

W. ENTERLINE.

THERMOSTAT.

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929,081.

Patented July 27, 1909.

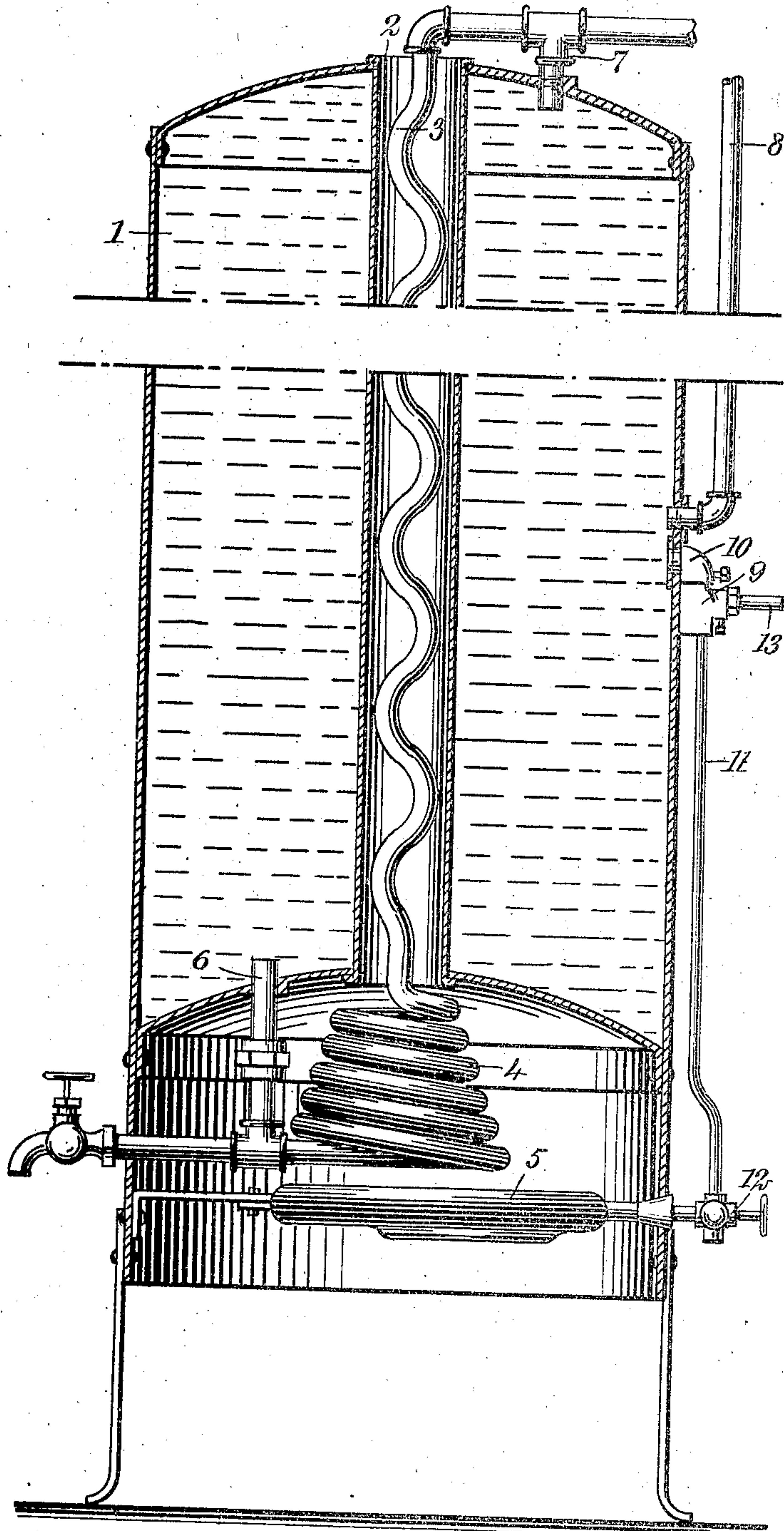


Fig. 1

WITNESSES

*John A. Bergstrom*  
*E. B. Marshall*

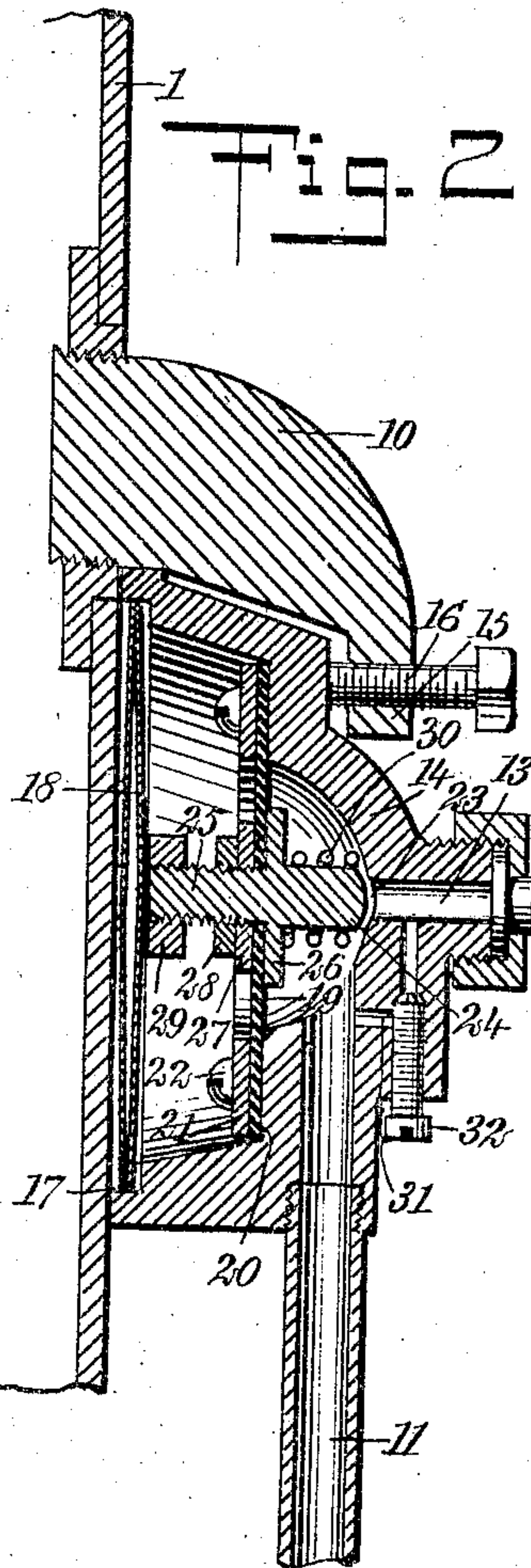


Fig. 2

INVENTOR

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BY

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# UNITED STATES PATENT OFFICE.

WILLIAM ENTERLINE, OF BIG RUN, PENNSYLVANIA.

## THERMOSTAT.

No. 929,081.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed July 8, 1908. Serial No. 442,464.

*To all whom it may concern:*

Be it known that I, WILLIAM ENTERLINE, a citizen of the United States, and a resident of Big Run, in the county of Jefferson and State of Pennsylvania, have invented a new and Improved Thermostat, of which the following is a full, clear, and exact description.

My invention relates to thermostats, and it has for its object to provide a thermostat which may be disposed against a boiler and which, while inexpensive to construct, may be readily adjusted to a boiler of any type and will automatically and accurately regulate the supply of gas which is supplied to the burner under the boiler. This result I am able to accomplish by means of the following construction. The thermostat has a casing which may be held against the boiler by any suitable means, and secured to this casing and adapted to lie against the boiler, is an expansible disk against which is disposed a valve stem. The valve stem is supported and the gas chamber in the casing is separated from the remainder of the casing by means of a diaphragm, which may be constructed of rubber. The diaphragm is secured to the casing by an annular washer and screws, or by other appropriate means. The valve stem is threaded and it has a flange thereon, the flange being adapted to lie against the diaphragm, and a nut which engages the thread is adapted to press the diaphragm against the said flange to make a tight connection between the diaphragm and the valve stem. Another nut may be used on the thread, in order to regulate the distance between the expansible disk and the said nut engaging the valve stem. The valve is disposed in alinement with the valve seat, which as shown in the drawings commands the inlet. A spring is disposed between the flange on the valve stem and the casing near the said valve seat, in order normally to keep the valve open. An outlet from the gas chamber is provided, which is in communication with the burner, and there is a by-pass around the valve to this communication, the by-pass being commanded by a second valve.

In this specification I will describe the preferred form of my invention, but I do not limit myself thereto, as I consider myself entitled to all forms and embodiments of the invention which may fall within the scope of the appended claims.

Reference is to be had to the accompany-

ing drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the figures, in which—

Figure 1 is a vertical sectional view showing the application of my thermostat to a boiler; and Fig. 2 is an enlarged sectional view of my thermostat.

By referring to the drawings, it will be seen that a boiler 1, has a central column 2, which extends from the bottom to the top of the boiler and has water-tight connections therewith. In this column is disposed a pipe 3 which leads from a heating coil 4, which is disposed over the burner 5. The heating coil 4 is in communication with the bottom of the boiler by means of a pipe 6 and the pipe 3 is in communication with the top of the boiler by means of a pipe 7. Suitable means 8 are provided by means of which water may be introduced into the boiler. My thermostat is shown in Fig. 1 at 9, and the means by which it is secured to the boiler is shown at 10. A pipe 11 from the thermostat leads down to the burner 5 and is commanded by a valve 12. A pipe 13 is the inlet for the gas.

Referring now to Fig. 2, it will be seen that the means by which my thermostat is secured to the boiler may be a yoke, such as is shown in Fig. 2, this yoke being screwed into the boiler at a place provided for a connecting pipe, or the yoke 10 may be constructed in a different manner so that it may be connected directly with a connecting pipe. My thermostat consists of a casing 14, and the yoke 10 has a flange 15 in which there is a threaded orifice, and in this orifice is disposed a bolt 16, which is adapted to screw against the casing 14 of the thermostat to hold the thermostat against the boiler 1. A side 17 of the thermostat which is disposed against the boiler 1, is not covered by the casing, and in this side there is secured to the casing an expansible disk 18, which may be of any well known form. To the casing 14 is secured a diaphragm 19, this diaphragm 19 being preferably secured to an annular shoulder 20 in the casing, and as shown in Fig. 2, I prefer to press the said diaphragm 19 against the said annular shoulder by means of an annular washer 21, which is held against the shoulder by means of screws 22. There is a valve seat 23 in the casing, which is commanded by a valve 24. This valve 24 has a stem 25, the end of which is disposed in close



proximity to the expansible disk 18. On this valve stem 25 is formed an annular flange 26, and from this annular flange 26 to its end in close proximity to the expansible disk, the stem is threaded. The valve stem is disposed through an opening in the diaphragm 19, and by means of a washer 27 and a nut 28 the diaphragm 19 is pressed against the flange 26, to obtain a tight connection. Another nut 29 may be disposed on the threaded valve stem 25, the function of this nut 29 being to enable the adjustment of the valve 24 with reference to the expansible disk 18, so that predetermined expansion of the disk 18 will actuate the valve as may be desired. A spring 30 is disposed on the valve stem between the flange 26 and the casing 14 around the valve seat 23, the function of this spring 30 being to keep the valve normally open. A by-pass 31 is provided, to afford a communication between the inlet pipe 13 and the pipe 11 around the valve, and this by-pass 31 is commanded by a screw valve 32.

In using my invention, the distance between the valve stem 25 and the expansible disk 18 when at rest, is adjusted in connection with the spring 30, so that on the expansion of the disk, it will press the valve stem 25 so that the valve 24 will rest against the valve seat 23, closing the valve, or if desired, the nut 29, may be adjusted on the valve stem 25 so that the desired action between the expansible disk 18 and the valve may be regulated. When the water in the boiler 1 becomes heated, the disk 18 lying against the boiler will expand, thereby operating the valve to cut off the supply of gas which is being fed to the burner 5. If desired, the screw valve 32 commanding the by-pass 31, may be opened to permit a small amount of gas to be supplied to the burner 5 at all times, in which case the valve 24 will only cut off the additional supply which is heating the water in the boiler beyond a predetermined, or safe degree.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a thermostat, a casing, a diaphragm dividing the casing, one side of the casing being open to the atmosphere, a disk expansible by heat disposed in the division of the casing open to the atmosphere, a valve stem passing through the diaphragm, a terminal of the diaphragm being disposed in close proximity to the expansible disk, a valve seat in the division of the casing which is not open to the atmosphere, and a valve on the valve stem which commands the valve seat.

2. In a thermostat, a casing, an expansible disk on one side of the casing, a diaphragm disposed between the expansible disk and the other side of the casing, a valve the stem of which passes through the dia-

phragm, a flange on the valve stem which is adapted to lie against the diaphragm, the valve stem being threaded and a terminal of which is disposed in close proximity to the expansible disk, a nut on the valve stem which is adapted to press the diaphragm against the flange, a valve seat in the casing which is commanded by the valve; and a communication from the casing which is independent of the valve.

3. In a thermostat, a casing, an expansible disk on one side of the casing, a diaphragm disposed between the expansible disk and the other side of the casing, a valve the stem of which passes through the diaphragm, a flange on the valve stem which is adapted to lie against the diaphragm, the valve stem being threaded and a terminal of which is disposed in close proximity to the expansible disk, a nut on the valve stem which is adapted to press the diaphragm against the flange, a valve seat in the casing which is commanded by the valve, a communication from the casing which is independent of the valve, and means to support the thermostat on the side of a boiler.

4. In a thermostat, a casing, an expansible disk on one side of the casing, a diaphragm disposed between the expansible disk and the other side of the casing, a valve the stem of which passes through the diaphragm, a flange on the valve stem which is adapted to lie against the diaphragm, the valve stem being threaded and having its terminal in close proximity with the expansible disk, a nut on the valve stem which is adapted to press the diaphragm against the flange, a valve seat in the casing which is commanded by the valve, a spring which is adapted to hold the valve normally open, and a communication from the casing which is independent of the valve.

5. In a thermostat, a casing, an expansible disk on one side of the casing, a diaphragm disposed between the expansible disk and the other side of the casing, a valve the stem of which passes through the diaphragm, a flange on the valve stem which is adapted to lie against the diaphragm, the valve stem being threaded and a terminal of which is disposed in close proximity to the expansible disk, a nut on the valve stem which is adapted to press the diaphragm against the flange, a valve seat in the casing which is commanded by the valve, and a by-pass around the said valve.

6. In a thermostat, a casing, an expansible disk on one side of the casing, a diaphragm disposed between the expansible disk and the other side of the casing, a valve the stem of which passes through the diaphragm, a flange on the valve stem which is adapted to lie against the diaphragm, the valve stem being threaded and a terminal of which is disposed in close proximity to the expansible



disk, a nut on the valve stem which is adapted to press the diaphragm against the flange, a valve seat in the casing which is commanded by the valve, a by-pass around the said valve, and a second valve which commands the by-pass.

7. In a thermostat, a casing, an expansible disk on one side of the casing, a diaphragm disposed between the expansible disk and the other side of the casing, a valve the stem of which passes through the diaphragm, a flange on the valve stem which is adapted to lie against the diaphragm, the valve stem being threaded and having its terminal in close proximity to the expansible disk, a nut on the valve stem which is adapted to press the diaphragm against the flange, a valve seat in the casing which is commanded by the valve, a spring which is adapted to hold the valve normally open, a communication from the casing which is independent of the valve, and a by-pass around the said valve.

8. In a thermostat, a casing, a diaphragm dividing the casing, one side of the casing being open to the atmosphere, a disk expansible by heat disposed in the division of the casing open to the atmosphere, a valve

stem passing through the diaphragm, a terminal of the valve stem being disposed in close proximity to the expansible disk a valve seat in the division of the casing which is not open to the atmosphere, a valve on the valve stem which commands the valve seat, and a by-pass around the said valve.

9. In a thermostat, a casing, a diaphragm dividing the casing, one side of the casing being open to the atmosphere, a disk expansible by heat disposed in the division of the casing open to the atmosphere, a valve stem passing through the diaphragm, a terminal of the diaphragm being disposed in close proximity to the expansible disk, a valve seat in the division of the casing which is not open to the atmosphere, a valve on the valve stem which commands the valve seat, and means for supporting the thermostat on the side of a boiler.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM ENTERLINE.

Witnesses:

SILAS H. GOURLEY,  
GEORGE I. PALMER.