

J. B. COLLIN.
Apparatus for Heating Railroad-Cars.
No. 222,246. Patented Dec. 2, 1879.

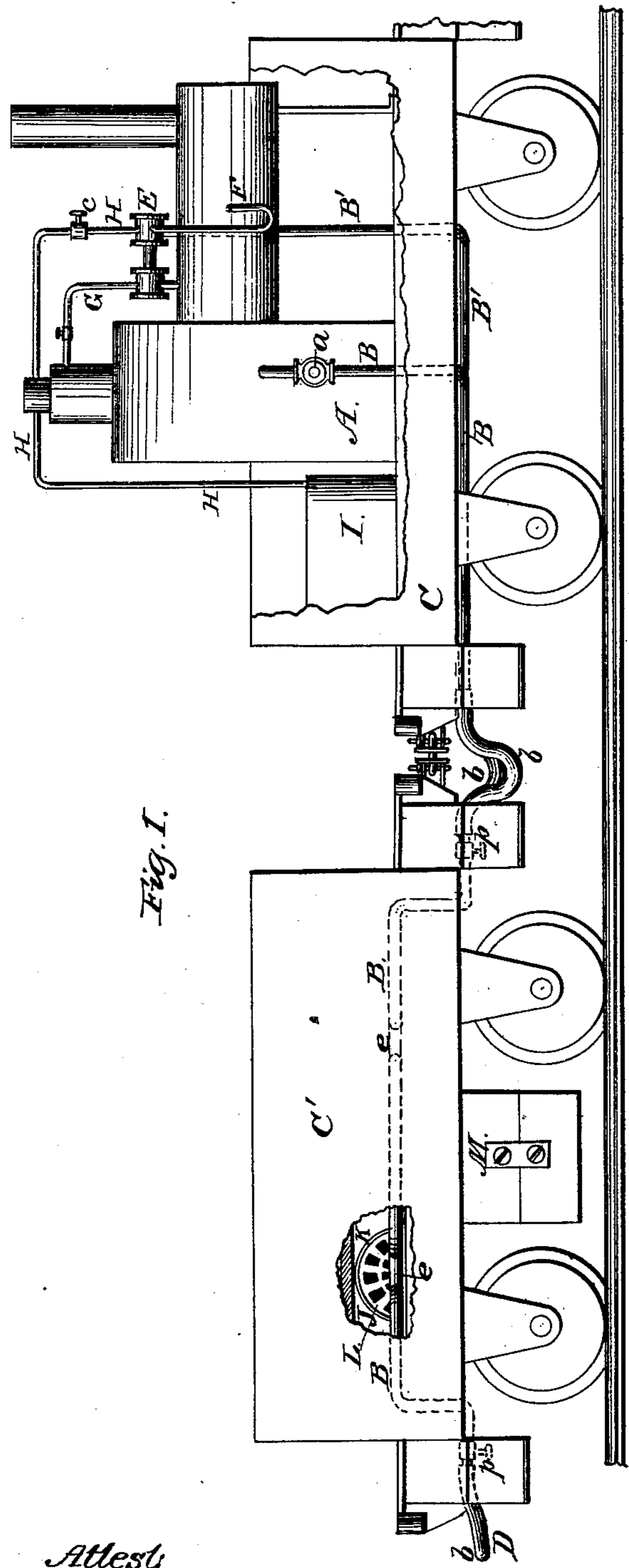


Fig. 1.

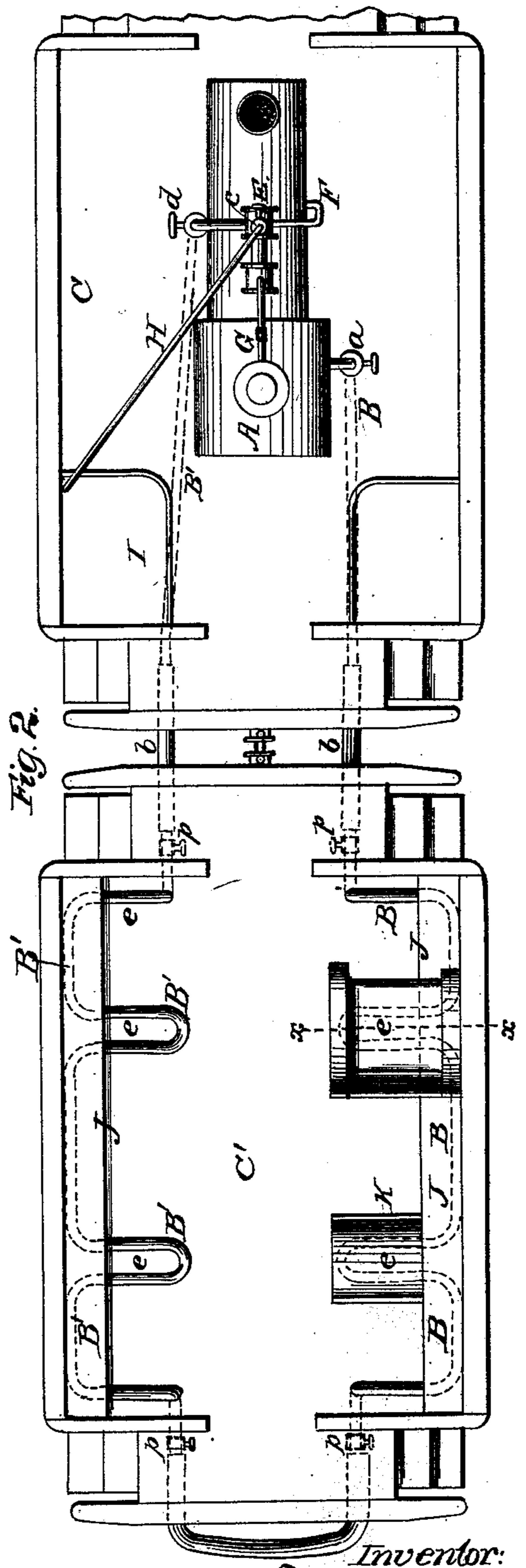


Fig. 2.

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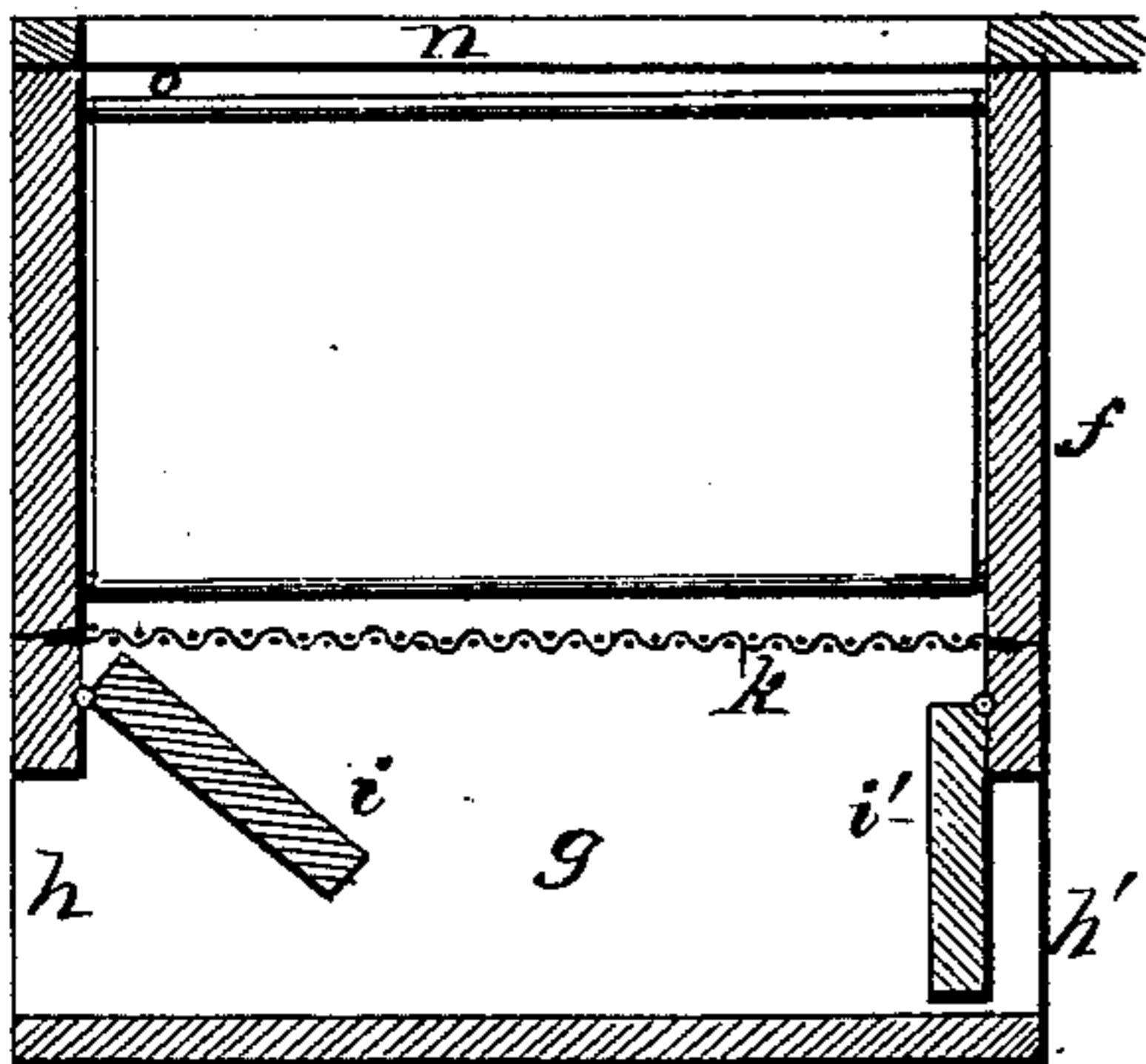


Fig. 3.

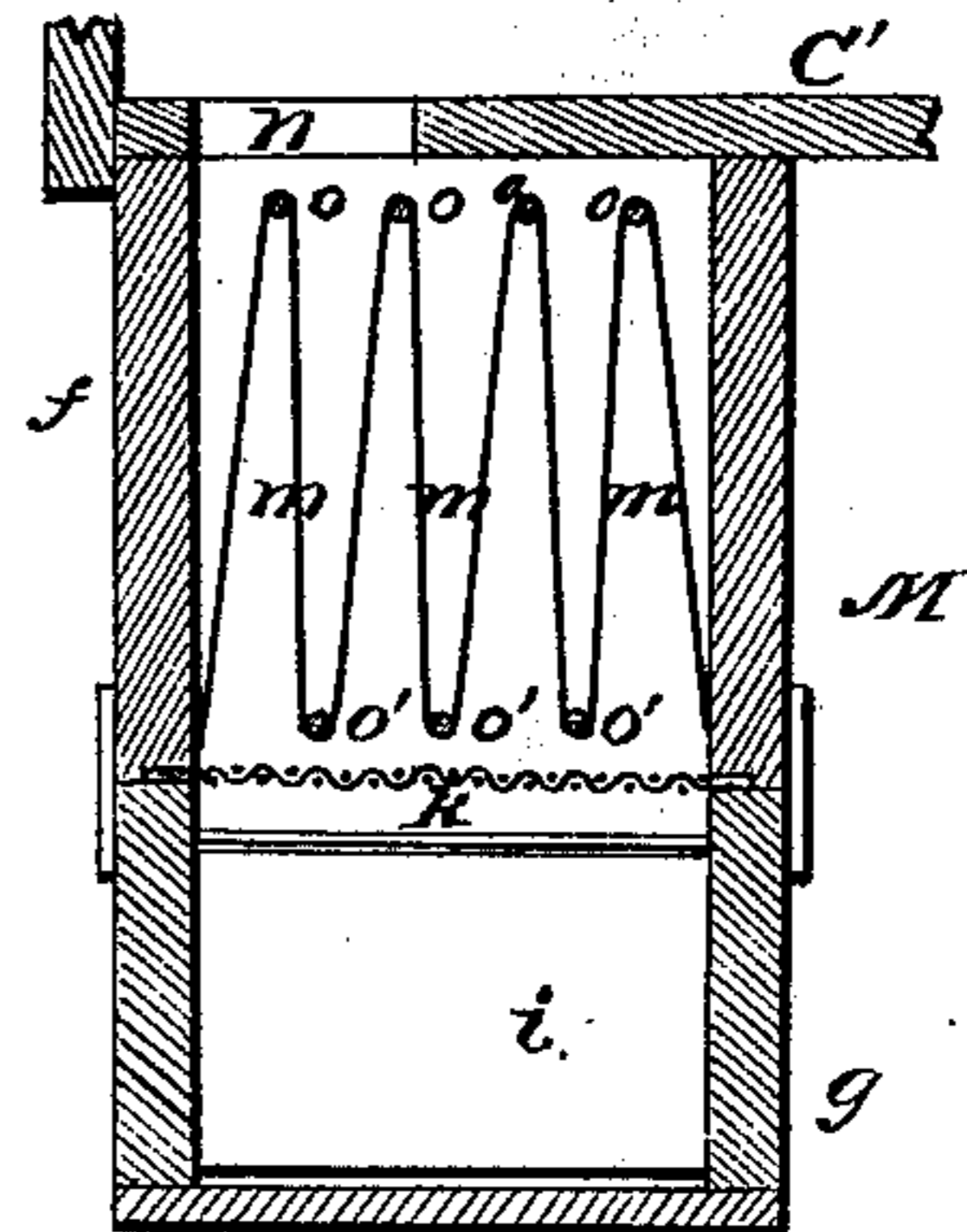


Fig. 4.

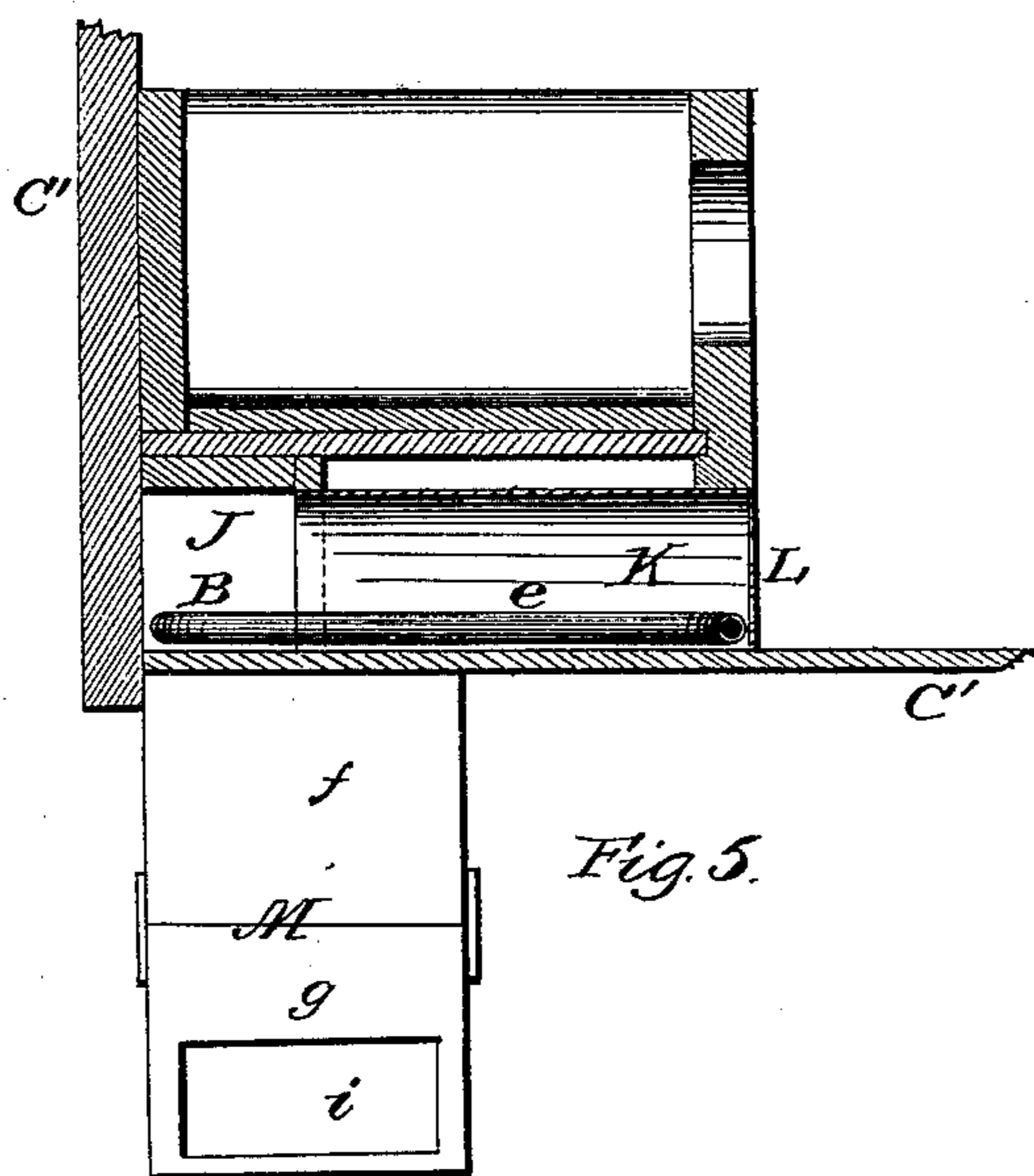


Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN B. COLLIN, OF ALTOONA, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR HEATING RAILROAD-CARS.

Specification forming part of Letters Patent No. **222,246**, dated December 2, 1879; application filed April 25, 1879.

To all whom it may concern:

Be it known that I, JOHN B. COLLIN, of Altoona, in the county of Blair and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Heating Railroad Cars and Trains; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification, in which—

Figure 1 represents a side elevation of two railroad-cars to which my improvements have been applied, the roof and upper portion of the cars being cut away, and a portion of their sides broken away to show more clearly the arrangement and construction of parts. Fig. 2 represents a top or plan view of the two cars with their roofs removed, illustrating the arrangement and mode of applying my improvements. The boiler shown in these figures is intended to represent a stationary boiler of any known and approved type, placed in one of the cars of the train, so as to warm and ventilate the others; or it may represent the locomotive-boiler itself. Fig. 3 represents a longitudinal vertical section of the ventilating device, and Fig. 4 a transverse vertical section of the same. Fig. 5 represents a detail sectional view through one of the seats on the line *x x*, and shows the arrangement of the ventilator.

My invention relates to a new and improved mode of heating railroad and other cars.

I am aware that heretofore a continuous pipe extending throughout the train has been used, in which virgin steam from the locomotive-boiler has been employed to heat the cars.

I am also aware that exhaust-steam of the engine has been employed for the same purpose; but to these plans there are serious objections—as, for instance, to the first plan, the locomotive in drawing a long train of cars, or in ascending a heavy grade, requires the use of all the steam that can be generated, and consequently at times the steam has to be shut off from the pipes which heat the cars, thereby inadequately heating them or otherwise

subjecting the passengers to sudden changes of temperature. To the second plan there is this objection, that the utilization of the exhaust-steam by forcing it through the circulating-pipes causes a reaction upon the engine, and consequent loss of power, besides which its utilization as a heater for the cars deprives the furnace of its aid as a forcer of the draft for the combustion of the fuel. The other methods, when hot water is used, are defective by reason of the inefficient and inadequate means resorted to to obtain a thorough circulation.

I am also aware that hot water drawn from the water-space of a boiler has been suggested for use in heating houses, the circulation of the water in the pipes being effected by a force-pump, the pump for this purpose being attached to the boiler at the point the water issues therefrom. This arrangement is defective, as it deprives the water in the pipes of all benefit of the pressure of the steam in the boiler as an aid to its circulation, and as an aid to the pump in forcing it back again into the boiler.

The object of my invention is to remedy these defects by establishing and maintaining a rapid and effective circulation of boiling water within the pipes throughout the train.

For these purposes my invention consists in drawing the hot water which is to be used for heating the cars direct from the water-space of the locomotive-boiler, and leading it back through the cars by means of a circulating-pipe, it passing, as it leaves the boiler, along on one side of the cars and returning on the other, and connecting with the supply-pipe of the regular locomotive feed-pump, by which it is forced back again into the boiler; or it may be led into the tank on the tender and thence pumped back into the boiler. This plan I adopt where the locomotive is not required to draw very heavy trains, or trains up many and heavy grades; but where the work to be performed by the locomotive is very heavy and great, I use an independent steam-boiler and locate it upon one of the cars, and draw the hot water from its water-space and lead it along the sides of the cars by means of a circulating-pipe in the same manner as from the locomotive-boiler, and bring it back

again to the boiler, into which I force it by means of a pump arranged at some point within the circuit, and which I prefer should be upon or near the boiler; or it may be allowed to discharge into the supply-tank of the boiler, whence it can be returned to the boiler by means of an injector or other boiler-supply pump.

To enable others skilled in the art to make, construct, and use my invention, I will now proceed to describe its parts in detail, omitting a particular description of such parts of a car, locomotive, or steam-boiler as are non-essential to a full understanding of my present improvement.

In the drawings, A represents a steam-boiler arranged in a car, C—or it may represent the locomotive-boiler itself—from the side of which, in the water-space, leads a pipe, B, provided with a valve, *a*. This pipe leads back and connects by means of flexible hose-pipes *b* with a corresponding pipe, B, arranged in the next car, C', in the rear. Each car of the train is intended to be supplied with a pipe, B, which is connected to corresponding pipes B on the adjoining cars by the flexible hose *b*, which should be provided with suitable couplings, capable, if desired, of being automatically detached under unusual strain, and, if deemed advisable, with automatically-closing valves, which should also automatically open on being again coupled together; or said pipes B may be provided at each end with stop-cocks *p*, to retain the water on uncoupling the cars; but I prefer the automatic valves. These pipes B run on one side throughout the whole length of the train and are connected to similar pipes B', which lead back to the boiler on the other side, as illustrated in Fig. 2, wherein the coupling-pipe D shows a method of connecting the two pipes B and B' together. Any suitable coupling device for this purpose may be used.

Pipes B' lead back to the boiler A and communicate therewith through a force-pump, E, of any suitable and known construction.

F represents the pipe through which the return-water is forced back into the boiler by pump E.

G represents the steam-pipe that supplies steam to the engine that drives the pump, and H a pipe leading from the pump to a water-tank, I, arranged on the car that carries the boiler, and which is used for supplying water to the boiler. *c* represents a valve in pipe H, and *d* a valve in pipe B'.

The operation of the apparatus for circulating the hot water is as follows: Valves *c* and *d* are first opened; then valve *a* is turned to admit the hot water from the boiler A into the pipes B. As the water enters the coils B the air escapes, through the pipes B', valves *d* and *c*, and pipe H, into the tank I, and in due course is followed by the water. As soon as the water comes through the pipe solid and free from air, the pump is started by opening the steam-valve in pipe G, and closing the

valve *c*. This done, the apparatus is then in full running order.

The rate at which the water is circulated is from that time on regulated by the speed of the pump. No water is wasted excepting the exhaust of the pump.

When but a moderate degree of artificial heat is required to make the cars comfortably warm, the pump E may be stopped and the return-water allowed to circulate slowly through it and discharge itself into the supply-tank I, whence it can be forced back again into the boiler, as required, by an injector or other ordinary supply-pump; but where, instead of using the independent boiler arranged in one of the cars and just described, I use the locomotive itself as the source of the hot-water supply, then I prefer, instead of using the pump E, to lead the end of pipe B' directly into the supply-pipe of the regular locomotive feed-pump, or else into the tank of the locomotive-tender, whence it is forced back into the boiler in the usual way; but I prefer the former mode of doing it by leading it into the supply-pipe.

Now, by reference to Fig. 2 of the drawings, it will be seen that the pipes B B' pass along the bottom at the sides of the cars and are bent or coiled under each seat. The main parts of the pipes which run along the sides of the cars are inclosed in a box-tube, J, forming an air-chamber, which is provided with openings at the side opposite each seat, through which the coils or bends *e* of the pipes B B' are projected and pass under the seats. These bends *e* are each covered over with a shield, K, which also forms an air-heating chamber, the end of which is provided with a register, L, (see Fig. 1,) for the escape of the air into the interior of the car.

Air is supplied to the box-tube J and chambers K on each side of the car by means of one or more air-boxes, M, which I prefer to construct in the manner shortly to be described. These boxes are secured to the bottom of the car at the sides, and in them the air is caught and filtered by passing it through a cloth screen, arranged in a peculiar manner, with a view of securing a large surface within a small space, and is thence passed through the bottom of the car into the system of air-passages and chambers J and K, before referred to, which surround the hot-water pipes, and whence, after being heated, it escapes through the registers L into the center aisle of the cars.

The construction of these filtering-boxes, which, though adapted for use therewith, does not form part of the present invention, the same having been withdrawn from this case to form the subject-matter of another patent, is well illustrated in Figs. 3, 4, and 5. They are made of rectangular form, longer than they are wide, and are arranged and secured lengthwise of the car. These boxes are made in two parts, *f* and *g*. The lower half, *g*, is provided with openings *h h'* at each end, and with

doors *i i'* to close them. These doors swing open in a vertical plane, they, for this purpose, being hinged at the top, as shown in Fig. 3. Thus constructed, as the cars advance, the air forces open one of the doors and firmly closes the other, as shown in the figure, and in so doing is forced up through the wire-gauze diaphragm *k* into the upper half of the box, and through the cloth screen *m*, and thence through the opening *n* of the box into the air-passages *J*, and from there through chambers *K* and registers *L* into the center aisle of the car, it, in its passage, being heated by the hot water in the pipes *B B'* and their bends or coils *e*. The wire-gauze air-screen *k* is attached to the upper side of the lower half, *g*, of box *M*. The upper half, *f*, of box *M* is provided with a double series of rods or bars, the one series, *o*, at or near its top, and the other series, *o'*, at or near its bottom, and which, for obvious reasons, I prefer should run lengthwise of the box, although they may be made to run crosswise. Over these rods is passed a cloth screen of suitable texture and material, in the manner shown in Fig. 4—that is to say, by first passing one end over one of the top side bars, *o*, and then over the lower side bar, *o'*, and then over the next top bar, *o*, and lower bar, *o'*, and so on for as many bars as there are arranged in the box. The two ends are then firmly secured to the sides of the upper half, *f*, of the box. This mode of arranging the screening-cloth gives much surface for filtering and purifying the air from dust, &c., in a small space.

The two halves *f* and *g*, thus constructed, are secured together in any suitable way, but so that the lower half can be readily removed

from the other, to give access to the cloth screen *m*, for the purpose of dusting and cleaning it whenever its pores become clogged.

It will be apparent that this filtering-box will operate no matter in what direction the cars move.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The apparatus herein described for heating railroad-cars by hot water, consisting of a series of circulating-pipes, *B B'*, connected by flexible hose-pipes *b*, the circulating-pipes communicating at their induction end with the water-space of a steam-boiler arranged upon one of said cars, and used in connection with a pump, *E*, arranged at or near their discharge end to force the water back again into the boiler, substantially as described.

2. In combination with a locomotive-boiler and its feed-pump, a circulating-pipe, *B B'*, and flexible hose-connections *b*, substantially as set forth.

3. In combination with a locomotive-boiler, a series of circulating-pipes, *B B'*, having flexible hose-connections *b*, and communicating at their induction end with the water-space of the boiler, and a pump arranged at or near their discharge end to force the water back again into the boiler.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN B. COLLIN.

Witnesses:

W. C. STEARNS,
T. W. COLE.