(No Model.)

# R. M. DIXON.

## CAR HEATING APPARATUS.

No. 457,706. Patented Aug. 11, 1891.

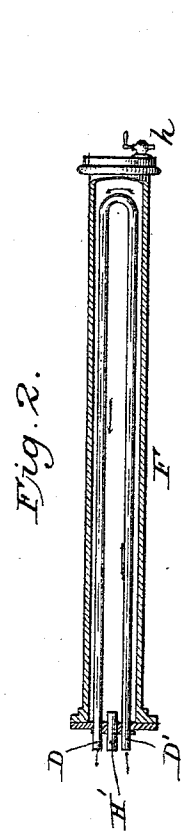


Fig. 2.



Fig. 1.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

ROBERT M. DIXON, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO THE SAFETY CAR HEATING AND LIGHTING COMPANY, OF NEW YORK, N. Y.

## CAR-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 457,706, dated August 11, 1891.

Application filed November 26, 1888. Serial No. 291,921. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT M. DIXON, a citizen of the United States, and a resident of East Orange, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Apparatus for Heating Railway-Cars, of which the following is a specification.

My invention relates to an improvement in apparatus for heating cars of that class in which water in a series of circulating and heat-radiating pipes within a car is heated by steam generated outside of the car, provision also being made for heating the water by means of a stove in case of temporary failure of the steam.

Figure 1 of the drawings is a perspective view of a part of a car containing heating apparatus with my improvements applied. Fig. 2 is a longitudinal section of the transfer-drum F, showing the pipes within it.

Referring to the letters on the drawings, A represents a part of the floor of a car.

B represents a steam-supply pipe, which extends from one end along one side of the under part of the car to a point *a* about midway between the ends, at which point it extends across to the opposite side and thence to the other end of the car.

C represents an expansion tank or reservoir located, as usual, at an elevated point.

D represents a water-circulating pipe, which communicates with the reservoir C at its lowest point, then extends downward and into an ordinary stove-heater E, where it is coiled, as shown at *b*. From the heater it extends along the floor of the car at one side to about the center, thence down under the floor across the car, thence up through the floor and back to the point *c*. It has, as shown in the drawings, a series of U-shaped bends *d*, designed to occupy positions beneath the car-seats; but these are not essential. It is surrounded just below the expansion-tank C within the car by a steam-tight heater or transfer-drum G. Under the car is arranged a steam-tight transfer drum F, into which the pipe D extends, and within which it may be bent or coiled in any desired manner.

H represents a pipe, which is connected with the main steam-supply pipe B and extends up to and enters the upper end of the transfer-drum G. A pipe H′ extends from the lower end of the transfer-drum G along the floor of the car the required distance, when it passes under the car to the transfer-drum F and enters the latter, supplying it with steam for heating the water in the pipe contained in the drum.

D′ designates a water-pipe, which is connected with the pipe D just above the transfer-drum G and extends along the floor to the opposite end of the car, at which point it is bent and returned to about the center of the car, the returned portion being, as shown, in U form under each seat. This pipe then extends downward, under, and across the car, thence upward through the car-floor, being bent or looped, as at *e*, thence to the opposite end *x* of the car, being, as shown, bent in U form under each seat, thence in a straight line to a point just in front of the transfer-drum F, where it extends downward and is connected to the pipe D. It will thus be seen that the pipe D extends on both sides of the car for one half of it, while the pipe D′ extends on both sides of the car for the other half. It will also be observed that the pipes D D′ form practically one continuous circulating-pipe, which is heated from the main source of supply at two different points—*i. e.*, in the transfer-drums G and F.

The pipe H is provided with a cock *f*, for controlling the admission of steam to the transfer-drum G, and the pipes D D′ are provided at convenient points with valves *g g′ g²*, for trapping off the water in said pipes when it is desired to empty them. A cock *h* is also provided for the transfer-drum F to permit the water of condensation in the drum to be discharged.

On the under side of the car at the point *i*, where the pipes D D′ recross the car, is provided a box I, which incloses said pipes and the bent portion of the steam-supply pipe B, thereby preventing loss of heat from said pipes and materially aiding in heating them by reason of the fact that they are located there in close proximity to the steam-pipe.

The operation is as follows: The circulating-pipes D D′ are charged with water through the tank C. Upon the cock *f* being opened

steam is supplied to the transfer-drums G and F and through the pipes H H′, at which points it is brought in contact with the pipes D D′, thereby heating them and causing the water in them to expand and circulate in the direction indicated by the arrows. The water-pipes radiate their heat within and warm the interior of the car in the usual way. It will be observed that the steam is first conveyed to the transfer-drum G, which is preferable, and thence to the transfer-drum F. Hence that portion of the water-circulating system included in the transfer-drum G will be first heated and the direction of circulation established upward toward the expansion-tank and through the pipe D′. As the steam is carried to the transfer-drum F, the circulation established by the transfer-drum G is followed, but the rapidity of the circulation is increased. In cases where a single transfer-drum, as F, has been employed under the car, for reasons which will be well understood—to wit, the variation in the level of the car by standing upon an incline or the difference in disposition of weight within the car—the direction of circulation of the water in the circulating-pipes will be materially affected. A single transfer-drum G also gives unsatisfactory results; but when drums G and F are used, and that at G is heated first, the best results always follow. The circulation will always be in one direction, will be quickly established, and will be constantly maintained, irrespective of the level of the car. I thus provide a heating apparatus in which two separate transfer-drums are employed, one elevated above the other, but both applied to transfer heat to the water-pipes in what may be called the "rising part" of the water-circuit. I also employ a steam-supply pipe leading to the upper transfer-drum, a steam-supply pipe leading to the lower transfer-drum, and radiators in the water-circuit between the transfer-drums. The higher transfer-drum is shown as, and in practice is preferably, heated first. By this means a difference of temperature, such as is essential to rapid circulation, is secured and speedy heating is attained because the transfer-drum G first receives the steam and heats the water in the pipe running through it and starts circulation of the water in the pipes and assists in keeping it up until the water in the higher part of pipe D′ is as hot as the water within drum G. The transfer-drum F heats the water in the pipes within it and (inasmuch as water in the pipe leading to it is always the coldest in the whole circuit and the pipe leading from it is hot) constantly maintains the circulation.

I do not confine myself to the formal details of construction illustrated in the drawings, because the substance of my invention can be embodied in various forms different from that exhibited, and the locations of the parts may also to a considerable extent be changed, so long as the essentials above mentioned for securing speedy heating and constant and rapid circulation are provided for. The heater E may or may not be employed as a secondary source of heat-supply, and of course it may be employed independent of the steam-supply—as, for instance, when a car is side tracked and it is desired to have it warmed before it is coupled to a train.

What I claim is—

In a heating apparatus, the combination of a system of circulating-pipes connected with an expansion reservoir, a main source of heat-supply in operative connection with said system at different points by means of a series of transfer-drums, one placed above and another below the main body of the circulating-pipes, branch steam-pipes H and H′, leading from the main steam-pipe B through the transfer-drum G and into the transfer-drum F, a cock *f* for controlling the admission of the steam into the drums, and a cock *h* in the drum F for discharging the water of condensation, substantially as set forth.

In witness whereof I have hereunto set my hand this 23d day of November, 1888.

ROBERT M. DIXON.

Witnesses:

JOSEPH J. SULLIVAN,

JAMES C. BAYLES.

Correction in Letters Patent No. 457,706.

It is hereby certified that the assignee in Letters Patent No. 457,706, granted August 11, 1891, upon the application of Robert M. Dixon, of East Orange, New Jersey, for an improvement in "Car-Heating Apparatus," should have been described and specified as *The Safety Car Heating and Lighting Company, of New York, N. Y., a corporation of New Jersey,* instead of "The Safety Car Heating and Lighting Company, of New York, N. Y.;" and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of April, A. D., 1903.

[SEAL.]

F. I. ALLEN,
*Commissioner of Patents.*