

(No Model.)

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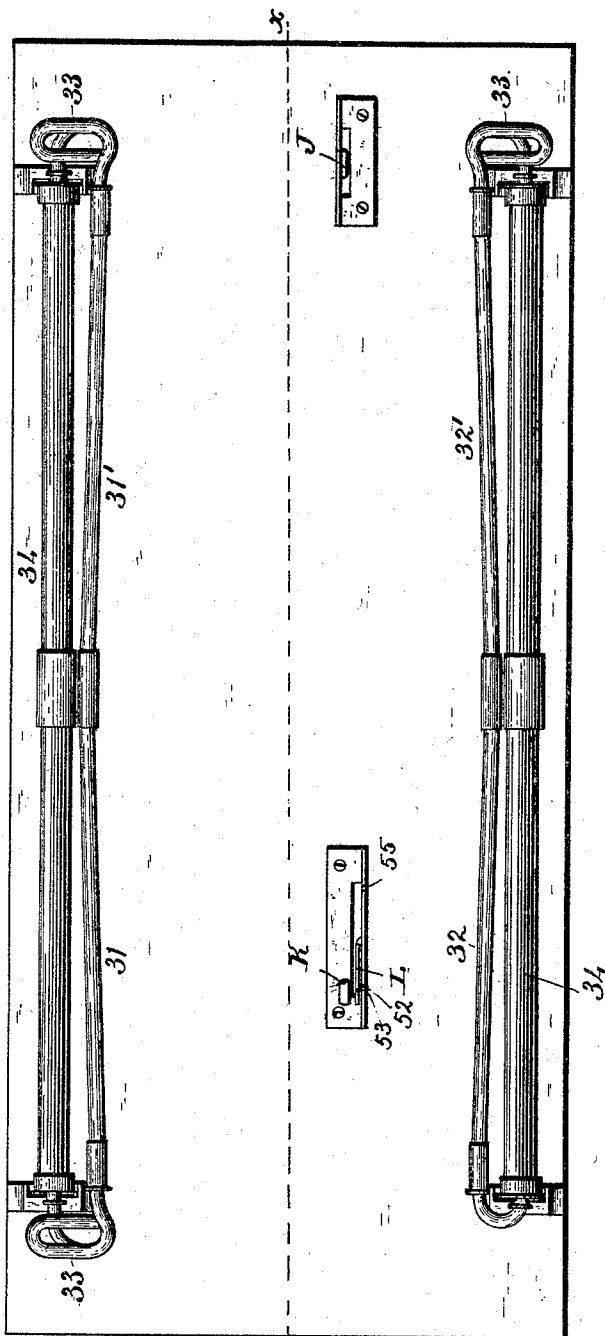
C. B. GRIM.

SYSTEM OF DISTRIBUTING STEAM FOR HEATING RAILWAY CARS.

No. 495,612.

Patented Apr. 18, 1893.

FIG. 1



ATTEST.

J. Henry Kaiser
H. E. Hay

INVENTOR.

Charles B. Grim,

By

J. M. Vale

Attorney

(No Model.)

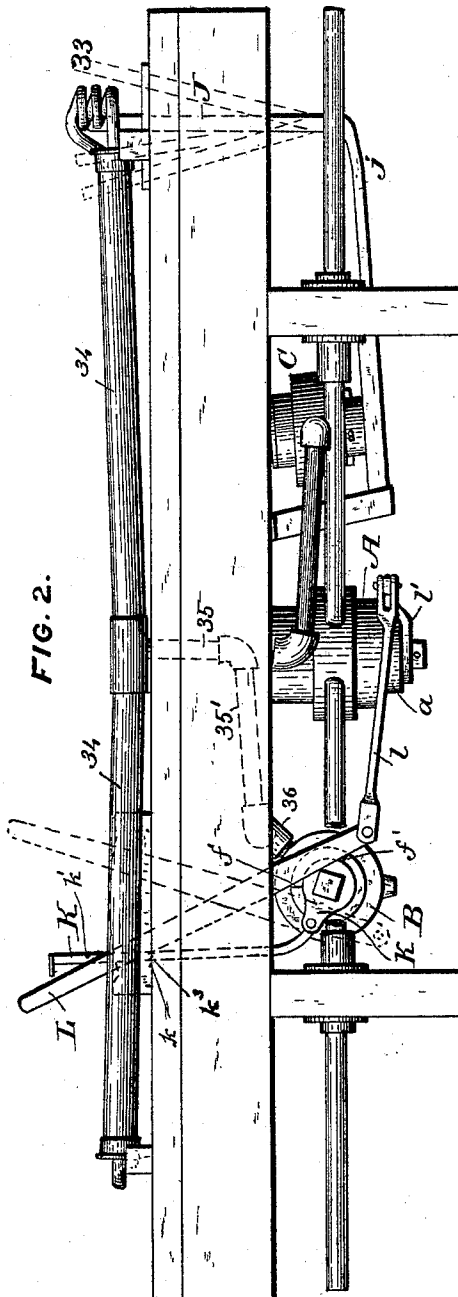
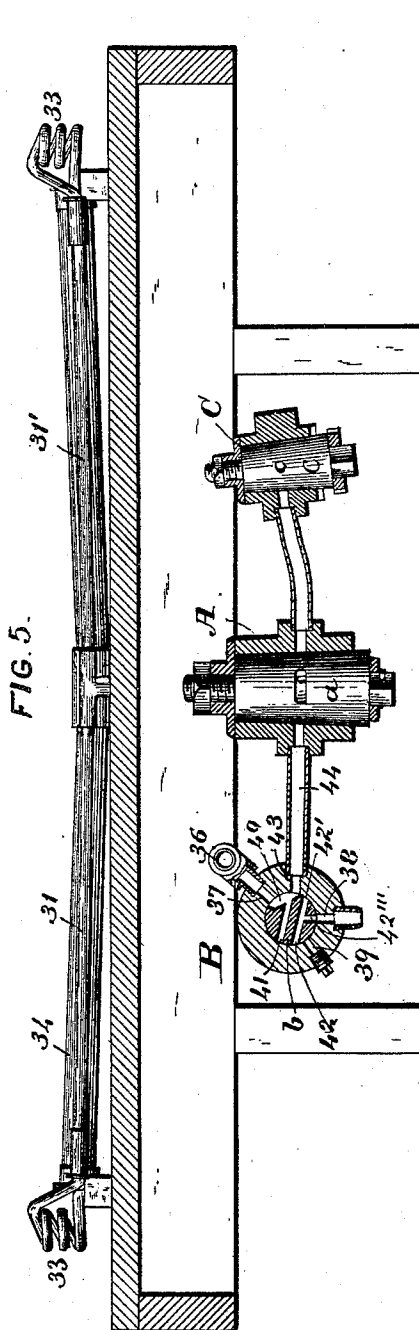
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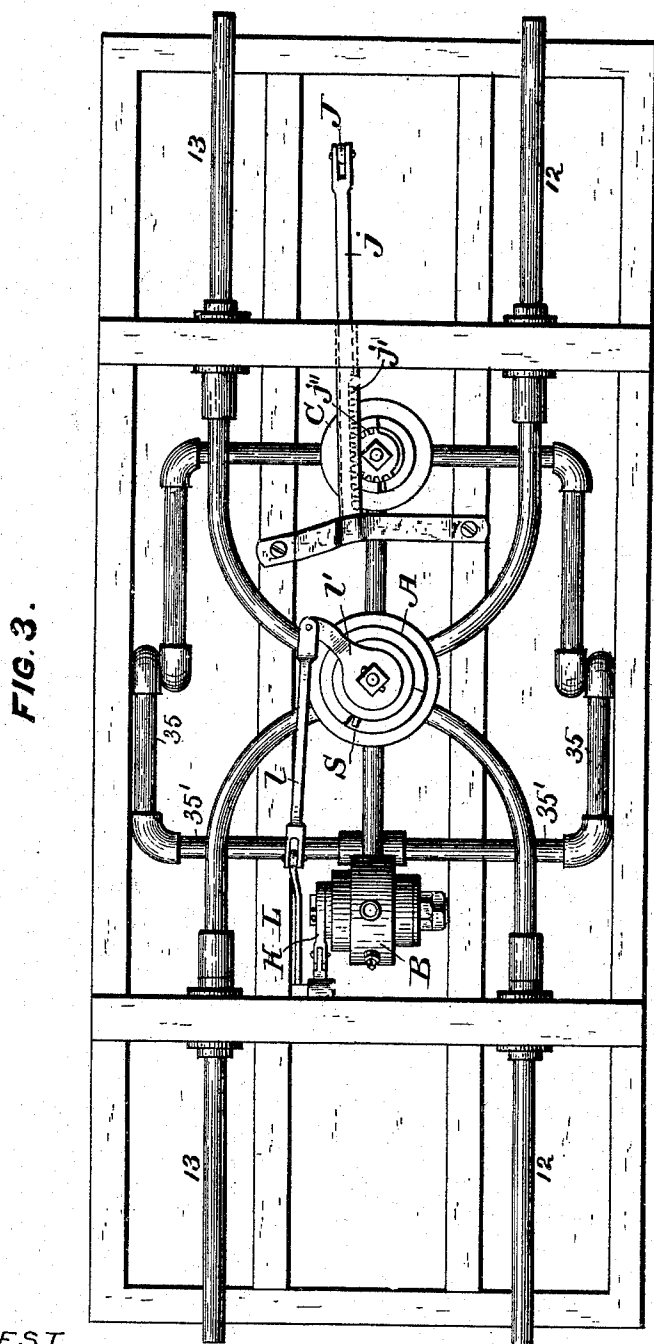
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(No Model.)

5 Sheets—Sheet 4.

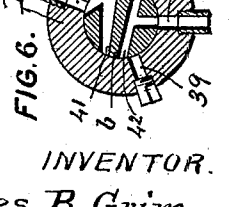
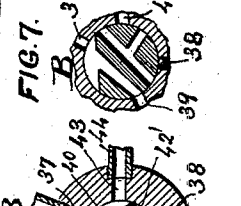
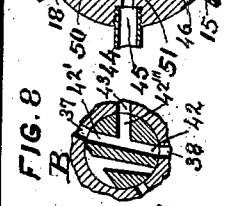
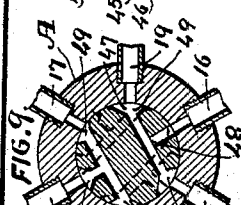
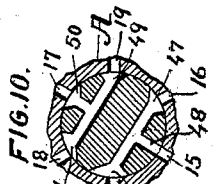
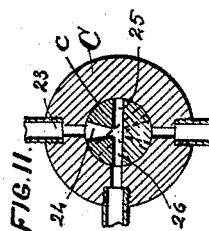
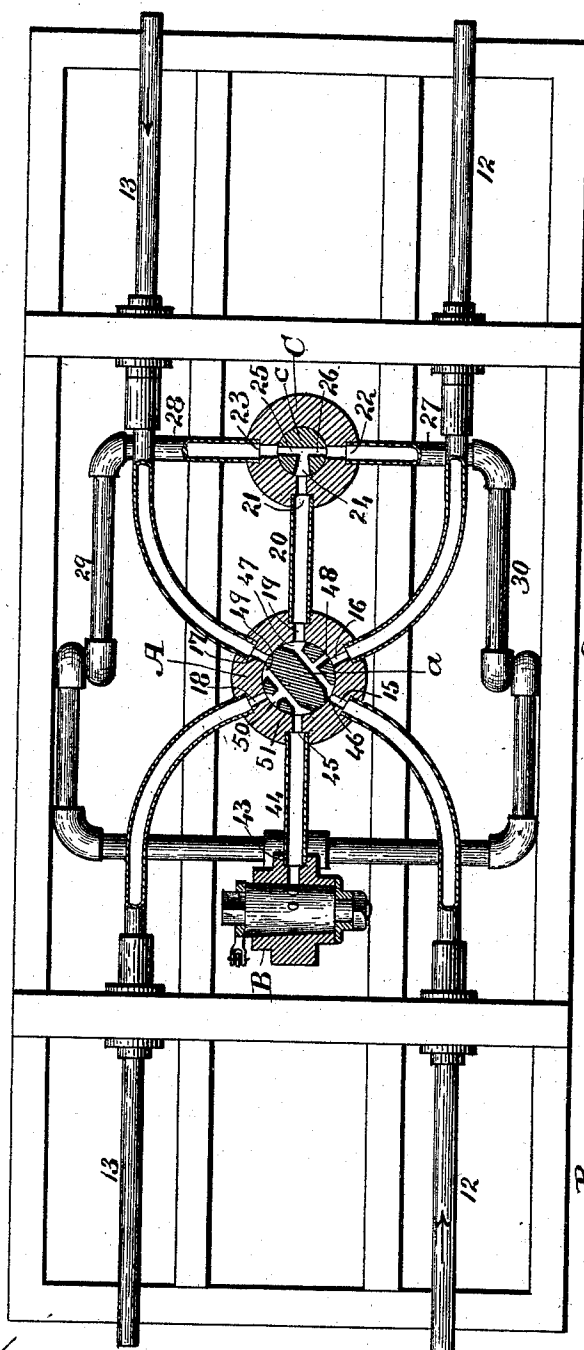
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FIG. 4.



ATTEST.

J. Henry Kaiser.
H. E. Hay.

By

Charles B. Grim,

J. M. Hale

Atty.

(No Model.)

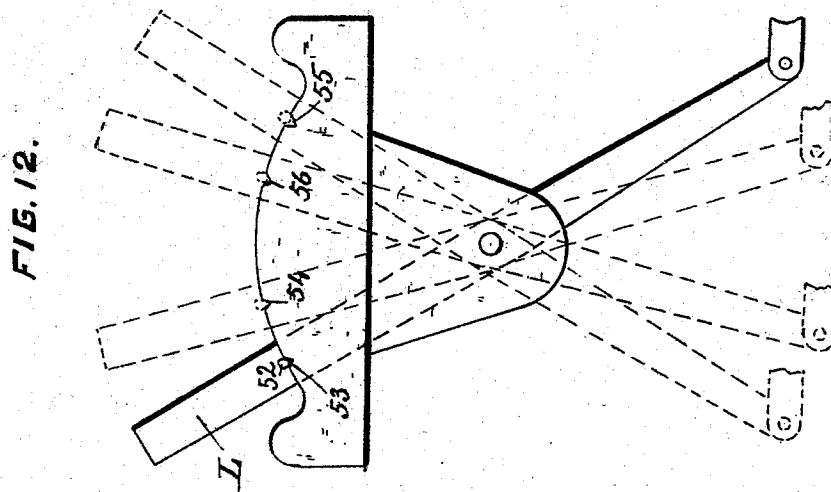
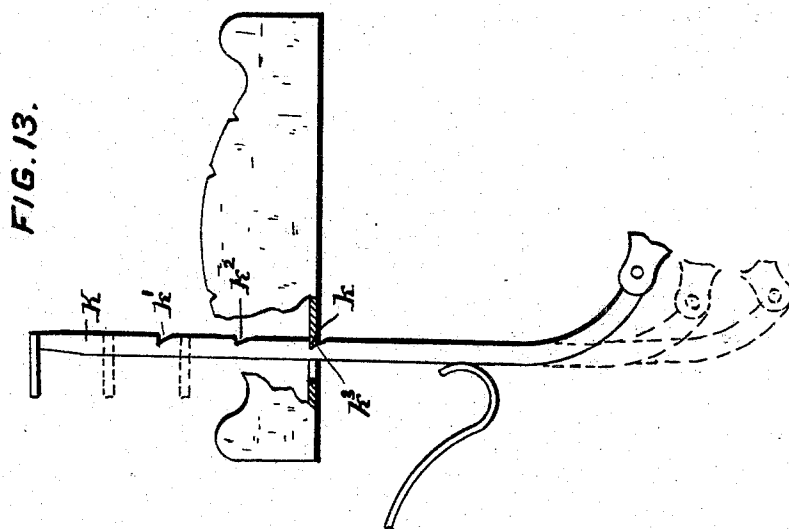
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ATTEST.
J. Henry Kaiser
H. E. Hay.

INVENTOR.
Charles B. Grim,
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ATTY.

UNITED STATES PATENT OFFICE.

CHARLES B. GRIM, OF POTTSVILLE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF
TO FRANK L. LAMONT AND CHARLES STERNER, OF SAME PLACE.

SYSTEM OF DISTRIBUTING STEAM FOR HEATING RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 495,612, dated April 18, 1893.

Application filed July 21, 1892. Serial No. 440,842. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. GRIM, a citizen of the United States, residing at Pottsville, in the county of Schuylkill and State of Pennsylvania, have invented certain new and useful Improvements in Systems of Distributing Steam for Heating Railway-Cars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to provide a system for heating rail-way cars from the locomotive by steam, first, when the locomotive is provided with a vacuum pump to secure the return of the steam, which may properly be termed a return system, and second, when the locomotive is not so supplied, the steam being permitted to escape into the open air after passing through the radiator pipes, which may be termed the direct system.

It is also among the objects of my invention, when either the return or direct system, as above defined, be employed, to confine the heat to any particular car or cars composing the train wholly cutting the heat off from any desired car, to heat one or both sides of any car as may be desired, to apply the heat from either end of the car so that in making up trains either end of a car may be nearest the locomotive or source of steam supply, to quickly drain the parts when not in use and to afford a minimum opportunity for freezing within the steam passages and pipes; and I attain these objects by the mechanical means hereinafter described and claimed.

In the drawings, Figure 1 is a top plan view of my device. Fig. 2 is a side elevation thereof. Fig. 3 is a bottom plan view thereof. Fig. 4 is a bottom plan view partly in section. Fig. 5 is a longitudinal section through line $x-x$ of Fig. 1. Figs. 6, 7 and 8 are details of valve B. Figs. 9 and 10 are details of valve A. Fig. 11 is a detail of valve C. Figs. 6, 9 and 11 are enlarged views. Fig. 12 is a detail of the lever L. and its detents, and Fig. 13 is a detail of the lever K. and its detents.

Like characters of reference indicate the same parts throughout the several views.

My mechanism for supplying the live steam

to the various cars throughout the train or for conducting the condensed steam on its return to the locomotive as the case may be and as will be more fully hereinafter described, consists of the pipes 12 12 and 13 13, a distributing six-way valve A, located approximately beneath the center of the car, the pipes being connected to the valve A at the ports in the valve casing, 15 16 17 18, the distributing six-way valve A, having the ports 19 and 45 in addition to the ports 15 16 17 and 18, and the valve core a having ports 46 47 48 49 50 and 51 with communicating ways between the core ports in groups of three, the ways being upon the same horizontal plane. Flexible tubes connect the ends of pipes 12 12 and 13 13 with the ends of similar pipes in abutting cars in a manner well known to those skilled in the art thus forming continuous steam passages from the locomotive to the rear of the train throughout the entire extent of the train.

Steam is supplied from pipes 12 12 or 13 13 as the case may be to each car by means of the pipe 20 connected at one end with the distributing valve casing at the port 19 of the valve casing and at the opposite end with port 21 in the valve casing of the three-way supply valve C. The three-way supply valve C has ports 21 22 and 23 in its casing and is supplied with the valve core c having ports 24 25 and 26. The supply of steam to each car is regulated by means of the three-way valve C in the manner hereinafter more fully described.

The pipes 27, 28, 29 and 30 with their connections are for the purpose of carrying the live steam to the pipes 31 31' and 32 32' respectively, (Fig. 1) which supply the radiators 33 located in three of the corners of the car and the radiating pipes 34 34 located on each side of the car. I do not show a radiator in one of the corners of the car because one corner is usually occupied by a closet; of course radiators may be located wherever required for convenience or to afford the necessary radiating surface; the system of radiators do not form a distinct element in my invention.

I supply the pipes 35 35' and 36 (Figs. 2, 3 and 5) for the return of the steam or condensed steam to the drip-valve B.

The drip-valve B (Fig. 5) has ports 37, 38,

39 and 43 in its casing and ports 40, 41, 42, 42' and 42''' in its core *b*. The pipe 44 connects the drip-valve B. and the distributing valve A, extending from port 43 in the casing of the drip-valve B to port 45 in the casing of the distributing valve A.

The valve core *a* of the distributing valve A is operated as hereinafter described by the lever L. pivoted in the bottom of the car and is connected with the lever L. by the link *l* and valve core lever *l'*, shown best in Figs. 2 and 3.

The valve core *b* of the drip-valve B. is connected with the lever K. (Fig. 2) through the short lever *k* for the purpose of operating this valve core as hereinafter more fully described.

The valve core *c* of the supply valve C is connected with the lever J, pivoted in the bottom of the car, by means of the link *j* for the purpose of operating the valve core *c* in the manner more fully hereinafter described (see Figs. 2 and 3). The connection of the link *l* with valve core *a* of valve A is made through the valve-core lever *l'*; the connection between the link *j* and the core *c* of valve C is made through the rack and pinion *j'* and *j''*, as shown best in Fig. 3. These connections of the levers with the valve cores are all well known to the art. The levers L K and J are respectively provided with suitable detents to hold them securely in a desired position.

The operation of my mechanism is as follows: When the steam enters the six-way distributing valve A from the locomotive in the direction of the arrow, through the pipe 12, Fig. 4, the locomotive being nearest the end of the car represented by the left hand of the drawings, the return system being in operation and the car being the last car of the train, lever L will be thrown to its extreme left hand movement, the detent 52 upon the lever L engaging the notch 53, as shown best in Fig. 12, and the valve core *a* of valve A will occupy the position shown in Fig. 4, that is to say port 46 of the valve core *a* will be opposite port 15 of the valve casing of valve A and port 47 of the valve core *a* will be opposite port 19 of the valve casing, the parts of pipes 12 and 13 to the right of the distributing valve A, and, as now considered, leading to and from the rear of the train, being cut off; the steam will therefore pass only through the way in the valve core leading from port 46 to port 47, thence by port 19 in the valve casing into pipe 20 and thence through the three-way supply valve C into the radiating pipes of the car; if the car be not the last car of the train and it is desired to permit the steam to pass into a car farther to the rear, then the lever L must be moved to the right until the detent 52 upon this lever engages with the notch 54 thereby changing the position of the distributing valve core *a*, as shown in positive lines in Fig. 9, so

that without affecting the passage of steam through ports 15, 46, 47 and 19 the steam will also be permitted to pass through ports 48 and 16 rearwardly and on its return passage to pass through the ports 17, 49, 50 and 18, by way of pipe 13. If the locomotive be attached to the opposite end of the car, that is to the end represented by the right hand of the drawings, Fig. 4, the car being the rear car of the train, the lever L should be thrown to its extreme right hand movement when the detent 52 will engage with notch 55; the core of distributing valve A will then be brought into position as shown in dotted line in Fig. 9 so that its ports will permit the passage of live steam from pipe 13 through port 17 in the valve casing, ports 50 and 49 in the valve core and port 19 leading to the pipe 20 which connects with the three-way supply valve C; in this position the portions of the pipes 13 and 12 to the left of the distributing valve A, Fig. 4, will be cut off, cutting off the rearward passage of steam; but if it should be desired to carry steam to rearward cars or cars to the left of valve A in the position now being considered the locomotive being on the right, the lever L should be moved to the left so that detent 52 engages with notch 56 when the position of the valve core in valve A will be changed as shown in Fig. 10 to permit the passage of live steam rearwardly through ports 51 of the valve core and 18 of the valve casing and return through ports 15 and 16 of the valve casing and ports 48 and 47 of the valve core, the passage of steam through ports 17, 50, 49 and 19 being undisturbed.

When steam has entered through pipe 20 into the supply valve C through port 21 in the casing of valve C and port 24 of the core of valve C, it will be distributed to the car through ports 25 and 26 of the valve core and ports 23 and 22 of the valve casing and the connecting pipes; when the ports of the core *c* of valve C are in the position shown in Fig. 4, being the position just described, it is plain both sides of the car will receive steam; the lever J should then be in a vertical position as shown in Fig. 2 partly in dotted lines; if it should be desired to heat only the side of the car supplied by the steam through the port 23 of the valve casing then the lever J should be thrown to its extreme right hand movement bringing the port 26 of the valve core *c* opposite port 21 of the valve casing of valve C and port 24 of the valve core opposite port 23 of the valve casing as shown in positive lines in Fig. 11; to heat only the side of the car supplied with steam through port 22 of the valve casing of valve C the lever J should be carried to its extreme left hand limit, as shown in the drawings in dotted lines, thereby changing the position of the ports in the valve core *c* so that port 23 of the valve casing will be cut off and port 25 of the valve core will be brought opposite port 21 of the valve casing and port 24 of the valve core will be brought

opposite to port 22 of the valve casing as shown in dotted lines in Fig. 11; if it be desired to cut the steam entirely off from all the radiators of the car the lever J should be moved intermediate between its vertical position and its extreme right hand or left hand movement changing the position of the valve core *c* so that neither of its ports will be opposite port 21 of the valve casing. The operation of the supply valve C is the same whether the direct or return system be in use.

When the return system is in use the core *b* of the drip valve B which is actuated by the lever K, is in the position shown in Fig. 5 and the lever K is in the position shown in Fig. 2 the vertical lever K being held in the upper notch *k*³ by the detent *k*, shown also in Fig. 13 the condensed steam will then be drawn by the exhaust pump on the locomotive through the port 37 in the valve casing of valve B the enlarged port 40 in the valve core *b* the port 43 in the valve casing of valve B and the pipe 44 leading to the distributing valve A, through port 45 in the casing of distributing valve A and then in the direction of the locomotive by the ports and pipes heretofore described, as shown in Figs. 4 and 6. But when the direct system is employed the position of the vertical lever K will be changed so that it will be held in the center notch *k*² by the detent *k* and the core *b* of valve B will be changed so as to bring port 41 in the valve core opposite port 39 in the valve casing affording free opportunity for the escape of the condensed steam into the open air as shown in Fig. 7. Port 43 in the valve casing of valve B will be then cut off, but the enlarged port 40 will still be in position to admit the condensed steam from the valve casing and its connected pipe through port 37.

To drain or blow out the system, the lever K should be pushed down so that its upper notch *k*¹ will be held by the detent *k*, bringing the core *b* of valve B into position so that port 42' of the valve core *b* will be opposite to port 37 of the valve casing of valve B port 42'' will be opposite port 43 of the valve casing and port 42 of the valve core will be opposite to port 38 of the valve casing as shown in Fig. 8; drainage will then result by gravity, the ports leading to the radiators being open, but if desired the system may be cleared by blowing out. By the construction of the distributing valve A, the supply valve C and their connections as herein shown there is no point at which water or condensed steam will settle and afford opportunity to greatly obstruct the passages by freezing and when such freezing occurs during the idleness of a car as it may do to a limited extent, live steam may be quickly driven through all the ports; the contact of the hot steam with the valve cores operating to quickly relieve the slight freezing that is possible. I reserve the construction of my six-way valve A as the sub-

ject for a separate application for Letters Patent.

Having thus described my invention, I claim—

1. In a system of distributing steam heat to rail-way cars, steam supply and return pipes to carry the steam from its source of supply to the desired radiating surface and return the same either to the supply source or to an exhaust port, in combination with a valve having multiplex ports in its casing and channels in its core for the purpose of distributing steam to its attached car, and to one or more additional cars in the same train the source of steam supply being at either end of the car to which said valve is attached and a valve having channels in its core and ports in its casing adapted to permit the return of the steam to its source of supply or the exhaust of the steam into the open air, substantially as described.

2. In a system of distributing steam heat to rail-way cars, steam supply and return pipes to carry the steam from its source of supply to the desired radiating surface and return the same either to the supply source or to an exhaust port, in combination with a valve having multiplex ports in its casing and channels in its core for the purpose of distributing steam to its attached car, and to one or more additional cars in the same train the source of steam supply being at either end of the car to which said valve is attached, and a valve having channels in its core and ports in its casing adapted to permit the admission of steam to both sides of a car or to either side of the car, or to wholly exclude the steam from the car, substantially as described.

3. In a system of distributing steam heat to rail-way cars, steam supply and return pipes to carry the steam from its source of supply to the desired radiating surface and return the same either to the supply source or to an exhaust port, in combination with a valve having multiplex ports in its casing and channels in its core for the purpose of distributing steam to its attached car and to one or more additional cars in the same train the source of steam supply being at either end of the car to which said valve is attached and to return the steam to its supply source or to an exhaust port, as and for the purposes described.

4. In a system of distributing steam heat to rail-way cars, steam supply and return pipes to carry the steam from its source of supply to the desired radiating surface and return the same either to the supply source or to an exhaust port, in combination with a valve having multiplex ports in its casing and channels in its core for the purpose of distributing steam to its attached car and to one or more additional cars in the same train the source of steam supply being at either end of the car to which said valve is attached and to return the steam to its supply source or to

an exhaust port, and a lever mediatly connected with the valve core to operate the core, substantially as described.

5 5. In a system of distributing steam heat to
rail-way cars, steam supply and return pipes
to carry the steam from its source of supply
to the desired radiating surface and return
the same either to the supply source or to an
exhaust port, in combination with a valve
10 having multiplex ports in its casing and chan-
nels in its core for the purpose of distribut-
ing steam to its attached car, and to one or
more additional cars in the same train the
source of steam supply being at either end
15 of the attached car, and a valve having chan-
nels in its core and ports in its casing adapted
to permit the return of the steam to its source
of supply or the exhaust of the steam into the
open air and levers mediatly connected with
20 the valve cores to operate the cores, substan-
tially as described.

6. In a system of distributing steam heat to
rail-way cars, steam supply and return pipes

to carry the steam from its source of supply
to the desired radiating surface and return 25
the same either to the supply source or to an
exhaust port, in combination with a valve
having multiplex ports in its casing and chan-
nels in its core for the purpose of distribut-
ing steam to its attached car, and to one or 30
more additional cars in the same train the
source of steam supply being at either end
of the attached car, and a valve having chan-
nels in its core and ports in its casing adapted
to permit the admission of steam to both sides 35
of the car or to either side of the car, or to
wholly exclude the steam from a car, and le-
vers mediatly connected with the valves cores
to operate the cores, substantially as described.

In testimony whereof I affix my signature in 40
presence of two witnesses.

CHARLES B. GRIM.

Witnesses:

CHAS. E. STEMEN,
JOHN MCGURL.