

I. WASSILIEW.
HOT WATER HEATING INSTALLATION.
APPLICATION FILED AUG. 2, 1910.

993,926.

Patented May 30, 1911.

3 SHEETS-SHEET 1.

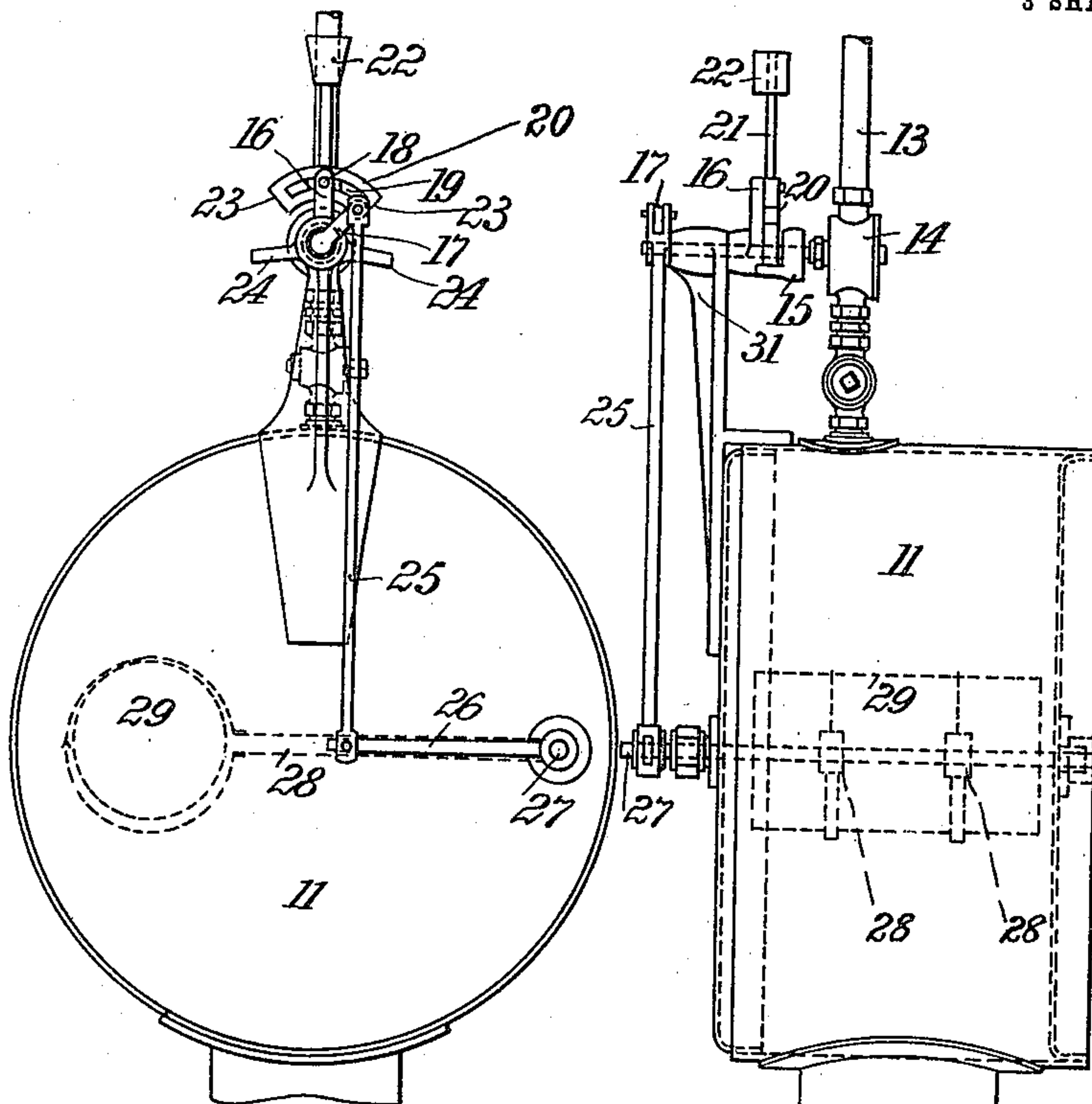


Fig. 4.

Fig. 5.

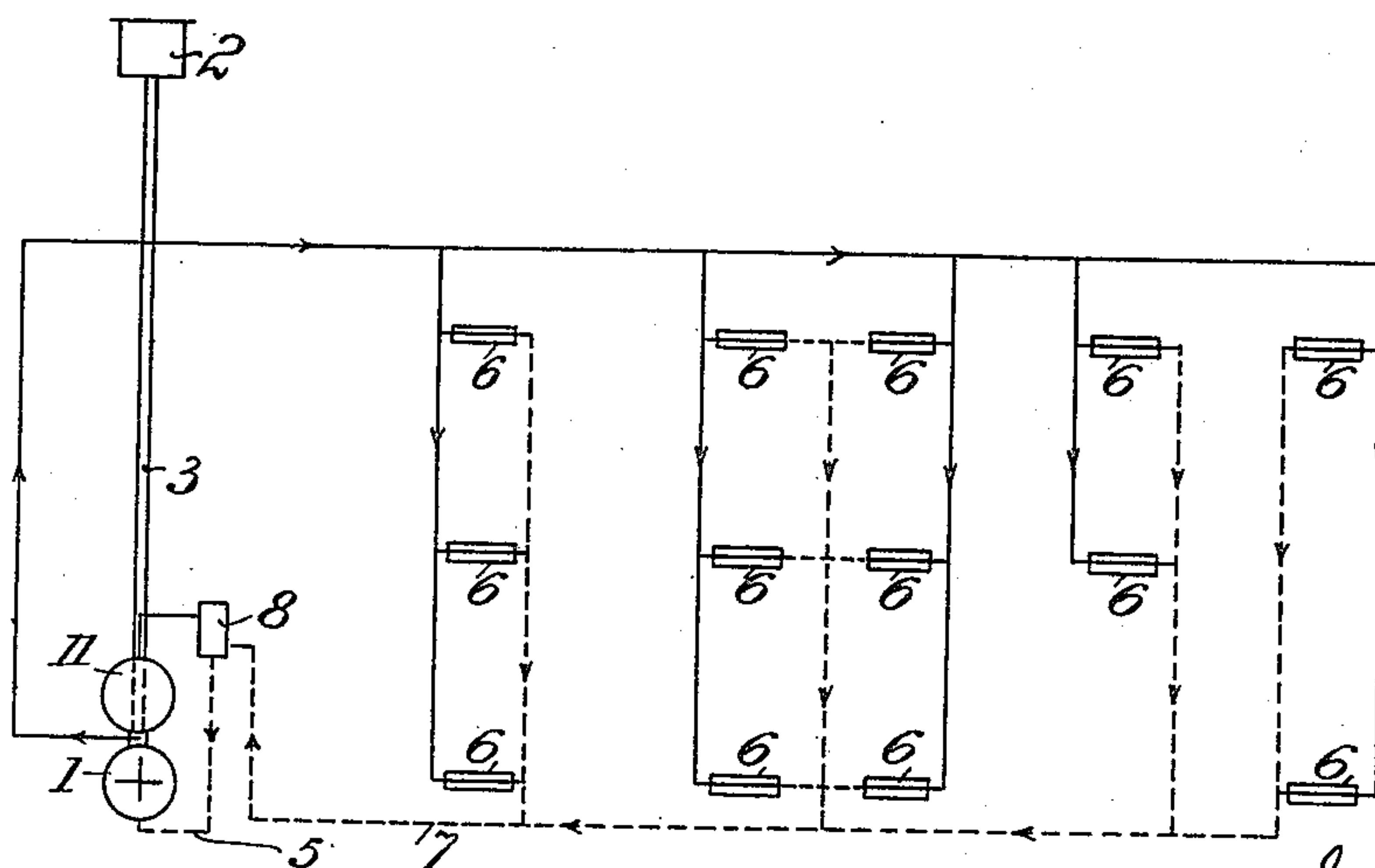


Fig. 1.

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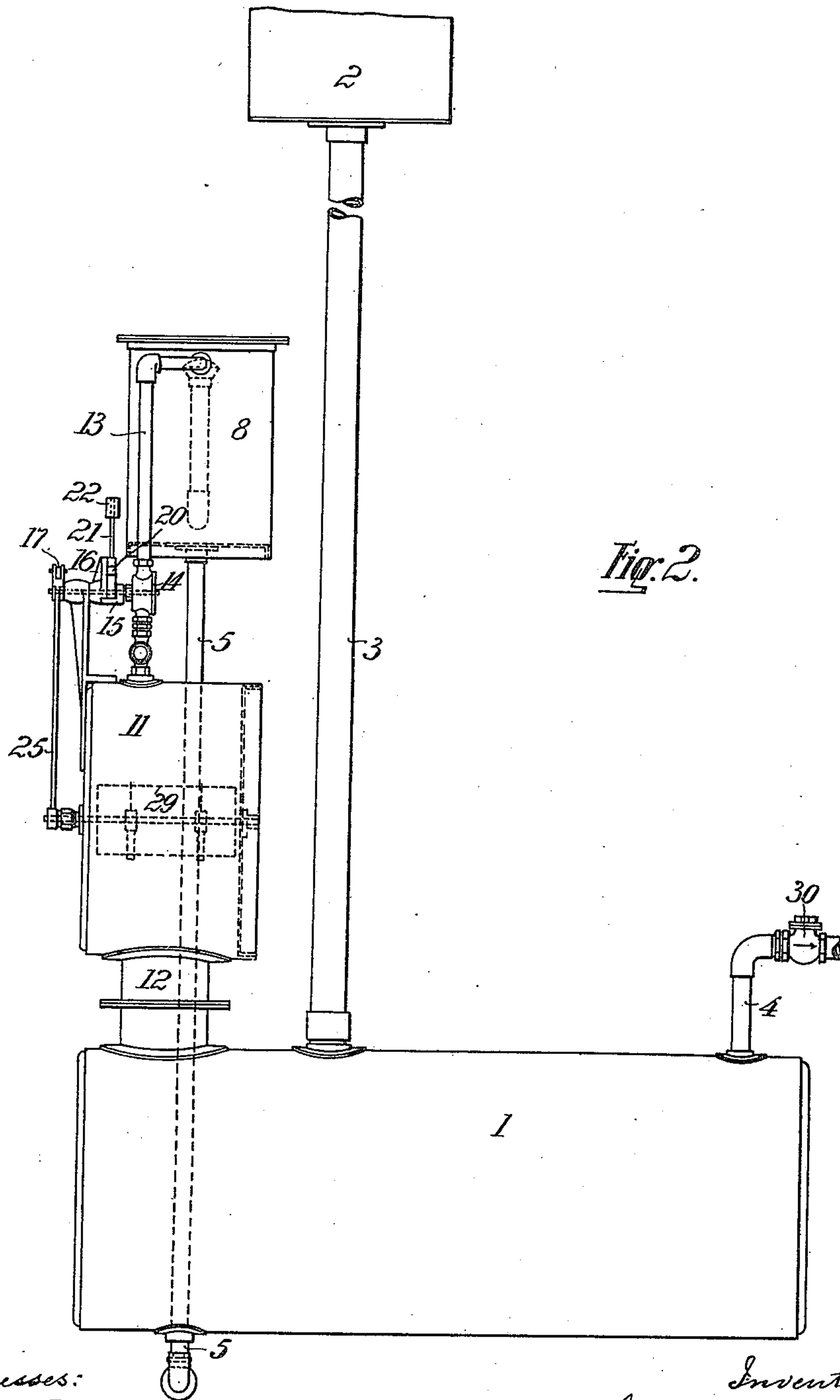


Fig. 2.

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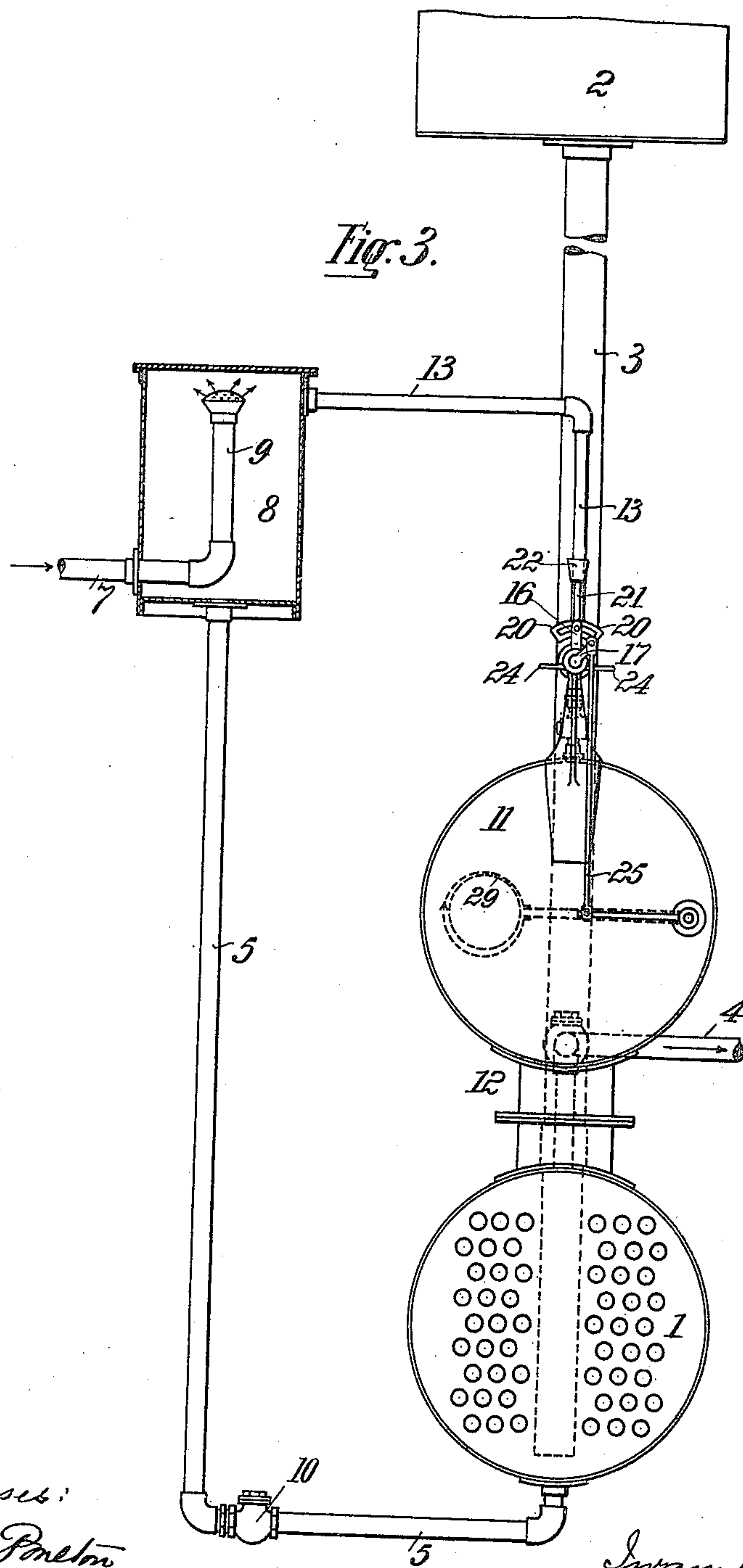
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3 SHEETS—SHEET 3.



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HOT-WATER HEATING INSTALLATION.

993,926.

Specification of Letters Patent.

Patented May 30, 1911.

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To all whom it may concern:

Be it known that I, IWAN WASSILIEW, engineer, residing at Wiatka, Russia, have invented certain new and useful Improvements in Hot-Water Heating Installations; 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 appertains to make and use the same.

This invention relates to a device for heating buildings or the like by hot water, and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

A new heating device is illustrated by way of example in the accompanying drawing in which:—

Figure 1 shows the whole installation diagrammatically. Fig. 2 is a side elevation of the boiler with the device producing the circulation of water. Fig. 3 is a front elevation of the boiler with the circulating device, the latter in section. Fig. 4 is a front elevation of the valve gear, and Fig. 5 is a side elevation of the controlling or valve gear.

1 is the boiler to which is connected by a rising pipe 3 an expansion vessel 2 arranged at the highest point of the building for determining the pressure.

4 is the rising pipe for the hot water provided with a check-valve 30, while the returning cold water passes back through the pipe 5 into the boiler. Between the said pipe 5 and the return pipe 7 coming from the heaters 6, is arranged a collector vessel 8 into which the returning water passes from the pipe 7 by means of an upward overflow pipe 9, and to the bottom of which is connected the pipe 5. The latter is further provided with a check valve 10 which prevents the water from the boiler 1 from getting into the collector vessel 8 when the pressure rises, or the counter-pressure decreases.

Above the boiler is arranged a vessel 11 connected to the same by means of a wide branch 12 and constituting a steam dome when steam is generated, the level of water in the said dome or vessel fluctuating in accordance with the degree of steam generation. Obviously the vessel 11 can not only have any other suitable shape, but it can be dispensed with altogether, in which case its function is taken up by the boiler itself. From the vessel 11, from the upper point of

the same, that is to say, from the steam space, a connecting pipe 13 leads to the upper portion of the collector vessel 8. Communication between the vessel 11 and the vessel 8 is, however, established automatically but only temporarily, by a device hereinafter described.

In the pipe 13 is arranged a cock 14 to the spindle of which is secured a driver 15. On the extension of the said spindle carrying the driver 15, with an intermediate space sufficient for the free expansion, is placed another spindle. This second spindle passes through the boss of the bracket arm 31 secured to the steam dome 11, the said spindle being rotatable in the said boss. On the said second spindle, on both sides of the boss, are mounted two levers 16 and 17 secured to the spindle. Immediately next to the lever 16, on the same spindle is mounted in a loosely rotatable manner a sector 20 with the circular slot 19 of which is engaged a pin 18 of the lever 16, so that the latter, and with it the lever 17, can turn to a considerable extent before the sector 20 is moved. To the sector 20 is connected a weight 22 on an arm 21, which, when the central position is passed, as shown in Fig. 4, produces by turning over an automatic movement of the sector which then strikes with its surface 23 one of the projections 24 of the driver 15 and shifts the cock 14, that is to say, opens or closes the same.

To the free end of the lever 17 is pivoted a rod 25, the other end of which engages with the free end of a lever 26 secured to the spindle 27 passing through the vessel 11. To the same spindle, but in the interior of the vessel are secured lever arms 28 carrying at their ends a float 29, so that the rising and sinking of the float during the change in the level of water in the vessel 11 results in a turning of the spindle 27 and therefore in a turning of the levers 16 and 17 or in a movement of the cock 14.

The working of the device is as follows: When the heating begins, that is to say, when there is still no steam, the whole vessel 11 is filled with water. The float 29 is in its highest position, and the tipping weight is therefore resting on the projection 24 (situated on the left hand side in Fig. 4) of the driver 15, that is to say, it is turned, and closes the cock 14. The piping or pipe circuit, the heaters as well as the collector vessel 8 are also filled with water. As the

firing of the boiler proceeds, steam is generated and collects in the vessel 11, so that the level of water in the same sinks, the water displaced being forced into the expansion vessel 2. Simultaneously with the sinking of the water level in the vessel 11, the float 29 also sinks, and when it has sunk far enough the sector 20, and with it the tipping weight, are caused to participate in the movement, until the central position of the weight has been passed, whereupon the cock 14 is suddenly turned, that is to say, the connecting pipe between the steam chamber 11 and the upper portion of the collector vessel 8, is opened. Owing to the difference in the specific gravity of water and of steam, the steam from the vessel 11 flows into the vessel 8, and the water contained in the latter is forced through the pipe 5 into the boiler. Thus the level of water in the steam chamber 11 rises again, the float is again caused to move, and after a certain time, owing to the movement of the sector and to the turning of the weight 22, the cock is moved in the opposite direction, that is to say, suddenly closed. The boiler is then in communication on the one hand with the expansion vessel 2, and on the other hand only with the collector vessel 8, no longer however through the connection pipe 13, but through the whole heating circuit or piping. Owing to the condensation of steam in the collector vessel 8, a strong suction is produced in the latter and owing to this suction, assisted by the pressure in the boiler, the water in the heating circuit is caused to circulate quickly, in the direction from the boiler to the collector vessel 8 which is finally filled completely with the cooled water of the return pipe. The cooled water taken from the heating circuit or piping is replaced by an equal quantity of hot water from the boiler. The valves 10 and 30 act, therefore as suction or pressure valves, for they prevent a return movement of water at any time. In the meantime, steam generation in the boiler is continuing. Steam collects again in the vessel 11 and displaces the water and drives it partly into the heat-

ing circuit, and partly into the expansion vessel 2. As the level of water in the vessel 11 sinks, the float 29 also sinks, and the process described is naturally repeated in a sequence the speed of which varies with the firing, thus the greater the firing the quicker the sequence. That is to say, by suitably firing the boiler, it is possible to obtain, within certain limits, any desired speed of circulation of water and any desired intensity of heating.

What I claim is:

In a hot water heating system, the combination, with a boiler provided with a dome for steam and water which is constantly in free communication with its main portion, and a circuit of pipes for hot water provided with a circuit-supply pipe which is connected to the boiler and having also a return pipe; of an expansion vessel connected with the main portion of the boiler and operating to determine its working pressure, a collector vessel having a single chamber arranged above the level of the boiler dome and having the said return pipe connected to it, a pipe coupling the said collector vessel direct to the main portion of the boiler, check valves inserted in the said circuit-supply pipe and in the return coupling pipe adjacent to the boiler, a steam pipe arranged between the said dome and collector vessel and constituting the only direct communication between them, a steam supply valve arranged in the said steam pipe, a float arranged in the said dome and operated by the water in the dome, and trip mechanism arranged between the said float and steam valve and operating to admit steam to the collector vessel when the water level in the dome is reduced by the pressure of the steam in said dome which forces the water from the main portion of the boiler into the said expansion vessel and circuit-supply pipe.

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

IWAN WASSILIEW.

Witnesses:

H. A. LOVIAGUIRE,
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