

No. 865,439.

PATENTED SEPT. 10, 1907.

F. A. SIMONDS.
HEATING SYSTEM.

APPLICATION FILED NOV. 25, 1904. RENEWED DEC. 14, 1905.

2 SHEETS—SHEET 1.

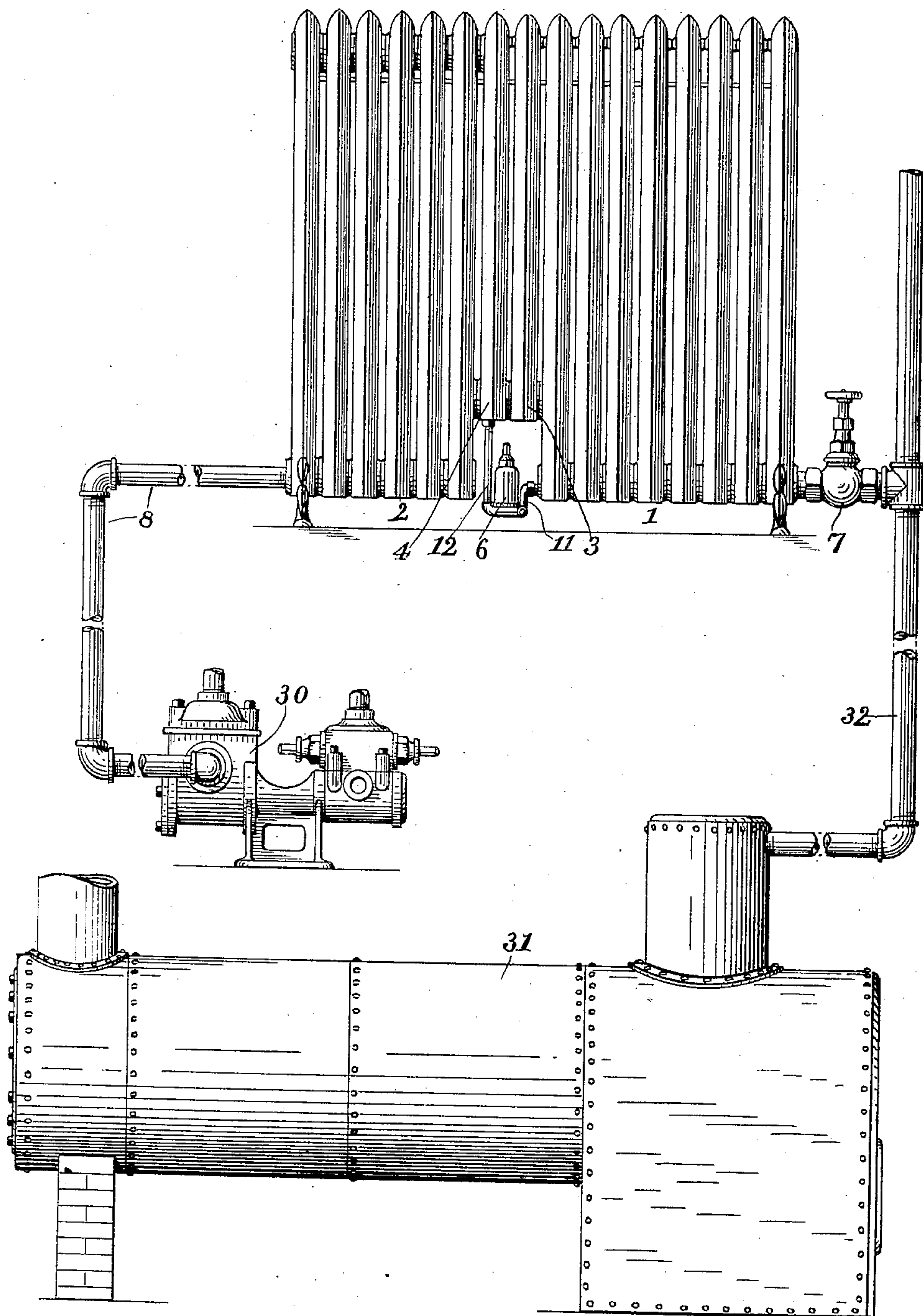


Fig. 1.

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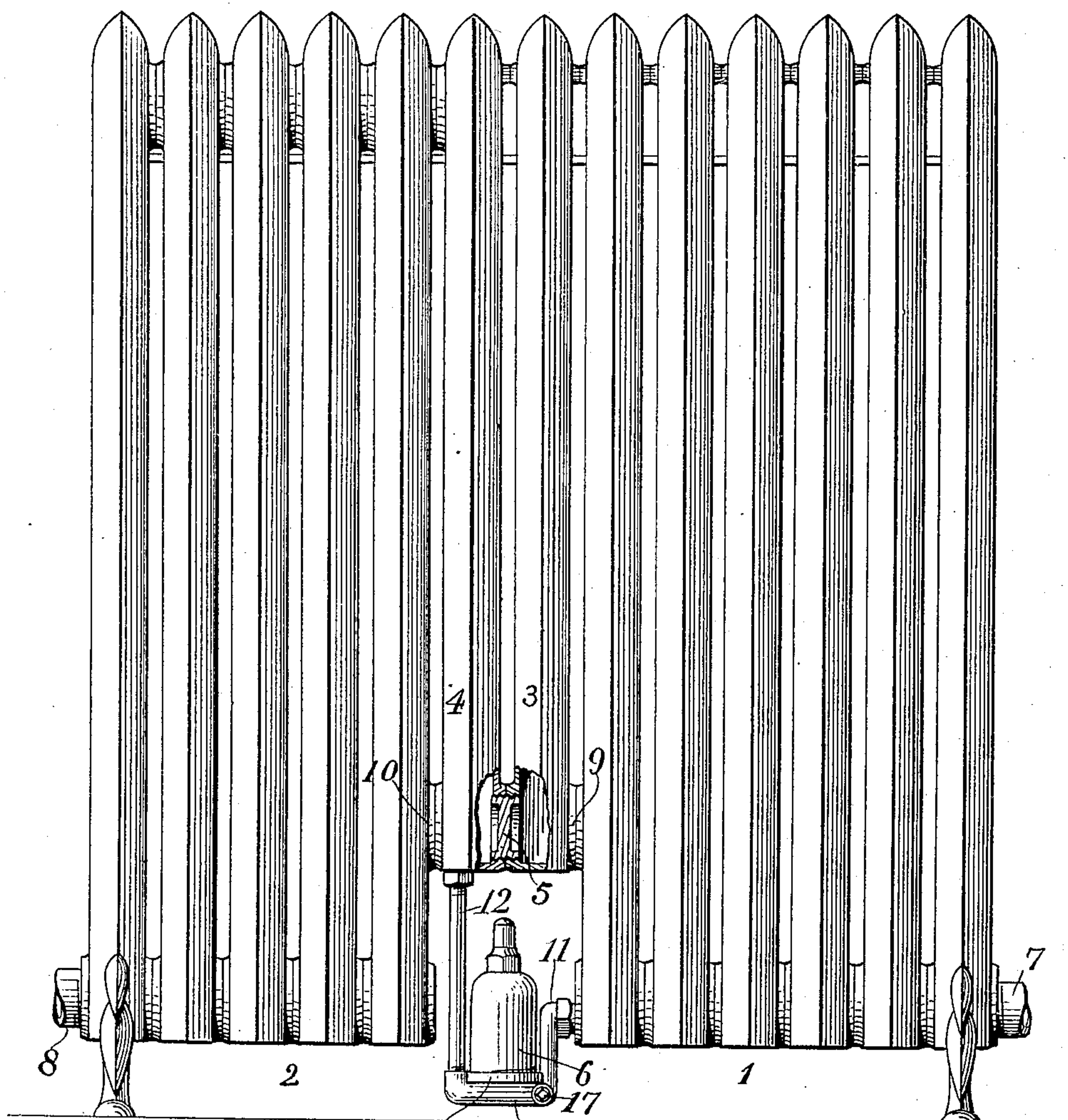


Fig. 2.

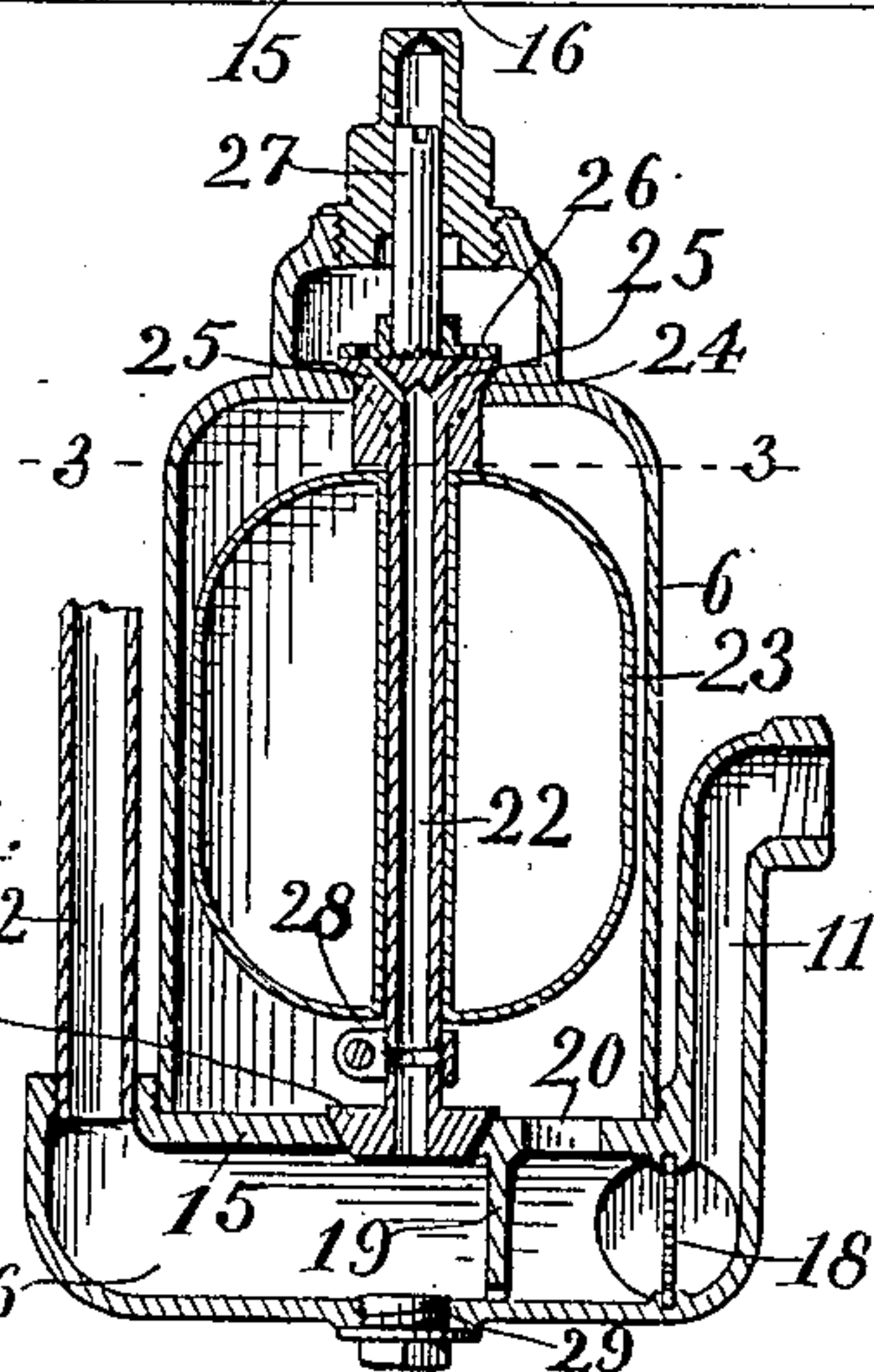


Fig. 3.

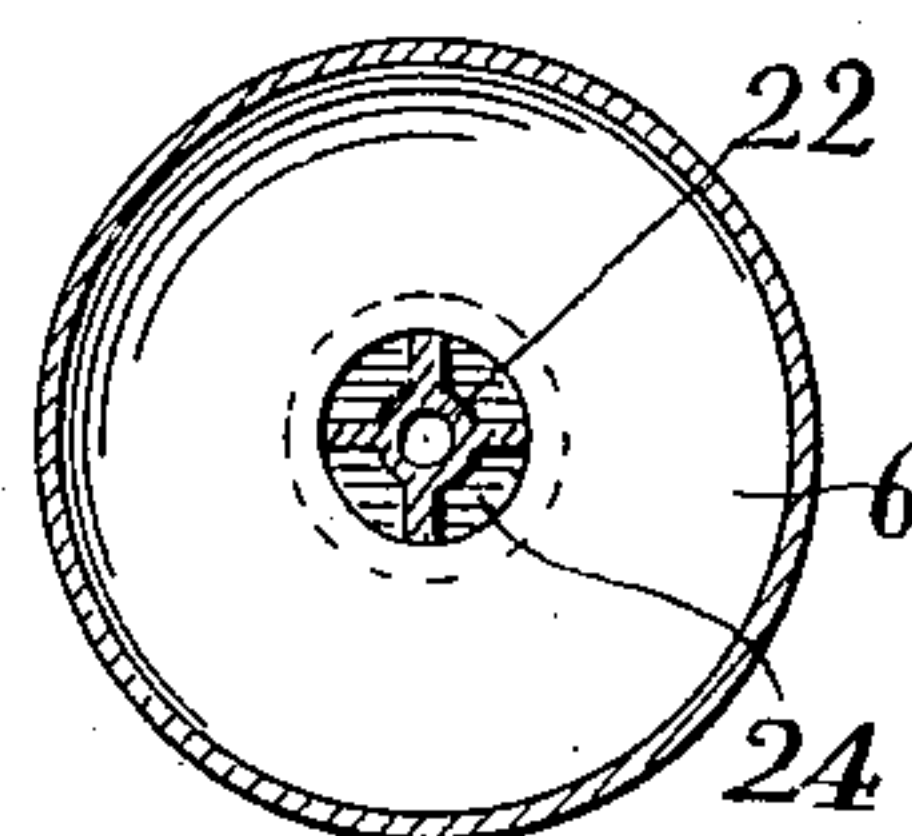


Fig. 4.

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UNITED STATES PATENT OFFICE.

FRANK A. SIMONDS, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO THE SIMONDS HEATING AND SPECIALTY COMPANY, OF FREMONT, MICHIGAN, A CORPORATION OF MICHIGAN.

HEATING SYSTEM.

No. 865,439.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed November 25, 1904, Serial No. 234,177. Renewed December 14, 1905. Serial No. 291,731.

To all whom it may concern:

Be it known that I, FRANK A. SIMONDS, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented
5 certain new and useful Improvements in Heating Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-

10 My invention relates to improvements in heating systems and its object is to provide a heating system of greater economy; to provide a device in which a heating fluid can be used at different pressures and temperatures in accordance with the method shown in my co-
15 pending application on heating methods filed Dec. 14, 1905, Ser. No. 291,730; and to provide the device with various new and useful features hereinafter more fully described and particularly pointed out in the appended claims.

20 My invention consists of a heating system embracing any desired number of radiators, each of which comprises two portions connected by a restricted passage whereby the heating fluid will pass from the high pressure member to the low pressure member of each radiator,
25 and in which the medium will first be utilized at a pressure above the atmosphere until it has been cooled or condensed and will then pass to the low pressure member of the radiator in the cooled or condensed form where it may be further utilized at a lower tem-
30 perature, being reexpanded or reevaporated at a lower pressure and again utilized until further cooled or recondensed, as will hereinafter more fully appear by reference to the accompanying drawings, in which:—

Figure 1 is an elevation of the entire apparatus; Fig.
35 2 is a side elevation of a radiator embodying my invention with a part broken away to show the separating means between the high and low pressure sides; Fig. 3 is an enlarged detail in vertical section of the steam trap shown in Fig. 2; and Fig. 4 is a horizontal section
40 on the line 3—3 of Fig. 3.

Like numerals refer to like parts in all of the figures.

The radiator proper may be of any number and style of sections or coils and is shown as divided into two separate portions hereafter called the high pressure and
45 low pressure sides, which are indicated by 1 and 2. The heating fluid preferably consists of steam and water, the former being admitted to the high pressure side or member 1 of the radiator, and the latter entering the low pressure side or member 2 through a restricted opening or trap between the two radiating members. The
50 two adjacent coils in these respective portions are connected by a plug 5 instead of a tube, and the only connection between the two sides is through the trap or restricted passage for transferring the cooled or condensed fluid and any air to the low pressure side.

These coils 3 and 4 are preferably made shorter than the remaining coils to make room for the steam trap located beneath the same. These coils are also connected to their respective adjacent coils by the usual tubular connections 9 and 10.

60 6 represents any suitable steam trap for transferring the fluid from the high pressure to the low pressure side of the device, the form shown being preferably the same as that shown in my application for patent on balanced steam traps, patented March 28, 1905, number
65 786,238, and which is connected by suitable pipes 11 and 12 to the respective high and low pressure sides of the device. This trap is constructed substantially as shown in detail in Fig. 2, in which 15 is a suitable bed
70 plate on which the case 6 of the trap is mounted and beneath which bed plate is a suitable passage 16, interposed in which passage is a screen 18 to intercept any solid substances that may be carried into the same.

19 is a partition through which is a small drain opening to permit a limited quantity of the heating fluid
75 to escape therethrough; 29 is a plug to permit access to the lower valve 21; 20 is an opening into the case 6; 21 is a lower valve to permit water to escape from the case into the passage 16; 22 is a tubular valve stem extending upward through the case and opening into the
80 upper chamber of the same; 23 is a float mounted on this valve stem to open the valve 21; 24 is a balancing valve in the upper chamber of the case and attached to the stem 22; 25 are passages through this valve for the escape of air or steam from the upper chamber; 26
85 is a disk rotative on the upper valve stem 27 and having openings to adjust the openings 25 in the valve; 27 is an upper valve stem whereby the upper valve may be rotated to adjust the valves 21 and 24 on their respective
90 seats, for which purpose the stem 22 is divided below the float and screw threaded and connected by a screw threaded collar 28 to effect the relative adjustment of these valves.

It is not intended to limit my device to any particular means of providing a restricted passage between
95 the two sides, but I prefer the device illustrated in Fig. 2. for that it is automatic in operation. When in use this radiator may be connected at 7 by a pipe 32 to any convenient supply of steam under pressure in the usual manner such as a boiler 31 and the passage
100 from the high pressure side 1 to the low pressure side 2 being properly restricted, the steam will be retained in the side 1 until it has cooled or condensed under the pressure therein. The fluid will then pass through the restricted passage between the two sides and flowing
105 into the side 2 will accumulate therein and heat the same, from whence it can be withdrawn by means of any suitable pipe connections at 8. I prefer to attach to this connection 8 a pump 30 or other suitable means
110 for reducing the pressure within the side 2 of the ra-

diator, thus permitting the fluid therein to reëxpand or reëvaporate and again part with heat at a lower temperature and pressure than in the side 1 and thus be come further cooled or recondensed. It will then be
5 drawn off at 8 sufficiently cooled to be pumped without further cooling. I am thus able to abstract a greater amount of heat from the heating medium than is possible under ordinary conditions of substantially
10 uniform pressure and temperature throughout the entire radiator. It will also be noted that any steam escaping with the air and water from the side 1 is used in the other side instead of wasted.

Having thus fully described my invention, what I claim and desire to secure by Letters Patent is:

The combination of a radiator divided into two separate parts, means for supplying steam under pressure to one part, a steam trap between the parts and connecting the same, and a vacuum pump connected to the second part. 15

In testimony whereof I affix my signature in presence of two witnesses.

FRANK A. SIMONDS.

Witnesses:

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