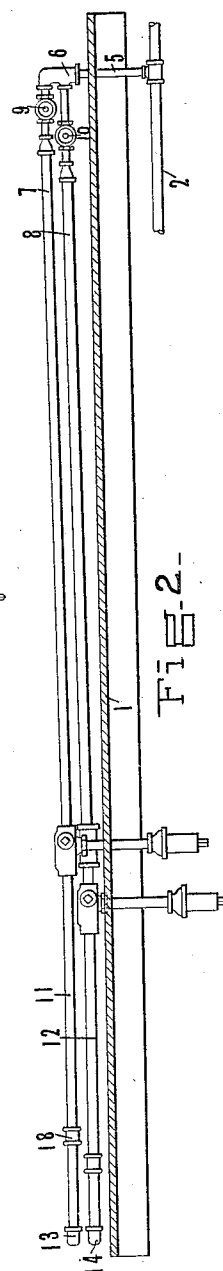
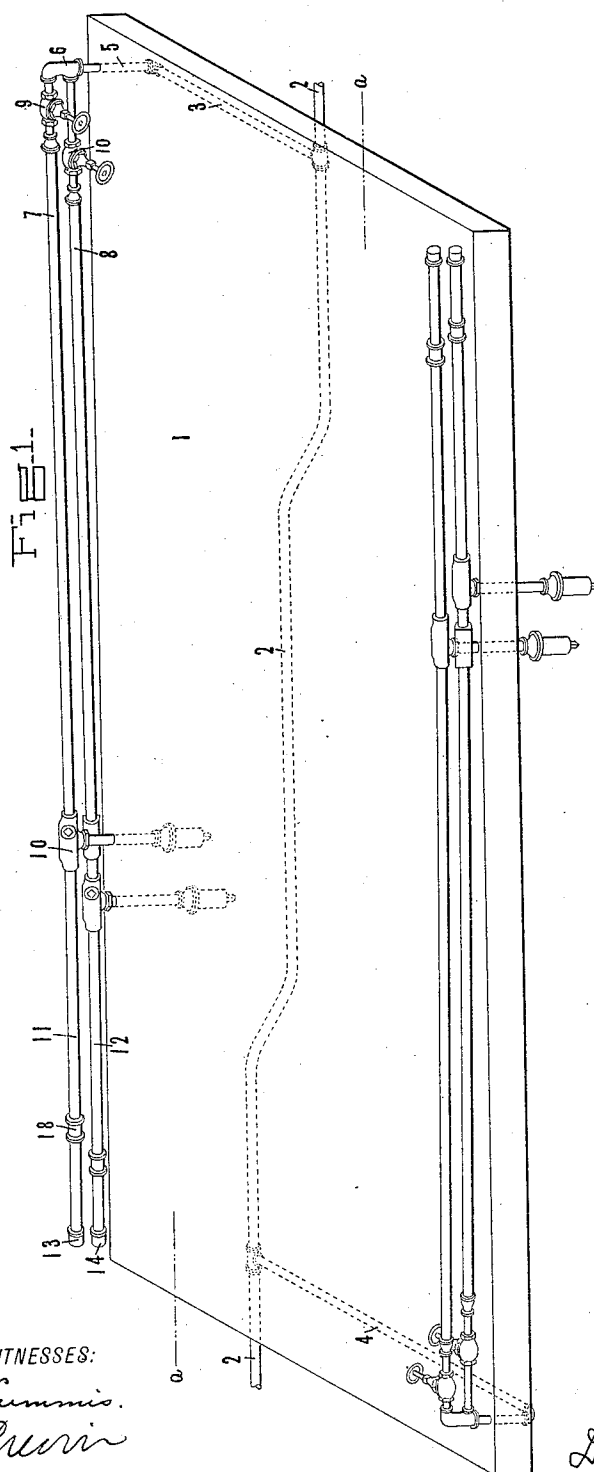


1,052,900.

R. M. DIXON.
HEATING SYSTEM.
APPLICATION FILED JUNE 17, 1907.

Patented Feb. 11, 1913.

3 SHEETS—SHEET 1.



WITNESSES:

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3 SHEETS—SHEET 2.

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FIG-3-

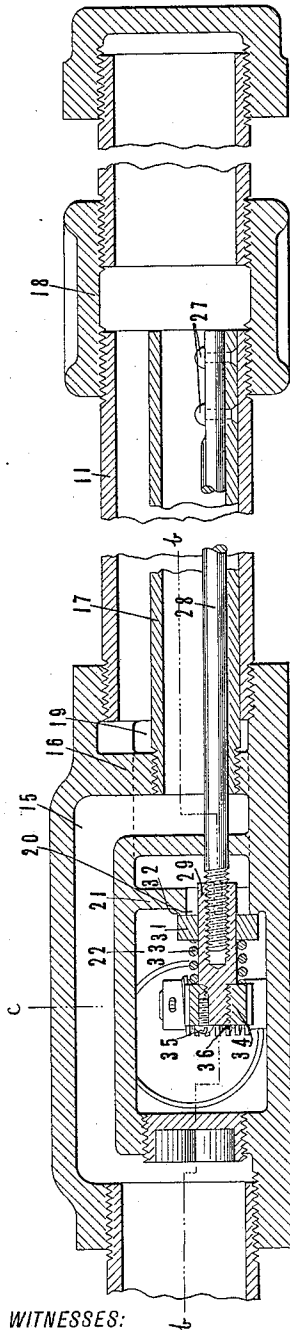
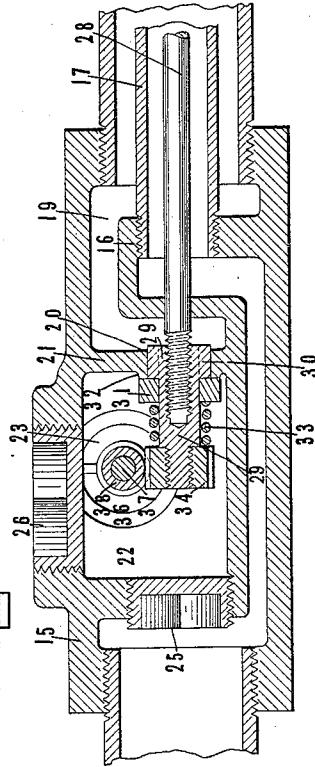


FIG-4-



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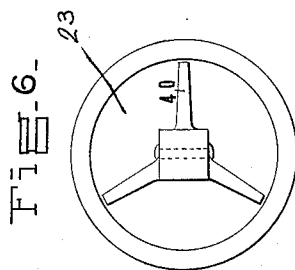
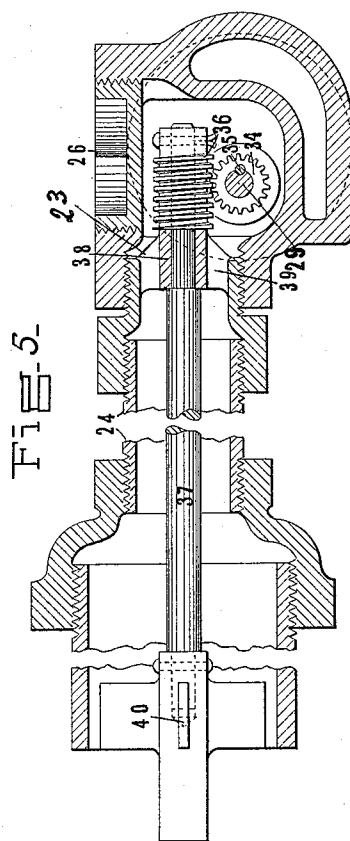
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1,052,900.

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APPLICATION FILED JUNE 17, 1907.

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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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HEATING SYSTEM.

1,052,900.

Specification of Letters Patent.

Patented Feb. 11, 1913.

Application filed June 17, 1907. Serial No. 379,327.

To all whom it may concern:

Be it known that I, ROBERT M. DIXON, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Heating Systems, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to heating systems and more especially to steam heating apparatus adapted for use in railway cars or similar structures.

One of the objects of my invention is to provide improved means for regulating the discharge of the water of condensation from steam heating apparatus of the above type.

Another object hereof is to provide an improved form of thermostatic regulating device for heating apparatus of the above type whereby the whole apparatus while automatically regulated will be self-contained.

A further object is to provide an automatically regulated heater wherein the danger of freezing will be substantially eliminated.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangements of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, wherein is illustrated one of the various possible embodiments of my invention,—Figure 1 is a view in perspective showing the floor plan of a railway car equipped with the same; Fig. 2 is a vertical sectional view taken on line *a—*a**, Fig. 1; Fig. 3 is a vertical sectional view taken through that portion of the system wherein is located the means employed for regulating the discharge of the water of condensation; Fig. 4 represents a sectional view on line *b—*b** of a portion of the mechanism shown in Fig. 3; Fig. 5 is a sectional view on line *c—*c**, Fig. 3; and Fig. 6 is a bottom plan view taken of the parts shown in Fig. 5.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to the drawings, 1 indicates the floor of a railway car upon either side of which is arranged independent radiating systems, each system receiving its supply of steam from the train pipe 2 through branch pipes 3 and 4 respectively. Inasmuch as the radiating systems arranged upon each side of the car are identical in construction and operation, a description of one thereof will, it is thought, suffice to impart a clear understanding of my invention.

Mounted upon a riser 5, which extends from branch pipe 3 upwardly through the floor of the car, is a fitting 6, from which lead, in the present instance, two radiating pipes 7 and 8 respectively, said pipes being independently valved as at 9 and 10 and extended longitudinally of the car. Pipes 7 and 8 have, in the present instance, a slight fall toward their points of discharge, which in the present instance are located intermediate their ends and at these points said pipes lead into heads constituted by casings, or fittings 10 which form a portion of the radiating system and within which are located the thermostatically operating means utilized for regulating the discharge of the water of condensation hereinafter to be more particularly described. Sections 11 and 12 of the radiating pipes lead from the opposite end of fittings 10 toward the farther end of the car and are capped as at 13 and 14 respectively.

Referring now to Figs. 3, 4, 5 and 6, wherein is disclosed one of the thermostatic regulating devices, fitting 10, it will be observed, is provided with a passageway 15 through which the steam passes from one section of a radiating pipe to the other section, and threaded internally of an apertured web 16 within this fitting is a spur tube 17 which extends longitudinally of section 11 and, in the present instance, lies against the bottom wall thereof. Spur tube 17 is preferably formed of brass or similar metallic substance having a relatively high co-efficient of expansion, said tube at its outer free end being open and, in the present instance, ending intermediate the ends of extension 11 of radiating pipe 7, which for convenience of assemblage comprises two shorter sections of pipe joined by a union 18. Extension 11 at its inner end leads into a passageway 19 of fitting 10 which in turn leads to a discharge port 20

formed in a web 21 located internally of the fitting. This discharge port leads into a valve chamber 22 formed interiorly of the fitting and leading from this valve chamber is a discharge port 23 from which depends a discharge conduit 24, said discharge conduit extending downward through the floor of the car and discharging freely into the atmosphere. The lower end of discharge conduit 24 is enlarged and formed substantially bell-shaped, as shown in Figs. 3 and 5 of the drawings. Access to valve chamber 22 may be had by means of openings closed by plugs 25 and 26 respectively, which are internally squared, or otherwise shaped for receiving a wrench or other turning implement. Secured as by means of rivets 27 to the free end of spur tube 17 and lying within the same in the bottom thereof is a rod 28 which at its opposite end is guided in an aperture formed in the wall of passageway 19, and threaded upon said rod is a post 29 which extends through discharge port 20 into the valve chamber 22. Post 29 is centered with respect to discharge port 20 by means of webs 30 which enter the discharge port, said webs, however, not operating to prevent a free discharge through said port. At this point it may be noted that the rod 28 is formed of a metal having a relatively low co-efficient of expansion,—in the present instance iron. Slidably mounted upon post 29 is a valve 31 which is adapted to co-act with a seat 32 formed upon web 21 and thereby control the flow of water of condensation through discharge port 20, valve 31 being resiliently urged toward its seat by means of a coil spring 33 interposed between the said valve and the lateral surface of a worm wheel 34 which in the present instance is threaded upon post 29 and held in fixed position thereon by means of a cotter pin 35. It may be understood that due to the threaded engagement of post 29 with rod 28 a rotation of this post by means of worm wheel 34 will operate to change the disposition of valve 31 with respect to its seat inasmuch as said valve is interposed between the coil spring 33 and the webs 30 of the post. Meshing with worm wheel 34 and adapted to rotate the same, is a worm 36, the latter being carried upon the upper end of a spindle 37 which is journaled in a bearing 38 formed in webs 39. Said stem extends downwardly longitudinally of discharge conduit 24, the lower end thereof extending below the lower end of the discharge conduit and is preferably squared or otherwise shaped to receive a turning implement. Spindle 37 is centered with respect to the discharge conduit by means of extensions or webs 40.

Having thus described the construction of this embodiment of my invention, the operation thereof may now be understood. It will be understood that steam from the train pipe

will be delivered by means of branch pipe 3 and riser 5 to fitting 6, will flow therefrom into the radiating pipes 7 and 8, thence through passageway 15 of fitting 10, where it will pass into the spur tubes located within the extensions 11 and 12. The returning steam or the water of condensation will then return exteriorly of spur tubes 17 through passageways 19 to the discharge ports 20. From this point the water of condensation or steam, as the case may be, will pass into the valve chamber and will discharge therefrom to the atmosphere through discharge conduit 24. It will be understood, of course, that valve 31 has been adjusted by means of the worm wheel mechanism to meet the particular heat conditions within the structure in which the system is to be employed, and also by means of this worm wheel mechanism the position of the valve with respect to its seat may be readily changed to meet varying heat conditions within said structure. The relative expansion between spur tube 17 and rod 28 will, of course, automatically move the valve toward or from its seat in accordance with the internal heat conditions of the system and the operation of this thermostatic device may, as above suggested, be changed to meet particular requirements by means of the worm wheel mechanism employed for changing the position of the valve with respect to its seat.

It will accordingly be seen that I have provided heating apparatus of the above character adapted to attain the several ends and objects of my invention in an exceedingly simple and efficient manner, and that by means of my construction the use of independent traps and similar contrivances for draining heating systems of this type of heaters is entirely eliminated. Inasmuch as the spur tube and the valve stem are in direct contact with the steam and lie in the bottom of the steam conduit and in contact with any water of condensation that may lie therein, the thermostatic controlling device constituted by these parts is extremely sensitive in its operation. Owing to the feature of construction, the valve in its opening and closing movements is quick to respond to differences of temperature of the heating medium, thus insuring an even temperature within the structure to be heated. It will also be apparent that the valve may be so adjusted with respect to its seat as to remain substantially closed until the internal temperature of the system has reached a very low point, when the same will automatically open to permit the water of condensation to be discharged into the atmosphere, thus eliminating all danger of freezing.

The apparatus is constructed of comparatively few parts, and being self-contained

can be constructed at a less cost than apparatus of this type hitherto constructed, and at the same time it occupies less room within the car.

5 It is to be noted that the claims in this case are drawn to the specific embodiment shown and that generic claims readable upon the construction herein shown are embodied in applicant's companion application, Serial
10 Number 369,907, filed April 24, 1907.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from
15 the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

20 Having described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a heating system, in combination, a steam conduit having feed and discharge
25 ports, a valve chamber located adjacent said discharge port, a valve seat provided upon the discharge port of said steam conduit, a valve co-acting therewith and resiliently pressed toward its seat, means comprising a
30 conduit within said steam conduit for automatically determining the operation of said valve, a discharging conduit leading from said valve chamber to the atmosphere, and means extending upwardly through said
35 discharging conduit adapted for changing the disposition of said valve with respect to its seat.

2. In a heating system, in combination, a steam conduit having feed and discharge
40 ports, a valve chamber arranged adjacent said discharge port, a valve seat provided upon said discharge port, a valve co-acting therewith, a thermostatic device comprising a member of a relatively high co-efficient
45 of expansion located within said steam conduit and a member having a relatively low co-efficient of expansion connected therewith and also connected with said valve, said thermostatic device operating to control the
50 operation of said valve in accordance with the internal heat conditions of the heater, a discharge conduit leading from said valve chamber and discharging freely into the atmosphere, and means extended upwardly
55 through said discharge conduit and having operative connections with said valve adapted to change the position thereof with respect to its seat.

3. In a heating system, in combination, a
60 steam conduit having feed and discharge ports, a valve chamber located adjacent the discharge port thereof, a valve seat formed upon said discharge port, a valve co-acting therewith, a thermostatic device located in
65 said steam conduit and in the flow of the cir-

culating heating medium adapted automatically to control the operation of said valve, a discharge conduit leading from said valve chamber to the atmosphere, and worm mechanism operable through said discharge conduit and accessible for manipulation exterior thereto adapted for changing the disposition of the valve with respect to its seat.

4. In a heating system for railroad cars
75 or like structures, the combination with the train pipe, of a plurality of independent radiating systems arranged upon either side of the car, each of which receives its steam supply from said train pipe, a manually
80 operated valve for regulating the admission of steam into each of said systems, an automatically operated valve for regulating the discharge from each of said systems, a discharge conduit leading from each of said
85 systems through the floor of the car and discharging freely into the atmosphere, and manually operated means extended upwardly through said discharge conduit and having operative connection with said valve
90 and adapted to be operated to change the disposition of the valve with respect to its seat.

5. In a heating system for railroad cars or like structures, the combination with the train pipe, of a plurality of independent
95 steam conducting conduits arranged upon either side of the car, each of which has a connection with said train pipe, a valve for controlling the admission of steam to each of said conduits, a discharge port for each
100 of said conduits, a valve operating to regulate the flow from the discharge port of each of said conduits, a thermostatic device for automatically controlling the opening and closing movements of said valve, a discharge
105 conduit leading from each of said steam conduits through the floor of the car and discharging freely into the atmosphere, a worm wheel connected with said valve, a second worm wheel meshing with the first worm
110 wheel, and a spindle extending upwardly through the said discharge conduit and operatively connected with the latter worm wheel, said worm wheels being adapted
115 when operated to change the disposition of the valves with respect to their seats.

6. In a heating system, in combination, a steam conduit having feed and discharge
120 ports, a valve for controlling the flow through said discharge port, a thermostatic device for controlling the operation of said valve comprising a spur tube of a relatively high co-efficient of expansion seated at one end within said steam conduit and lying in
125 the bottom thereof, a rod having a relatively low co-efficient of expansion secured to the opposite end of said spur tube, a post having a threaded connection with the opposite end of said rod, said valve being slidably
130

mounted upon said post and resiliently urged against its seat, a worm wheel fixed upon said post, a second worm wheel connected therewith, and means operable from
 5 a position exterior to said system adapted to rotate the latter worm wheel, whereby said post will be rotated upon said rod and the disposition of the valve thereby changed with respect to its seat.

10 7. In a heating system for railroad cars, in combination, a steam conduit located within the car and receiving its steam supply from the train pipe, said steam conduit extending longitudinally of the car near the
 15 floor thereof, a casing having steam inlet and discharge ports arranged intermediate the ends of said steam conduit, a valve chamber provided within said casing, a valve located within said valve chamber and
 20 adapted to control the flow from said discharge port, a spur tube seated at one end within said casing, extending within said conduit and lying in the bottom thereof, a rod secured to the opposite end of said spur
 25 tube and extended through said rod having a connection with said valve, said spur tube being formed of a metal having a relatively high co-efficient of expansion and said rod being formed of a metal having a
 30 relatively low co-efficient of expansion whereby said parts constitute a thermostatic regulating device for said valve, said casing having a passageway leading into said spur tube and also having a passageway leading
 35 from a position exterior to said spur tube to said discharge port, a discharge conduit leading from said discharge port and adapted to discharge freely to the atmosphere beneath the car, and means extending up-
 40 wardly through said discharging conduit adapted to adjust said valve toward or from its seat.

8. In a heating system for railroad cars or like structures, the combination with the
 45 train pipe, of a plurality of independent steam conduits arranged within the car on either side thereof near the floor, each of said conduits being provided with an inde-

pendent manually operated valve for regulat- 50
 ing the admission of steam therein from the train pipe, a casing located intermediate the ends of each of said conduits, said casing having steam inlet and discharge ports, a spur tube seated at one end within said casing and extending within said conduit near 55
 the lower portion thereof, said spur tube having a communication with the inlet port of said casing, said casing having a passageway leading from a position exterior to said spur tube to said discharge port, a rod se- 60
 cured to the opposite end of said spur tube, lying in the bottom thereof and extending within the discharge port of said casing, a post having threaded engagement with said rod and having webs extending within said 65
 discharge port, said casing having a valve chamber located adjacent to said discharge port, a valve slidably mounted upon said post and seating against the exterior wall of said discharge port, a worm wheel fixed 70
 upon the opposite end of said post, a spring interposed between said worm wheel and said valve to urge the latter toward its seat, said spur tube and said rod being formed of 75
 metals having different co-efficients of expansion and constituting a thermostatic device for operating said valve, whereby the opening and closing movements thereof are controlled in accordance with the internal heat conditions of the system, a discharge 80
 conduit leading from said valve chamber and discharging freely into the atmosphere beneath the floor of the car, a worm meshing with the worm wheel, and a spindle extending upwardly through said discharge 85
 conduit, said spindle being adapted to operate said worm whereby said post will be adjusted upon said rod and the position of said valve changed with respect to its seat.

In testimony whereof I affix my signature, 90
 in the presence of two witnesses.

ROBERT M. DIXON.

Witnesses:

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ELMER E. ALLBEE.