(No Model.) 2 Sheets—Sheet 1.

J. F. McELROY.

RAILWAY CAR HEATING APPARATUS.

No. 490,673. Patented Jan. 31, 1893.

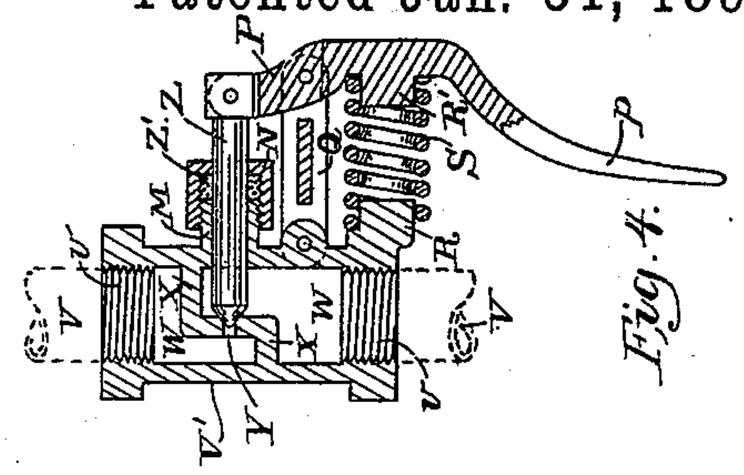

Fig. 4.

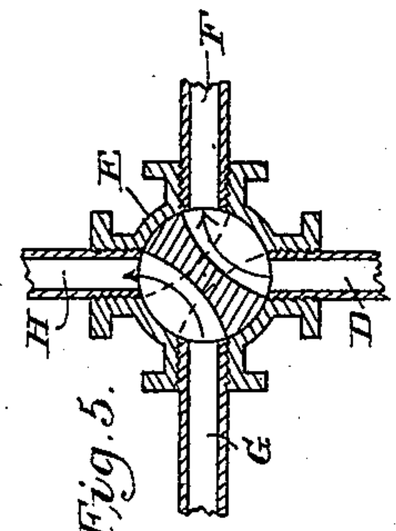

Fig. 5.

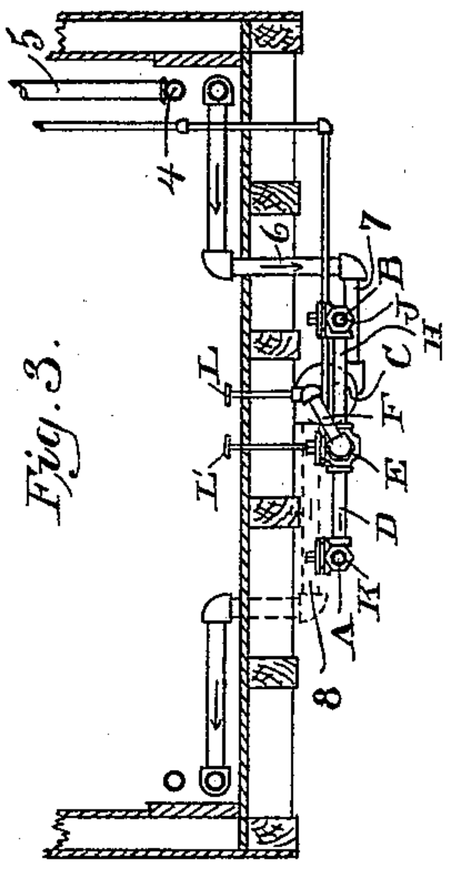

Fig. 3.

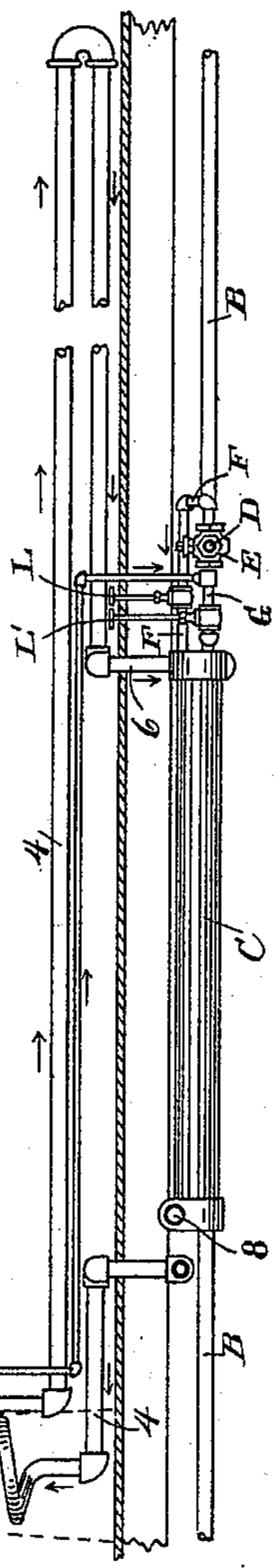

Fig. 1.

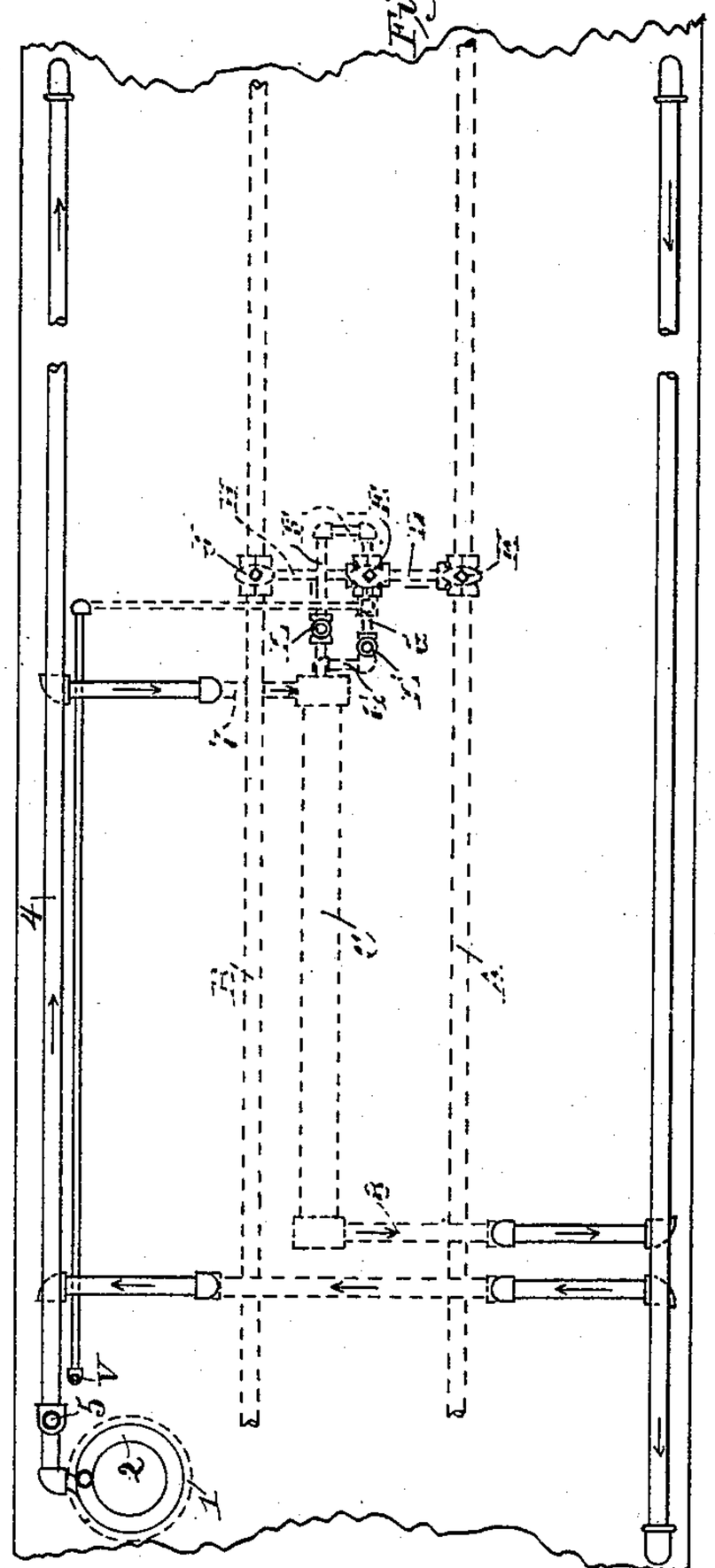

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

J. F. McELROY.

RAILWAY CAR HEATING APPARATUS.

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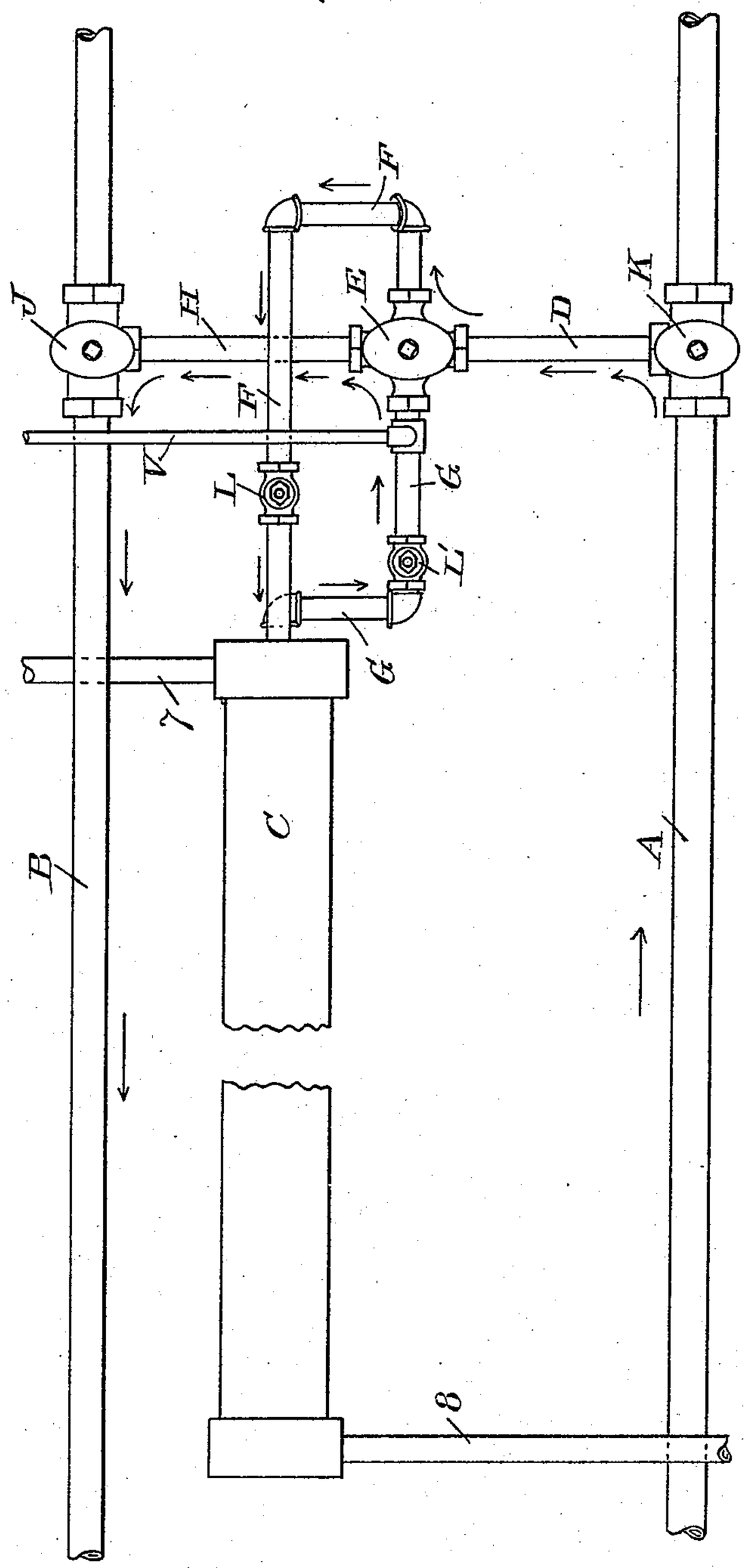

Fig. 6

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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.

RAILWAY-CAR HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 490,673, dated January 31, 1893.

Application filed January 11, 1892. Serial No. 417,633. (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 Improvement in Railway-Car Heating Apparatus, of which the following is a specification.

My invention relates to improvements in apparatus for heating railway cars in which a hot water circulating system is used in connection with a steam heated drum; and the object of my invention is to produce a railway car heating apparatus provided with means for reducing the pressure in the water circuit when the steam pressure in certain parts of the steam supply system decreases. I accomplish this object by means of the mechanism illustrated in the accompanying drawings, in which

Figure 1 is an elevation. Fig. 2 is a plan. Fig. 3 is a cross section. Fig. 4 is a section of the vacuum pipe in detail, and Fig. 5 is a detail view of the four-part valve E. Fig. 6 is a plan of the work on the under side of the car drawn to a larger scale, and showing the course of the different fluids through the system by means of arrows.

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

For the purpose of producing a means for reducing the pressure in the water circuit in a railway car-heating apparatus when the steam pressure in certain parts of the steam supply system connected with said apparatus decreases, I provide a means for connecting the upper portion of the expansion chamber of the water circulating system with the return pipe, through which the water of condensation is pumped back to the locomotive tender in the steam supply system, and in this way reduce the pressure upon the water circuit. I accomplish this result by means of the following described apparatus.

Referring to the drawings, the train pipe A carries the steam from the locomotive, the pipe B is the return train pipe through which the steam is pumped back to the tender.

C represents an ordinary water heating drum placed beneath the car.

D is a pipe communicating with the steam pipe A, by means of a suitable valve K, the pipe D communicating also with the four-way valve E, the steam passing through the pipes F F into the drum C. The steam and water of condensation pass out of the drum C through the pipes G G into the four-way valve E and out through the pipe H which connects with the return train pipe B by means of the valve J. The flow of steam from the train pipe may be regulated from within the car by means of a steam valve L, and the pipe G leading from the drum may be opened or closed by valve L′ from within the car.

The numeral 1 represents a Baker or other heater provided with a water circulating coil 2 connected with the expansion chamber 3, having its lower leg communicating with the pipe 4 of the circulating piping in the car, the expansion chamber also communicating with the piping in the car by means of the connecting pipe 5. The piping in the car is connected with the drum C by means of the pipe 6 passing through the floor of the car and communicating with the pipe 7 entering the drum C. After passing through the drum C, the water leaves the drum through the pipe 8 and again enters the piping in the car and continues its circulation until it reaches the lower leg of the circulating coil placed in the heater.

As thus far described, there is nothing particularly new in the arrangement of my pipes and their connections. The drum C contains heating surface with which the water of circulation comes into contact similar in construction and operation to the drum commonly used in this connection. I place the pipe V communicating with the upper portion, above the level of the water, of the expansion chamber 3 and extending downward and along or near the floor of the car and passing through the floor and along the bottom of the car, connects with the pipe G just before the pipe G enters the four-way valve E and which pipe G is the pipe containing the water of condensation and returning steam from the drum C immediately before its connection with the return train pipe B. It is apparent therefore that when the vacuum is formed in the pipe B, the air contained in the pipe V will be forced out through the pipe G into the pipe B and a vacuum will occur in

the pipe V and therefore in the upper portion of the expansion chamber 3 into which the upper end of the pipe V opens. The vacuum occurring in the upper portion of the expansion chamber 3 reduces the pressure upon the water in that chamber and therefore lowers the boiling point and as a consequence, the free bubbles of steam will be formed rapidly, promoting the circulation of the water through the piping in the car, the result which I desire to attain.

For the purpose of closing the pipe V, I arrange a valve V′ therein, which may be operated by hand and so constructed that when the hand is removed therefrom, the valve will close, since it is not advisable to have the pipe V in operation but a very short time at a time. The valve V′ is shown in the enlarged sectional detail view Fig. 4 and is attached to the pipe V by means of the threaded openings *v* at each end of the valve, being screwed upon threads upon the pipe V, which is cut away for the purpose of inserting the valve. Within the valve chamber W, I arrange the projecting pieces X X extending the one from one side of the valve chamber and the other from the opposite side, each bent toward the other, but leaving an opening Y between the two, through which opening Y communication is established between the upper and lower portions of the pipe V. For the purpose of closing the opening Y, I place the valve stem Z provided with a suitably rounded end which will fit snugly in the opening Y, which is formed to supply a seat therefor. The valve stem Z is provided with a suitable packing Z′ placed within the nut N, which is suitably threaded to mesh with threads on the lug M attached to the side of the body of the valve, and in which nut the valve stem Z reciprocates freely. The end of the valve stem Z farthest from the opening Y, is attached to the lever arm P. The lever arm P is fulcrumed to the bar Q attached to the exterior side of the body of the valve. The lever arm P is provided at its end farthest from the valve stem Z with a suitable handle *p* and between the end of the handle *p* and the fulcrum bar Q, I arrange a spiral spring S being in contact with the lug R on the side of the body of the valve, and a corresponding lug R′ on the lower side of the lever arm, and so arranged that the resiliency of the spring will tend to cause the valve stem to be forced into the opening Y, closing communication between the upper and lower portions of the valve chamber. As thus arranged, it is apparent that when the valve V′ is in its normal condition, there is no communication between the upper portion of the expansion chamber 3 and the pipe G communicating with the return train pipe B, but when the circulation of the car becomes sluggish, by pressing the handle *p* of the lever arm P toward the pipe V, communication is established, and the air in the upper portion of the expansion chamber is exhausted therefrom; the pressure upon the water in the expansion chamber is less than atmospheric; free bubbles of steam will be formed and the circulation in the car accelerated. When the hand is taken from the lever arm handle *p*, the spring S causes the valve to be closed immediately.

I do not limit myself to the exact construction of my valve V′ nor to the place or manner of connecting the expansion chamber with the return pipe. Any manner of connecting the expansion chamber with the return steam pipe, or its branches, in such a way as to utilize the vacuum therein, will suffice.

As thus arranged, my apparatus is extremely simple in its construction and operation and there is little danger of its becoming out of order through inattention since the vacuum pipe is inoperative, except when the person in charge thereof has his hand upon the valve handle.

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

1. A railway car heating system consisting of a steam supplying pipe connected with the locomotive, a return pipe conducting the water of condensation from the car to the locomotive, a drum provided with heating surface, connections between the drum and the steam supplying pipe and the return pipe, a water circulating system provided with a stove containing a circulating coil, piping about the car connected with said coil, an expansion chamber communicating with the coil and also with the piping about the car, the water of circulation passing through the drum provided with the heating surface, a pipe connecting the upper portion of the expansion chamber with the pipe connecting the drum containing the heating surface with the return pipe, substantially as described and for the purpose set forth.

2. A system for heating railway cars consisting of a steam supplying pipe connected with the locomotive, a return pipe to carry the water of condensation back to the locomotive, a drum having a surface heated by means of the steam passing through the steam supplying pipe, which is connected with said drum, a water circulating system which is connected with said drum and which is provided with a stove containing a circulating coil, an expansion chamber connected with said coil and with piping in the car, the upper portion of said expansion chamber communicating with the return pipe, substantially as described and for the purpose set forth.

3. In a system for heating railway cars, the combination of a stove, a water circulating coil therein, an expansion chamber connected with said coil, piping within the car connected with said coil and also with said expansion chamber, a drum containing a heated surface connected with the piping in the car, a steam supplying pipe connected with said drum a return pipe connected with said drum, through which return pipe the water of condensation is pumped back to the locomotive, a pipe con-

necting the upper portion of the expansion chamber with the return pipe, substantially as described and for the purpose set forth.

4. In a car heating system, the combination with a system of water circulating pipes within the car, of a suitable radiator in contact with said circulating system, mechanism for supplying said radiator with steam as a primary means of heating said circulating system, mechanism for returning the water of condensation from the steam supplying system, with a pipe connecting the upper portion of the expansion chamber of said water circulating system with the mechanism for returning the water of condensation from the steam supplying system, substantially as described and for the purpose set forth.

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Witnesses:
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