

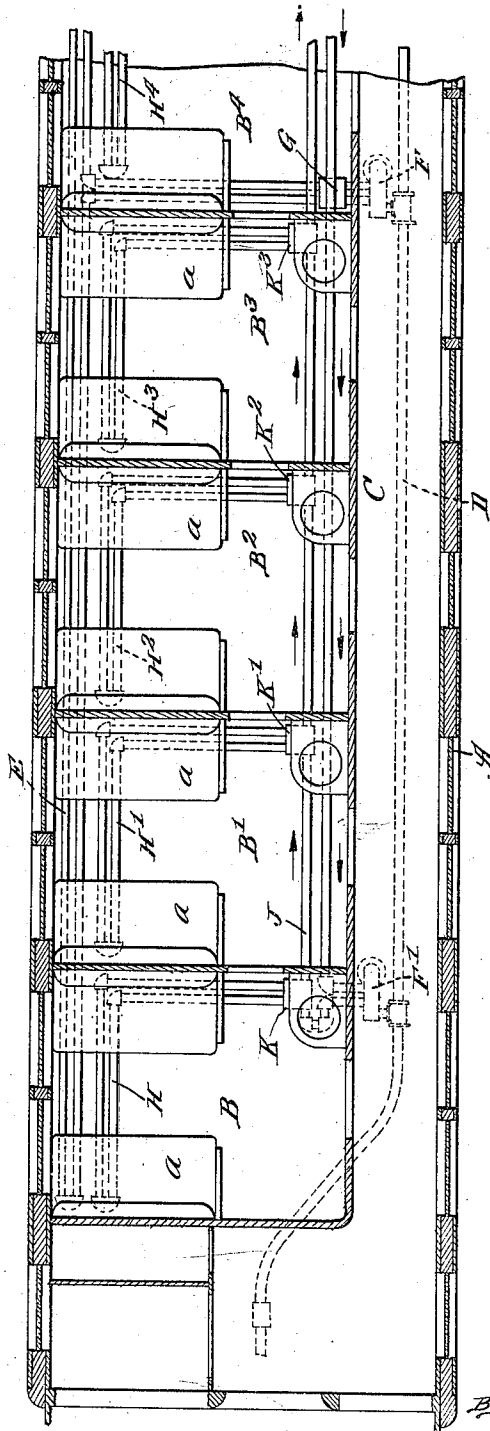
E. H. GOLD.
HEATING SYSTEM FOR COMPARTMENT CARS.
APPLICATION FILED JUNE 7, 1909.

987,567.

Patented Mar. 21, 1911.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

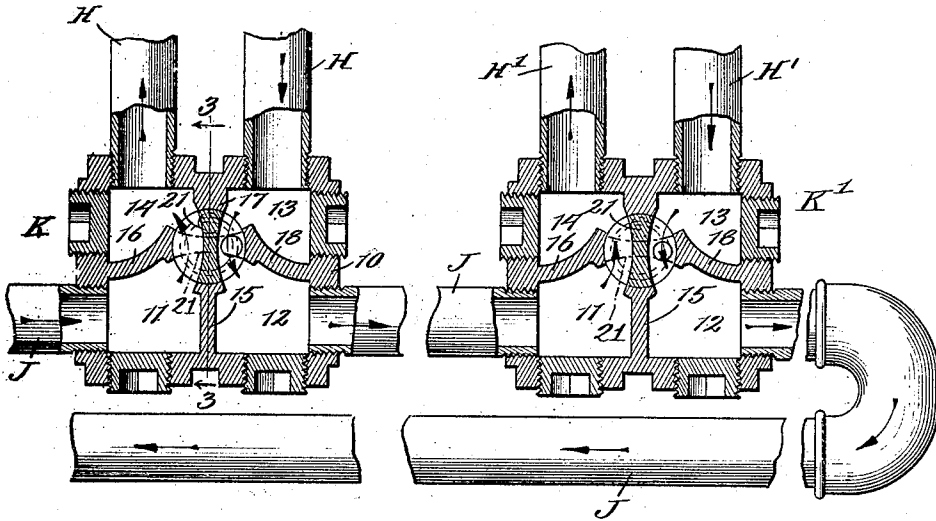
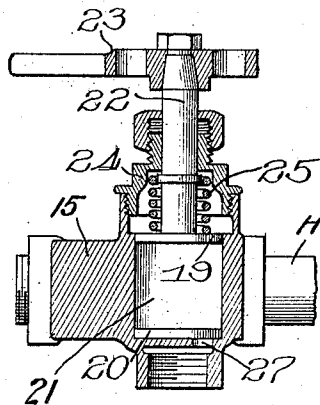


Fig. 3.



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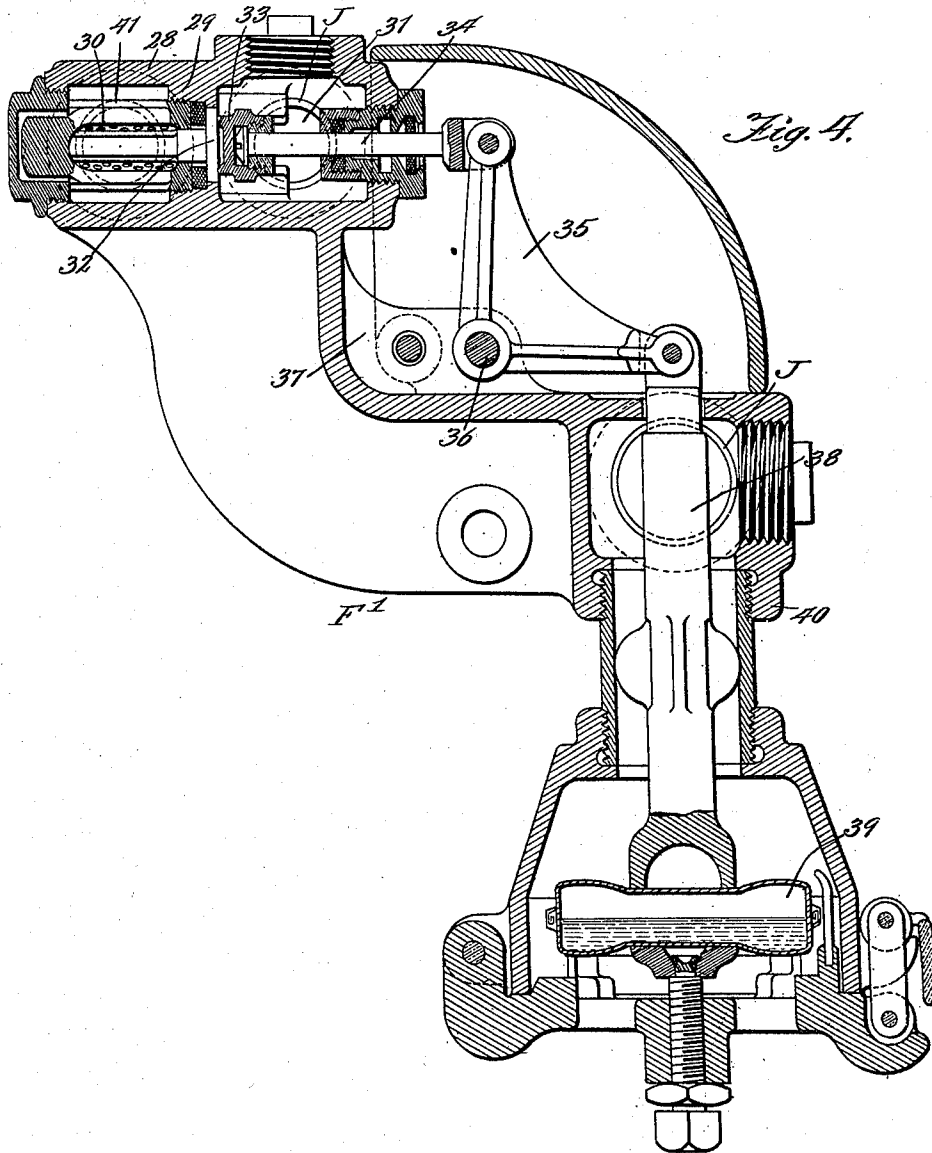
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3 SHEETS-SHEET 3.



Witnesses:

Ed Perry
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UNITED STATES PATENT OFFICE.

EGBERT H. GOLD, OF CHICAGO, ILLINOIS.

HEATING SYSTEM FOR COMPARTMENT-CARS.

987,567.

Specification of Letters Patent.

Patented Mar. 21, 1911.

Application filed June 7, 1909. Serial No. 500,478.

To all whom it may concern:

Be it known that I, 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 Heating System for Compartment-Cars, of which the following is a specification.

My invention relates to a heating system particularly designed and intended for heating railway cars having two or more compartments; and the invention has for its object to provide a heating system of new and improved construction, suitable for cars of this sort, in which the control of the circulation of the heating medium is preferably automatic in accordance with temperature conditions, but which admits of an arbitrary regulation, within certain limits, to suit the taste or needs of the occupants of the several compartments; and to accomplish this desirable result by apparatus which does not involve an undue multiplication of valves and controllers, and which, in consequence is relatively economical to install and easily understood in its operation by the attendant having charge of the same.

While the novel arrangement of the valves and controlling means in a heating system which forms the special matter of this application might be employed with some advantage in various systems of different types, it is particularly designed for use and is of particular value when used in an atmospheric pressure system of heating; and in this regard it is one of the objects of my invention to adapt the well known atmospheric pressure system or vapor system of car heating to the special requirements and needs of compartment cars.

A further object of the invention is to provide a heating system for compartment cars which, by proper regulation of the valves, may be made to heat the car as a whole sufficiently for moderate weather and sufficiently to keep the water pipes and the like from freezing in any sort of weather, no matter how cold; which, however, will supply additional heat to any or all of the compartments that may need the same; and which when desired will supply heat to any of the compartments separately and in varying degrees, as desired, from the unitary system which is common to the entire car.

The invention has for further objects such

new and improved constructions in heating systems and in systems for heating railway compartment cars as will be described in this specification and specifically set forth in the claims appended thereto.

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

Figure 1 is a fragmentary sectional plan of a railway car illustrating an arrangement of heating coils, valves and automatic controllers in accordance with my invention, the arrangement of the heating coils being somewhat diagrammatic for the purpose of clearness of illustration. Fig. 2 is a sectional plan through two of the four-way valves employed. Fig. 3 is a vertical section on line 3—3 of Fig. 2 looking in the direction of the arrows. Fig. 4 is a vertical section illustrating an automatic controller or vapor regulator suitable for the type of heating system illustrated in the preceding figures.

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

Referring to the drawings, A represents a common form of compartment car divided into a plurality of compartments, B, B', B², B³, B⁴, which open upon an aisle C. *a* are the seats.

D is a steam train pipe which runs the length of the train and receives steam at relatively high, though variable, pressure from the locomotive.

For heating the car as a whole, I preferably provide a coil of radiating pipes E which preferably runs the length of the car through all of the compartments. This coil, when supplied with steam, serves to keep the car at a moderate temperature when the weather is not too cold and also serves, in all weathers to keep the water pipes and the like in the car from freezing up. This coil is fed from the train pipe preferably through a vapor regulator F and a four-way valve G, of constructions to be described hereafter, this arrangement being such that steam may be admitted to or shut off from the coil as desired, and when admitted will be maintained in the coil at substantially atmospheric pressure. For the purpose of supplying additional heat to the compartments separately, in accordance with the desires of the several occupants, or to so supply the compartments with heat when it is not desired to heat the car as a

whole,—that is when coil E is cut out—I provide the several compartments with supplemental radiators H, H', H², H³ and H⁴. These radiators are supplied from and discharge into a pipe J which may be termed a supply pipe or a supply circuit and which, as shown, preferably takes steam from the train pipe D through a vapor regulator F', the return end of said circuit leading to the thermostat chamber of said controller, as will be hereafter described. The several supplemental radiators H, H', etc., are connected both at their inlet ends and also their discharge ends through a plurality of four-way valves K, K', K² and K³, which are of such construction and so arranged in the supply circuit J that any of said radiators may be supplied with steam or may be closed, as desired, the steam being obliged to pass in series through such of the radiators as are open.

The four-way valves G, K, K', etc., are all alike. The construction of these valves and the arrangement of the valves employed in the controlling circuit J is shown in Figs. 2 and 3.

Referring first to Fig. 2, the valve consists of a casing 10, divided into four chambers, 11, 12, 13 and 14 by webs 15, 16, 17 and 18. The valve piece consists of the upper and lower disks 19 and 20 and the vertical web 21, these parts being arranged upon a stem 22 provided with a handle 23. Within the bonnet 24 is a spring 25 which bears against the upper disk 19. The lower disk has the drip opening 26 which registers with the opening 27 in the bottom of the case when web 21 is turned to the dotted line position of Fig. 2,—that is, when the radiator is bypassed. This description applies to all of the four-way valves of the system. It will be seen that supply circuit J leads into chamber 11 of one valve and connects chamber 12 of said valve with chamber 11 of the next valve.

Supposing the left hand valve of Fig. 2 to be the valve K of Fig. 1, the inlet end of radiator H leads from chamber 14 and the discharge end of the radiator to chamber 13.

The vapor regulators F, F', if used, are the same in construction and may be the familiar form of vapor regulator shown in Fig. 4. A casing 28 is divided by web 29 to form a high pressure chamber 30 and a low pressure chamber 31, communicating by port 32, controlled by valve 33, provided with a stem 34, attached to a bell crank 35, pivoted at 36 to a web 37, the other arm of the bell crank being connected with the operating rod 38 of the thermostat 39, the operating rod and thermostat being located in a suitable casing 40. Supposing this controller to be the controller F' of Fig. 1, it will be connected with train pipe D by the short pipe 41 which leads to chamber 30.

The inlet end of supply circuit J leads from chamber 31 and the discharge end of supply circuit J to the interior of casing 40. As this form of thermostatic controller is well known, I have described only such parts as are necessary for the understanding of the function of the controller in the heating system of this application.

The operation of this system of heating is as follows: Whenever the weather is cold, coil E will be in operation. Its thermostatic controller F, if used, will maintain the steam in the coil at substantially atmospheric pressure. The heat given out will be sufficient to keep the water pipes and the like located in the car from freezing. In moderate weather this coil will be ordinarily sufficient to heat the compartments without employing the supplemental coils. The interposition of the four-way valve G bypasses the steam which goes through the controller to the thermostatic member of the controller, in case valve G is closed and coil E is cut out, so that there is no danger of freezing up the thermostat. When additional heat is required for any compartment, its four-way valve may be set to the full line position of Fig. 2, and in such case steam from supply circuit J must pass through the coil in such compartment before it can proceed to the next compartment coil or through supply circuit J to the thermostatic chamber of controller F', as the case may be. This arrangement insures the filling with steam of all of the coils that may be open. All of the supplemental coils may thus be controlled by a single thermostatic controller F' which operates in the customary manner, if such a controller be used; that is, steam will enter the high pressure chamber 30 of the controller, pass into chamber 31, past valve 33, so long as the latter is open, and thence through the radiator and into contact with thermostat 39. The latter is expanded by contact with steam and this closes or throttles valve 33, so that in effect only so much steam is allowed to pass said valve as will keep the radiators filled at atmospheric pressure.

When the valve of any coil is set so as to close the coil, the drip openings 26, 27 are brought to a register so as to afford an outlet for water of condensation and steam bypasses through chambers 11 and 12.

The supplemental coils may be used even when coil E is not under steam, as, for example, in warm weather when it is not advisable to heat the entire car, but heat is required for some one or more of the compartments.

It will be seen that the above described system has considerable capacity for arbitrary regulation in order to meet special requirements of compartment cars. After the arbitrary regulation has been made by a

proper setting of the valves, the required supply of steam will be maintained automatically if an automatic supply regulator be used. These results are obtained by a system which involves the use of but few automatic controllers and comparatively few other valves, and with a system of piping which is comparatively simple. The result is that the system is economical to install and simple and easily comprehensible in its operation. No steam goes to waste. Suitable radiators may be employed for heating the aisles and other portions of the car. These have not been shown, as they form no part of my present invention.

I do not limit myself to the particular devices, constructions and arrangements herein shown, as modifications might be devised which would come within the scope of my invention, as defined by the claims.

In this application I do not claim broadly the combination of a primary radiator such as the coil E and one or more supplemental radiators, such as the coils H, H', etc., as this combination is broadly claimed in my pending application, Serial No. 464,057, filed November 23, 1908.

I claim:

1. The combination with a railway car divided into a plurality of compartments, of a train pipe carrying steam at high pressure, a radiator in communication with the train pipe and extending through a plurality of said compartments, means for automatically controlling the flow of steam through said radiator at a point outside of said compartments, a separate supplemental radiator in each of said compartments, a supply pipe leading from said train pipe which is common to said supplemental radiators, and means for directing the flow of steam from said supply pipe through any or all of said supplemental radiators in series, or for closing any of the same at will without interfering with the flow through those which are not so closed.

2. The combination with a railway car divided into a plurality of compartments, of a train pipe carrying steam at high pressure, a radiator in communication with the train pipe and extending through a plurality of said compartments, means for automatically controlling the flow of steam through said radiator at a point outside of said compartments, a separate supplemental radiator in each of said compartments, a supply pipe leading from said train pipe which is common to said supplemental radiators, means for directing the flow of steam from said supply pipe through any or all of said supplemental radiators in series as desired, and for closing any of the same at will without interfering with the flow through those which are not so closed, and means for automatically controlling the supply of steam

to such of said supplemental radiators as are under steam.

3. The combination with a railway car divided into a plurality of compartments, of a train pipe carrying steam at high pressure, a radiator in communication with the train pipe and extending through a plurality of said compartments, means for automatically controlling the flow of steam through said radiator at a point outside of said compartments, a separate supplemental radiator in each of the several compartments, separate hand-operated valves for said several supplemental radiators, whereby steam may be directed to any or all of said radiators as desired, a single automatic controlling device which maintains steam at atmospheric pressure in such of said supplemental radiators as are under steam, and means for shutting off steam from said radiator common to the plurality of compartments, substantially as and for the purposes described.

4. The combination with a railway car divided into a plurality of compartments, of a train pipe carrying steam at high pressure, a radiator in communication with the train pipe and extending through a plurality of said compartments, means for automatically controlling the flow of steam through said radiator at a point outside of said compartments, a separate supplemental radiator in each of the several compartments, a controlling circuit provided with a single controller, and valves connecting the several supplemental radiators with said circuit arranged so as to direct the steam through any or all of said supplemental radiators in series and to close any or all of said radiators, as may be desired without interfering with the flow of steam through those which are not closed.

5. The combination with a railway car divided into a plurality of compartments, of a train pipe carrying steam at high pressure, a radiator in communication with the train pipe and extending through a plurality of said compartments, means for automatically controlling the flow of steam through said radiator at a point outside of said compartments, a separate supplemental radiator in each of the several compartments, a controlling circuit common to said supplemental radiators, valves connecting said supplemental radiators respectively with said controlling circuit and arranged so that any or all of the radiators may be closed without closing said circuit and which cause the steam to be passed in series through such of the radiators as are open, and a thermostatic controlling device which controls the inflow of steam to said circuit in accordance with thermostatic conditions at the outlet thereof.

6. The combination with a railway car di-

vided into a plurality of compartments, of a train pipe, a radiator communicating with said train pipe which is common to said compartments, means outside of said compartments for controlling the supply of steam to said radiator, separate radiators in said several compartments, a supply pipe common to all of said radiators which receives steam from the train pipe, a four-way valve for each radiator which is interposed in the supply pipe and between the same and the inlet and return ends of said radiator, said valve being adapted at one adjustment thereof to put the inlet and discharge ends of its radiator in communication with said supply pipe and at the same time to close the supply pipe between said inlet and discharge ends of the radiator, and at its other adjustment to close communication between the ends of the radiator and the supply pipe, and at the same time to open communication through said supply pipe, whereby steam from the train pipe may be directed through any or all of said radiators, as may be desired, but is compelled to pass through such radiators as are open in series.

7. The combination with a railway car divided into a plurality of compartments, of a train pipe, a radiator communicating with said train pipe which is common to said compartments, means outside of said compartments for controlling the supply of steam to said radiator, separate radiators in said several compartments, a supply pipe common to all of said radiators which receives steam from the train pipe, a four-way valve for each radiator which is interposed in the supply pipe and between the same and the inlet and return ends of said radiator, said valve being adapted at one adjustment thereof to put the inlet and discharge ends of its radiator in communication with said supply pipe and at the same time to close the supply pipe between said inlet and discharge ends of the radiator, and at its other adjustment to close communication between the ends of the radiator and the supply pipe, and at the same time to open communication through said supply pipe, whereby steam from the train pipe may be directed through any or all of said radiators, as may be desired, but is compelled to pass through such radiators as are open in series, said valves being constructed with drip ports with which the respective radiators are put into communication when communication between said radiators and said supply pipe is closed.

8. The combination with a railway car divided into a plurality of compartments, of a train pipe, a radiator communicating with said train pipe which is common to said compartments, means outside of said compartments for controlling the supply of steam to said radiator, separate radiators in said

several compartments, a supply pipe common to all of said radiators which receives steam from the train pipe, a four-way valve for each radiator which is interposed in the supply pipe and between the same and the inlet and return ends of said radiator, said valve being adapted at one adjustment thereof to put the inlet and discharge ends of its radiator in communication with said supply pipe, and at the same time to close the supply pipe between said inlet and discharge ends of the radiator, and at its other adjustment to close communication between the ends of the radiator and the supply pipe, and at the same time to open communication through said supply pipe, whereby steam from the train pipe may be directed through any or all of said radiators, as may be desired, but is compelled to pass through such radiators as are open in series, and means for controlling the flow of steam through such radiators as are open, comprising a valve in the supply pipe in advance of said radiators, and a thermostat to actuate the same located in communication with the discharge end of said supply pipe.

9. The combination with a railway car divided into a plurality of compartments, of a train pipe carrying a supply of steam at high but variable pressures, a radiator communicating with said train pipe which is common to said compartments, means outside of said compartments for controlling the supply of steam to said radiator, separate radiators in said several compartments, a supply pipe common to all of said radiators which receives steam from the train pipe, a valve device having a single operating handle associated with each of said radiators and with said supply pipe, said valve device being adapted in each instance, when said operating handle is in one position to put the inlet and discharge ends of its radiator in communication with said supply pipe and at the same time to close the supply pipe between said inlet and discharge ends of said radiator, and, at the other position of said operating handle to close communication between the ends of said radiator and the supply pipe, and at the same time to open communication through said supply pipe; and means whereby the steam in such of said radiators as are in use may be maintained at a definite pressure.

10. The combination with a railway car divided into a plurality of compartments, of a train pipe carrying a supply of steam at high but variable pressures, a radiator communicating with said train pipe which is common to said compartments, means outside of said compartments for controlling the supply of steam to said radiator, separate radiators in said several compartments, a supply pipe common to all of said radiators, and a valve device associated with each

of said radiators and having a single operating handle, said valve device being adapted in each instance to direct the steam from the supply pipe through said radiator, when the operating handle is in one position, and, when the operating handle is in the other position, to close the inlet and outlet ends of said radiator and direct the steam to the next succeeding radiator, whereby the steam may be directed through any or all of said radiators, as may be desired, but is compelled to pass through such radiators as are open in series.

11. The combination with a railway car divided into a plurality of compartments, a train pipe carrying a supply of steam, a radiator in communication with said train pipe and extending through a plurality of said compartments, means comprising a controlling device outside of said compartments for controlling the flow of steam through said radiator, a separate supplemental radiator in each of said compartments, a supply pipe leading from said train pipe which is common to said supplemental radiators, and means for directing the flow of steam from said supply pipe through any or all of said supplemental radiators in series, or for closing any of the same at will without interfering with the flow through those which are not so closed.

12. The combination with a railway car divided into a plurality of compartments, of a radiator which extends through a plurality of said compartments, means including a controlling device located outside of said compartments for supplying said radiator with heating medium, a separate supple-

mental radiator in each of said compartments, a supply pipe common to said supplemental radiators and means for introducing heating medium into said supply pipe; and means for directing the flow of the medium from said supply pipe through any or all of said supplemental radiators in series or for closing any of the same at will without interfering with the flow through those which are not so closed.

13. The combination with a railway car divided into a plurality of compartments, of a radiator which extends through a plurality of said compartments, means including a controlling device located outside of said compartments for supplying said radiator with heating medium, a separate supplemental radiator in each of said compartments, a supply pipe common to said supplemental radiators and a four-way valve device for each of said supplemental radiators, each of said valve devices being interposed in said supply pipe with two ports thereof communicating therewith, the other two ports of each of said valve devices communicating with the inlet and return ends of the respective supplemental radiators, whereby the medium from the supply pipe may be directed through any or all of said supplemental radiators, but serially, or any of said radiators may be shut off at its inlet and outlet ends from said supply pipe without interfering with the flow through those radiators which are not so shut off.

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