Dec. 22, 1925. 1,566,814

W. L. BLISS

HEATING APPARATUS

Original Filed Jan. 31, 1918 3 Sheets-Sheet 1

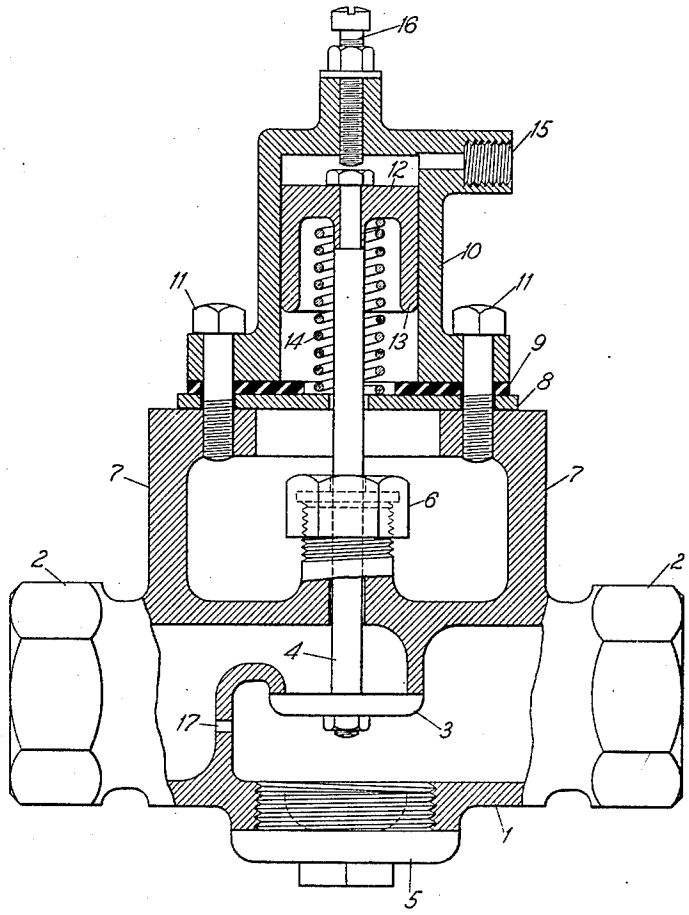


Fig. 1

WITNESS:
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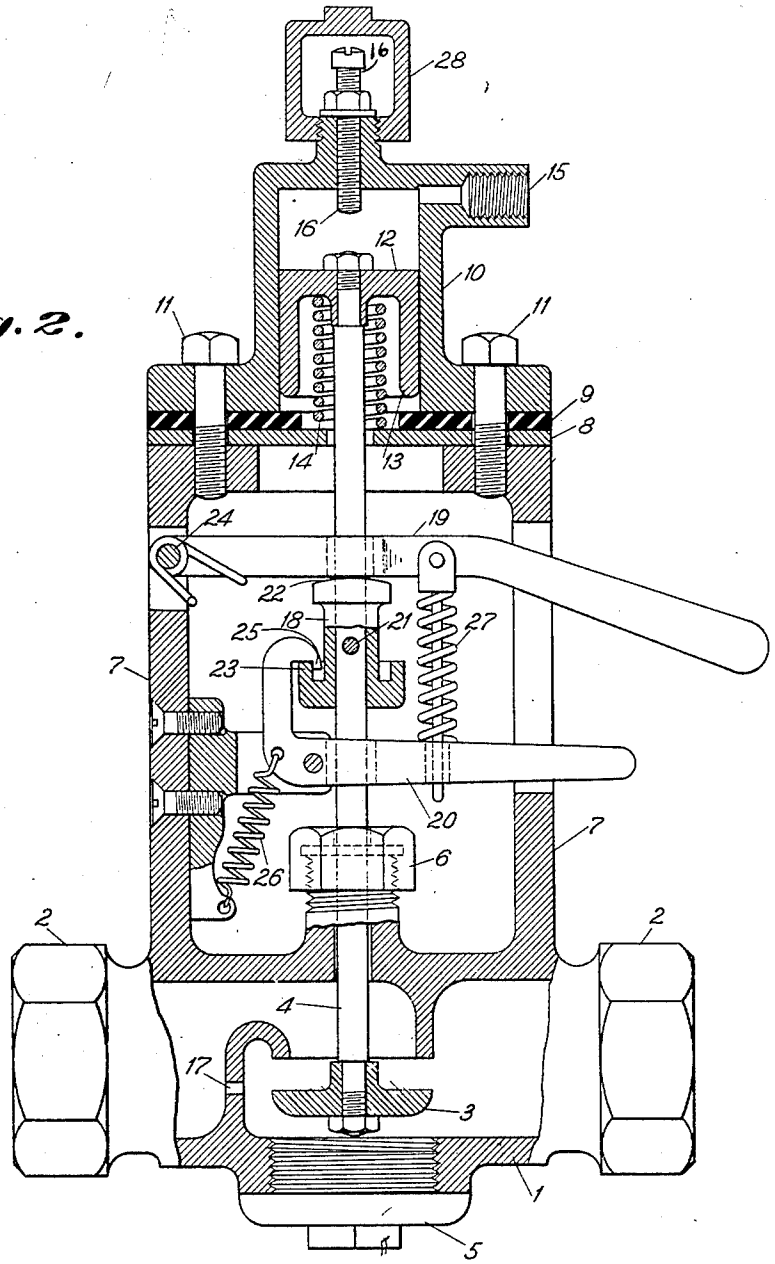
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Fig. 2.



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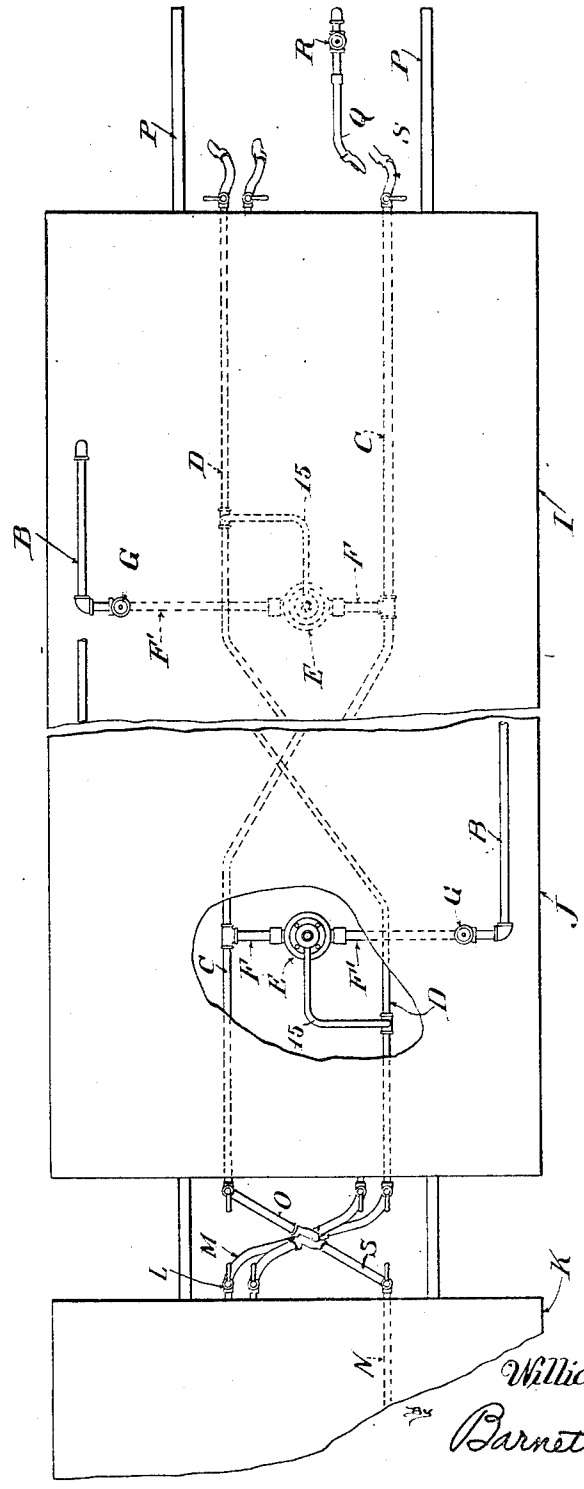
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HEATING APPARATUS

Original Filed Jan. 31, 1918 3 Sheets-Sheet 3

Fig. 3.



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Patented Dec. 22, 1925. 1,566,814

UNITED STATES PATENT OFFICE.

WILLIAM L. BLISS, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO VAPOR CAR HEATING COMPANY, INC., OF CHICAGO, ILLINOIS, A CORPORATION OF NEW YORK.

HEATING APPARATUS.

Application filed January 31, 1918, Serial No. 214,603. Renewed May 2, 1924.

To all whom it may concern:

Be it known that I, WILLIAM L. BLISS, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented new and useful Improvements in Heating Apparatus, of which the following is a specification.

The present invention relates to steam heating apparatus.

More particularly the present invention relates to heating apparatus applicable to car heating.

It is common to heat railway cars from a steam train line which is supplied with steam from the locomotive when a locomotive is attached to the train. At times when no locomotive is attached to the train said train line is ordinarily attached to a stationary steam supply system and receives steam therefrom. Inasmuch as the cars are often tightly closed when standing connected to the stationary steam system, the temperature in the cars may rise to an undesirable degree. Furthermore, unless a system of inspection is maintained, there is often a much greater supply of steam than is necessary, resulting in a waste.

The system of heating contemplated by my invention relates to the conservation of the heating medium by automatically shutting off or reducing the inflow of the heating medium to the radiating coils or other heating devices of the car during such periods as the car is not in service. It is the usual practice in winter weather to heat passenger cars, for example, while they are standing in the yard or at the terminal from a yard or terminal line to which the steam train pipes of the cars are connected. It is necessary to do this in order to prevent the freezing of the water pipes and other fixtures containing or likely to contain water and to prevent injury to the paint or other damage which would be likely to occur if the car were allowed to stand without heat in a low temperature. Under these circumstances, however, it is not necessary that the car be kept at a temperature as high as that required during occupancy. It is not feasible to leave it to the trainmen to adjust the heating system to give a lower temperature during the periods when the car is out of service because the re-adjustment is likely to be neglected or possibly the steam shut down to too great an extent. When it is considered that the ordinary passenger car on the average is standing unoccupied more than it is in service, it will be seen that the waste of steam incident to maintaining the cars at the normal occupancy temperature during periods of non-occupancy, is very considerable. My invention seeks to minimize this waste by providing the heating system with controlling means which function automatically to decrease the amount of heating medium delivered to the car from a supply source when the car stands disconnected from the locomotive and to re-establish the normal supply when the car is again connected with the locomotive so as to maintain the car temperature at a lower point when unoccupied than is maintained during occupancy.

One of the objects of the present invention is to provide, in combination with the car heating and air-line systems, a steam valve which will permit the passage of the required amount of steam to keep the railroad cars at the proper temperature when said cars are connected to the locomotive, but which will automatically throttle the steam when said cars are disconnected from the locomotive and taken out of service, permitting, however, a reduced amount of steam to pass from the stationary supply system into the heating devices of the car. A further object is to provide a valve of the kind referred to which may be locked in open position, if desired, when the locomotive is disconnected, but which may be manually operated at any time to return said valve to the condition to permit only the reduced amount of steam to pass, said valve being adapted, in any event, to be immediately responsive to the condition of connection to or disconnection from the locomotive.

The utilization of the heating system contemplates in its specific embodiment either an arrangement whereby a small amount of

heating medium will pass into the radiators even when the valve is moved to its extreme closing position, due to absence of pressure in the signal line or other portion of the compressed air system of the car or an arrangement whereby the valve may be set by hand, for instance, to an intermediate open position. When the latter arrangement is employed the setting device is preferably so constructed that with the re-appearance of pressure in the signal line such setting device becomes inoperative, the valve being thereupon subject only to the automatic control. When both these expedients are employed, that is, when the valve in its extreme closing position does not prevent a small quantity of heating medium from reaching the radiators and the valve is capable also of being set to an open position, the controlling means can be operated to supply the car radiators with a minimum amount of heating medium when the car is standing in the railroad yard and to a larger flow of heating medium when the car is on a siding or during the period it stands at a terminal, before the locomotive is connected with the train, at which time it is desirable to bring the car temperature as rapidly as possible up to the normal temperature of occupancy.

A further object is to provide a mechanism of the kind referred to which is sturdy in construction, cheap to manufacture, and which will necessitate a minimum of inspection service.

Further objects will be apparent as the description proceeds.

Figure 1 is a view partly in section of one embodiment of the present invention.

Figure 2 is a similar view of a modification.

Fig. 3 is a diagrammatic plan view illustrating the application of the invention to a car heating system.

Referring first to Fig. 1, the numeral 1 indicates the base portion of a valve according to the present invention and may be made of cast iron or similar material. The base portion 1 is provided with a pair of sockets 2, 2, preferably internally screw-threaded, which are adapted to be connected to the train line and the heating devices in the car. The base portion 1 provides between the sockets 2, 2, a passageway for the steam which, however, may be obstructed by the valve 3 which is adapted to be operated by the valve stem 4. A screw-plug 5 may be provided in the bottom portion of the base member 1 whereby access may be had to the valve 3 for assembly, inspection and repair. The valve stem 4 may be operated through a packing gland which is indicated as a whole by the numeral 6.

Mounted upon the base portion 1 is a pair of upright members 7, 7, which serve as a support for the superstructure of the valve. Mounted upon said upright members 7 is a plate 8 which supports a gasket 9. Mounted upon the gasket 9 is a cylindrical member 10. The plate 8, gasket 9 and cylindrical member 10 may be securely bolted to the upright members 7 by means of the bolts 11, 11.

Sliding within the cylindrical member 10 is a piston 12 which should preferably be of cup-shaped formation whereby to provide a depending petticoat portion 13. Said piston 12 is mounted upon valve stem 4. A spring 14 is provided which urges the piston 12 to its uppermost position whereby to tend to close the valve 3. The upper portion of the cylinder has communication with the passageway 15 which may communicate with the signal line from the locomotive or with any other source of fluid supply which is operative when the locomotive is connected to the car upon which the present invention is used. A stop screw 16 is provided in the upper part of the cylinder 10 which screw may be adjusted to limit the upward movement of the valve stem 4 to the desired point. When the piston 12 is in its lowermost position the petticoat portion 13 should make a tight seal with the gasket 9 whereby to prevent the escape of fluid. With this construction a close fit between the piston 12 and cylindrical member 10 is unnecessary, inasmuch as when the supply of fluid through the passageway 15 has caused the piston 12 to move to its lowermost position, any wastage of fluid will be prevented by the seal between the petticoat portion 13 and the gasket 9. An aperture 17 may be provided as shown, adjacent to the valve 3.

A mode of operation of the above described embodiment of the present invention is substantially as follows:

When the device is connected in service on a car and said car is connected to the locomotive, the passageway 15 will communicate to the signal line from the locomotive. Pressure of the air from said signal line will urge the piston 12 against the tension of spring 14 to a position wherein the petticoat portion 13 will firmly engage the gasket 9. In this position of the petticoat 13, the valve stem 4 will hold the valve 3 open, whereby steam may pass through the base portion 1 between sockets 2, 2, to supply the heating devices of the car. When the car is disconnected from the locomotive and connected to a stationary source of steam supply, communication with a source of fluid under pressure through the passageway 15 will, of course, be broken. At this time the spring 14 will urge the piston 12 upwardly. The stop screw 16 may be adjusted to hold the piston 12 at any desired position. In service said stop screw 16 may be so adjusted as to hold the valve 3

slightly open, so that a small amount of steam may pass through the base portion 1 to maintain the low degree of temperature required in the car when out of service. The small aperture 17 may be provided or omitted, as desired. If the aperture 17 is provided, a small amount of steam will be allowed to pass through the base portion 1 at all times and niceties of adjustment of the valve 3 may be avoided.

It is preferred to utilize the pressure from the signal line for operating the described embodiment of the present invention, for the reason that the pressure in the signal line is always reduced when the locomotive is disconnected. In this regard, the signal line is preferable to the brake line, inasmuch as the pressure in the brake line is, in practice, always maintained by means of pressure reservoirs, even though the locomotive be disconnected. The invention is not limited, however, to use in connection with the signal line. Any means responsive to the connection of the locomotive may be utilized.

Referring now to the embodiment illustrated in Figure 2, means are provided whereby an operator may lock the valve 3 in open position when pressure is relieved through passageway 15. The valve stem 4 has secured thereto a member 18 with which a pair of levers 19 and 20 are adapted to cooperate. Said member 18 may be secured to the valve stem 4 by means of a pin 21. The upper part of the member 18 is provided with a rounded head 22 and the lower part of said member 18 is provided with an upturned portion providing a lip 23. The particular embodiment of the member 18 chosen for illustration will be found advantageous for the reason that it can be readily turned out in a screw machine, and for the reason that, though the stem 4 will rotate in use, such rotating will not affect the operation of the lip 23. The lever 19 may be pivoted on one of the members 7 and may be yieldably held in to its uppermost position by means of a spring 24. The lever 20 is illustrated as a bell crank lever and should be provided with a hook-shaped end portion 25 to engage with the lip 23 of the member 18. A spring 26 may be provided for urging the lever 20 in a counter-clockwise direction to thereby tend to move the hook 25 away from the member 18. Said lever 20 may be mounted on one of the members 7. A compression spring 27 is mounted between levers 19 and 20. The spring 27 should be stiffer than the spring 26 but should be so designed that when the levers are in the positions indicated, that is, when the hook 25 is engaged with the lip 23, the spring 27 will be under substantially no compression. Said spring 27 should be so designed, however, that when lever 19 is depressed sufficiently to free the lip 23 from the hook 25, said spring 27 will be under sufficient compression to overcome the tension of the spring 26.

In Fig. 2, the upper part of the set screw 16 is illustrated as being housed within a cap 28. Said cap 28 will prevent the accidental movement of said set screw 16, and inasmuch as it may be screwed down by means of a pipe thread, it will prevent the escape of fluid from the passageway 15 around said set screw.

The embodiment of the present invention illustrated in Figure 2 will operate in response to pressure upon the piston 12 in the manner discussed in connection with Figure 1, whereby when the locomotive is connected to the car upon which the present invention is being used, the piston 12 will be urged to its lowermost position, whereby the petticoat portion 13 will form a tight seal with the gasket 9, holding the valve 3 in open position. When the locomotive is disconnected from the car, the piston 12 will be urged upwardly by the spring 14, moving the valve 3 to closing position. The closed position of the valve may be varied as desired by adjusting the set screw 16.

In case it should be desired to hold the valve 3 open at a time when the locomotive is disconnected, such a condition may be obtained by operation of the lever 19. At the time when the locomotive has been disconnected, the spring 14 and the spring 24 will cooperate to urge the lever 19 to its uppermost position. If the operator desires to move the valve 3 to open position, he will depress the lever 19, thereby moving the lip 23 downwardly. When the lip 23 has been moved downwardly to a point which will permit the engagement of the hook 25 therewith, the spring 27 will have been placed in a condition of compression, as described above. At this time, the spring 27 will overcome the pull of the spring 26 and will move the lever 20 in a clockwise direction, whereby, when pressure of the lever 19 is released, the hook 25 will engage with lip 23 to hold the valve 3 in the position illustrated. Steam may now pass from a stationary source of supply to the heating devices on the car. If the operator should desire to move the valve to closing position, he will depress the lever 19 and raise the lever 20. The depression of the lever 19 will free the lip 23 from the hook 25 and the raising of the lever 20 will throw said hook and lip out of engagement, whereby, when pressure is relieved from the lever, 19, the member 18 will be drawn upwardly by the spring 14.

It will be noted from an inspection of Figure 2 that when the valve 3 is locked in its open position, the piston 12 is at an intermediate point in its travel, whereby further depression of the piston 12 will move the lip 23 to a position below the hook 25.

If the locomotive should be connected to the car and the passageway 15 should be connected to the signal line of the locomotive, the piston 12 would be moved to the lowermost limit of its travel. At this time the spring 27 will not be in a state of compression and the spring 26 is free to move the lever 20 in a counter-clockwise direction, whereby to release engagement between the lip 23 and hook 25. The valve 3 will therefore be no longer locked in position but will operate in response to pressure above the piston 12.

The member 4 need not be connected directly with the valve 3 as here shown, but intermediate connections, either mechanical, electrical or fluid may be employed to operate a steam valve located at a point remote from the operating member.

Referring to Fig. 3 of the drawings, I and J represent the two end portions of a car (which is centrally cut away), and K is the end portion of an adjacent car of the train, the cars being operable along a trackway P. The radiators are indicated at B, and C is the main steam line, and D is the signal air line. When the cars are coupled in a train, the air lines of adjacent cars are connected by coupling pipes M, controlled by valves L, and the steam line N of car K is similarly connected with steam line C of car J by couplings S and O. The control valve of a stationary steam supply in the yard is indicated at R, and Q is a coupling for connecting this yard supply with a coupling S of the steam line C on the car.

The operation of the heating system is as follows: When the locomotive is connected up with the train, the signal line receives air pressure, which, exerted against piston 12 causes valve 3 of the throttle device E to be opened and full steam pressure applied to the radiator through pipes F and F'. The radiator may have in addition its own regulating means, either automatic or manual (for illustration, a manually operated valve G is shown) whereby only so much of the heating medium passing valve 3 will enter the radiator as the adjustment or operation of such regulating device permits. When the car is disconnected from the locomotive, pressure in the signal line D will disappear and spring 14 will move valve 3 to a closing or throttling position as the case may be. Thereafter when the train steam pipe B of the car is coupled up with the yard or terminal steam supply pipe R, the radiator will receive only such an amount of steam as can pass valve 3.

The described embodiments of the present invention have been chosen merely for the purpose of illustration. Many modifications will occur to those skilled in the art. It is intended in this patent to cover all such modifications that fall within the scope of the present invention as defined by the appended claims.

I claim:

1. In combination with a railway car, a heating device located in the car, a supply pipe leading thereto and adapted to be connected to a source of supply of heating medium, a pipe adapted to be connected with a source of supply of pressure fluid, and a governing device for controlling the supply of medium from the source of supply to the heating device having a port and comprising automatic means whereby said port is restricted without being closed on the disappearance of pressure fluid in said last named pipe and is opened to a greater extent when said pipe is put under pressure.

2. In combination with a railway car, a heating device located in the car, a supply pipe leading thereto and adapted to be connected with a source of supply of heating medium, a pipe adapted to be connected with a source of supply of pressure fluid, a valve for controlling the flow of heating medium to the heating device, means whereby, in the absence of pressure in said last named pipe, said valve may be set to an intermediate open position, and automatically operating means whereby when said last named pipe is put under pressure, the valve is moved to its fully opened position.

3. In combination with a railway car and the steam train pipe, and the air signal line of the car, a heating device in the car, a valve to control the flow of steam from the train pipe to the heating device, and governing means for the valve whereby, in the absence of pressure in the air signal line, said valve will assume a closed position or may be set to an intermediate open position, and a pressure actuated device subject to pressure in said air signal line for moving said valve to its fully opened position.

4. In combination with a radiator of the heating system, and the compressed air system of a railway car, a valve for controlling the introduction of heating medium into said radiator, the movements of which are effected through the presence or absence of pressure in a portion of said compressed air system, and means operable in the absence of pressure in said portion of the compressed air system for operating said valve, which means is made ineffective when pressure is returned to said portion of the compressed air system.

5. In combination with a railway car, a heating device located in the car, a supply pipe leading thereto and adapted to be connected with a source of supply of heating medium, a pipe adapted to be connected with a source of supply of pressure fluid, a valve for controlling the flow of heating medium to the heating device, means whereby, in the absence of pressure in said last

named pipe said valve may be set to an open position, and automatically operating means whereby when said last named pipe is put under pressure, the position of said valve is thereafter made dependent upon the disappearance of pressure from and the introduction of pressure into said pipe.

6. In combination with a railway car, a heating device located in the car, a supply pipe leading thereto and adapted to be connected with a source of supply of heating medium, a pipe adapted to be connected with a source of supply of pressure fluid, a valve for controlling the flow of heating medium to the heating device, means whereby, in the absence of pressure in said last named pipe, said valve may be set to an intermediate open position or to a closed position, and automatically operating means whereby, when said last named pipe is put under pressure, said valve is moved to its fully open position.

7. In combination with a railway car, a heating device located in the car, a supply pipe leading thereto and adapted to be connected with a source of supply of heating medium, a pipe adapted to be connected with a source of supply of pressure fluid, a valve for controlling the flow of heating medium to the heating device, means whereby, in the absence of pressure in said last named pipe, said valve may be set to an intermediate open position or to a closed position, and automatically operating means whereby, when said last named pipe is put under pressure, said valve is moved to its fully open position and is thereafter moved in accordance with the disappearance of pressure from and the introduction of pressure into said last named pipe.

8. In combination with the steam train pipe and compressed air system of a railway car, a steam heating device in the car, a valve to control the flow of steam from the train pipe to the heating device, means whereby, in the absence of pressure in a part of the compressed air system, said valve may be set to a position which restricts the flow of steam to said heating device, and automatically operating means made effective when pressure exists in said part of the compressed air system for moving said valve in the opening direction.

9. In combination with the steam train pipe and air signal line of a railway car, a heating device in the car, a valve to control the flow of steam from the train pipe to the heating device, and governing means for the valve whereby, in the absence of pressure in the air signal line, said valve will assume a closed position or may be set to an intermediate open position, and a pressure actuated device subject to signal line air pressure to govern the movements of said valve in accordance with the disappearance of pressure from the air signal line and the introduction of pressure thereinto.

10. In combination with a railway car, a radiator therein, an air train pipe, a steam train pipe, a valve to control the flow of steam from the steam train pipe to the radiator, and a device actuated when said air train pipe is put under pressure above atmospheric pressure to move the valve to a fully open position, and, when the pressure in the air train pipe is reduced to atmospheric pressure, to move the valve to a position restricting the flow of steam to the radiator.

11. In combination with a radiator, a supply pipe for heating medium and the compressed air system of a railway car; a valve for controlling the flow of heating medium from said supply pipe to said radiator, the movements of which are effected through the presence or absence of pressure in a portion of said compressed air system; and means operable manually in the absence of pressure in said portion of the compressed air system for setting said valve, which means is made ineffective when pressure is returned to said portion of the compressed air system.

12. In combination with a radiator, a supply pipe for heating medium and the compressed air system of a railway car; a valve controlling the flow of heating medium from said supply pipe to said radiator, which is opened and closed in response to appearance and disappearance of pressure in a portion of said compressed air system; and means operable in the absence of said pressure for moving said valve to an open position which means is made ineffective on reappearance of said pressure.

13. In combination with a radiator, a supply pipe for heating medium, and the compressed air system of a railway car; a valve controlling the flow of heating medium from said supply pipe to said radiator, which is opened and closed in response to appearance and disappearance of pressure in a portion of said compressed air system; and means operable manually in the absence of said pressure for moving said valve to an intermediate open position, which means is made ineffective on reappearance of said pressure.

14. In combination with a heating device, a source of supply of heating medium, a valve to control the supply of heating medium from said source of supply to the heating device and a conduit adapted under determined conditions to contain a pressure fluid; means governed by pressure in the conduit for moving said valve in response to changes of pressure in said conduit; and means operable only during the absence of

pressure in the conduit for moving said valve, which means is made ineffective when pressure reappears in said conduit.

15. In combination with a heating device, a source of supply of heating medium, a valve to control the supply of heating medium from said source of supply to the heating device and a conduit adapted under determined conditions to contain a pressure fluid; means governed by the presence and absence of pressure in the conduit for causing the valve to be opened and closed, respectively; and means operable during the absence of such pressure for setting the valve to an open position, which means is made ineffective on return of said pressure.

In witness whereof, I have hereunto subscribed my name.

WILLIAM L. BLISS.