

No. 630,627.

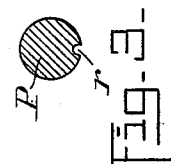
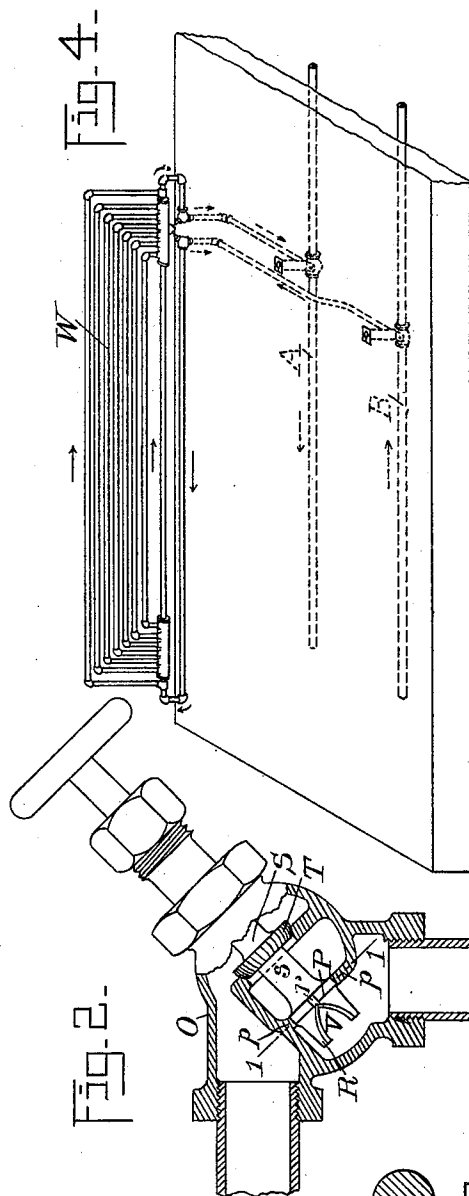
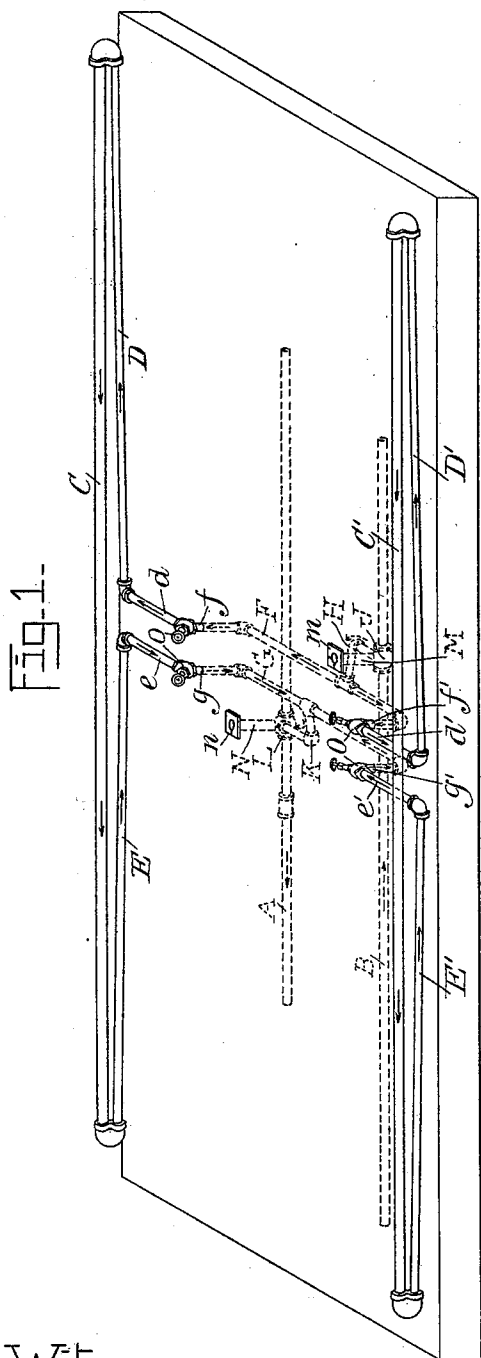
Patented Aug. 8, 1899.

J. F. McELROY.
CAR HEATING SYSTEM.

(Application filed Apr. 13, 1895.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses =

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44

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2 Sheets—Sheet 2.

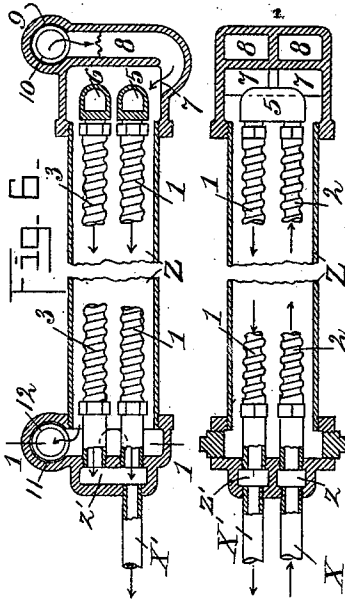


Fig. 7 -

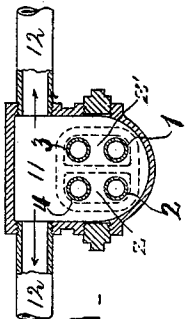


Fig. 8 -

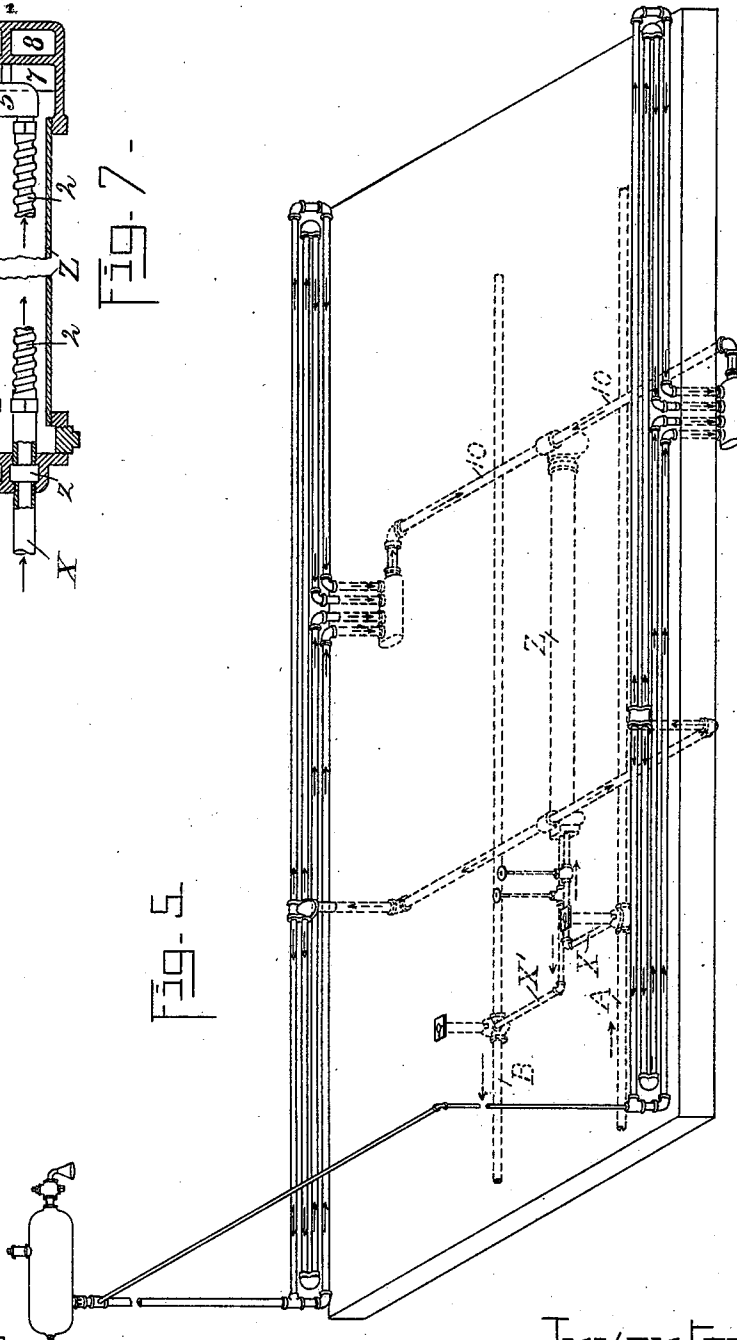


Fig. 5 -

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UNITED STATES PATENT OFFICE.

JAMES F. McELROY, OF ALBANY, NEW YORK, ASSIGNOR TO THE CONSOLIDATED CAR-HEATING COMPANY, OF SAME PLACE.

CAR-HEATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 630,627, dated August 8, 1899.

Application filed April 13, 1895. Serial No. 545,578. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McELROY, a citizen of the United States, residing in the city and county of Albany, State of New York, have invented a new and useful Car-Heating System, of which the following is a specification.

My invention relates to methods of heating railway-cars by steam; and the object of my invention is to produce a direct steam-return system which is much less expensive in construction and greatly reduces the dangers from freezing which have been so common with return systems of heating. I attain this object in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a car-floor provided with my system of heating, the dotted lines showing the work beneath the floor. Fig. 2 is a detail view of the steam and drip valve. Fig. 3 is a section of the piston P along the line 1 1 on Fig. 2. Fig. 4 shows my invention applied to a coil. Fig. 5 shows a modified form of my invention in perspective applied to the drum-heating system. Fig. 6 is a vertical section through the drum Z. Fig. 7 is a horizontal section through the drum Z, and Fig. 8 is a cross-section along the line 1 1 on Fig. 6.

Similar letters and figures refer to similar parts throughout the several views.

The train-pipes A and B beneath the car are connected at one end with a source of steam, which is usually furnished by the locomotive or which may be in a separate heating-car carrying boilers. These train-pipes have suitable connections between the cars for the purpose of carrying the steam and water of condensation, making the train-pipes continuous. When the locomotive is changed from one end of the car to the other, it is evident that steam will be supplied through the opposite train-pipe, and hence through the opposite valves. When the source of steam is at one end of the train, the steam enters through the train-pipe B, as indicated by the arrow, Fig. 1, the train-pipe A being a return-pipe for the condensation of steam to the source of supply, or when the source of steam

is at the other end of the car the pipe A is the supply and the pipe B is the return.

Within the car, on each side thereof or in any suitable position, I arrange a heat-distributing system, consisting of the pipes C, D, and E on one side and corresponding pipes C', D', and E' on the opposite side. I usually construct the upper pipes C and C' larger than the lower pipes D, E, D', and E'. The pipe C is connected with the pipes D and E and the pipes C' with the pipes D' and E'. The lower pipes D, E, D', and E' are arranged to decline toward the center of the car, as shown in Fig. 1. The upper pipes C and C' may by the use of fire-clay or of hot-water storage be constructed so as to make the system that of a storage system. To the inner ends of the lower pipes D E D' E' are respectively attached short horizontal pipes *d e d' e'*, which are located transversely to the axis of the car and beneath the car-seats, each of which connects, respectively, with uprights *f g f' g'*, the lower ends of which are connected with the pipes F and G, respectively, beneath the car-floor. The pipe F is connected by means of the coupling H with the three-way valve J in the train-pipe B. The pipe G is connected by the coupling K with the three-way valve L in the train-pipe A. The valve-stems M N, which operate the three-way valves, respectively, J L, extend through the floor of the car and are adapted to be operated from within the car at *m n*.

At the connection between the horizontal pipes *d, e, d', and e'* with their corresponding risers *f, g, f', and g'* I arrange a steam and drip valve O. (Shown in detail in Fig. 2.) These valves are shown placed under the seat, one on each side, and will be used, one for controlling the steam, the other for controlling the return of condensation to the train-pipe. When the position of the locomotive or steam-supply is changed, it is evident that the use of the valves must be reversed, as the steam will be supplied through the opposite train-pipe, and hence through the opposite valve, the rule being to supply steam through the valve farthest from the engine or source of steam-supply and the water of con-

densation returned through the sets of valves on both sides toward the engine. It is for this purpose that I make the particular form of valve shown in Fig. 2, although I do not

limit myself to the construction described.

In the valve O the valve-stem S has a projection *s* below the disk T, and on said projection is fitted a piston P, having a cylindrical projection R, in which V-shaped slots V are made. The piston P makes a loose fit in an opening through a web *p*, made with the casing. Through this piston there may be a small hole *r*, which is placed in the edge of the piston, so as to allow water to flow between the piston and the web R. When this valve is used at the drip connection, it is turned about one complete turn open, which allows the water to flow through and under the valve-disk, then through the opening in the piston, and down into the main return. When this valve is used for steam, its position may be regulated to suit the circumstances from open to closed. In the position in which it is used as a return the opening through it is just the size of the opening through the piston-space. When a car happens to be at the end of a train, I then turn the three-way valves so as to close off the rear half of both train-pipes.

The operation of my system is apparent. The steam entering the pipe B, Fig. 1, when, because of the position of the source of steam the pipe B is the supply-pipe, as aforesaid, it passes through the three-way valve J into pipe F and enters the heat-distributing system by means of the lower radiating-pipes D and D', through the connecting-pipes *d* and *d'*, from whence it passes to the end of the car and then upward through the larger pipes C and C', traverses the whole length of the car, and returns through the pipes E and E', through the pipes *e* and *e'*, into pipe G, through the three-way valve L, to the return-pipe A. The larger and upper pipes C and C', I preferably place parallel to the top of the truss-plank, the full length of the car, as this would make it nearly horizontal, so that the water would flow through it in the direction in which the flow of steam takes place through the same pipe. This would make sure that the flow of water in this main pipe takes place, so as to carry the water to the main return. The lower pipes are preferably inclined from the corners of the car to the center, and at the same time I make these pipes small, so that the steam passing from the steam-valve would have sufficient velocity to carry with it any water which might be in this pipe. By the omission of the complicated valve arrangement by which steam is directed from either train-pipe into the side pipes I am able to greatly reduce the cost of the apparatus, also to greatly reduce dangers from freezing, which have been so common with return systems of heating.

When it is desired in operation to convert this system into a straight system without re-

turning the water, I would preferably disconnect the couplers K in the return train-pipe and allow the water to drip from the ends of these couplers, it being possible to direct the water to either end of the return train-pipe as desired by turning the three-way valve at the junction of the return from the car to the return train-pipe.

In Fig. 4 I show the heat-distributing system in the form of a coil of pipe W, which is connected at one end to the pipe B, the supply-pipe, at the other end to the train-pipe A, the return-pipe, provided with valves corresponding to J and L, respectively, and particularly adapted for use in a baggage-car, where it would be inadvisable to run the pipes the full length of each side of the car, but operated in substantially the same manner as already described.

In Fig. 5 I show my invention applied to the multiple-circuit system, in which I connect the pipes A and B, the pipe A being the supply and B the return pipe, with the drum Z, which is usually placed beneath the car-floor and which has at one end chambers *z z'*, connected with which chambers *z* I arrange the pipe X, communicating with the train-pipe A. The pipe X', communicating with the pipe B, connects with the chamber *z'*. Within the drum Z, I arrange the heat-distributing system, consisting of corrugated pipes 1, 2, 3, and 4, the pipes 1 and 2 being connected together at their loose ends by means of the return-bend 5, the pipes 3 and 4 being connected together by means of a similar return-bend 6. The ends of the said pipes opposite the return-bends are secured in any suitable manner and open into the chambers *z z'*, the pipes 2 and 4 opening into the chamber *z*, and 1 and 3 opening into the chamber *z'*. At the end of the drum Z opposite the chamber *z* I arrange an opening 7, near the bottom of the drum, connecting with the chamber 8, which near the top of the drum is provided with an opening 9, which connects with the pipe 10, extending to each side of the car and connected at each end with a system of water-circulating pipes and arranged to conduct the water from said pipes into said drum, there to be deposited at the bottom thereof. Near the end of the drum Z and at the top thereof and communicating with the interior of the drum I arrange an opening 11, which connects with the pipe 12, extending to the water-circulating pipes on each side of the car. As thus arranged the water coming into the drum from the pipe 10 becomes heated when in contact with the corrugated pipes 1, 2, 3, and 4, containing steam, and passes out through the pipe 12 to each side of the car and makes its circuit. I arrange valves at the connection between the train-pipes A and B and the pipes connecting the drums therewith, X and X', as already described, allowing for the reverse flow of steam, depending upon the position of the engine to the car.

I do not wish to limit myself to the construc-

tion of valve described, because it is evident that a large number of forms of valves may be designed which can be operated in place of the one described herein. For example, plug-cocks may be used in the two pipes that lead to the apparatus on each side of the car and these cocks may be so arranged that when, for example, the handles of the cocks are pointed toward the locomotive a large port is then made through one of the cocks for the supply of steam and a small port is made through the other cock for the water of condensation. On attaching the locomotive to the opposite end of the car, and consequently making steam-pressure in the other one of the two train-pipes, the direction of these handles then being reversed the sizes of these ports will also be reversed.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A system for heating railway-cars in which a train-pipe conducts steam from the source of supply to the car, a return-pipe carries the water of condensation back to the source of supply of steam, a radiator placed within the car, connections made between the lowest point of said radiator with the steam-carrying pipe, similar connections made between a corresponding point at the opposite end of said radiator with the return-pipe, with similar suitable valves for the purpose of regulating the supply of steam and the drip, substantially as described and for the purpose set forth.

2. In a railway-car-heating system, a steam-supply pipe, a return-pipe, radiating-pipes placed in the car, a three-way valve in the steam-supply pipe connected with a pipe registering with the radiating-pipes at their lowest extremity, a three-way valve in the return-pipe connected with a pipe registering with the radiating-pipes at their lowest extremity, a steam and drip valve placed in

each of said pipes connected with said radiating-pipes, substantially as described and for the purpose set forth.

3. In a system for heating railway-cars, a radiating-pipe placed on each side of the car in substantially a horizontal position, two pipes connected with said radiating-pipe, one at each end thereof and slightly declining toward the center of the car, each of said last-mentioned pipes connecting with substantially horizontal pipes, a means for conveying steam to one of said pipes, the other connected with the return-pipe, with suitable valves for regulating the supply of steam and the drip, substantially as described and for the purpose set forth.

4. In a railway-car-heating system, two train-pipes, either of which may be used as a return-pipe, radiating-pipes located along the side of a car, communication between the lowest points of the radiating system with each of the train-pipes, suitable three-way valves located at points of communication with the train-pipes, all arranged and constructed to operate reversibly, as hereinbefore specified.

5. A system for heating railway-cars in which a train-pipe conducts steam from the source of supply to the car, a return-pipe carries the water of condensation back to the source of supply of steam, a heat-distributing system, pipes for conducting steam from the steam-supply pipe to the lowest point of the system, and arranged to heat the same, similar pipes for conducting the condensed steam to the return-pipe, with similar suitable valves for the purpose of regulating the supply of steam to said system and the drip, substantially as described and for the purpose set forth.

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Witnesses:

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