

(No Model.)

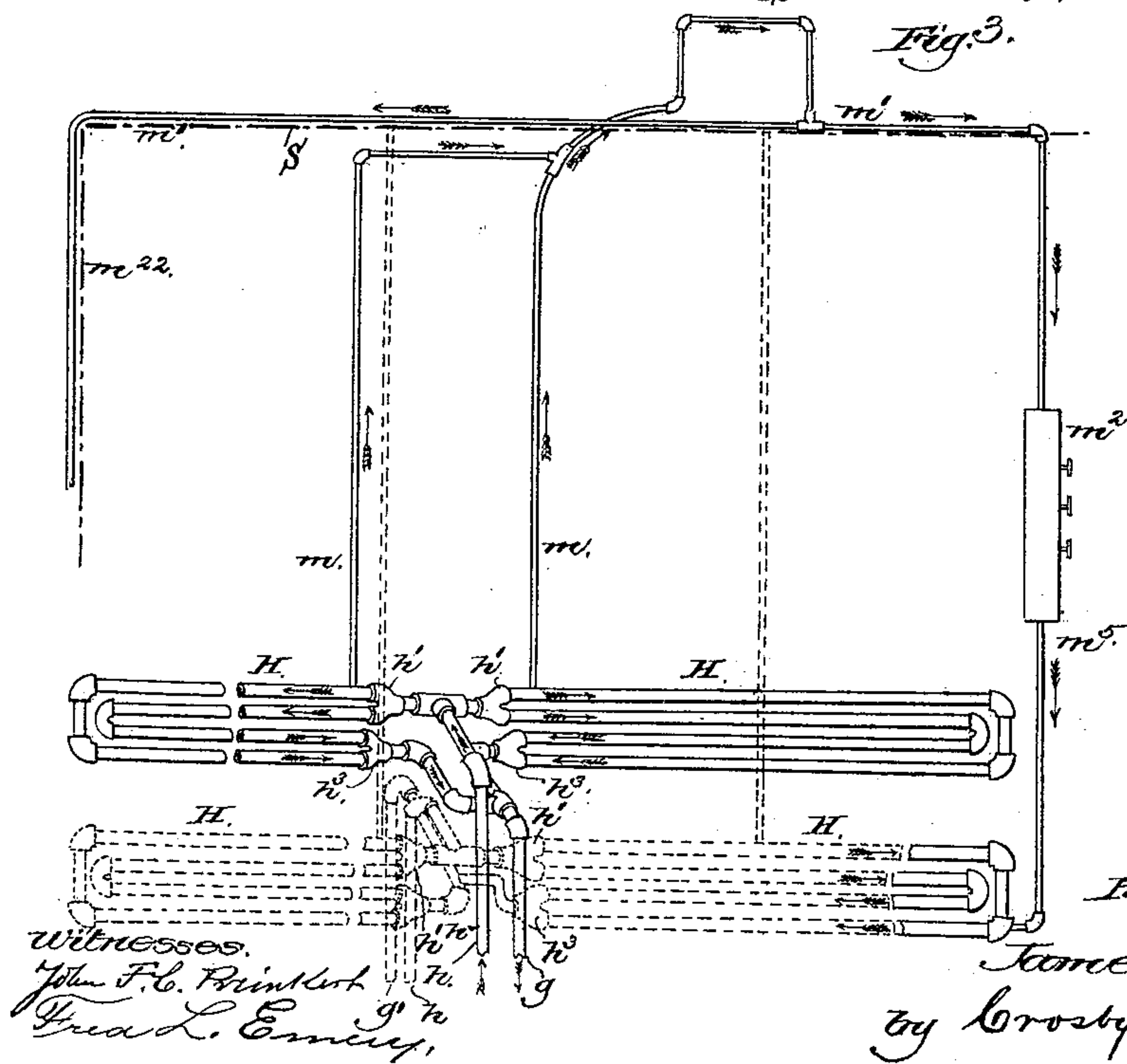
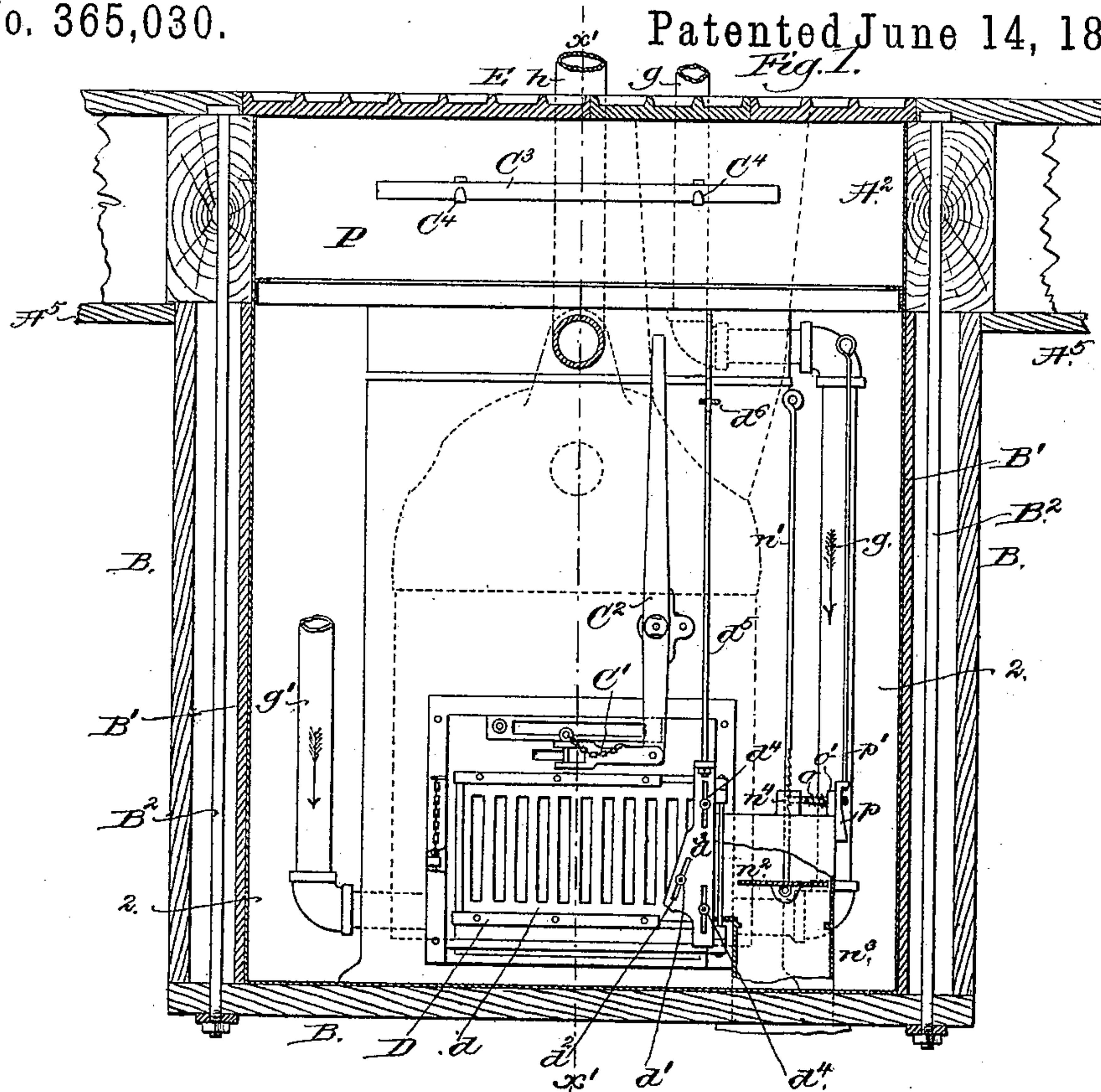
2 Sheets—Sheet 1.

J. M. THAYER.

HEATER FOR CARS AND OTHER PURPOSES.

No. 365,030.

Patented June 14, 1887.



Inventor.

James M. Thayer,
by Crosby Gregory attys

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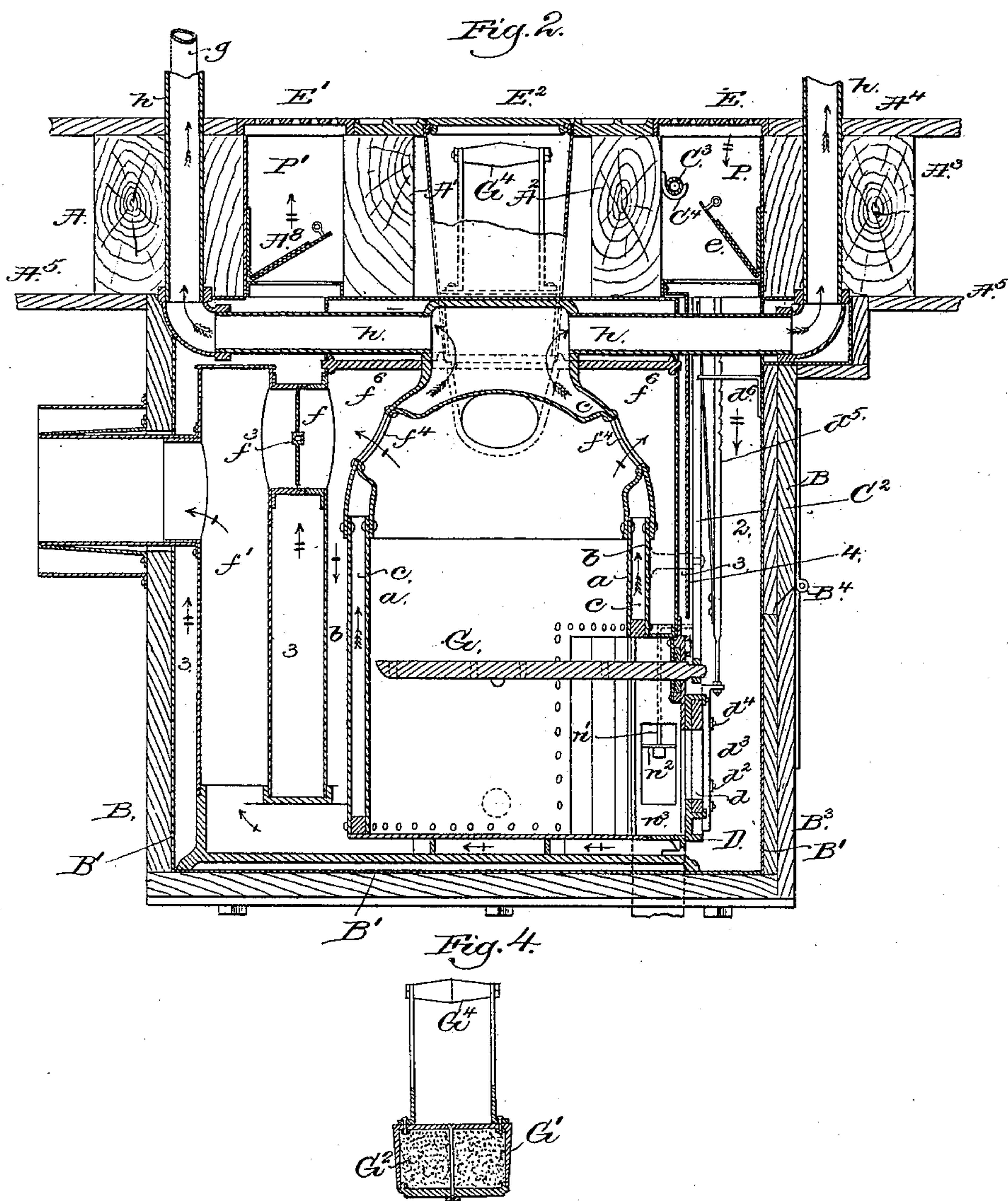
2 Sheets—Sheet 2.

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HEATER FOR CARS AND OTHER PURPOSES.

No. 365,030.

Patented June 14, 1887.



Witnesses
John F. C. Brewster
Fred L. Emery.

Inventor:
 James M. Thayer.
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UNITED STATES PATENT OFFICE.

JAMES M. THAYER, OF RANDOLPH, ASSIGNOR OF TWO-THIRDS TO THEOPHILUS KING, JR., OF QUINCY, AND JOHN C. COOMBS, OF BOSTON, MASSACHUSETTS.

HEATER FOR CARS AND OTHER PURPOSES.

SPECIFICATION forming part of Letters Patent No. 365,030, dated June 14, 1887.

Application filed May 4, 1885. Serial No. 164,288. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. THAYER, of Randolph, county of Norfolk, State of Massachusetts, have invented an Improvement in Heaters for Cars and other Purposes, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The object of my invention is to provide an improved apparatus for heating cars by means of hot water.

The particular features in which my invention especially consists will be pointed out in the claims at the end of this specification.

Fig. 1 in elevation shows one of my improved heaters attached to a part of the floor of a car, the box containing the heater being broken away in front of the heater proper.

Fig. 2 is a vertical cross section of Fig. 1 on the dotted line $x'x'$, the said figure showing only the center part of the car. Fig. 3 is a diagram showing part of the piping at the interior and on the roof of the car, and Fig. 4 a detail of the cover closing the coal-chute near the fire pot.

The timbers $A A' A^2 A^3$ are part of the longitudinal timbers constituting the bottom of the car-frame and holding the flooring A^4 . The usual bottom-sheathing is marked A^5 . At the under side of the car-body I have attached a box, B , preferably of wood lined with metal, as at B' , the said box being firmly attached to the under side of the car by means of strong bolts B^2 . The box B has a suitable door, B^3 , having hinges B^4 .

The heater is composed, essentially, of plates of steel riveted together to form an inner wall, a , and an outer wall, b , leaving a space or water-jacket, c , between them. The heater has a grate, G , of usual construction, which is vibrated when desired by a link, C' , and lever C^2 , engaged by a hand rod or handle or pipe, C^3 , which when not in use is supported on the hooks C^4 . The door D of the heater has a draft-slide, d , adapted to slide in guideways on the door, and the said draft-slide has a pin or projection, d' , which enters a diagonal slot, d^2 , in a cam-slide, d^3 , the lat-

ter having other slots to receive pins or projections d^1 on the door, the cam-slide having a rod, d^5 , which is extended upward into, or so as to be reached through the space between two of the floor-timbers, as at $A^2 A^3$, the said rod having suitable notches to be engaged with a guide, d^6 , to hold the said rod in adjusted position. The floor of the car at or near its center and above the heater is provided with metal gratings $E E'$, having suitable openings for the passage of air and a metal cover, E^2 . The grating E covers the space between the timbers $A^2 A^3$, into which space enters the cold air, which settles on the floor at the bottom of the car, and if the door or damper e is open, as it normally is when the car is running, the said cold air passes down into the box B and into the space 2, the rear or inner wall of which is the thin metal plate or diaphragm 4, which extends down nearly to the top of the door-frame, from which space the said air which does not enter the heater through the holes in the door left uncovered by the draft-slide passes under and back of the said diaphragm 4 into space 3, extended entirely about the heater, the pipes $f f'$ taking the products of combustion from the heater, leading from the said heater through the said space 3, thus imparting additional heat to the air in the said space, the said heated air rising in the space between the timbers $A A'$ through holes in the grating E' , and thence into the car at or near its center.

The heater at one side of the top has an attached coal or fuel chute, (shown by dotted lines, Fig. 1, and partly in section, Fig. 2,) and this chute is closed near the heater by a double cover, G' , (see Fig. 4,) having a space, G^2 , the upper part of the cover having an attached handle, G^4 , which may be reached from the interior of the car by lifting the plate E^2 in the floor. The space in the double cover will preferably be filled with some suitable fire-proof material. The space between the timbers A and A' is provided with a door or damper, A^8 , which may be closed when ashes are being removed or the heater is being cleansed, to thus prevent dust from entering the car. The water-jacket at its lower end

and at opposite sides of the heater has attached to it two inlet-pipes, g g' , which, extended up into the car, have joined to them the return-legs of the loops of circulating-pipes H . The water heated in the water-jacket rises into the dome-shaped top thereof, and passes into the two horizontal pipes h h' , which are turned or directed upward into the car above its floor, under a seat where the upper ends of the said pipes have applied to them Y-shaped fittings h' , which enable the hot water to be divided into the two main legs of the double loop-pipe, the said loop-pipes being extended from near the center of the car in opposite directions toward each end thereof, the hot water returning through the return-legs of the loop-pipes and passing through the Y-shaped fittings h^3 into one of the inlet-pipes g or g' , according to which side of the car the said loop-pipes are situated.

I do not herein claim these Y-fittings, but reserve the same for an application which I am about to file.

The water in practice will be heated only to about 200° (more or less) at the heater, and preferably so as not to generate steam, for if steam is generated the proper circulation of the water cannot be maintained. In case the water should be overheated at the heater and steam should be formed, the said steam will be conducted from the circulating-pipes through the steam-pipes m m' , one from each main branch of the circulating-pipes, into a condensing-pipe, m' , arranged outside the car at its top, which top is indicated by broken line S , Fig. 3, the said condensing-pipe leading to the tank m^2 , a portion of the said pipe, as at m^{22} , being led down outside and below the bottom of the car, its end being left open for the escape of air, steam, or water which does not find its way into the said tank m^2 . The water is led from the tank m^2 (a closed tank supported in the closet or otherwise of the car) through a pipe, m^5 , into one of the return-legs of the circulating-pipes.

If the fire is to be started, or if it becomes low and a stronger draft is desired, the attendant will turn the damper f^3 to more or less open the space in the throat or short pipe f , located between the pipe f' and the space f^6 , into which latter space, through the outlets f^4 , pass the products of combustion formed in the heater, and at the same time the attendant will lift the grating E , and, grasping the rod n' , (see Fig. 1,) will lift the valve or damper n^2 from its seat in the pipe n^3 , the open end of which is extended through the bottom of the box B , thus permitting a full supply of cold air into the heater direct from outside the car. When the fire is burning properly, the damper or valve n^2 is to be moved into its normal position to cut off the entrance of air into the box B . The rod n' , extended through the guide n^4 , is notched at one side, and said notches are engaged by a locking device, o , herein shown as a headed bolt extended through a lug, o' , and surrounded back of the lug by a

spiral spring, the end of the said spring opposite the lug acting against a short pin extended through the bolt o , the spring normally acting to push the point of the bolt into the guide n^4 and into one of the notches of the rod n' . The bolt o , between its head and the lug o' , is surrounded by a wedge block or slide, p , connected with a rod, p' , the said wedge-block having a slot to receive the bolt and to permit the block to be raised and lowered to cause its inclined face, acting against a suitable pin through the head of the bolt, to withdraw the point of the bolt from engagement with the teeth of the bar n' .

The purpose of the locking device is to retain the damper or valve n^2 in the position in which it is left by the attendant, and when the bolt is withdrawn the rod n' falls by gravity. As usual in such cases, the outlet of the pipe n^3 may be covered by a wire-cloth or other reticulated screen. The direction of the circulation of the water is designated by a plain arrow, the direction of the circulation of the products of combustion by arrows having one bar, and the direction of the atmospheric air-currents by arrows having two bars.

In my present invention the water entering the car from the heater passes directly to the end of the car from about the middle of its length along one side of the car, and then directly back to the middle of the car along the same side thereof and down into the water-jacket at its lower portion, thus maintaining uniform circulation of the water, which is essential to enable hot water to be practically used and produce an even temperature. By arranging the pipes as herein shown the hot water leaves the heater, travels through a very short circuit, and returns to the heater before it is robbed of its heat.

Instead of using a single main pipe from near the middle of the length of the car toward its end, as in my former apparatus, I now divide the current of hot water so that it passes toward each end of the car, and the water in any one pipe has to travel only from the middle of the car to its end and directly back. The pipes g or g' form practically a continuation of the return-pipes. The grating E covers the passage P and the grating E' the passage P' , cold air entering passage P from the car, and when heated being returned through the passage P' . As indicated in Fig. 1, the passages P and P' extend longitudinally of the car.

I claim—

1. A structure having a floor provided with passages P and P' , the box B , suspended from beneath the same, the heater arranged in said box, and a diaphragm, 4, dividing the box to form air-spaces 2 3, communicating with said passages, combined and operating substantially as described.

2. The car-body, box B , suspended therefrom, and the heater arranged within said box, combined with a pipe, n^3 , opening on the outside of the box to the external air and leading

directly into the draft-chamber of the heater, a valve in said pipe, and a notched rod and locking device therefor, consisting of a spring-bolt, *o*, and operating devices *p p'*, accessible
5 from the interior of the car to operate said valve, substantially as described.

3. The car provided with the passages *P* and *P'* and the door or dampers *e A*⁸ therein, and the box *B*, suspended below the car-body, combined with the heater located in the said box, and the diaphragm 4, the latter dividing the
10 box to form communicating air-spaces 2 3, the cold air from the interior of the car at the floor entering the passage *P* and then the
15 spaces 2 3, and, heated in the latter, being discharged through the passage *P'* and grating *E'* into the car, substantially as described.

4. A heater provided with a water-jacket, pipes *h h* connected thereto, main circulating-

pipes, and return-pipes, the tank *m*², pipes 20 *m*⁵, and series of steam-pipes, combined with the condensing-pipe *m'*, substantially as described.

5. The car-body, the box at its under side, and the heater therein having a water-jacket, 25 and hot-water-circulating pipes in connection with the said heater, combined with the condensing-pipe the open end of which is extended to or below the bottom of the car-body outside the same, substantially as described. 30

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES M. THAYER.

Witnesses:

GEO. W. GREGORY,
W. H. SIGSTON.