

(No Model.)

3 Sheets—Sheet 1.

R. D. KIMBALL.
CAR HEATING SYSTEM.

No. 422,596.

Patented Mar. 4, 1890.

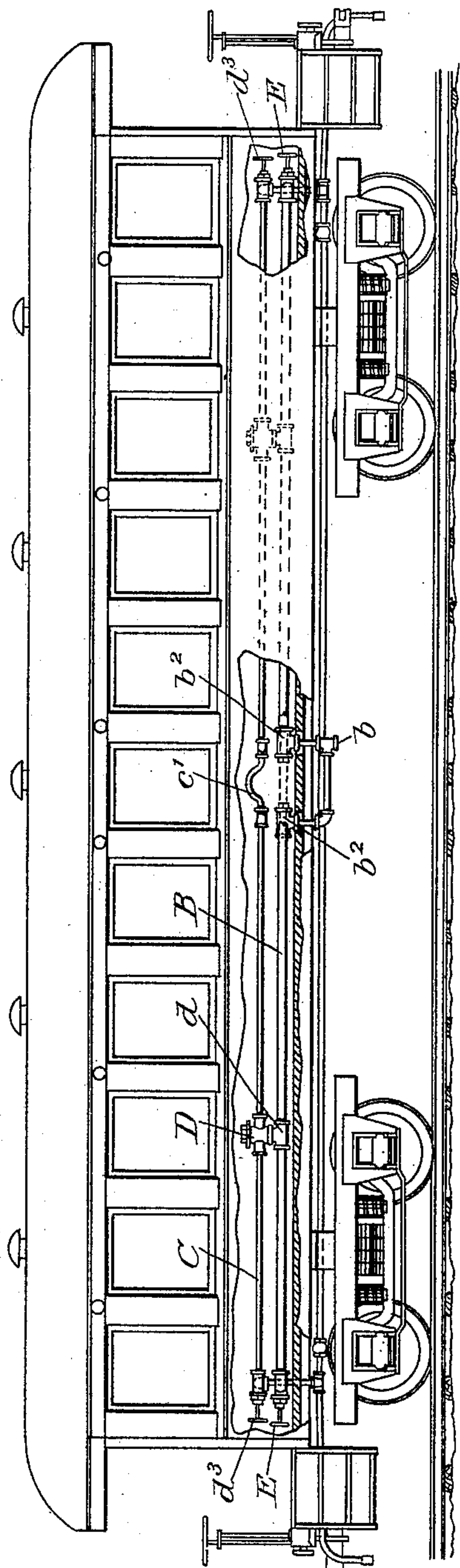


Fig. 1.

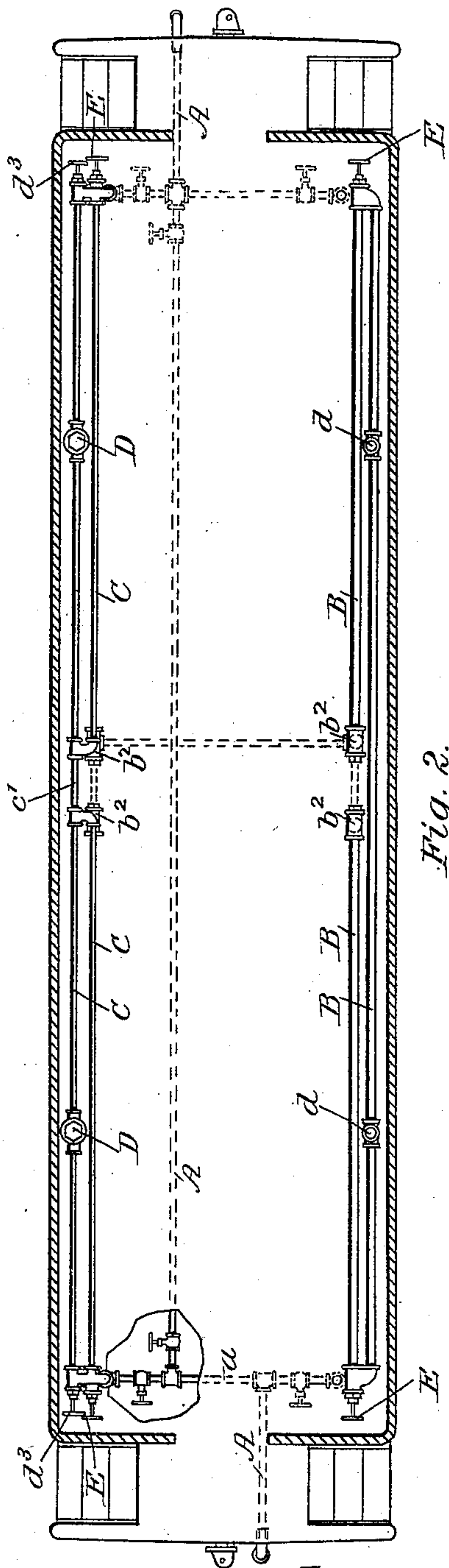


Fig. 2.

Witnesses.
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Samuel H. Kimball

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Richard D. Kimball

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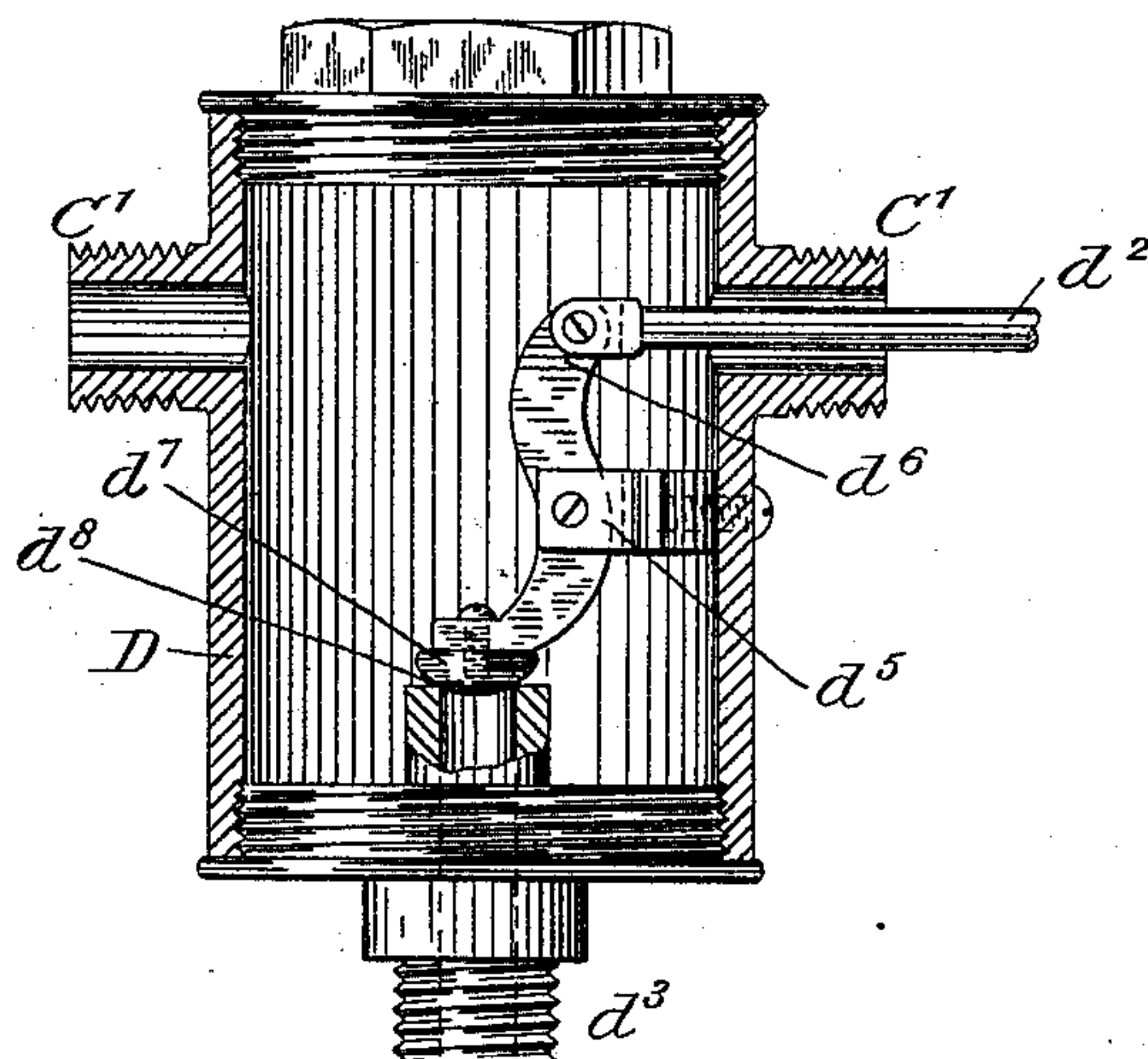


Fig. 3.

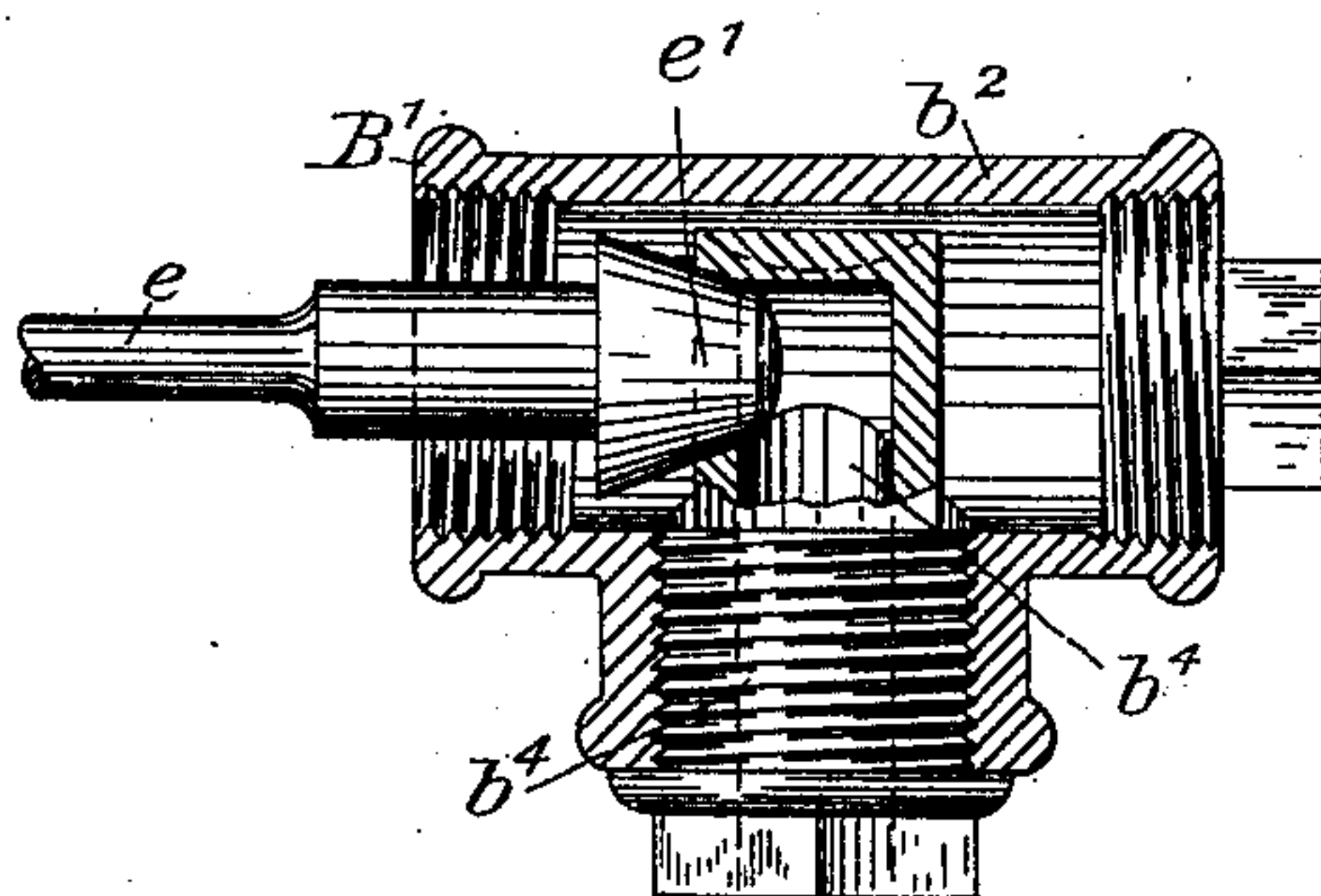


Fig. 4.

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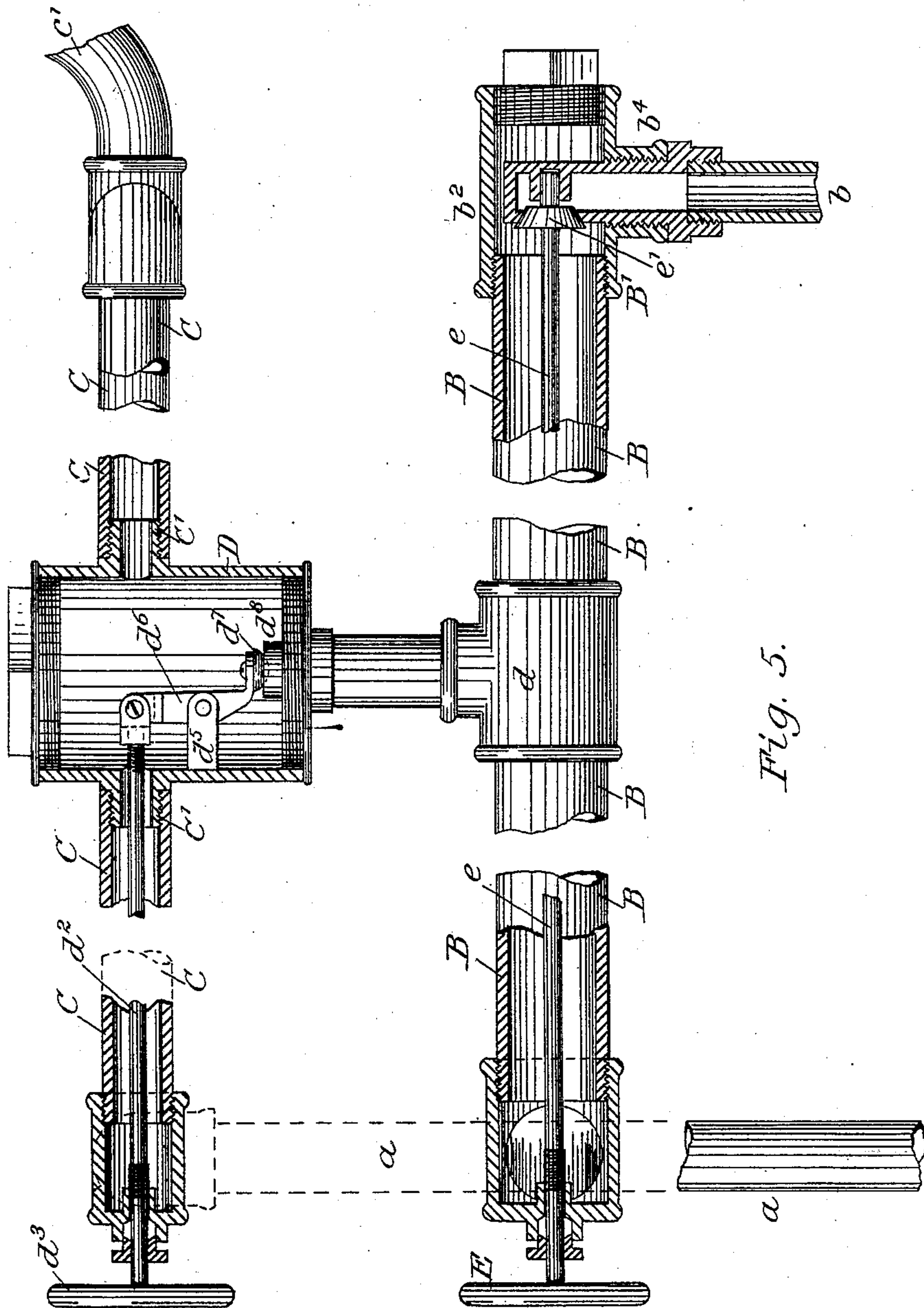
(No Model.)

3 Sheets—Sheet 3.

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CAR HEATING SYSTEM.

No. 422,596.

Patented Mar. 4, 1890.



Witnesses.
Joseph Willett.
Sam'l. H. Kimball.

Inventor
Richard D. Kimball

UNITED STATES PATENT OFFICE.

RICHARD D. KIMBALL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE KIMBALL AUTOMATIC CAR HEATING COMPANY, OF PORTLAND, MAINE.

CAR-HEATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 422,596, dated March 4, 1890.

Application filed May 23, 1889. Serial No. 311,783. (No model.)

To all whom it may concern:

Be it known that I, RICHARD D. KIMBALL, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Car-Heating Systems, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

In an application now pending in the Patent Office, filed July 2, 1888, No. 278,786, I described an apparatus for heating cars in which there were two systems of circulating-pipes, one containing steam only, the other containing hot water only, which two systems of pipes—one for steam and one for hot water—were separated by an automatic steam-trap, so as to carry off as soon as it was formed the water of condensation from the steam-pipes to the hot-water pipes, and in which there was also described at the outlet of the hot-water pipes an automatic thermostatic valve to discharge the water of condensation when it had sufficiently radiated its heat into the car.

The invention which I now describe is an improvement on the invention set forth in the application above referred to.

In the drawings, Figure 1 represents a car, partly in elevation, provided with a steam-heating system of my improvement. Fig. 2 represents a plan of the steam-pipes as applied to a car. Fig. 3 is a vertical section of the form of steam trap or valve which I prefer to employ between the steam-circulating pipes and the water-circulating pipes; and Fig. 4 is the form of discharge-valve which I prefer to employ at the outlet of the hot-water pipes. Fig. 5 is a side elevation, partly broken away, of a fragment of the steam and water circulating pipes.

The main steam-pipe, which furnishes steam from the engine to the cars, is shown in dotted lines at A, Fig. 2. It runs underneath the car. There are branches at *a* at either end of the car by which the steam is admitted to the steam-pipes, (marked C in Fig. 1.) At the center of the car there is an expansion-joint,

(marked *c'* in Fig. 1.) The hot-water pipes are marked B in Figs. 1 and 2. The steam is admitted to the steam-pipe and circulates therein. These steam-pipes are so inclined that any water formed in them by condensation drains to a point adjacent to the location of the steam or valve traps D. These steam traps or valves D are mounted on the coupling *d* of the hot-water-circulating pipe B, as shown in Fig. 2. Through the center of the steam-pipe C on one side of the steam-trap D there extends a rod *d*², as shown in Fig. 3, and this rod may be adjusted in length by the hand-wheel *d*³, as shown in Figs. 1 and 2. This forms, therefore, a comparatively familiar rod-trap. The steam to which the rod *d*² is exposed is the steam which is nearest to the delivery-point of the water of condensation, and consequently as the water of condensation will run past the rod *d*² the temperature of this rod will always be nearly the temperature of the water of condensation, and therefore nearer the temperature of the car than live steam would be. This arrangement also allows a very long thermostatic rod *d*² to be provided, and therefore makes a very delicate steam-trap and one which is susceptible of nice adjustment.

It will be observed that the water of condensation from the steam-pipes is admitted into the pipes B at *d*—that is to say, to the outside pipe. This water of condensation is discharged at the outlet-orifice of the pipes B, which is situated at or near the center of the car at *b*, the valve being represented at *b*², and the pipe leading from the valve toward the center of the car being shown in dotted lines on Fig. 2 at *b*, the discharge-pipe from both branches of the hot-water pipe B uniting together for a discharge common to the two branches. It will be observed in Fig. 2 that this arrangement of pipes gives a length to the outlet drainage of the hot-water pipe nearly equal to half the length of a car. The valve which controls this outlet is again a long rod thermostatic valve, and the rod, being nearly of the length of half the car, has a large movement and works with great delicacy. This rod is also entirely inclosed in

the hot-water pipe, and, as it is near its outlet, is submitted to the lowest temperature of the water in the hot-water pipe. This outlet-valve is of the form shown in Fig. 4. It is
5 operated by a hand-wheel and screw, as shown at E, Fig. 2.

Turning now to the drawings, Fig. 3, C' represents the steam-pipe connections. They enter the shell of the thermostatic valve on
10 each side.

D is the trap or valve.

d^3 is the connection of the valve with the hot-water pipe. To a boss d^5 on the interior of the shell of the valve is hinged a lever d^6 ,
15 to the end of which lever is attached a valve-facing d^7 , which rests upon a raised valve-seat d^8 . The thermostatic rod d^2 is made of a metal which has a somewhat greater susceptibility to thermal influence than the metal
20 of the pipe C, and consequently will expand and contract somewhat quicker than this pipe. It is therefore so inclosed by the heating medium that it will be at a higher temperature than the pipe C, in which it is in-
25 closed. This also gives it great susceptibility. Although the form of the discharge-valve shown in Fig. 4 differs somewhat from the trap or valve D, yet the principle of its operation is the same.

30 b^2 is the shell of the valve. The thermostatic rod is marked e .

B' is the neck of this valve b^2 , by which it is coupled to the pipe B. (Shown in Fig. 2.)

A valve-seat is formed in the interior of this
35 shell b^2 , which connects with a discharge-

nozzle b^4 , and a valve-head e' is formed on the end of the rod e .

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

40 1. The combination, with a car-heating system consisting of steam-circulating pipe or pipes and hot-water-circulating pipe or pipes, of thermostatic steam-traps, the discharge-
45 valves D of which are placed between and connect the said steam-circulating pipe or pipes and said hot-water-circulating pipe or pipes, the expansion-rods of said thermostatic steam-traps being entirely inclosed within
50 the pipe or pipes of said steam circulation, substantially as described.

2. The combination, in a car-heating system consisting of steam-circulating pipe or pipes and hot-water-circulating pipe or pipes, of a thermostatic steam-trap D between and
55 connecting said steam and hot-water circulating pipe or pipes, of a thermostatic discharge-valve e' , the expansion-rod of which is entirely inclosed within and extends the entire
60 length of the hot-water-circulating pipe, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 18th day of May, A. D. 1889.

RICHARD D. KIMBALL.

Witnesses:

SAML. H. KIMBALL,
JOSEPH WILLETT.