

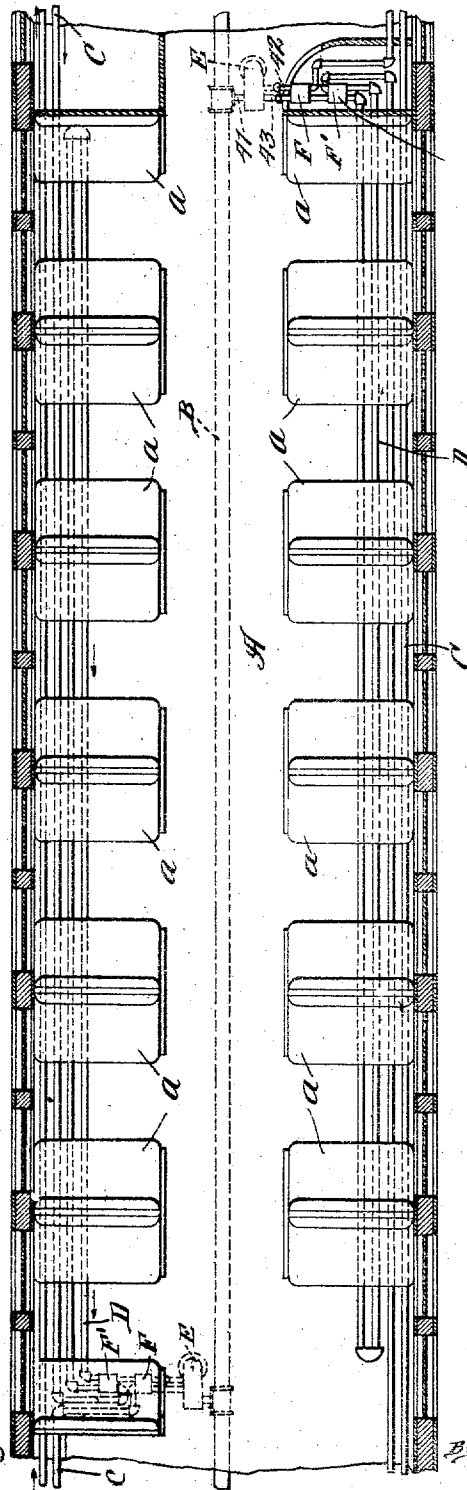
E. H. GOLD.
SLEEPING CAR HEATING SYSTEM.
APPLICATION FILED JUNE 7, 1909.

987,565.

Patented Mar. 21, 1911.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Ed. D. Long

Albert J. Sauer

Inventor:

E. H. Gold

R. B. Barnett

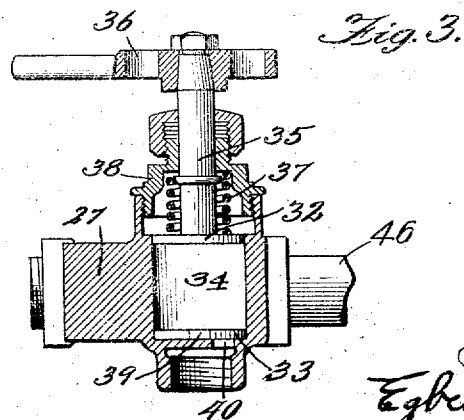
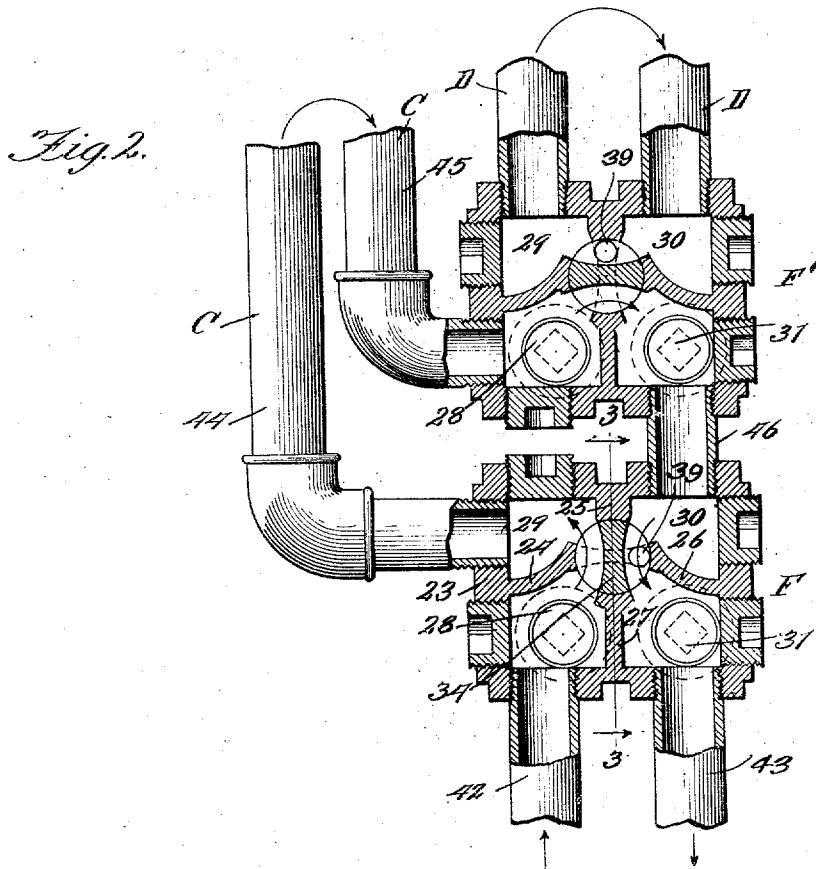
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4 SHEETS-SHEET 2.



Witnesses:
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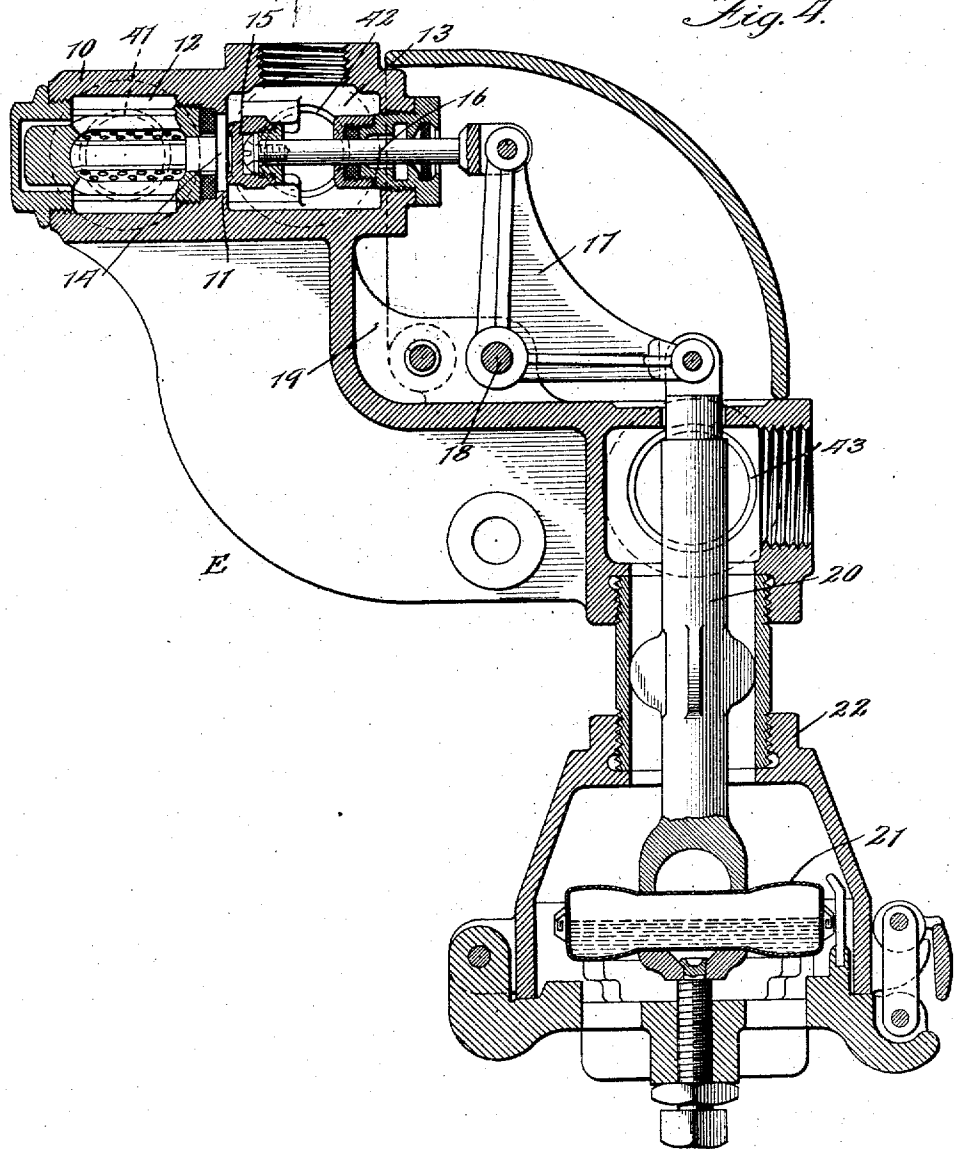
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4 SHEETS—SHEET 3.



Witnesses:

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Albert J. Sausser

Inventor:

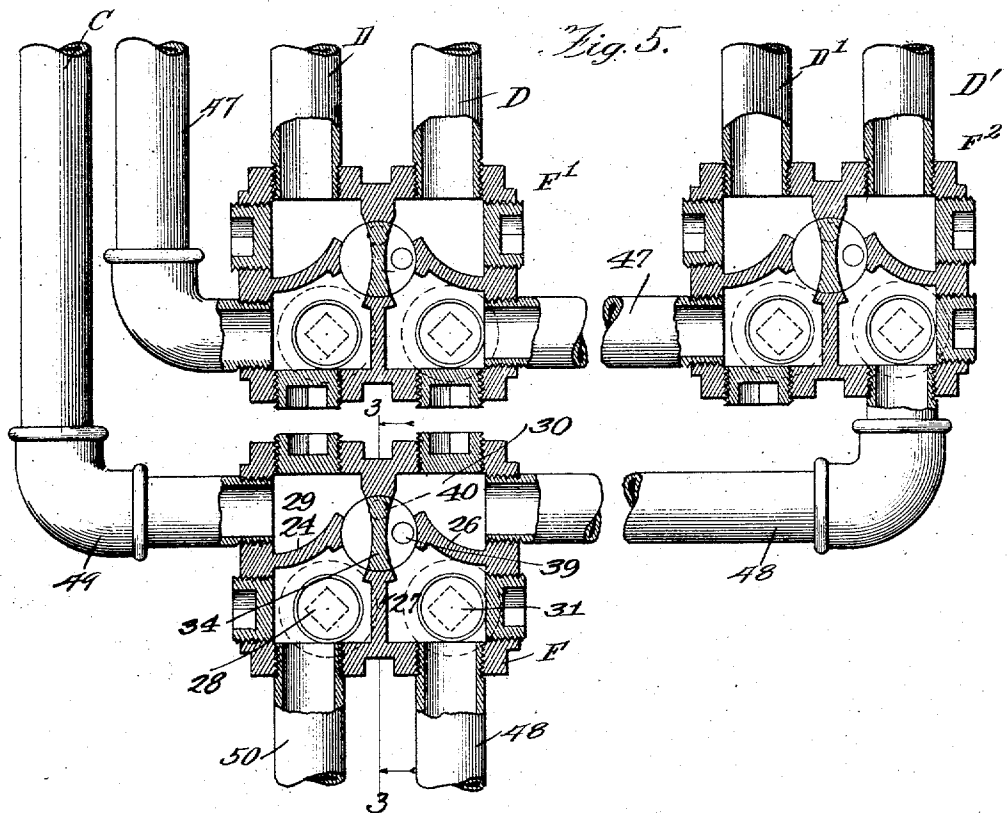
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Patented Mar. 21, 1911.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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SLEEPING-CAR-HEATING SYSTEM.

987,565.

Specification of Letters Patent. Patented Mar. 21, 1911.

Application filed June 7, 1909. Serial No. 500,477.

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 Sleeping-Car-Heating Systems, of which the following is a specification.

My invention relates to a heating system designed and intended particularly for heating railway cars; and the invention has for its object to provide a heating system which is primarily automatic in its operation, but which is capable of a certain amount or arbitrary regulation, by means of which the amount of effective radiation may be varied so as to produce, for example, more heat in the daytime than at night, or an increase of heat over the normal in very severe weather, or so as to vary at will the temperature in different compartments of the same car.

While the arrangement of radiating coils, valves and controlling devices which forms the subject matter of this application might be employed to some advantage in a variety of heating systems, the arrangement is designed particularly for atmospheric pressure or vapor systems of car heating and more particularly for the vapor system as applied to sleeping cars; and in this regard it is one of the objects of my invention to adapt the vapor system to the needs and requirements of sleeping cars and the like.

The invention involves the use in conjunction of a primary radiator and a secondary radiator, the secondary radiator comprising one or more radiator units, the circulation through which radiators is preferably controlled by a single thermostatic controller. This arrangement, broadly speaking, is shown in my application filed November 23, 1908, Serial No. 464,057, in which, however, the two coils or radiators, when both are used, are in parallel. This arrangement necessitates the use of some device for compelling the steam to pass through the secondary coil when it is first opened, the tendency being for the steam to follow its old course through the hot pipes and so interfere with the intended conjoint operation of the coils.

The present invention provides for an arrangement of two radiators in series with suitable valves interposed, whereby the steam may be circulated either through the primary radiator alone and thence to the controller or through the two radiators se-

rially, thus insuring the filling of both radiators when both are used, before the controlling thermostat is actuated to diminish the supply.

The invention has for a further object to provide a heating system of the sort described which shall be simple in construction, requiring but a few valves and controllers so that it is economical to install and so that its operation will be easily understood by the attendant having charge of the same.

The invention has for further objects such new and improved devices, constructions and arrangements in heating systems, and particularly sleeping car heating systems as will be described in this specification and particularly 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 sleeping car, the arrangement of the radiating pipes being, however, somewhat conventional for the purpose of clearer illustration. Fig. 2 is a sectional plan through the four-way valves employed to connect the radiating units. Fig. 3 is a sectional view taken on line 3—3 of Fig. 2 looking in the direction of the arrows. Fig. 4 is a vertical sectional view of a vapor regulator suitable for use in the heating system of the present invention. Fig. 5 is a sectional plan view illustrating a modified form of the invention employing two units in the secondary radiator.

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

Referring to the drawings, A represents the center part of a sleeping car of ordinary construction.

a are the car seats.

B is the steam train pipe which runs the length of the train and is kept filled with steam from the locomotive at high but varying pressures.

The car is heated by two sets of radiating coils, one on each side of the car. As these sets of coils and their valves and controllers are the same for both sides of the car, it will be necessary to describe only one set. Each set consists of a primary radiator C and a supplemental or secondary radiator D. The primary coil or radiator, preferably, extends the whole length of the car and is intended to impart sufficient heat in all weather to

keep the water pipes and the like in the car from freezing up, and to keep up the normal temperature in the car in moderate weather. Coil C will ordinarily be sufficient to heat the car at night even in quite cold weather as it is not necessary nor desirable to have the temperature of a sleeping car as high during the sleeping hours as at other times. The secondary coil or radiator D runs along through the berth section of the car and can be utilized to supply additional heat. Preferably, a controller E is employed for maintaining the steam in one or both of the coils at uniform pressure. A four-way valve F is interposed between the controller, the inlet to the primary coil and the common outlet from both of the coils. A second four-way valve F' is interposed between the return pipe of the primary coil C and the inlet and return ends of the secondary coil D.

I will now describe the construction of the controller and the four-way valves and their arrangement in the heating system.

The controller, if one be used, may be any form of automatic controller for regulating the inflow to the radiators in accordance with thermostatic conditions at their outlet. In the common form of controller or vapor regulator shown, a casing 10 is provided which is divided by the partition 11 to form the high pressure chamber 12 and the low pressure chamber 13, these chambers communicating by means of a port 14 which is controlled by the valve 15 on a stem 16 attached to a bell crank 17 pivoted at 18 on a web 19, the other arm of the bell crank being connected with the operating rod 20 of the thermostat 21, the rod and thermostat being inclosed in a suitable casing 22.

The four-way valves F, F' are identical in construction. A casing 23 is divided by the webs 24, 25, 26 and 27 into chambers 28, 29, 30, 31. Between the webs is set a valve piece consisting of the upper and lower disks 32, 33, respectively, connected by the vertical web 34, these parts being arranged on a stem 35 having a handle 36; a spring 37 being interposed between the upper disk 32 and the bonnet 38. The lower disk is perforated at 39 and this perforation registers with a perforation 40 in the bottom of the casing when the web 34 is in the full line position of the valve F' in Fig. 2.

A pipe 41 leads from train pipe B to chamber 12 of the controller. A pipe 42 leads from chamber 13 to the compartment 28 of the valve F. A pipe 43 connects compartment 31 of valve F with the thermostat chamber 22. The inlet pipe 44 of coil C leads from compartment 29 of valve F and the return end 45 of the coil to the compartment 28 of valve F'. A pipe 46 connects compartment 31 of F' with 30 of F. The coil D leads from and is returned to, respectively, compartments 29 and 30 of valve

F'. It will be understood that the arrangement of the heating coils shown in Fig. 1 is diagrammatic for the purposes of illustration and not intended to be exactly followed in practice. The heating coils of my system are intended to be arranged in the customary way along the sides of the car. They are shown in horizontal arrangement merely for the purpose of illustrating in one view all of the elements of the system.

The operation of the heating system above described is as follows: With the valves set as shown in the full lines in Fig. 2 the steam will flow through port 14, pass valve 15 of the controller through compartments 28 and 29 of valve F, through radiator C, thence through compartments 28 and 31 of valve F', compartments 30 and 31 of valve F and then to thermostat 21. The action of the steam on the thermostat will expand the same, closing or throttling valve 15 so as to regulate the inflow of steam to coil C in accordance with its needs. The coils are automatically kept full of steam at atmospheric pressure. In cold weather, when the condensation is more rapid, a greater amount of steam will pass the valve 15 to make up for the increased loss by condensation. The coil C is designed to give off sufficient heat to keep the water pipes and the like from freezing in all weathers and, as it is intended that this coil should be in service all the time, day and night, during moderately cold weather, the danger of freezing of the waterpipes is prevented. It often happens that when an attendant has allowed a car to become too hot he tries to remedy the difficulty by shutting off the steam entirely, with the result that with a sudden fall of the temperature a freezing of the water pipes takes place.

The secondary radiator D is put into service when heat is required in excess of the capacity of radiator C, as in very cold weather, and particularly during the daytime. It is a common complaint that sleeping cars are unduly heated at night and particularly during the first part of the night. This results from the fact that no efficient means is provided for reducing the amount of radiating surface under steam during the sleeping hours. By the present system both coils C and D may be cut out or coil C alone retained in service during the sleeping hours. When both coils are active, the valve F' will be set with the valve piece in the position indicated by the dotted lines in Fig. 2. Compartment 28 will be put into communication with compartment 29 and compartment 30 with compartment 31. Communication is now closed between compartment 28 and 31 so that the steam discharged from coil C will be compelled to pass through coil D before it can reach the thermostat. In other words, valve 15 of

the controller will remain open until steam is forced from coil C through coil D. When the valve piece of valve F' is turned back so as to by-pass coil D the perforation 39 in disk 33 will register with the perforation 40 in the bottom of the valve casing so as to open a drip outlet from the said coil.

In Fig. 5 I have shown a modified form of apparatus in which, the secondary radiator consists of two radiator units, so connected that steam from the return end of coil C may be made to pass through either one of these secondary units, or through both of the same in series; provision being also made for short circuiting both of the secondary units so that steam from the coil C may, at will, be caused to pass directly to the thermostat. The application of this modified form of the invention to a car, to provide separate radiation for particular compartments or for any other purpose, will be obvious without further illustration.

Referring now to Fig. 5, it will be seen that in the return end 47 of the primary coil C are interposed two four-way valves F', F². To these valves are connected the inlet and return ends of, respectively, the secondary radiator units D, D'. Preferably, the four-way valve F is interposed in the common return pipe 48, the inlet end 49 of coil C being connected with this valve and also the common supply pipe 50. The same sort of thermostatic controlling device as is used in the previously described form of apparatus may be employed in the modified system. It will be seen that either secondary radiating unit D or D' may be connected up with coil C, or short circuited, as desired. When both D and D' are in service the steam is forced to flow through the same in series. By closing valve F all of the coils may be cut out, the steam from the inlet valve of the controller in such case flowing immediately through to its thermostat chamber, thereby at all times preventing freezing of water of condensation in the controller which is preferably exposed beneath the car to insure sensitive action of the thermostat in response to changes in weather conditions.

The arrangement of the primary and secondary radiators and of the valves which control the flow of steam therethrough is such that the secondary radiator in each case cannot be used except when its primary radiator is under steam. Therefore, it is impossible to inadvertently use the secondary radiator and so run the risk of freezing water pipes and the like in parts of the car to which the primary radiator alone extends, it being understood that one of the functions of the primary radiators, and these radiators are located with that in view, is to protect water pipes and the like from freezing.

As hereinbefore indicated the secondary radiator may consist of a single radiator unit from which the steam may be conducted directly to the thermostat, as illustrated by Fig. 2; or it may consist of a plurality of radiator units to either of which the steam from the primary radiator may be conducted directly, and thence directly to the thermostat, or to one of which the steam from the primary radiator may be conducted and thence to said thermostat, either directly, or indirectly through the other of said secondary radiator units. By the language occurring in some of the claims to the effect that the steam is circulated through a secondary radiator unit and thence to the thermostat, and by expressions of like import, unless otherwise qualified, I wish to be understood as including both forms of the device; the form in which the steam from a secondary radiator unit is conducted to the thermostat directly, as illustrated by Fig. 2, or in which the steam from a secondary radiator unit may be conducted to said thermostat either directly or indirectly through other secondary radiator units, as illustrated by Fig. 5.

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

I do not claim the parallel arrangement of coils D, D', and their four-way valves as shown in Fig. 5, combined with an entirely distinct and separately controlled radiator so as to form a system adapted for the heating of compartment cars, as this arrangement is specifically claimed in my pending application Serial No. 500,478, filed June 7, 1908.

I claim:

1. The combination with a railway car, of a train pipe, a primary radiator supplied with steam from said train pipe, an independent secondary radiator, both arranged so as to heat the same apartment, said secondary radiator consisting of one or more radiator units, a single automatic controlling device for controlling the supply of steam to said radiators, and means operated by a single handle for admitting steam to or excluding the same from said secondary radiator, said means being operatively arranged with respect to said primary radiator, so that steam may be circulated either through the primary radiator alone or through both of said radiators in series.

2. The combination with a railway car, of a train pipe, a primary radiator and an independent secondary radiator both arranged so as to heat the same apartment, said secondary radiator consisting of one or more radiator units, a single automatic controlling device for controlling the supply

of steam to said radiators, comprising a thermostat and a valve actuated thereby, and means operated by a single handle for admitting steam to or excluding the same from said secondary radiator, said means being operatively arranged with respect to said primary radiator and said thermostat, so that the steam may be circulated through the primary radiator alone and thence directly to the thermostat, or through both the primary radiator and a secondary radiator unit in series, and thence to the thermostat, as desired.

3. A heating system comprising a source of supply of heating medium, supply and discharge pipes, a primary radiator and a secondary radiator, said secondary radiator consisting of one or more radiator units, and a four-way valve interposed between the return end of said primary radiator and the inlet and return ends of said secondary radiator and said discharge pipe, adapted to put in communication with each other either the return end of the primary radiator and said discharge pipe or the return end of the primary radiator and the inlet end of the secondary radiator and, at the same time, the return end of the secondary radiator and said discharge pipe.

4. A heating system comprising a source of supply of heating medium, supply and discharge pipes, a primary radiator and a secondary radiator exhausting through said discharge pipe, said secondary radiator consisting of one or more radiator units, a four-way valve interposed between the return end of one of said radiators and the inlet and return end of the other of said radiators and said discharge pipe, adapted to put in communication with each other either the return end of the primary radiator and said discharge pipe, or the return end of the primary radiator and the inlet end of the secondary radiator and, at the same time, the return end of the secondary radiator and said discharge pipe; a common controller for said radiators comprising a thermostat located in communication with the discharge pipe and a valve actuated thereby which are arranged to control the flow of heating medium through said supply pipe.

5. A heating system comprising a source of supply of heating medium, supply and discharge pipes, a primary radiator, a secondary radiator consisting of one or more radiator units, a four-way valve interposed between the return end of said primary radiator and the inlet and return ends of said secondary radiator and said discharge pipe, adapted to put in communication with each other either the return end of the primary radiator and said discharge pipe, or the return end of the primary radiator and the inlet end of the secondary radiator and, at the same time, the return end of the secondary radiator

and said discharge pipe; a common controller for said radiators comprising a thermostat located in communication with the discharge pipe and a valve actuated thereby, arranged to control the flow of heating medium through said supply pipe, and a second four-way valve interposed between said radiators and the supply and discharge pipes adapted to put in communication with each other the supply pipe and the inlet end of the primary radiator and the return end of one of said radiators and the discharge pipe; or to close communication between the supply pipe and the radiators and open communication directly between the supply and discharge pipes, for the purpose specified.

6. A heating system comprising a source of supply of steam, a primary radiator, an independent secondary radiator comprising one or more radiator units, said radiators arranged to heat the same apartment, said primary radiator being in direct communication with said source of supply of steam, and means operated by a single handle whereby steam from the primary radiator may be directed through said secondary radiator or excluded therefrom as desired.

7. A heating system comprising a source of supply of steam, supply and discharge pipes, a primary radiator, an independent secondary radiator, one of said radiators being arranged to receive steam from said supply pipe, means operated by a single handle and adapted either to open communication between the return end of said primary radiator and the inlet end of said secondary radiator and the return end of said secondary radiator and the discharge pipe, or to close communication between said radiators and open communication between the discharge pipe and the return end of the radiator which is in communication with the supply pipe.

8. A heating system comprising a source of supply of steam, supply and discharge pipes, a primary radiator, a secondary radiator, one of said radiators being arranged to receive steam from said supply pipe, means operated by a single handle and arranged, when in one position, to open communication between the radiator which receives steam from the supply pipe and the inlet end of the other of said radiators and between the return end of said other radiator and the discharge pipe and, when in another position, to open communication between the first-named of said radiators and said discharge pipe and to close both the inlet and discharge ends of the other of said radiators.

9. A heating system comprising a source of supply of steam, supply and discharge pipes, a primary radiator, a secondary radiator, one of said radiators being arranged to receive steam from said supply pipe, 130

means arranged, when in one position, to open communication between the return end of said last-named radiator and the inlet end of the other of said radiators and between the return end of said other of said radiators and the discharge pipe, and when in another position, to close both the inlet and discharge ends of said last named radiator and open communication between the return end of said first named radiator and said discharge pipe and, at the same time, to open communication between the atmosphere and the radiator, which is otherwise so closed at both ends, for the purpose specified.

10. The combination with a railway car, of a heating system therefor comprising a train pipe, a primary radiator and a secondary radiator which are arranged along one side of the car, one of which radiators is in constant communication with the train pipe whenever said heating system is in operation, and means operated by a single member whereby at one position of said operating member the medium is discharged from said last named radiator and excluded from the other radiator and, at another position of said operating member, the heating medium, after passing through said first named radiator, is caused to pass immediately through the other of said radiators.

11. The combination with a railway car, of a heating system therefor comprising a train pipe, a primary radiator and a secondary radiator extending lengthwise of the car at one side thereof, common supply and discharge pipes with which said radiators are adapted to be in communication, a controlling device comprising a valve in said common supply pipe and a thermostat in communication with said common discharge pipe, means whereby said radiators may be short circuited and the steam from the supply pipe directed into the discharge pipe, and a valve device arranged so as to put said radiators into communication with each other serially, said valve device being provided with means operated by a single member for excluding steam from one of said radiators.

12. The combination with a railway car, of a train pipe carrying steam at high but variable pressures, a primary radiator and a secondary radiator supplied with steam from said train pipe and located in said car, a discharge pipe, a four-way valve interposed between the return end of said primary radiator and the inlet and return ends of said secondary radiator and the discharge pipe, adapted to put in communication with each other either the return end of the primary radiator and said discharge pipe, or the return end of the primary radiator and the inlet end of the secondary radiator and, at the same time the return end of the sec-

ondary radiator and said discharge pipe; and means for maintaining a constant pressure of steam in one or both of said radiators, as the case may be.

13. The combination with a railway car, of a train pipe carrying steam at high but variable pressures, a primary radiator and a secondary radiator in said car, supplied with steam from said train pipe, common supply and discharge pipes for said radiators, a four-way valve interposed between the return end of the primary radiator and the inlet and return ends of the secondary radiator and the discharge pipe, adapted to put in communication with each other either the return end of the primary radiator and said discharge pipe or the return end of the primary radiator and the inlet end of the secondary radiator and, at the same time, the return end of the secondary radiator and said discharge pipe; a valve in said common supply pipe and a thermostatic device to operate the same in communication with said common discharge pipe, whereby steam is maintained at substantially atmospheric pressure in one or both of said radiators, as the case may be.

14. The combination with a railway car, of a heating system therefor comprising a train pipe carrying steam at high but variable pressures, a primary radiator and a secondary radiator supplied with steam from said train pipe, which radiators are arranged along the side of the car, means operated by a single member and arranged so as to permit at all times the flow of steam through one of said radiators and which is adapted at will to cause the steam to flow serially through said radiators or to wholly exclude steam from said secondary radiator; and means whereby the steam may be maintained at a definite pressure either in said primary radiator alone or in both of said radiators, as the case may be.

15. The combination with a railway car, of a heating system therefor comprising a train pipe, a primary radiator and a secondary radiator adapted to be supplied with steam from said train pipe and arranged so as to heat the same part of the car, and a valve device, provided with a single operating handle, which is arranged so as to permit the flow of steam at all times from the train pipe through one of said radiators, while excluding steam from the other of said radiators and by which at will the steam may be caused to flow through both of said radiators in series by adjustment of the position of said operating handle.

16. A heating system comprising a source of supply of steam, a primary radiator which is in constant communication with said source of steam, a secondary radiator which is separate therefrom, and means operated by a single operating handle by

which, in one position, said secondary radiator may be put in communication with said primary radiator, so that the steam from said supply may flow through said radiators in series, and, in another position, steam will be excluded from the secondary radiator, while permitted to flow through the primary radiator.

17. In a heating system, the combination with a source of supply of steam, of a supply pipe in communication with said source of supply of steam, a discharge pipe, a primary radiator, a secondary radiator, a valve device operated by a single operating member, associated with each of said radiators, the valve device for said primary radiator being adapted to direct the steam from said supply pipe either through said primary radiator and thence to the next succeeding valve device or immediately to the discharge pipe, while excluding steam from said primary radiator, the valve device of said secondary radiator being adapted to direct steam received by it either through said secondary radiator and thence to the discharge pipe or to exclude steam from said secondary radiator and direct the steam to the discharge pipe, as desired.

18. In a heating system, the combination with a source of supply of steam, of a supply pipe in communication with said source of supply of steam, a discharge pipe, a primary radiator, a separate secondary radiator, a separate valve device operated by a single operating member, associated with each of said radiators, the valve device for said primary radiator being adapted to direct the steam at will from said supply pipe either through said primary radiator and thence to the next succeeding valve device or directly to the discharge pipe while excluding steam from said primary radiator, the valve device of said secondary radiator being adapted at will to direct the steam received by it either through the secondary radiator and thence to the discharge pipe or to exclude steam from said secondary radiator and direct the steam to said discharge pipe, and means for maintaining a definite pressure of steam in each of said radiators when under steam.

19. The combination with a railway car, of a heating system therefor comprising a source of supply of heating medium, a primary radiator and a secondary radiator adapted to receive medium therefrom, said primary radiator extending through the car lengthwise thereof and said secondary radiator arranged adjacent to the primary radiator, but extending through only a portion of the distance through which the primary radiator extends, said radiators being arranged and controlled so that the medium may be circulated through the primary radiator alone or through both of said radiators,

but can be circulated through the secondary radiator only when the primary radiator is supplied and in series therewith.

20. A heating system, comprising a source of supply of heating medium, supply and discharge pipes, a primary radiator and a secondary radiator adapted to be supplied with steam from said supply pipe and exhausting through said discharge pipe, said secondary radiator consisting of two or more radiator units arranged so as to heat the same region heated by the primary radiator, and four-way valves for each of said secondary radiator units adapted in each case either to put in communication with each other the return end of the primary radiator, the inlet end of a secondary radiator unit and the return end of the secondary radiator unit and the discharge pipe, or to close communication between the primary radiator and the secondary radiator unit in question and open communication between the primary radiator and the discharge pipe.

21. A heating system, comprising a source of supply of heating medium, supply and discharge pipes, a primary radiator and a secondary radiator adapted to be supplied with steam from said supply pipe and exhausting through said discharge pipe, said secondary radiator consisting of two or more radiator units arranged so as to heat the same region heated by the primary radiator, a four-way valve for each of said secondary radiator units, adapted in each case either to put in communication with each other the return end of the primary radiator and the inlet end of a secondary radiator unit and the return end of the secondary radiator unit and the discharge pipe, or to close communication between the primary radiator and the secondary radiator unit in question and open communication between the primary radiator and the discharge pipe; and an automatic controlling device comprising a valve in the supply pipe and a thermostat in the discharge pipe arranged to actuate said valve.

22. A heating system comprising a source of supply of heating medium, supply and discharge pipes, a primary radiator, a secondary radiator consisting of two or more radiator units, arranged to heat the same region as heated by the primary radiator, a four-way valve for each of the secondary radiator units adapted in each case either to put in communication with each other the return end of the primary radiator and the inlet end of a secondary radiator unit and the return end of the secondary radiator unit and the discharge pipe or to close communication between the primary radiator and said secondary radiator unit and open communication between the primary radiator and the discharge pipe; an automatic controlling device comprising a valve

in the supply pipe and a thermostat in the discharge pipe arranged to actuate said valve, and a four-way valve interposed between the supply and discharge pipes and
 5 said radiators adapted either to put the supply and discharge pipes respectively into communication with said primary radiator or with said primary radiator and one or more of said secondary radiator units, ac-
 10 cording to the position of said first-men- tioned four-way valves, or to close commu- nication between the supply pipe and said radiators and to open communication di- rectly between the supply pipe and the dis-
 15 charge pipe, for the purpose specified.

23. A heating system comprising a source of supply of steam, a primary radiator and a secondary radiator supplied with steam from said source, said secondary radiator
 20 consisting of a plurality of secondary radi- ator units separate from the primary radi- ator and from each other, a discharge pipe, and means associated with each of said sec-
 25 ondary radiator units whereby, at one po- sition of said means, the inlet end of the secondary radiator unit with which it is associated is placed in communication with the return end of the primary radiator and the return end of said secondary radiator
 30 unit is placed in communication with the discharge pipe or with the next succeeding secondary radiator unit, as the case may be, and, at another position of said means, com- munication between the secondary radiator
 35 unit with which it is associated and the primary radiator is closed and communica- tion is opened between the return end of the primary radiator and the succeeding sec-
 40 ondary radiator unit or between the primary radiator and the discharge pipe, as the case may be.

24. A heating system comprising a source of supply of steam, a primary radiator and a secondary radiator supplied with steam
 45 from said source, said secondary radiator consisting of a plurality of secondary radi- ator units separate from the primary radi- ator and from each other, a discharge pipe, and means associated with each of said sec-
 50 ondary radiator units whereby, in one position of said means, the inlet end of the secondary radiator unit associated therewith is placed in communication with the return end of the primary radiator, and the return end of
 55 said secondary radiator unit is put in com- munication with the discharge pipe or with the next succeeding secondary radiator unit, as the case may be, or, in another position of said means, the inlet and return ends of
 60 said secondary radiator unit with which it is associated are closed thereby and the re- turn end of the primary radiator is placed in communication with the next succeeding secondary radiator unit or with the dis-
 65 charge pipe, as the case may be.

25. The combination with a railway car, of a heating system therefor comprising a train pipe, a primary radiator and a sec-
 ondary radiator supplied with steam from
 70 said train pipe, said secondary radiator con- sisting of two secondary radiator units sep- arate from each other, a discharge pipe and a valve device, having a single operating handle, associated with each of said sec-
 75 ondary radiator units, by means of which the steam from the primary radiator may either be discharged to the discharge pipe and excluded from said secondary radiator or may be circulated through either of said
 80 secondary radiator units and excluded from the other of said secondary radiator units, or may be circulated through both of said secondary radiator units in series, according to the position of the operating handles of
 85 said valve devices.

26. In a heating system, the combination with a source of supply of steam, of a sup-
 ply pipe in communication with said source of supply of steam, a discharge pipe, a
 90 primary radiator, a secondary radiator com- prising two or more secondary radiator units, a valve device operated by a single operating member, associated with said pri-
 95 mary radiator and with each of said sec- ondary radiator units, the valve device for said primary radiator being adapted to di- rect the steam through said primary radi- ator and thence to the next succeeding valve device or immediately to the discharge pipe,
 100 while excluding steam from said primary radiator; the valve device of each of said secondary radiator units being adapted to direct the steam received by it either through its radiator unit and thence to the
 105 discharge pipe or to the next succeeding unit, as the case may be, or to exclude the steam from its said unit and direct it im- mediately to the discharge pipe or to the next succeeding unit, as the case may be.

27. In a heating system, the combination
 110 with a source of supply of steam, of a sup- ply pipe in communication with said source of supply, a discharge pipe, a primary radi- ator, a secondary radiator comprising two or more secondary radiator units, a valve
 115 device associated with said primary radiator and with each of said secondary radiator units, each said valve device being operated by a single and separate handle, the valve device for said primary radiator being
 120 adapted to direct the steam from said sup- ply pipe either through said primary radi- ator and thence to the next succeeding valve device or immediately to the discharge pipe, while excluding steam from said primary
 125 radiator; the valve device of each of said secondary radiator units being adapted to direct the steam received by it either through its radiator unit and thence to the discharge pipe or to the next succeeding
 130

unit, as the case may be, or to exclude the steam from its said unit and direct it immediately to the discharge pipe or to the next succeeding unit, as the case may be; and means for maintaining a definite pressure of steam in each of said units when under steam.

28. The combination with a railway car, of a heating system therefor comprising a source of supply of heating medium, a primary radiator arranged to extend through the car lengthwise thereof, a secondary radiator consisting of a plurality of secondary radiator units each of which is arranged adjacent the primary radiator, but extends only for a portion of the length of the same, said radiators arranged to receive heating medium from said source of supply, said primary and secondary radiators being arranged and controlled so that the medium may be circulated through the primary radiator alone or through the primary radiator and secondary radiator units serially, but can be circulated through the secondary radiator units only when the primary radiator is supplied with heating medium.

29. The combination with a railway car, of a heating system therefor comprising a source of supply of heating medium, a primary radiator and a secondary radiator arranged to receive medium therefrom, said primary radiator extending through the car lengthwise thereof and said secondary radiator consisting of a plurality of secondary radiator units arranged adjacent to said primary radiator but which in each case extend through the car for only a portion of the length of the primary radiator, said primary radiator and secondary radiator being arranged and controlled so that the medium may be circulated through the primary radiator alone or through the primary radiator and through any or all of the secondary radiator units, but can be circulated through the secondary radiator units only when supplied to the primary radiator and thence serially through such of the secondary radiator units as may be open.

EGBERT H. GOLD.

Witnesses:

P. H. TRUMAN,
H. L. PECK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

Corrections in Letters Patent No. 987,565.

It is hereby certified that in Letters Patent No. 987,565, granted March 21, 1911, upon the application of Egbert H. Gold, of Chicago, Illinois, for an improvement in "Sleeping-Car-Heating Systems," errors appear in the printed specification requiring correction as follows: Page 1, line 14, the word "or" should read *of*; page 7, line 61, the word "teh" should read *the*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of April, A. D., 1911.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.

unit, as the case may be, or to exclude the steam from its said unit and direct it immediately to the discharge pipe or to the next succeeding unit, as the case may be; and means for maintaining a definite pressure of steam in each of said units when under steam.

28. The combination with a railway car, of a heating system therefor comprising a source of supply of heating medium, a primary radiator arranged to extend through the car lengthwise thereof, a secondary radiator consisting of a plurality of secondary radiator units each of which is arranged adjacent the primary radiator, but extends only for a portion of the length of the same, said radiators arranged to receive heating medium from said source of supply, said primary and secondary radiators being arranged and controlled so that the medium may be circulated through the primary radiator alone or through the primary radiator and secondary radiator units serially, but can be circulated through the secondary radiator units only when the primary radiator is supplied with heating medium.

29. The combination with a railway car, of a heating system therefor comprising a source of supply of heating medium, a primary radiator and a secondary radiator arranged to receive medium therefrom, said primary radiator extending through the car lengthwise thereof and said secondary radiator consisting of a plurality of secondary radiator units arranged adjacent to said primary radiator but which in each case extend through the car for only a portion of the length of the primary radiator, said primary radiator and secondary radiator being arranged and controlled so that the medium may be circulated through the primary radiator alone or through the primary radiator and through any or all of the secondary radiator units, but can be circulated through the secondary radiator units only when supplied to the primary radiator and thence serially through such of the secondary radiator units as may be open.

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