

F. F. COGGIN & E. H. GOLD.
 AUTOMATIC CONTROLLING APPARATUS FOR STEAM HEATING SYSTEMS.
 APPLICATION FILED JULY 15, 1910.

1,021,505.

Patented Mar. 26, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

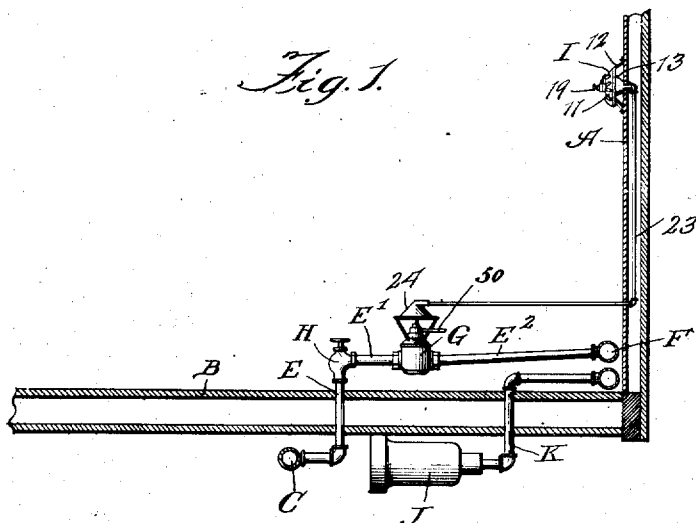
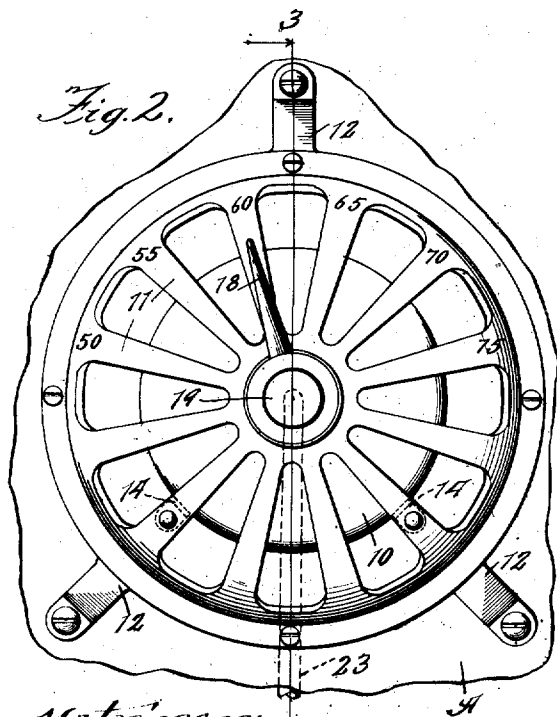
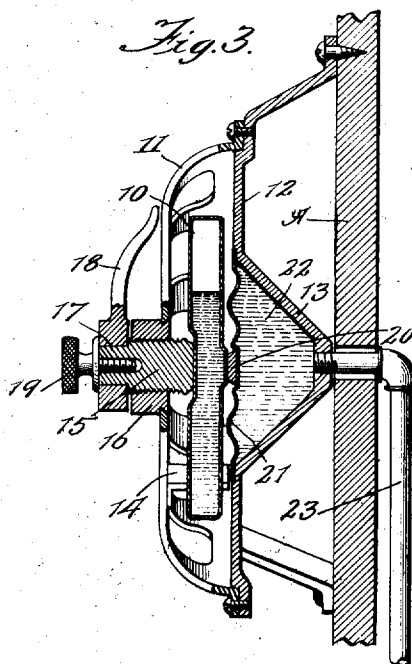


Fig. 2.



Witnesses
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Fig. 3.



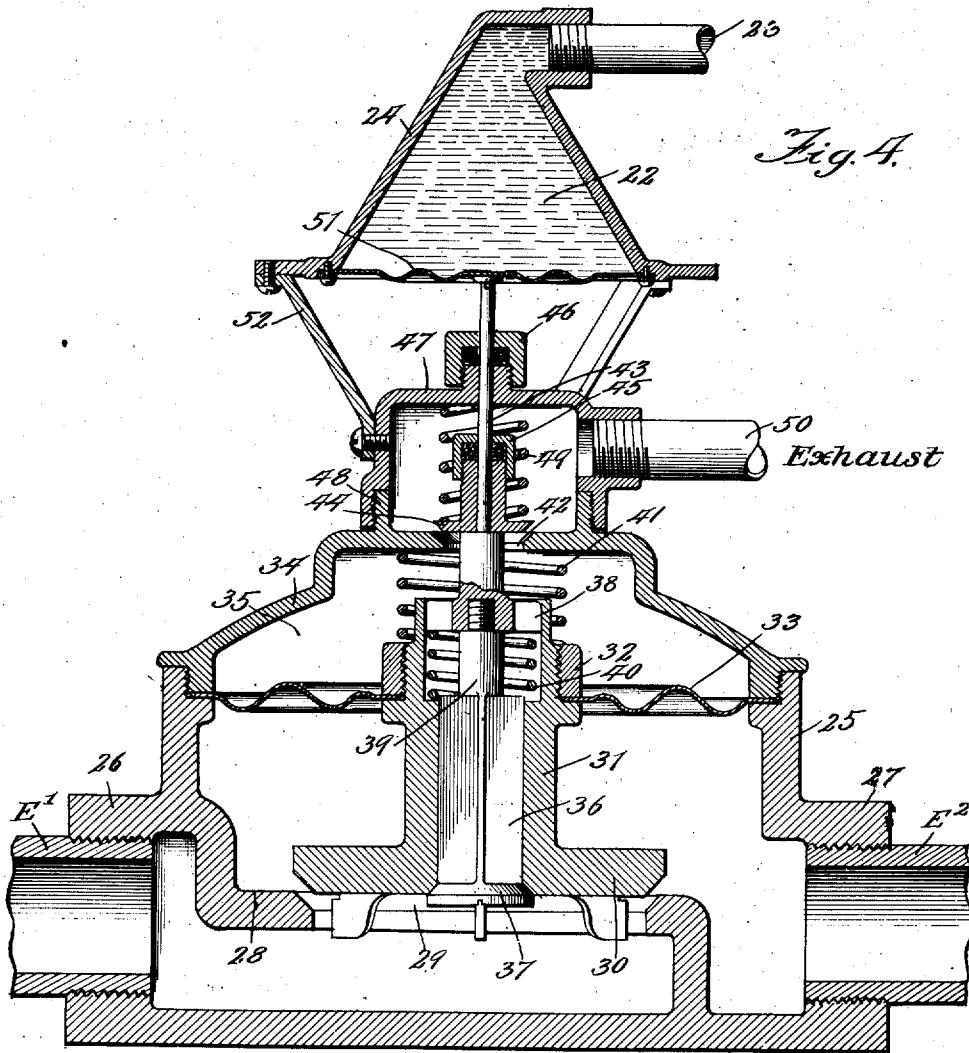
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

FRANK F. COGGIN, OF MATAWAN, NEW JERSEY, AND EGBERT H. GOLD, OF CHICAGO, ILLINOIS.

AUTOMATIC CONTROLLING APPARATUS FOR STEAM-HEATING SYSTEMS.

1,021,505.

Specification of Letters Patent.

Patented Mar. 26, 1912.

Application filed July 15, 1910. Serial No. 572,144.

To all whom it may concern:

Be it known that we, FRANK F. COGGIN, a citizen of the United States, residing at Matawan, in the county of Monmouth and State of New Jersey, and EGBERT H. GOLD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Controlling Apparatus for Steam-Heating Systems, of which the following is a specification.

Our invention relates to automatic controlling apparatus for steam heating systems and the invention has for its object to provide a form of controlling apparatus, suitable particularly for controlling the flow of steam from the train pipe into the radiating system or systems in car heating apparatus, in which the control is automatically determined by temperature conditions in the car or apartment to be heated, and which employs steam pressure taken from the supply pipe to move the controlling valve.

So far as we are aware, prior to this invention, no means for automatically controlling steam supply in accordance with temperature conditions has been devised which has been successfully applied to heating systems for railway cars. It has been proposed to use electro-magnetic apparatus for this purpose, but the constant vibration to which the car and all in it is subjected, has prevented such apparatuses from being successful. It has also been proposed to utilize, in connection with a thermostat, compressed air taken from the air brake system for furnishing power for moving the steam valve. But, of course, this arrangement is open to the objection that a supply of compressed air is not always available. It is not available, for example, when the cars are laid up under steam in a station or storage yard.

The invention has for further objects the several novel constructions, arrangements and devices in controlling apparatus for steam heating systems which will be hereinafter described and claimed.

The invention is illustrated in a preferred embodiment in the accompanying drawings, wherein—

Figure 1 is a fragmentary somewhat diagrammatic cross sectional view of a railway car showing the general arrangement of the

apparatus of our invention. Fig. 2 a front elevation of the thermostatic device and its associated parts. Fig. 3 a sectional view taken on line 3—3 of Fig. 2, looking in the direction of the arrows. Fig. 4 is a longitudinal sectional view of the valve apparatus, shown on a somewhat larger scale than that of Figs. 2 and 3.

Like characters of reference indicate like parts in the several figures of the drawings.

Referring to the drawings, A designates the side wall of a railway car, B the floor thereof, C the steam train pipe, E, E', E² a supply pipe leading from the train pipe to the radiator F, the controlling valve apparatus, designated G as a whole, being interposed in said supply pipe, which has also, preferably, the ordinary globe shut-off valve H.

I designates, as a whole, the thermostatic device which is located within the car, preferably, on the side wall thereof, and J a steam trap which, the illustrative heating system shown, is arranged at the end of the discharge pipe K of the radiator F.

The thermostatic device I is preferably constructed as follows, it being understood that the preferred constructions and arrangement of parts shown and described might be modified in certain respects which will be obvious to those skilled in the steam heating art: A thermostatic member 10 is provided consisting preferably of a vessel with flexible walls partly filled with a fluid which readily expands and contracts in accordance with changes in temperature. For example, either may be used, the vessel being partly filled with the ether, after which the air is exhausted from the vessel. The thermostatic member, so formed, is supported within a grill casing 11 which is secured to the flange 12 of a vessel 13 secured to the side wall A of the car, as shown, the grill casing being provided preferably with brackets 14 on which said thermostatic member rests. Against the front side of the thermostatic member 10 bears a screw 15 which is threaded through a nipple 16 on the grill casing, the screw having the squared portion 17, to which is secured the pointer 18, and being preferably provided with a thumb piece 19. By moving the screw 15 in or out, it is made to bear with a greater or less pressure against the thermostatic member 10, this adjustment being

made in accordance with the temperature scale on the face of the grill casing (Fig. 2). The back of the thermostatic member 10 bears against a button 20 intervening between said thermostatic member and a diaphragm 21 which forms the front side of the vessel 13. The vessel 13 is filled with a non-freezing relatively non-compressible body of fluid 22 and communicates by a pipe 23, which may be run through the woodwork forming the side wall of the car, with a vessel 24 (Fig. 4) forming a part of the steam valve apparatus.

The steam valve, and the associated devices by means of which it is opened and closed, are shown in a preferred form of construction and arrangement in Fig. 4. A valve casing 25 is provided having a tap 26 for supply pipe section E' and a tap 27 for pipe section E². The interior of the casing is divided by a web 28 in which is the steam port 29, controlled by the main or steam valve 30. The latter has a stem 31 to which is secured, by the nut 32, a diaphragm 33 which is circumferentially secured to casing 25 by the bonnet 34, constituting a pressure chamber 35 above the diaphragm. The valve 30 and its stem 31 are formed with a central passage way 36 which is closed by an auxiliary valve 37 seating against the under side of valve 30; the passage way being preferably enlarged at its upper end to receive the guiding wings 38 of the stem 39 of auxiliary valve 37 and a coiled spring 40 which bears against said wings. A coiled spring 41 is interposed between the stem 31 of the main valve and the top of bonnet 34. The stem 39 of the auxiliary valve extends through a port 42 in the top of the bonnet 34 and carries slidably on its upper reduced end 43 the valve 44 adapted to close port 42; the valve being preferably provided with stuffing box 45. Stem 43 passes through a stuffing box 46 on the top of the cap piece or dome 47 which is threaded on a boss 48 on the upper side of bonnet 34 and a coiled spring 49 is interposed between valve 44 and cap piece 47. A discharge pipe 50 leads from the cap piece 47. The stem 43 bears against, and is preferably secured to a diaphragm 51 which forms the bottom of vessel 24, described as being in communication with the vessel 22 against which the thermostatic member 10 bears. The vessel 24 may be supported on cap piece 47, by means of the bracket 52.

The operation of the controlling apparatus, above described, is as follows: With a proper initial adjustment of the several operative parts of the apparatus, the pointer 18 of the thermostatic device may be set at any desired point on the temperature scale and the temperature of the car will be automatically maintained at that point. Suppose the thermostatic device to be so set, if

the temperature begins to rise, the thermostatic member 10 will expand and press diaphragm 21 inwardly against the body of transmitting fluid 22 in vessels 13 and 24, causing diaphragm 51 to be depressed and auxiliary valve 37, which is rigidly connected with diaphragm 51 by means of its stem 39, 43, to be unseated. This permits steam from the supply pipe E' to pass up through the hollow stem of main valve 30, the valve 30, of course, being at this time unseated, so that the radiator F is receiving steam from the train pipe. The steam passing through the hollow stem of the main steam valve enters the pressure chamber 35 and equalizes the pressure on opposite sides of diaphragm 33 so that spring 41 moves valve 30 to its closing position to shut off further inflow of steam to the radiator. When the auxiliary valve 37, is opened the depression of member 39, 43 allows spring 49 to seat valve 44 and close the outlet port 42 in the top of the pressure chamber 35. Valve 37 remains open so that pressure is equalized on opposite sides of diaphragm 33 the main valve 30 being kept closed until the thermostatic member 10, by contracting, decreases its pressure on diaphragm 21, whereupon the steam pressure under valve 30 will cause it to be opened again, the pressure in pressure chamber 35 having been relieved by the opening of relief valve 44. By this construction of controlling apparatus, power is always available for moving the controlling valve so long as there is any steam to be controlled.

As various modifications in the form, construction and arrangement of the parts comprising our apparatus will readily suggest themselves to those skilled in this art, we do not limit ourselves to these particulars except so far as the same are made limitations on certain of the claims herein.

We claim:

1. Controlling apparatus for steam heating systems comprising in combination a main steam valve having a steam passage way therethrough, an auxiliary valve to control said passage way, a pressure chamber communicating with said steam passage way and constructed so that the pressure therein actuates the movement of said main valve, a thermostat and an inclosed body of pressure transmitting fluid which is substantially non-expansible at ordinary temperatures operatively interposed between said thermostat and said auxiliary valve.

2. Controlling apparatus for steam heating systems comprising in combination a main steam valve having a steam passage way therethrough, an auxiliary valve to control said passage way, a pressure chamber communicating with said steam passage way and constructed so that the pressure therein actuates the movement of said

main valve, a thermostat which governs said auxiliary valve, and a relief valve for said pressure chamber which opens when said auxiliary valve closes and vice versa.

5 3. Controlling apparatus for steam heating systems comprising in combination a
main steam valve having a steam passage
therethrough, a diaphragm which carries
said main valve, means constituting a pres-
10 sure chamber adjacent said diaphragm
which communicates with said steam pas-
sage way, an auxiliary valve controlling
said passage way, a relief valve for said
pressure chamber which closes when the
15 auxiliary valve opens and vice versa, and
means for opening and closing said auxil-
iary valve.

4. Controlling apparatus for steam heat-
ing systems comprising in combination a
20 main steam valve having a steam passage
therethrough, a diaphragm which carries
said main valve, means constituting a pres-
sure chamber adjacent said diaphragm
which communicates with said steam pas-
25 sage way, an auxiliary valve controlling
said passage way, a relief valve for said
pressure chamber which closes when the
auxiliary valve opens and vice versa, and
30 means for opening and closing said auxil-
iary valve comprising a thermostat lo-
cated in the apartment heated by said radi-
ator.

5. Controlling apparatus for steam heat-
ing systems comprising in combination a
35 main steam valve having a steam passage
therethrough, a diaphragm which carries
said main valve, means constituting a pres-
sure chamber adjacent said diaphragm
which communicates with said steam pas-
40 sage way, an auxiliary valve controlling said
passage way, a relief valve for said pressure
chamber which closes when the auxiliary
valve opens and vice versa, means for open-
ing and closing said auxiliary valve com-
45 prising a thermostat located in the apart-
ment heated by said radiator, and an in-
closed body of pressure transmitting fluid
which is substantially nonexpansible at or-
dinary temperatures interposed between
50 said thermostat and said auxiliary valve.

6. Controlling apparatus for steam heating
systems comprising in combination a valve
casing provided with an inlet port and an
outlet port, a main valve which controls the
55 flow of steam from the inlet port to the out-
let port, said valve formed with a steam pas-
sage way, an auxiliary valve which controls
said passage way, a diaphragm extending
across the interior of said casing on the
60 outlet side and constituting a pressure
chamber which communicates with said
steam passage way in the main valve, a re-
lief valve for said pressure chamber which
closes when said auxiliary valve opens and
65 vice versa, a thermostat and means inclosing

a substantially non-compressible liquid, said
means comprising two diaphragms, against
one of which the thermostat operates, with
the other of which said auxiliary valve is
operatively connected.

7. Controlling apparatus for steam heat-
ing systems comprising in combination a
valve casing provided with an inlet port and
an outlet port, a main valve which controls
75 the flow of steam from the inlet port to the
outlet port, said valve formed with a steam
passage way, an auxiliary valve which con-
trols said passage way, a diaphragm extend-
ing across the interior of said casing on the
outlet side and constituting a presure
80 chamber which communicates with said
steam passage way in the main valve, a re-
lief valve for said pressure chamber which
closes when said auxiliary valve opens and
vice versa, a thermostat and means inclosing
85 a substantially non-compressible liquid, said
means comprising two diaphragms, against
one of which the thermostat operates, with
the other of which said auxiliary valve is
operatively connected, said inclosing means
90 comprising two vessels communicating by a
pipe.

8. The combination with a railway car,
of a thermostat located in said car, a radi-
95 ator in said car, a steam supply pipe for the
same, a valve casing interposed in said sup-
ply pipe, a main valve which controls the
flow of steam through said casing, said valve
formed with a steam passage way there-
through, a diaphragm on which said valve
100 is carried and which forms with said casing
a pressure chamber communicating with
said steam passage way, an auxiliary valve
provided with a stem, which valve con-
trols said steam passage way in the main
105 valve, a relief valve for said pressure cham-
ber on the stem of said auxiliary valve, said
relief valve adapted to open when the aux-
iliary valve closes and vice versa, a vessel
comprising a diaphragm to which the stem
110 of said auxiliary valve is secured, a vessel
comprising a diaphragm against which said
thermostat acts, and a pipe connecting said
vessels, said vessels and pipe being filled
with a substantially non-compressible fluid. 115

9. Controlling apparatus for steam heat-
ing systems comprising in combination a
main valve provided with a port extending
through the same, a diaphragm supporting
the main valve, an auxiliary valve control-
120 ling the port in the main valve, means con-
stituting a pressure chamber on one side of
said diaphragm, a thermostat provided with
a movable member in the apartment heated,
an inclosed body of fluid substantially non-
125 expansible at ordinary temperatures inter-
posed between the movable member of the
thermostat and said auxiliary valve so as
to transmit motion from one to the other.

10. Controlling apparatus for steam heat- 130

ing systems comprising in combination a valve casing provided with an inlet port and an outlet port, a main valve which controls the flow of steam from the inlet port to the outlet port, a diaphragm extending across the interior of said casing on the outlet side and constituting a pressure chamber, means constituting a steam passageway adapted to put the pressure chamber in communication with the inlet side of the valve casing, an auxiliary valve which controls said passageway, a relief valve for the pressure chamber which opens when the auxiliary valve closes, and vice versa, and means for controlling the movements of the auxiliary valve com-

prising a thermostat, and means inclosing a substantially non-compressible liquid, said means comprising two diaphragms against one of which the thermostat operates and with the other of which said auxiliary valve is operatively connected.

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H. L. PECK.

Correction in Letters Patent No. 1,021,505.

It is hereby certified that in Letters Patent No. 1,021,505, granted March 26, 1912, upon the application of Frank F. Coggin, of Matawan, New Jersey, and Egbert H. Gold, of Chicago, Illinois, for an improvement in "Automatic Controlling Apparatus for Steam-Heating Systems," an error appears in the printed specification requiring correction as follows: Page 1, line 92, for the word "either" read *ether*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23rd day of April, A. D., 1912.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

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