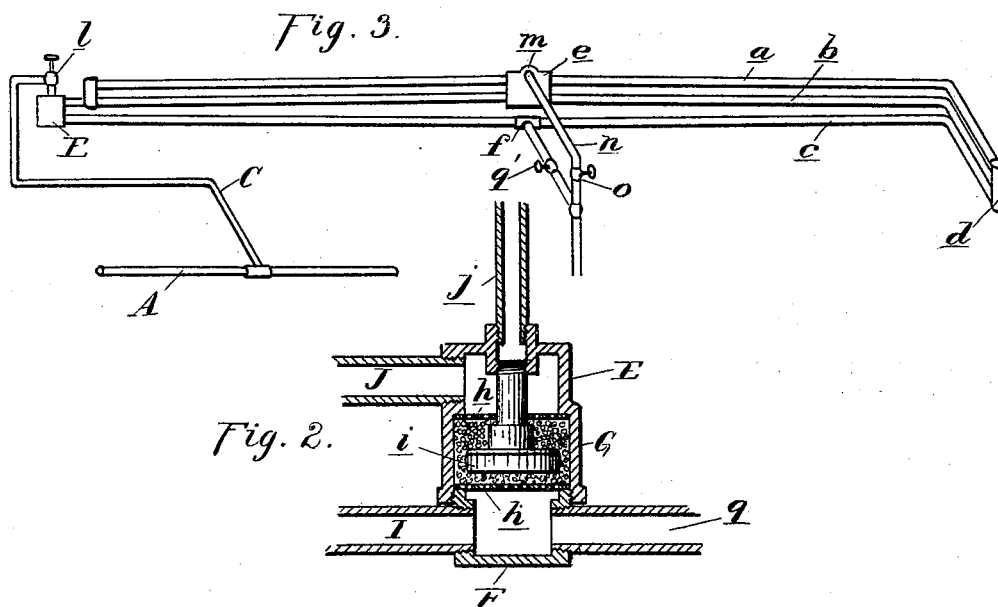
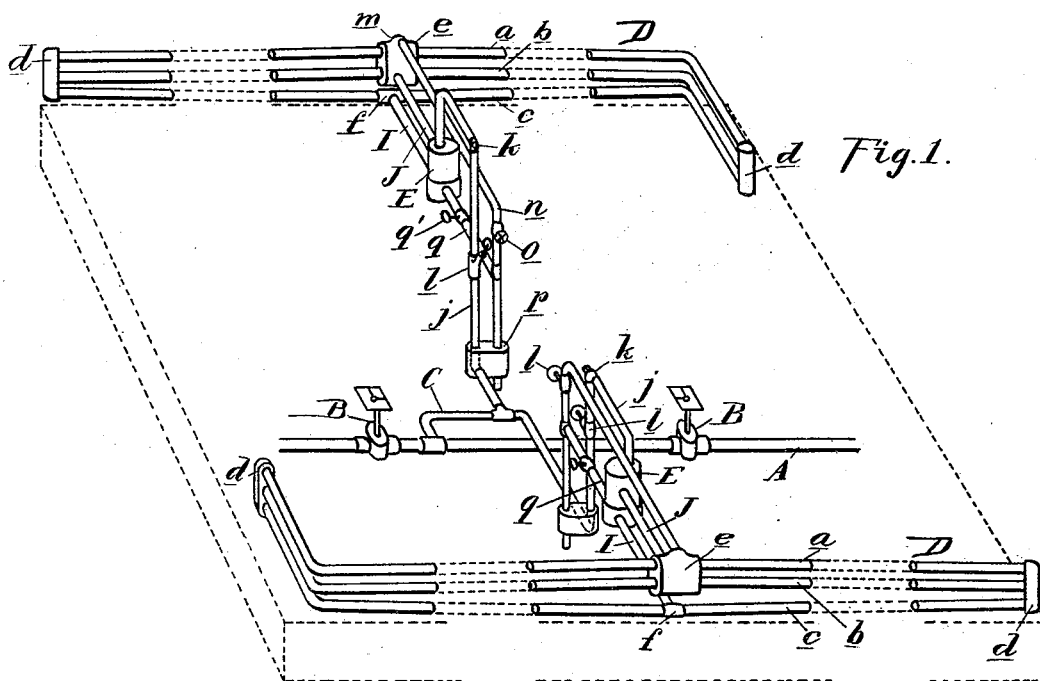


(No Model.)

J. F. McELROY.  
CAR HEATING APPARATUS.

No. 493,443.

Patented Mar. 14, 1893.



Witnesses:  
Chas. A. Gregg  
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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 APPARATUS.

SPECIFICATION forming part of Letters Patent No. 493,443, dated March 14, 1893.

Application filed April 28, 1890. Serial No. 349,748. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES F. McELROY, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Car-Heating Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in car heating apparatus.

This invention belongs to that class of car heating apparatus in which a hot water circulation is designed to be heated and circulated by the injection of steam as described and shown in my patent No. 422,312, dated February 25, 1890.

The invention consists in the peculiar construction and arrangement of the heating apparatus whereby each side of the car is heated independently. Further in the utilization of the ordinary side coils commonly used in the so-called direct steam heating apparatus for the hot water circulating apparatus, and further in the peculiar construction, arrangement and combination of the various parts.

In the drawings which accompany this specification, Figure 1 is a perspective view of the piping of a railway car embodying my invention. Fig. 2 is a cross section through the heater. Fig. 3 is a similar perspective view of one side of a car heating apparatus showing a modified form thereof.

A is the train pipe connected to the locomotive or other source of steam.

B are the valves controlling the train pipe, one upon each side of the steam supply pipe C.

The heater upon each side of the car being independent, and each side being alike, I will describe the heater upon one side, which description will suffice for both, like letters referring to like parts.

The use of direct steam for heating purposes in railway cars has proven unsatisfactory on account of the difficulty of regulating the heat. When the steam is in the radiator in medium weather it is too hot and when the steam is shut off it is too cold. To overcome these difficulties steam heating apparatus has

been provided with storage chambers and numerous other expedients have been tried.

My apparatus is designed to overcome this trouble and consists in applying to the ordinary form of steam radiators which are now in use in many cars, means for collecting the water of condensation and heating and circulating it by the heat of the steam, whereby either one or both sides of the car may be used as a water circulating heater.

D is the radiator consisting of the horizontal lines of piping *abc* connected together at the ends by a three hole manifold *d*. The pipes *a b* dip from the center to the ends, and the pipe *c* from the ends to the middle. The pipes *a b* connect at the middle into a double manifold *e* and the ends of the pipes *c* into the T *f*.

E is a heater which consists of a casing formed in two parts F and G, secured together in any suitable manner. Within the casing are secured the perforated screens *h h*, the space between being filled with gravel, shot or other porous medium, surrounding the steam nozzle *i*, which is perforated on its upper side only, and which is connected to the steam supply pipe *j*, entering through the top of the casing. This steam supply pipe is provided with a check valve *k* and a shut-off valve *l* and connects with the branch steam supply pipe C beneath the car.

The heater E is connected at its lower end with the lower pipe of the radiator by the pipe I which forms the return pipe of the water circulation, and at its upper end is connected into the double manifold *e* with the outgoing pipe J, these pipes being respectively above and below the steam inlet within the heater. The double manifold *e* is provided with a raised portion *m* to which is connected the overflow pipe *n* in which is located the drip valve *o* having a restricted aperture normally open to allow the escape of the accumulated water of condensation, this valve being of the construction shown in my patent No. 412,651, dated October 8, 1889. This overflow pipe is extended through the bottom of the car and passes through the hollow casting *p* through which the steam supply pipe *j* passes to keep the outlet of the overflow pipe hot to prevent

its freezing. The overflow pipe is connected with the lower end of the heater by the drain pipe *q*, which is controlled by the shut-off valve *q'*.

5 In Fig. 3 I show my system constructed with a double line of piping, inclined similarly to that shown in Fig. 1, and with the heater located at one end of the car. Either arrangement may be used according to convenience  
10 in applying the heaters to the cars to be equipped.

The parts being thus constructed and arranged, they are intended to operate as follows: No secondary heater being provided for my  
15 heating apparatus it is my intention when the car is laid up for the night or between trips to empty the system of water. This is done by opening the valve *q'* which allows the water to escape through the drain pipe upon the  
20 ground. When it is desired to heat the cars, steam being supplied through the train pipe enters the steam pipe *j*, the valve *l* being open, and is discharged through the nozzle in the heater in an upward direction. The steam  
25 filling the system drives out the air through the valve *q'*. As soon as the air is out of the system the valve *q'* is closed and the apparatus will operate as a steam heating apparatus, the water of condensation being retained  
30 therein until the system is filled to the level of the pipe *b*. As soon as it has reached this level it will begin to operate as a hot water circulating apparatus, the water being heated and circulated by the introduction of the  
35 steam through the nozzle *i* beneath the water, the water passing out from the heater through the out-going pipe *J* entering the double manifold *e* is distributed in both directions through the pipe *b* to the ends of the car, descends through the manifolds to the lower  
40 pipe and returns from the ends to the center entering the heater at its lower end through the return pipe *I*. During this interval the upper pipe of the system is a steam heating  
45 pipe, the water, however, will continue condensing and fill the pipes until both the pipes *a b* are filled when it will commence to overflow through the overflow pipe *n*, passing out beneath the car. Both sides of the car being  
50 equipped alike, in medium weather the car may be heated by using one side only. The heating of the car can be further regulated by running one side with the steam valve wide open and the other side partially closed, the  
55 side upon which the wind comes on a cold

day requiring the greatest heat. By establishing two independent circuits within the car I am also enabled to obtain a quicker circulation, there being a more effectual radiation and distribution of the heat, and therefore I am enabled to heat the car with less  
60 steam, and with a lower pressure than would be required with a system of piping embracing both sides of the car and comprising cross-overs beneath the car.

The operation of the apparatus shown in Fig. 3 is self-evident from that previously described. It is merely a matter of convenience  
65 whether the commingler is placed at the end of a horizontal radiator or central thereof. It is also a matter of how much heating surface is required whether I use a radiator with three lines of pipe, or with two. There is advantage in placing the heater, the steam supply pipe and the drain pipe all at one point  
70 of the heating system, for instance, the center of the car, as I am enabled to regulate the steam supply, the drain and the overflow pipe together without passing from one end to the other of the car, and when the car is side  
80 tracked upon an inclined track, the water will all drain out, the drain pipe being in the center.

What I claim as my invention is—

1. In a car heating apparatus, the combination of a radiator having its highest and lowest points at substantially the same place in the car, an overflow pipe from the highest point, a drain pipe at the lowest point, a water chamber communicating with the radiator  
85 at two points, and a steam supply pipe discharging into the water chamber, substantially as described.

2. In a car heating apparatus, the combination of a radiator inclined to have its highest  
90 and lowest points at substantially the middle, and a heater at such middle point, a steam pipe discharging in said heater, and an out-going and return connection from said heater to the radiator, an overflow pipe from the  
95 highest point of said radiator, a drain pipe extending from the heater and a valve to control said drain pipe, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses, this 7th day of  
10 April, 1890.

JAMES F. McELROY.

Witnesses:

EDWIN A. SMITH,  
HOMER J. NODINE.