

(No Model.)

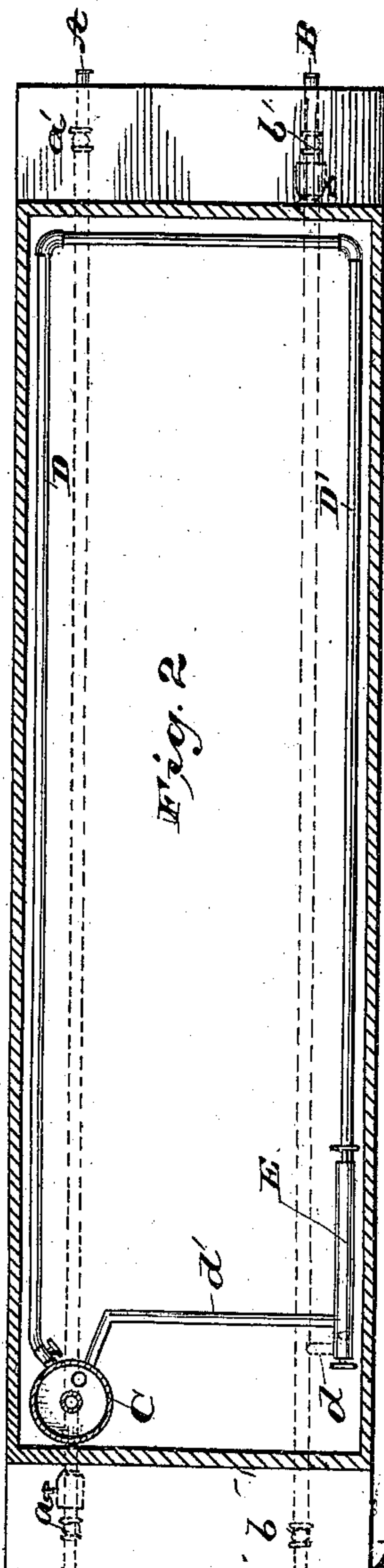
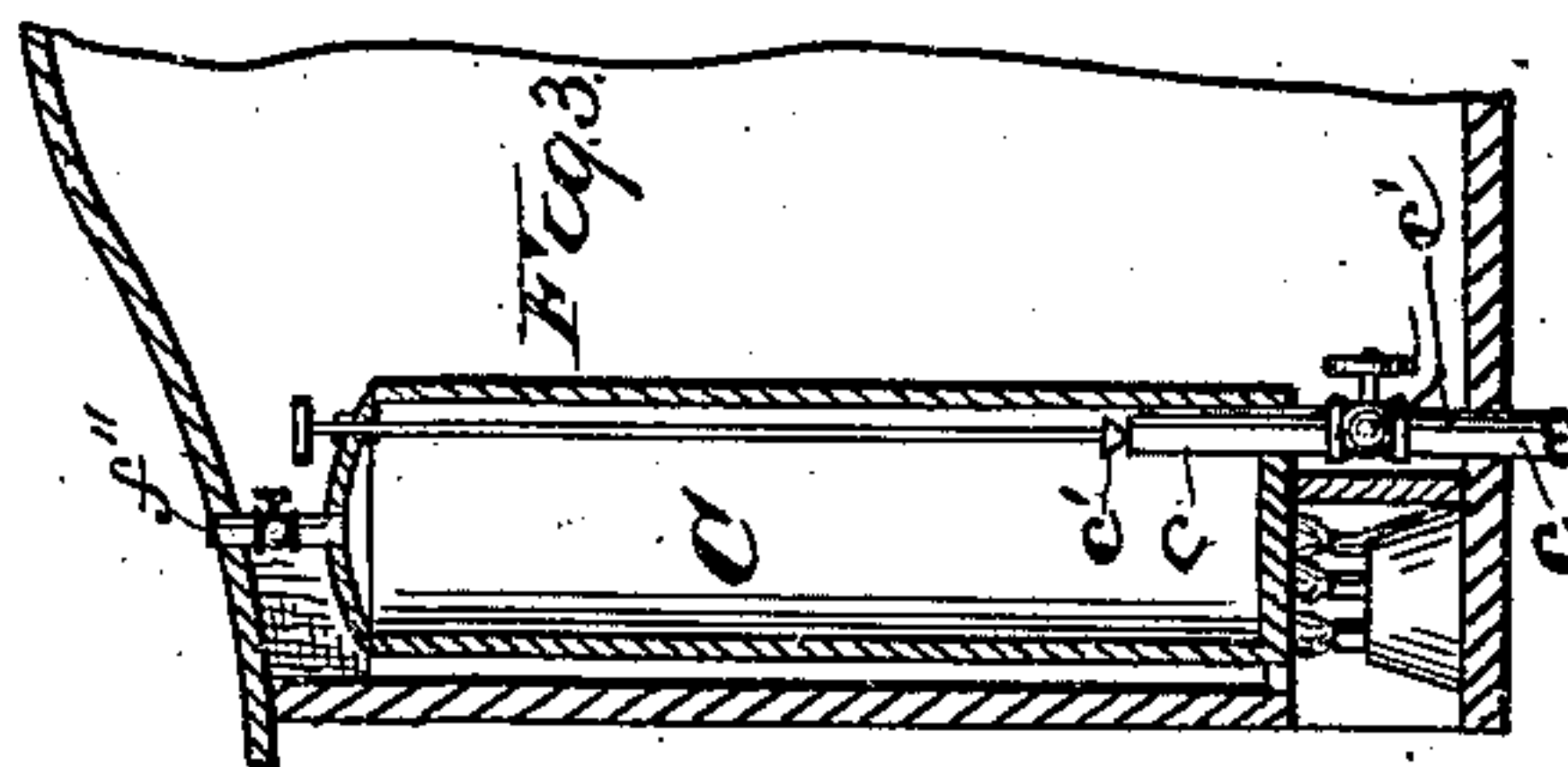
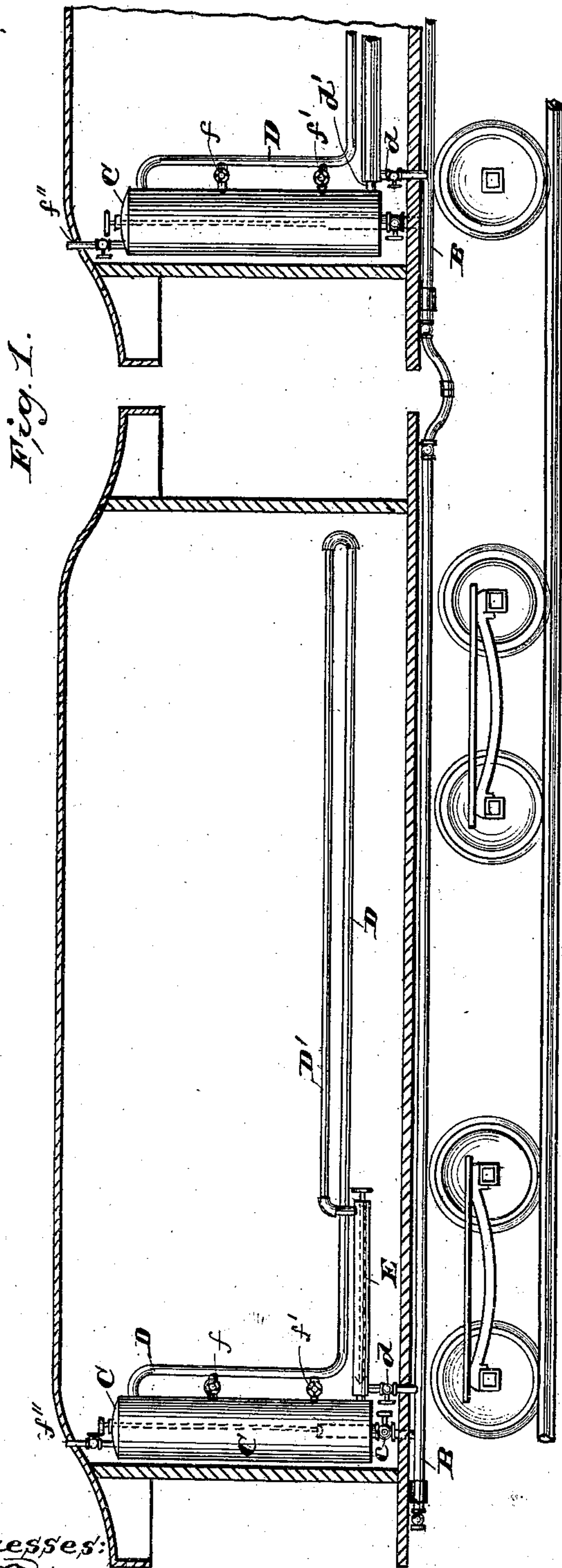
2 Sheets—Sheet 1.

W. L. HORNE.

CAR HEATER.

No. 372,071.

Patented Oct. 25, 1887.



Witnesses:

*E. J. Walker*  
*L. B. Whitaker.*

Inventor

*W. L. Horne*  
*By my attys*  
*Whitaker & Brown*

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2 Sheets—Sheet 2.

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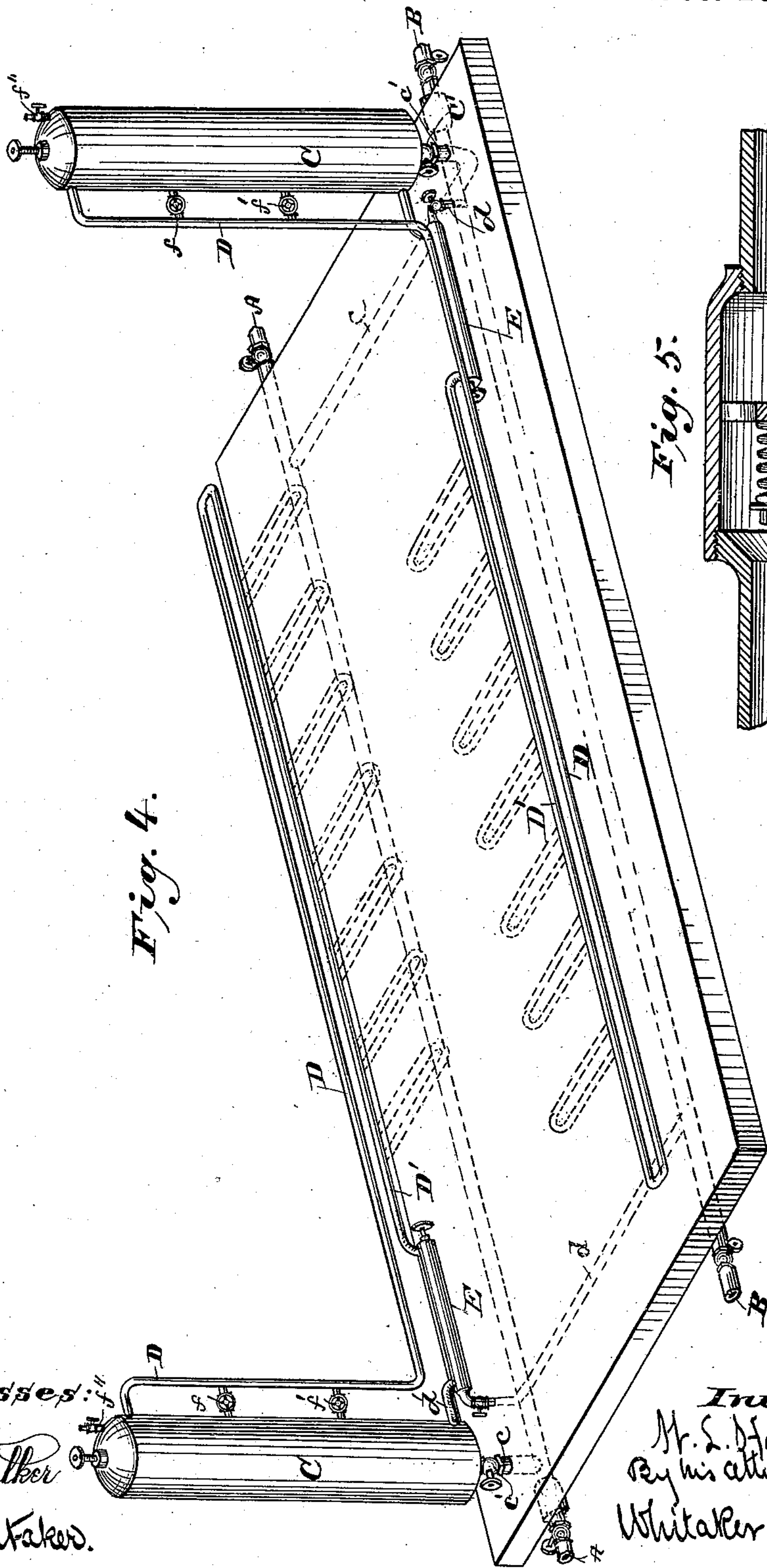
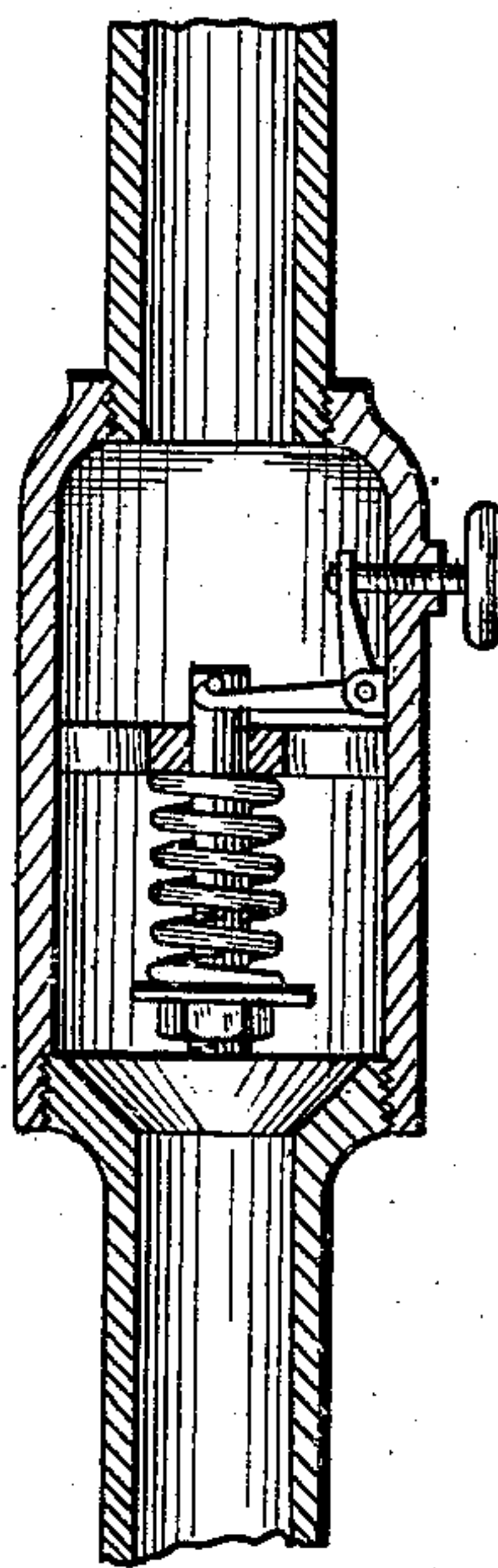


Fig. 5.



Witnesses:

*E. J. Walker*

*S. J. Pitkin*

Inventor

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By his atty.

*Whitaker & Tamm*



# UNITED STATES PATENT OFFICE.

WILLIAM L. HORNE, OF MERIDEN, CONNECTICUT.

## CAR-HEATER.

SPECIFICATION forming part of Letters Patent No. 372,071, dated October 25, 1887.

Application filed February 12, 1887. Serial No. 227,402. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM L. HORNE, a citizen of the United States, residing at Meriden, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Car-Heaters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the class of devices known as "car-heaters," and its object is to produce a hot-water heater without fire in the car, (which in case of accident becomes a source of danger to the passengers,) and which will yet be capable of maintaining the requisite degree of heat for a considerable period when detached from the train.

In the accompanying drawings I have shown one form of my invention, and have fully set said invention forth in the following specification and claims.

In the drawings, Figure 1 is a vertical longitudinal section of one car and a part of another forming part of a train provided with one form of my heating device. Fig. 2 is a horizontal section of one of said cars. Fig. 3 is a vertical section of a part of such car with the water-reservoir in section. Fig. 4 is an isometric view of a construction in which two tanks or reservoirs are employed in a single car. Fig. 5 is a longitudinal section of one form of balanced valve used in pipes A B.

A is a water-conducting pipe connected to some suitable or preferred form of water-heater forward of the passenger-cars and extending back under all of the cars of the train.

B is the return-water-conducting pipe completing the circuit. This pipe is connected with the water-heater or with the water-tank of the tender, as may be preferred. Within each car is a large water tank or reservoir, C, connected with pipe A by a short pipe, *c*, which extends a short distance up into the tank C, and is provided at or near its upper end with a valve-seat. This short connecting-pipe between pipe A and the tank C is provided with a valve or cock, *c'*. A valve, *c''*, is fitted to the valve-seat near the upper end of the pipe *c*, and a rod attached thereto extends upward for a distance within the tank, with a handle for operating it extending with-

out the tank. This rod is made of such materials as to be readily affected by heat, so that it expands as it is heated, and when a certain degree of heat is reached it automatically closes valve *c''*. The rod is also provided by means of adjustment for different degrees of heat.

To the upper part of the tank or reservoir C is connected a pipe, D, which extends therefrom along the side or sides of the car, with a return branch, D', in close proximity to the seats, and may have bends therein extending under the seats of the car, as shown in dotted lines in Fig. 4. The return-pipe D' is connected with the return-pipe B of the system by pipe *d*, and by pipe *d'* with the reservoir or tank C. In this pipe D', near the point at which it is connected to the pipe B, I propose to insert a valve-box or enlarged section of pipe, E, with a valve-seat between the connections of pipes *d* and *d'* therewith. In this enlarged section of pipe I place a valve with an operating-rod of thermostatic properties, so that on the water circulating through the pipes D and D' becoming heated to a certain point the connection of the system within a single car shall be cut off from the general system and only such a circulation be permitted as will naturally result from the giving off of heat from the radiating pipes. The pipe D for a portion of its length is parallel, or nearly so, with and but a short distance from the tank or reservoir C. This portion of such pipe is connected with the reservoir C by one or more pipes, *f f'*. The downwardly-extending portion of pipe D may be located at the end of the car and the pipes *f f'* may extend the whole length of the car, if preferred.

The upper end of the tank is provided with pipe *f''*, provided with a cock, through which air may be admitted or allowed to escape. The pipes A A and B B of the different cars are connected by flexible connections of any preferred construction. They are also provided at *a'* and *b* with stop-cocks, and at *a* and *b'* with balanced valves. These valves, when the heater is not in use, are closed, but are provided with means whereby they may be opened when desired, as shown in Fig. 5. In heating systems of this character the heater is a boiler, in which a considerable pressure is maintained in order to force the hot water



through the pipes, and the object of these balanced valves is to prevent an excess of pressure in such pipes, the construction of these devices being such that when the pressure in the pipes rises above a certain amount the valve closes and remains closed until the pressure is removed.

In Fig. 3 I have shown a car with but one tank or reservoir and but one series of radiating-pipes. In Fig. 4 I show a form of heater for a car in which two tanks or reservoirs are employed. The pipes D and D' are both on one side of the car and the arrangement slightly changed. Both heaters receive heated water from pipe A and discharge into pipe B.

In practice the tanks and radiating-pipes in each car may be filled either from a stationary boiler at the starting-station or after the train is made up from the heater on the train. While this filling takes place the cock in the pipe *f''* is opened and the air allowed to escape. When brought together in a train, with the pipe A furnishing the hot-water supply for the system, the balanced cock *a* on the car nearest the boiler or water-heater and cock *b'* on the last car included in the system are put in operative position, cock *a'* on the last car closed, and all the other cocks in pipes A and B opened. Hot water is thus brought into each car from the water-heater through pipe A, and after passing through the radiating-pipes and giving off its heat is discharged through pipe B.

In case the car is detached from the train, the cocks *a* and *b'* are put in operative position and cocks *a'* and *b* closed. The couplings with the other cars are then detached. The tank and pipes being filled with heated water, the required temperature within the car will be maintained a considerable period. There will be a certain amount of circulation in the pipes consequent on the cooling by radiation. This circulation may be accelerated by opening cock *b*, the cock in pipe *f''*, and turning cock in pipe *d* so that a small amount of water may be discharged therethrough. The colder water settling to the lowest part of the system within the car, it is slowly drawn off through pipe *d* and the radiating-pipes filled with the more highly heated water from tank C. While this is being done the cocks in pipes *f* and *f'* are opened to facilitate the transfer of hot water to the radiating-pipes. It may sometimes be preferred to draw the cooler water from pipe A, which can be done by arranging cocks *a'* and the cock in the pipe *c* so as to accomplish this.

I may prefer in some instances, when a car is side-tracked, instead of drawing off the cold water, to place a large lamp or other form of heater under the tank, as shown in Fig. 3. To enable this to be done in the most unobjectionable manner, I prefer to inclose the space beneath the tank and provide a door opening into the same from the outside of the car.

In case the car should be reversed and pipe

B of one or more cars brought into such position as to become a part of the hot-water-supply conduit, the operation of the device will be equally effective, the flow of the heated water being, however, in the opposite direction. In such case, if the car is in the middle of a train, all the valves in the pipes A and B will be opened. If the car is the last of a train, valve *a* will be put in operative position and valve *b* closed, and if the car is the first in the train the valve *b'* is put in operative position and the others in said pipes opened.

The tanks C may be made of any preferred form and of such size as may be found to be most effective. They are constructed of moderately-heavy plate, so as to resist all pressure and render them secure from breakage in case of accident. The connecting-pipes in case of accident will not be easily broken, and even if ruptured but little water will escape therefrom, as the passage of water from the system would produce a vacuum in the pipe or tank.

I do not limit myself to any particular heating device or any particular connection for the return-pipe. The heated water may be taken from the boiler of the locomotive or from any source which will furnish the required amount of heated water and force to pass it through the pipes of the system. The water from the return-pipe may be returned to the boiler by an injector, or to the tank on the tender by the same or other means.

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

1. A car-heater consisting of the combination, with pipes forming part of the supply and return pipes of a hot-water-circulating system, of a hot-water reservoir and a radiating-circuit interposed between said pipes, the said radiating-circuit being connected at both ends to said reservoir, substantially as described.

2. The combination, with pipes forming part of a hot-water-circulating system, of a hot-water reservoir connected with one of said pipes and a radiating-circuit having one end connected with said reservoir and its other end connected with the other pipe and also with said reservoir, substantially as described.

3. A car-heater consisting of the combination, with pipes forming part of a hot-water-circulating system, of a reservoir connected with the supply-pipe of said system, and a radiating-circuit having its supply and return pipes connected with said reservoir, a valve controlling the flow into the reservoir and radiating-pipes, and a thermostatic device connected to said valve, substantially as described.

4. A car-heater consisting of the combination, with pipes forming part of a hot-water-circulating system, of a hot-water reservoir connected with the supply-pipe of the said system, a radiating-circuit connected therewith and with the return-pipe of the system,



valves controlling the flow into and out of the reservoir and radiating pipes, and thermostatic operating devices for said valves, substantially as described.

5 5. A car-heater consisting of two pipes forming a part of a hot-water-circulating system, each of said pipes provided with a balanced valve at opposite ends of the car, in combination with a hot-water reservoir and a radiating-circuit, said radiating circuit having its

return-pipe connected to the reservoir and to the return-pipe of the circulating system, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM L. HORNE.

Witnesses:

E. T. WALKER,  
M. P. CALLAN.