

(No Model.)

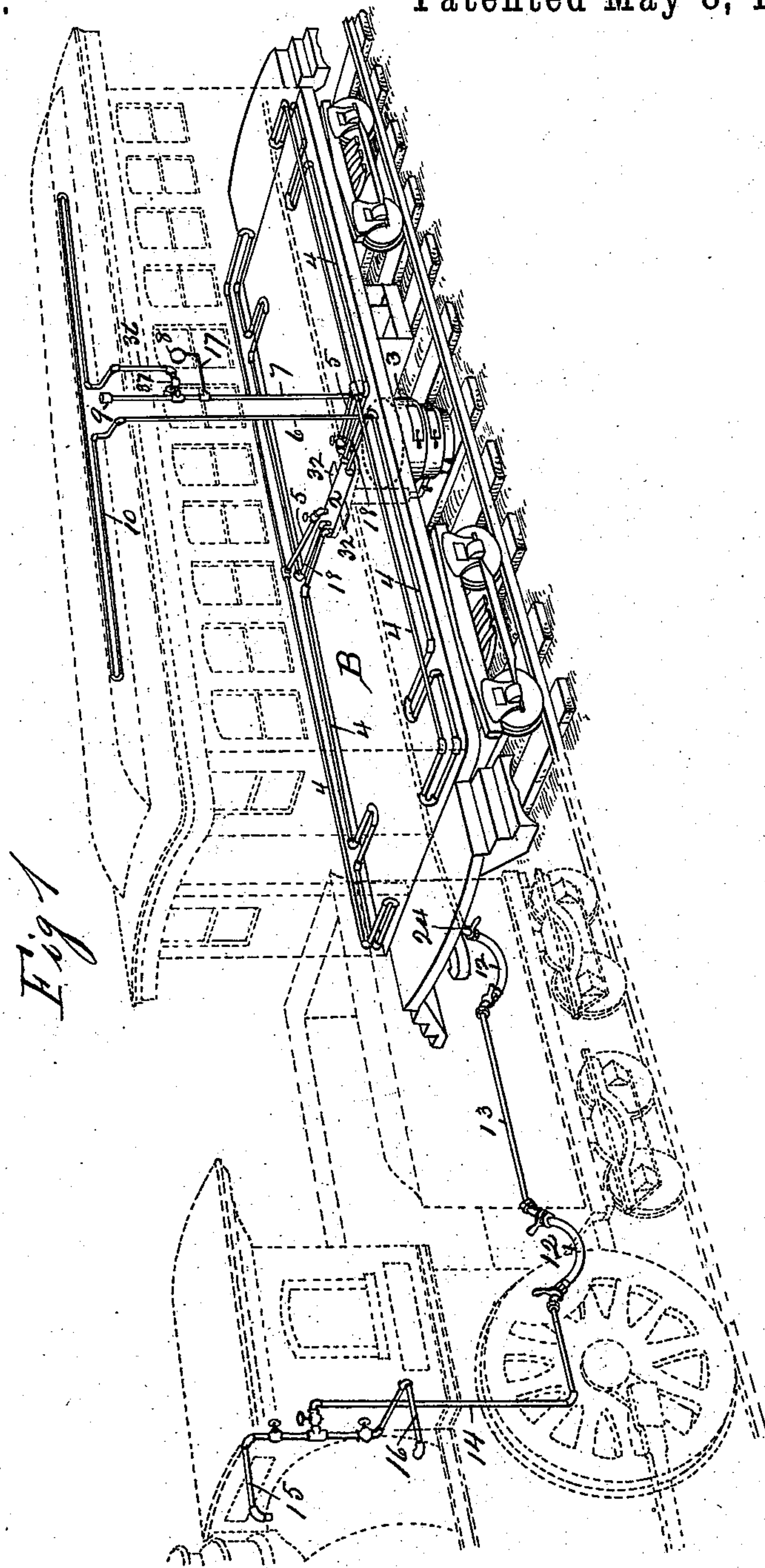
2 Sheets—Sheet 1.

J. EMERSON.

STEAM HEATING APPARATUS FOR RAILWAY CARS.

No. 382,596.

Patented May 8, 1888.



Witnesses
Wm. T. Chapin
L. M. Chamberlain.

Inventor
James Emerson
By his Attorneys
Chapin & Co.

(No Model.)

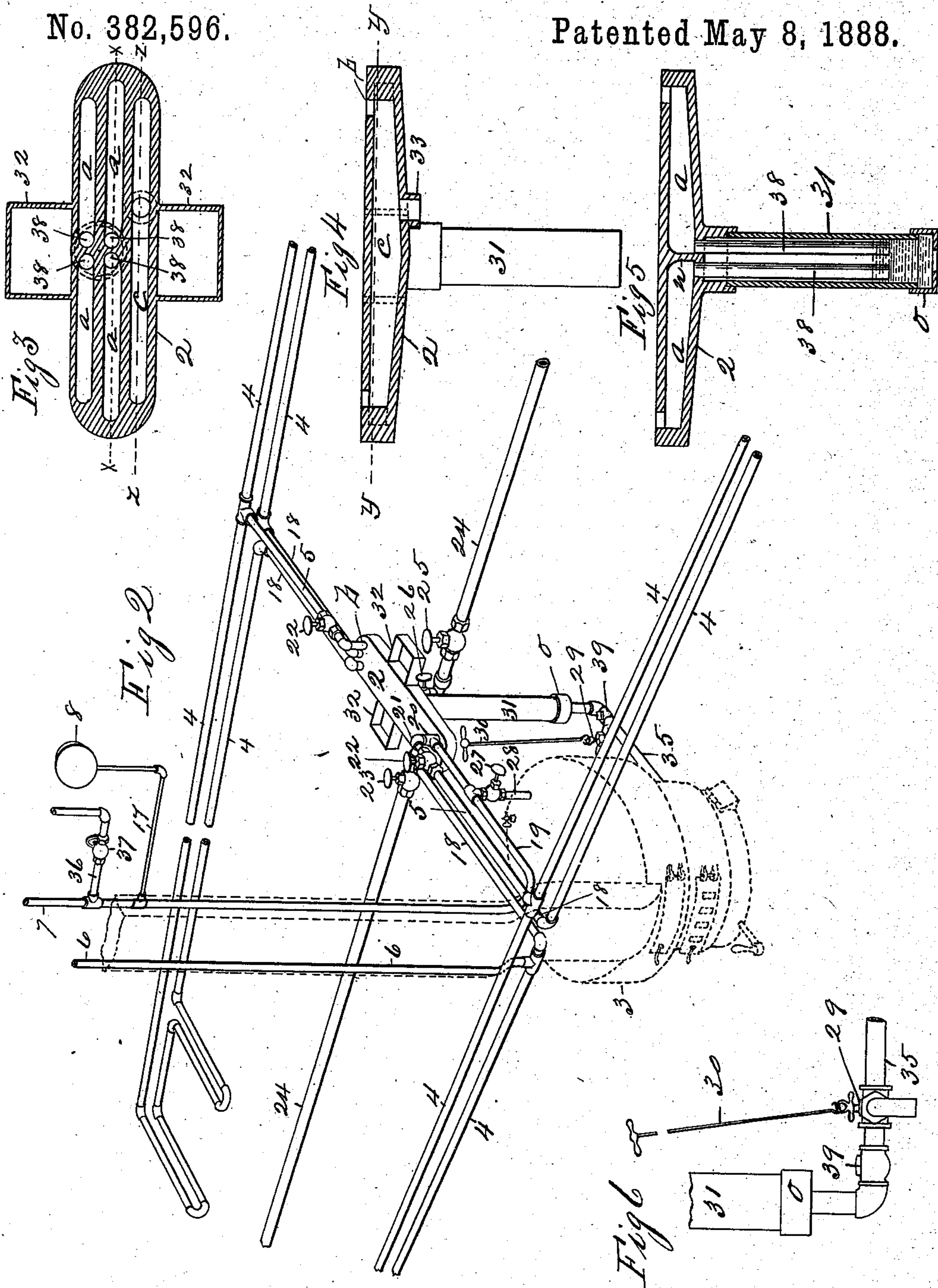
2 Sheets—Sheet 2.

J. EMERSON.

STEAM HEATING APPARATUS FOR RAILWAY CARS.

No. 382,596.

Patented May 8, 1888.



Witnesses.

Wm H Chapin
G. M. Chamberlain.

Inventor.

James Emerson.

By his Attorneys

Chapin & Co

UNITED STATES PATENT OFFICE.

JAMES EMERSON, OF SPRINGFIELD, MASSACHUSETTS.

STEAM-HEATING APPARATUS FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 382,596, dated May 8, 1888.

Application filed October 17, 1887. Serial No. 252,589. (No model.)

To all whom it may concern:

Be it known that I, JAMES EMERSON, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Steam-Heating Apparatus for Railway-Cars, of which the following is a specification.

This invention relates to steam-heating devices for railway-cars, the object being to provide improved pipe-connections both for heating circulations and drips; and the invention consists in the peculiar construction and arrangement of a steam and condensation receiver, combined with the heating and drip pipes of a car, and with a main to convey steam from the engine thereto, and with a steam-boiler on the car, all as hereinafter fully described, and pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a perspective view showing in full lines the floor of a car and in dotted lines the upper part thereof and a portion of the engine and a tender having applied thereto steam-pipes and apparatus connected therewith embodying my improvements. Fig. 2 is a perspective view of said steam and condensation receiver and a portion of the steam-heating pipes of a car connected therewith, a boiler and its chimney being indicated in dotted lines in said figure. Fig. 3 is a horizontal section of said receiver on the line yy , Fig. 4. Fig. 4 is a vertical section of said receiver on the line zz , and Fig. 5 on the line xx , Fig. 3. Fig. 6 is a detail part in side elevation, hereinafter fully described.

In the drawings, B, Fig. 1, indicates the floor of a railway-car, the outlines of the body of the car and the roof being there indicated in dotted lines. A receiver, 2, cast from brass or other suitable metal, having a body of oblong form, as shown, is let into the floor of the car either flush with or slightly beneath the level of the floor, as may be preferred, in the position shown in Fig. 1. Said receiver, which is so designated because it, as hereinafter described, receives and distributes the live steam for warming the car and the water of condensation from the circulating-pipes therein, has on its under side a pending cylindrically-shaped pocket, 31, consisting of a tube screwed thereto, as shown, on the lower end of which is screwed a cap, o , which extends through the floor of the car, as indicated in Fig. 1. On the

under side of the receiver, near the junction of said pocket and the body of the receiver, is a hub, 33, into which the live-steam-pipe connection is screwed, said hub opening into a longitudinal groove or chamber, c , in the receiver. The said cylindrical pocket 31 is located under the longitudinal grooves or chambers a (four in number) in the receiver, and each of said chambers is separately connected with the pocket 31 by a tube, 38, which is screwed or otherwise rigidly secured to the bottom of the receiver and extends downward in said pocket nearly to the bottom of the latter, as shown in Fig. 5. The walls of said chambers a and the transverse partition n (see Fig. 5) separate said four chambers.

On the opposite sides of the body of the receiver are cast two laterally-extending frames, 32, which constitute the lining and borders of two openings which are made down through the floor of the car and which communicate with the interior of said frames, the purpose of the latter and of said openings being to provide suitable chambers through the floor of the car to receive the upper ends of any operating-rods that may be connected with any of the valves of the circulating-pipes under the floor of the car, said frames 32 being provided in practice with any suitable covers for closing them.

An auxiliary boiler, 3, is suitably supported under the floor of the car in the position shown in Fig. 1, said boiler being indicated in dotted lines in Fig. 2. The lower end of the said pocket 31 of the receiver 2 is connected with the water-space of said boiler by a pipe, 35, one end of which is connected to said cap o , and through said pipe the water of condensation runs from said pocket into the boiler. A blow-off cock, 29, is connected in said pipe 35, and has an operating-rod, 30, connected thereto, said rod being arranged in practice so that it can be reached from the interior of the car to turn said cock and discharge water from the boiler or from said pocket, and consequently from the circulating-pipes of the car, which are connected to the receiver, as below described. A check-valve, 39, (see Fig. 6,) is connected in said pipe 35, and acts to prevent any flow of water from boiler 3 into the pocket 31, and thence to the circulating-pipes connected with the receiver 2.

The chief reliance for steam for warming a

car or cars having steam-pipes and connecting devices such as are herein shown and described is upon the engine of the train, the rear end of which is indicated in dotted lines in Fig. 1. A steam-pipe, 14, Fig. 1, has its upper end connected with the boiler of the locomotive by two branches, 15 and 16, branch 15 being connected with the steam-space of the boiler and branch 16 below the water-line of the boiler, suitable valves being connected in said branches and at the junction of the latter with the pipe 14 to permit either live steam or hot water to enter said pipe 14 from the boiler; but hot water is not drawn from the boiler for the purpose of warming the cars, but may be drawn therefrom into said auxiliary boiler, when required, under certain conditions, as below described. The said pipe 14 has one end connected through suitable flexible couplings, 12, and a conducting pipe or pipes, 13, with a supply-pipe, 24, under each car, as indicated by dotted lines in Fig. 1, said pipe 24 being shown in full lines in Fig. 2.

The pipes 24 of all of the cars of a train, together with their uniting flexible couplings 12, constitute a main steam-conduit to convey live steam from the boiler of the engine through the train, from which is drawn the requisite steam for each car to warm the same through the circulating-pipes below described. The said steam-conduit 24 has under each car a branch extending therefrom, which is connected with the hub 33 of said receiver 2, in which branch is a valve, 26, which is operated to admit steam from the conduit 24 into the chamber *c* in said receiver, or to shut off said steam-supply from said chamber. Stop-valves 23 and 25 are connected in said conduit 24 each side of the receiver 2, to provide means for cutting off said conduit from the receiver on each side of the latter.

The pipes of the car through which steam is made to circulate for warming the same are indicated by 4, said pipes running along the sides of the car, as shown, and having the usual loops formed therein extending in the ordinary way toward the center of the car. Said pipes 4 in the drawings, which run along the sides of the car, are shown one above the other, and the upper line of said pipes on one side of the car (see Fig. 2) is connected with one end of the chamber *c* of the receiver 2 by a branch pipe, 5, having a valve, 22, between the pipe 4 and said receiver, the end of said branch 5 between said valve and the receiver connecting directly with the latter at *b*, and live steam flows through this last-named branch 5 when valve 22 is open from chamber *c* of the receiver into the upper line, 4, of the circulation with which it is connected. At the opposite end of the receiver 2 a slightly different means of connection between the branch 5, at that end thereof, is adopted between the branch and said receiver, to accommodate an additional branch pipe, 19, hereinbelow described. Said difference of connection consists in connecting a T,

20, with the chamber *c* of the receiver, having an elbow, 21, on its upper end, to which is connected the valve 22, and with the latter is connected the branch pipe 5 between said valve and the upper line, 4, of the circulating-pipes on one side of the car. The upper line of the circulating-pipes 4 on the opposite sides of the car extends each way from its point of connection with said branch 5 toward the end of the car, and, from thence the pipe returns, forming the under line of the two pipes on each side of the car and arriving opposite the ends of the receiver 2. Branches 18 are connected to said lower lines and with the chambers *a a* at each end of the receiver, the latter-named chambers, as aforesaid, communicating with the condensation-pocket 31. There is, as shown in the drawings, an unobstructed communication between the circulating-pipes on each side of the car and the receiver 2, whereby the water of condensation from said circulations is permitted to flow freely into the receiver, and from each of chambers *a* therein through pipes 38 into said pocket.

The above-referred-to branch pipe 19 is connected into said T 20, and extends toward the side of the car under said branches 18 and connects with a vertical pipe, 7, whose upper end projects just above the roof of the car, and has an ordinary springsafety-valve, 9, attached thereto. Connected with said pipe 7 is a branch, 17, having on its end a steam-gage, 8, (indicated in Figs. 1 and 2,) and above said branch 17 is connected to said pipe 7 a condenser-circulation, 10, by a branch, 36, having a valve, 37, therein, extending along one side of the deck of the car-roof, as shown, the outlet of said condenser-circulation being connected by the vertical pipe 6 with one of the circulating-pipes 4 inside of the car near the point where one of said branches 18 leads from said circulating-pipe to one of chambers *a* in the receiver. In Fig. 2 one of said branches 18 (over the boiler 3) is only partly shown, owing to the fact that it runs under the branch 5 on that side of the car.

In Fig. 2 the chimney-flue leading upward from the boiler 3, there indicated, is shown in dotted lines. A branch pipe, 28, having a valve, 27, therein leads downward from said branch 19 and connects with the boiler 3.

When steam from the boiler of the engine is used for warming the car through the above-described circulations and devices, steam is admitted through the conduit 24 into the chamber *c* of the receiver 2, from which it flows into the branches 5, connected with said chamber at each end thereof, and thence into first the upper and then the under lines of the circulating-pipes 4, and from the latter through the branches 18 back to the receiver into the chambers *a a* thereof, the water of condensation at the same time flowing into the latter-named chambers and thence into the pocket 31, and from the latter into boiler 3, keeping the latter so long as steam flows from the engine-boiler supplied with hot water. Any sur-

plus of hot water coming into the boiler, as above described, is let off through the cock 29. The valves 22 in said branches 5 provide for letting steam into either one or both of the side circulations of the car, or for cutting either one or both off entirely from their connection with the receiver 2. When the car for any purpose is disconnected from the locomotive and it needs to be warmed, the valves 23 and 25 in the conduit 24 are shut, and (presuming that the boiler 3 contains the requisite supply of water) a fire is made in the boiler under the car, producing steam therein, and the valve 27 in the pipe 28, leading from the boiler into the branch 19, is opened, letting steam flow from the boiler through said branch 19 into chamber *c* of the receiver, from whence the steam circulates in the warming-pipes 4, as above described, the water of condensation returning to the boiler in the manner above set forth. Should the boiler 3, when required to warm the car, as just described, require to be supplied with water, the latter is drawn from the boiler of the engine before the latter is disconnected from the car by permitting said hot water to flow through the above-described pipe connections and the conduit 24 into the receiver 2, and thence through the circulating-pipes of the car and the chambers *a* and pocket 31 of the receiver into said boiler until sufficient has been drawn, and then the water-supply is shut off, any surplus being allowed to discharge through the cock 29, and then a fire is made in the boiler, as above set forth.

The lower end of the drip-pocket 31 extends below the water-line of the boiler 3, and, owing to the connection of said boiler and pocket by the pipe 35, the water (indicated in Fig. 5) in the pocket will rise to the level of that in the boiler, and the lower ends of the pipes 38 are in practice made to reach below said water-line, so that their said lower ends will dip into the water in the pocket and become sealed. The said arrangement of the chambers *a*, each connected with a separate pipe, 38, having its lower end water-sealed, tends to equalize the steam-circulation in the pipes 4 and render the action of the different portions thereof which are connected with the chambers in the receiver more independent and positive.

When any one car of a train needs no heat, the valve 26 between the conduit 24 and the receiver 2 is shut; and if valves 23 and 25 remain open steam may continue to flow through the conduit 24 to a car or cars beyond the car from which steam is shut off. The rear car of a train has either valve 23 or 25 shut, according to which end of conduit 24 extends toward the rear end of the car, to limit the flow of steam in said conduit to its point of connection with the receiver of said rear car.

The said condenser circulation 10, which is located outside the car, preferably at the side of the deck on the roof, is adapted by its connection through pipes 7 and 6 with the live-steam and return pipes of the circulations to

have steam turned through it by opening valve 37 when the heat in the car becomes too great, thereby reducing said heat by condensing the steam so let into said roof-circulation. This obviates the necessity of letting the steam escape into the open air when the boiler 3 is used, and thus wasting the condensed water.

If it be desired to employ the above-described receiver and circulating-pipes in a car without the auxiliary boiler 3, depending solely on the engine of a train for steam for warming, said auxiliary boiler may be dispensed with and the water of condensation be allowed to run off through the cock 29, the end of pipe 35 in such case being stopped or not extending beyond cock 29.

The receiver 2 is in practice located, as shown in Fig. 1, in the car-floor midway between the ends of the car, in order that it may constitute a distributing point for the live steam and a receiving-point for the water of condensation, having a position substantially central between the extreme ends of the heating-pipe circulations which are connected therewith. This arrangement of the receiver relative to said pipes and the manner of running the latter as described, wherein the steam passes from a central point toward the opposite ends of the car and the steam and water of condensation are conducted directly back to said central point and to the receiver again, greatly aids the free circulation of the warming element in the pipes, and the employment of said receiver reduces very much the number of lines of piping and valves required in a steam-heated car, and saves much expense and complication.

What I claim as my invention is—

1. In a car-heating apparatus, the combination, with the receiver 2, having the chamber *c* and the four separated chambers, *a*, therein, of two lines of steam-pipes 4, one above the other, a branch, 5, connecting said chamber *c* with the upper of said lines 4, two branches, 18, connecting the lower of said lines 4 with two of said chambers *a*, and a steam-pipe connected with chamber *c* of the receiver supplying live steam thereto and to said pipes 4, substantially as set forth.

2. In steam-heating apparatus for railway-cars, the receiver 2, having a chamber, *c*, therein to receive and distribute steam to the heating-pipes of a car, several separated chambers, *a*, therein to receive the water of condensation from said pipes, and a pending drip-pocket thereon having a series of pipes, 38, pending therein, each of which is connected by one end with said chambers *a*, combined with a main steam-conduit, 24, connected with said chamber *c* of the receiver, the heating-pipes 4 of a car having steam and drip-connections with said receiver, and a drip-cock connected thereto, substantially as set forth.

JAMES EMERSON.

Witnesses:

H. A. CHAPIN,

G. M. CHAMBERLAIN.