

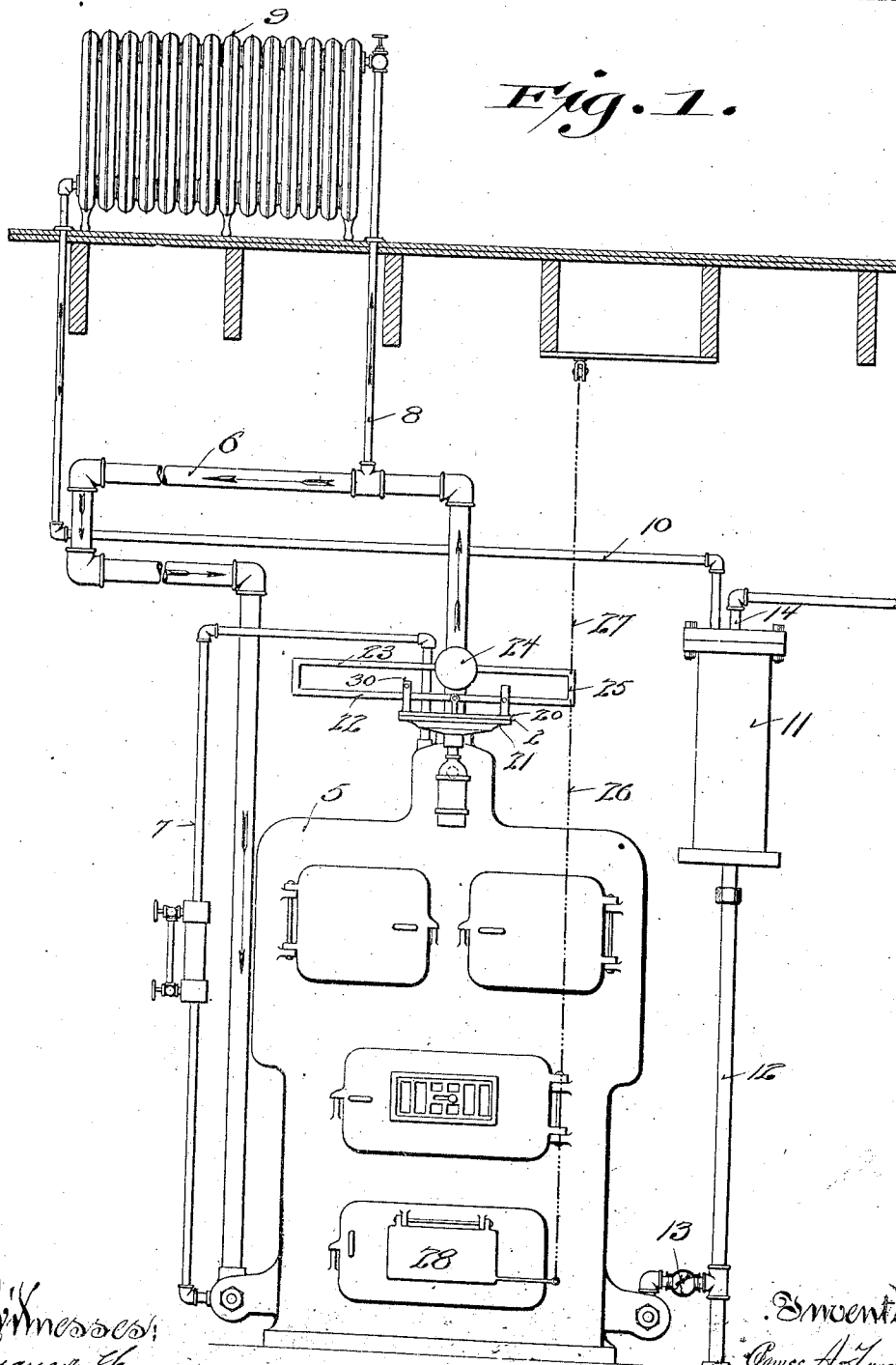
J. A. TRANE.
HEATING SYSTEM.
APPLICATION FILED APR. 11, 1911.

1,062,061.

Patented May 20, 1913

2 SHEETS-SHEET 1.

Fig. 1.



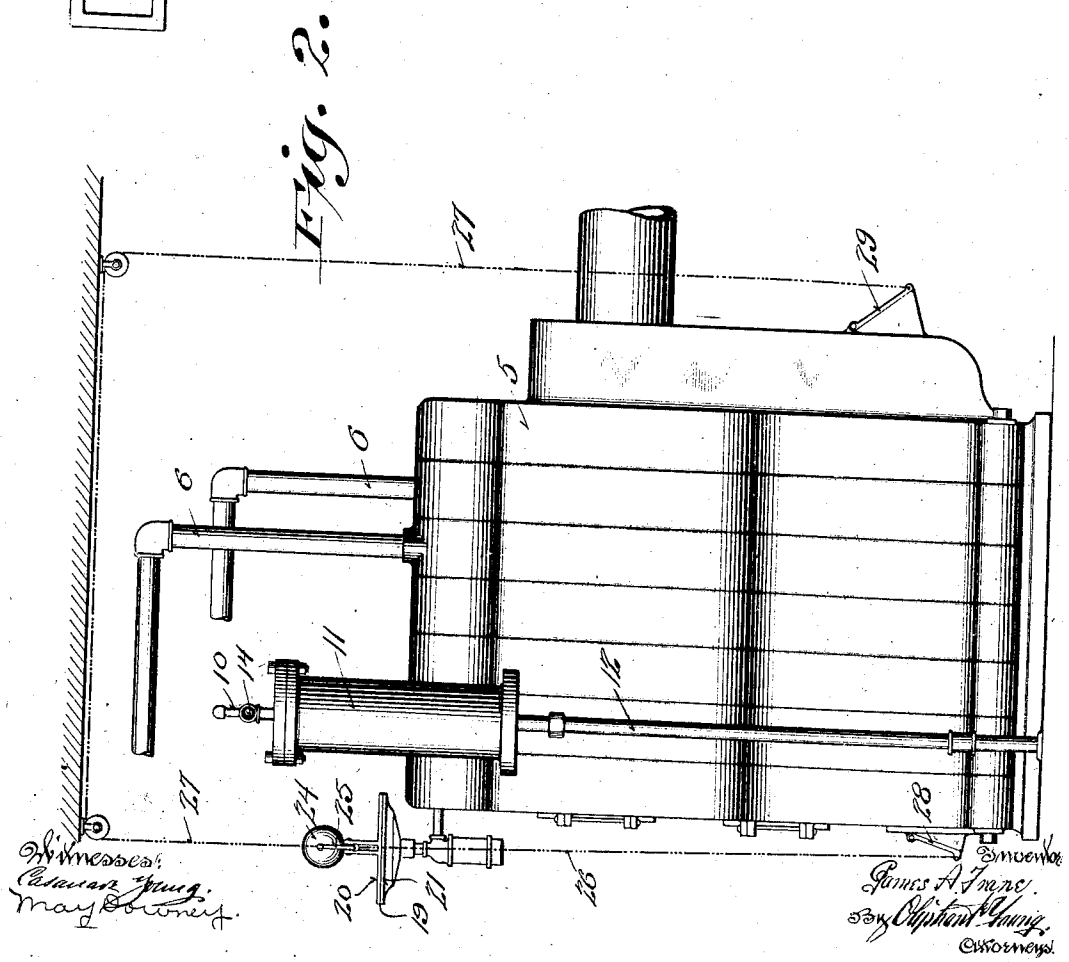
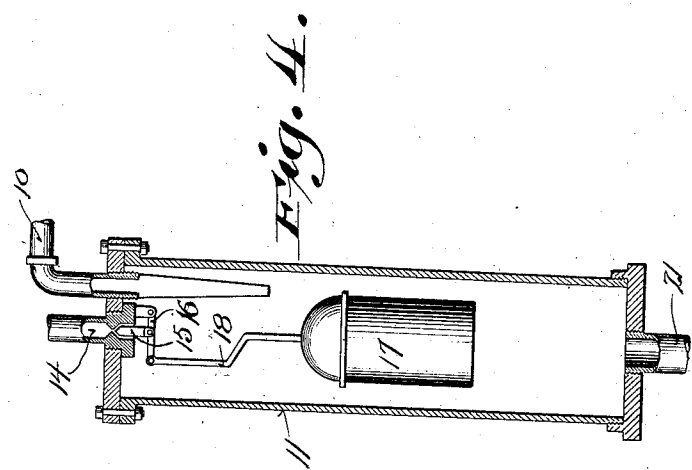
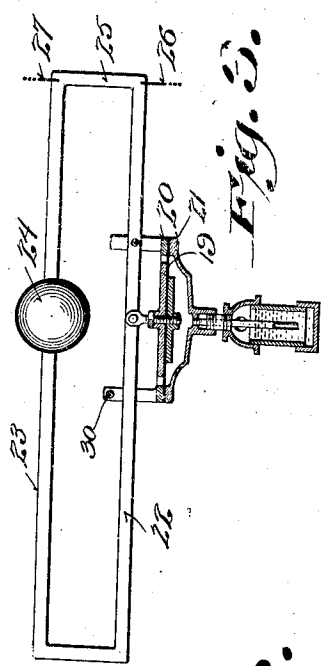
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UNITED STATES PATENT OFFICE.

JAMES A. TRANE, OF LA CROSSE, WISCONSIN.

HEATING SYSTEM.

1,062,061.

Specification of Letters Patent.

Patented May 20, 1913.

Application filed April 11, 1911. Serial No. 620,334.

To all whom it may concern:

Be it known that I, JAMES A. TRANE, a citizen of the United States, and resident of La Crosse, in the county of La Crosse and State of Wisconsin, have invented certain new and useful Improvements in Heating Systems; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention consists in what is herein particularly set forth with reference to the accompanying drawings and pointed out in the claims of this specification, its object being to provide steam-heating systems that will operate at approximately atmospheric pressure, their return ends being open to atmosphere, whereby the air contained in the pipes and radiators of said systems is discharged without resistance and air-valves eliminated.

Figure 1 of the drawings represents a front elevation of a steam-heating system in accordance with my invention partly in section to illustrate a check-valve fitting and having its main circuit partly broken away; Fig. 2, a side elevation of the same having its main circuit and a return pipe from a radiator partly broken away; Fig. 3, a detail front elevation of the draft-regulator of the system partly in section, and Fig. 4, a detail sectional view of a valve-controlled receiver into which return pipes from radiators discharge, the same being normally open to atmosphere.

Referring by numerals to the drawings, 5 indicates a boiler of ordinary type, 6 piping constituting a main circuit connected at its ends to the steam and water spaces of the boiler respectively. The usual water-gage circuit 7 is provided; and an automatic draft-regulator is also provided, further reference being had to the detail of the preferred form of regulator herein shown.

A branch pipe of the main circuit is connected to each radiator of the system at the top of the same, one of these pipes 8 and a radiator 9 of the hot water type being herein shown. This radiator and each of the others in the system is connected at its bottom or return end to a return pipe 10 that leads direct to a receiver 11 or to a general return that discharges into said receiver, as may be most convenient or economical in fitting up the system.

The receiver is supported above the water-line of the boiler and is normally open to

atmosphere so that air will discharge therefrom without resistance, the water of condensation being returned to said boiler from said receiver through piping 12 in which a check-valve 13 is provided to close against boiler-pressure, as shown in Fig. 1. The normally open air-outlet 14, shown at the top of the receiver, is controlled by a valve 15 in connection with a lever 16 from which a float 17 is suspended by a hanger 18 in said receiver. Hence in case of a sudden flow of water into the receiver, due to unusual heavy firing of the boiler, there would be a slight differential of pressure in the boiler and said receiver, the result being a seating of the valve to provide against loss of water, said valve being operated by the rise of the float with the water. The air-outlet of the receiver being closed the pressure in the system will equalize, and water in said receiver will recede to the level of the water in the boiler by gravity, thus permitting the valve 16 to again recede from its seat in said air-outlet.

From the foregoing it will be understood that I provide what is practically a vapor heating system, that is operative at approximately atmospheric pressure, but in order to insure constant circulation in the system a highly sensitive draft-regulator for the furnace of the steam-boiler is necessary. The regulator herein shown is of the flexible diaphragm type common in the art to which my invention relates and is best shown partly in section in Fig. 3, the diaphragm 19 being connected to a lever fulcrumed in connection with the ring 20 between which and the cup 21 said diaphragm is secured. The lever is herein shown as being preferably in the form of a rectangular frame, the lower longitudinal member 22 of which is a fulcrum-bar and the upper longitudinal member 23 a weight-bar, the adjustable weight 24 thereon being set to resist boiler-pressure on the diaphragm from one-quarter of an ounce to two pounds or more, and a vertically disposed member 25 of said lever is connected by flexible devices 26, 27, such as light chains, to the draft-controller 28 and the check-draft controller 29 of the boiler-furnace, the flexible device 27 being run over suitably arranged supporting pulleys.

It is essential that my regulator lever in any form shall have unobstructed weight-supporting surface over its fulcrum extend-

ing in opposite directions therefrom to permit of the adjustment of the weight itself longitudinally of said surface to a neutral position immediately over said fulcrum or to preponderate in one direction therefrom to provide for a predetermined degree of resistance to boiler-pressure on the part of the regulator as a whole, the check-draft controllers being then automatically operative, whereby one of the same is lifted and the other dropped according to the direction of rock on the part of said lever. Hence a practically constant pressure of predetermined degree is maintained in the entire heating system, it being practical to heat all the radiators in said system with a pressure of less than one ounce. To limit tilt of the lever in one direction, a stop 30 is provided, and the weight thereon is always permanent in its adjusted position.

I claim:

1. A heating-system boiler and its furnace combined with a highly sensitive draft regulator for the furnace comprising a flexible device under the influence of boiler-pressure, a lever in connection with said flexible device having unobstructed surface over its

fulcrum in opposite directions therefrom, and a weight adjustable longitudinally of said surface to be neutral immediately over said fulcrum or to preponderate in one direction therefrom, the weight being permanent in adjusted position.

2. A heating-system boiler and its furnace combined with a highly sensitive draft regulator for the furnace comprising a flexible device under the influence of boiler-pressure, a lever in connection with said flexible device having an auxiliary arm extending in opposite directions from the fulcrum of the lever and unobstructed from end to end, and a weight adjustable longitudinally of said arm to be neutral immediately over said fulcrum or to preponderate in one direction therefrom, the weight being permanent in adjusted position.

In testimony that I claim the foregoing I have hereunto set my hand at La Crosse in the county of La Crosse and State of Wisconsin in the presence of two witnesses.

JAMES A. TRANE.

Witnesses:

FRED H. HARTWELL,
HELEN VERCHOTE.