shown in dotted lines as it is not necessary in connection with our invention.

We will now describe the means for regulating or controlling the radiator by cutting off heating surface (see Figs. 3 and 4). These means are shown separated as the radiator 4 may or may not be provided with them. Outside the loop containing the partition 9 is added another loop, designated by 20, and communicating with said chamber by the passages 21 and 29. The interior of said loop 20 is closed at the bottom by the wall 22 in which is inserted the pipe 23 having the vertical slot 24. This pipe forms the outer casing of the valve 25 which is in the form of a tube open at the bottom and having the spiral slot 26, ending at the top in the aperture 27. The valve 25 is rotated by means of the handwheel 28.

In Fig. 3 the valve is shown as being shut, that is, the steam in this instance enters the radiator by passing up through the valve and through the passages 21 and 10, the passages 29 being closed by the condensation water which stands at the level of the aperture 27. Consequently the steam or heating room of the radiator is very small and less heat will be radiated. If it is desired to increase the temperature, the valve will be

turned until a certain portion of the spiral slot registers with the vertical slot in the valve casing, which will be at a lower level than at 27 and consequently the height of the condensation water will decrease and more steam room be obtained, hence the temperature will rise. If the radiator is filled with water and is to remain filled as above described, the by-pass is closed and the regulation then affects the space outside the partition only, that is, more or less steam space in the loop 20 may be obtained for keeping the water in the radiator hot. The water in the radiator will stand as high as the partition, but outside the latter, the condensation water may stand at a different height.

In Fig. 4 is shown a modified valve construction in which the valve 30 carries at its bottom another valve 31 which opens or closes the inlet pipe 13, and the steam enters the valve 30 through openings 32. The valve 30 is in this instance threaded into the wall 22 and as it is rotated it is simultaneously given a vertical motion, in such a manner that as the condensation water is allowed to rise, the inlet valve is moved nearer its seat, whereby less steam is supplied the radiator. In all other respects this construction operates like the one shown in Fig. 3. In this figure the reference numeral 40 indicates the point at which the two slots register, and at which level the condensation water will stand. Steam will of course enter the radiator through the aperture thus created, as well as at the top of the valve.

The construction of the radiator provided by our invention and the operation of the same is thought to be clear from the foregoing, and it will be understood, that the advantage of "water heat," to use this common expression, is incorporated and obtained in a steam heating system. This, to the best of our knowledge, it has not been possible to accomplish before.

The radiators are all fed with steam from a common source, but one or more of them operated at will so as to contain local bodies of water, which do not circulate, but which are heated by the steam. By a "local" body of water we mean the water contained within the radiator as distinguished from the water in a water heating system, in which the water circulates through the whole system.

What we claim is:—

1. In a steam radiator the combination of a vertical partition, a heating chamber formed to the one side thereof and communicating with the interior of the said radiator at the top, a valve chamber formed adjacent the said heating chamber and communicating therewith, a valve in said valve chamber comprising a slotted sleeve, a valve body in said sleeve and provided with a spiral slot adapted to cooperate with the aforesaid slot to cause the condensation

water to accumulate at will and means for supplying steam to the bottom of the said valve chamber.

2. In a steam radiator the combination of
5 a vertical partition, a heating chamber formed to the one side thereof and communicating with the interior of the said radiator at the top, a valve chamber formed adjacent the said heating chamber and communicat-
10 ing therewith, means for supplying steam to the bottom of the said valve chamber, a valve in said valve chamber for causing the con-

densation water to accumulate at will, and for controlling the admittance of the said steam.

Signed at New York, N. Y. this 8th day
of April, 1907.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."