(No Model.)

3 Sheets—Sheet 1.

F. S. HEATH.

CAR HEATER.

No. 257,325.

Patented May 2, 1882.

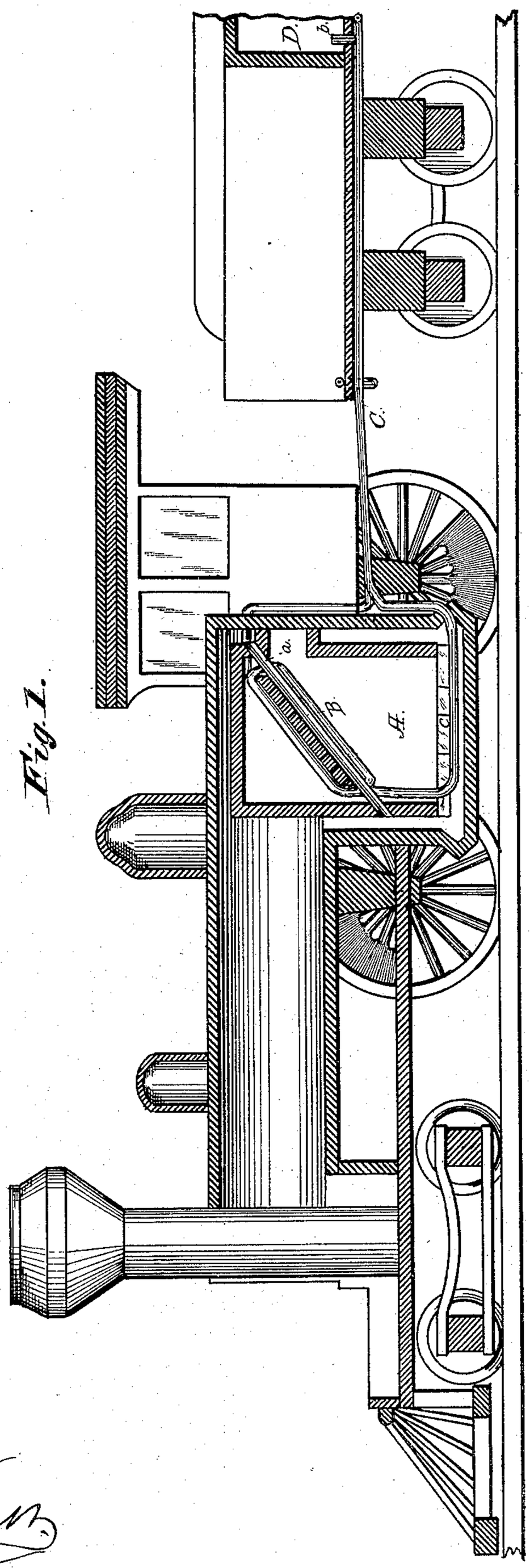


Fig. 1.

Witnesses:

J. C. Clark.

Wm. J. Clayton.

Inventor:

Francis S. Heath

by Geo. W. Dyer

Atty

(No Model.) 3 Sheets—Sheet 2.

F. S. HEATH.

CAR HEATER.

No. 257,325. Patented May 2, 1882.

Fig. 2.

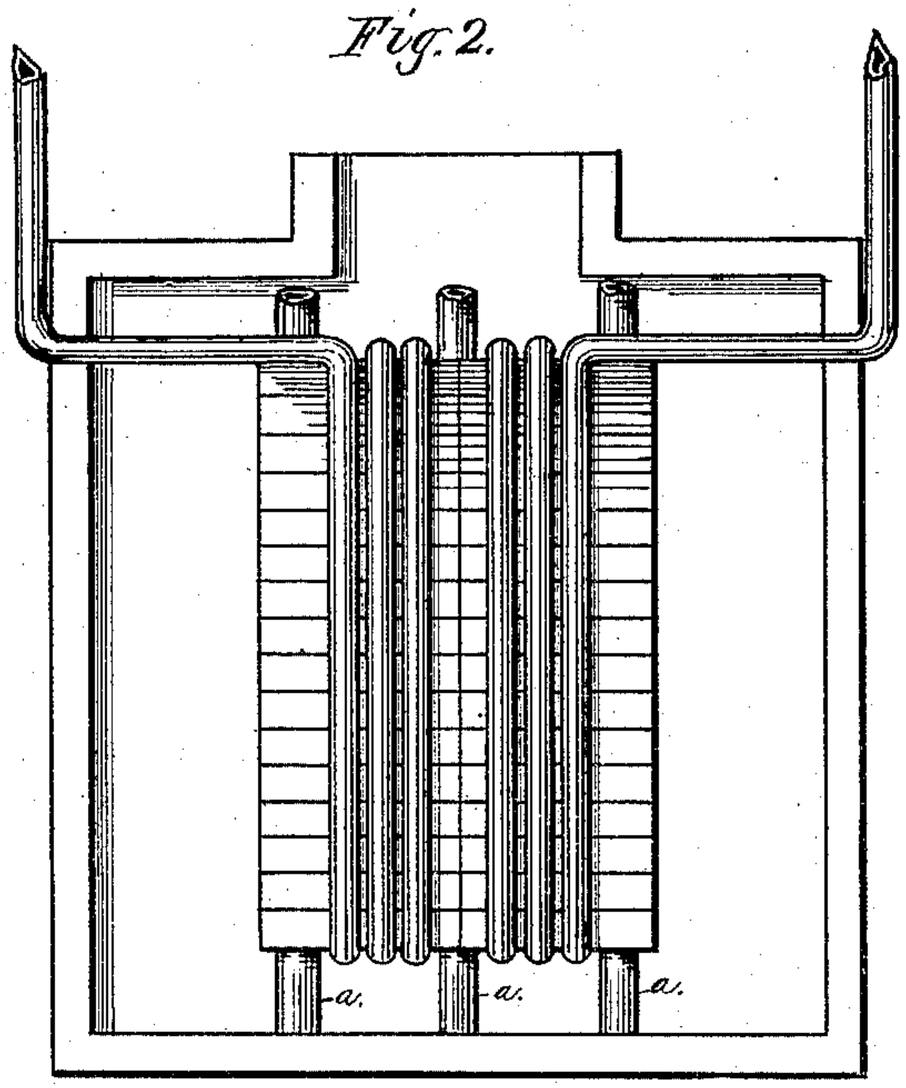
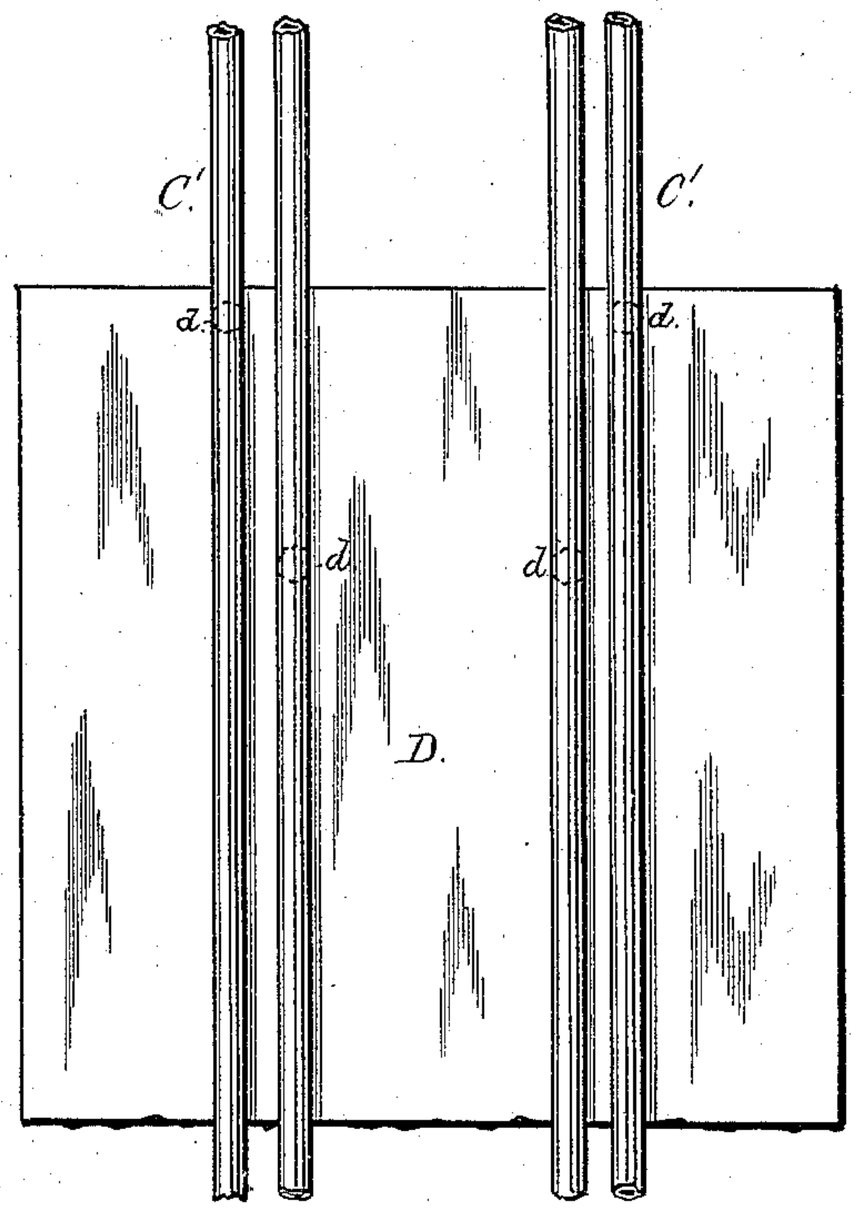


Fig. 3.



Witnesses:
P. Clark.
Wm. J. Clagett.

Inventor:
Frank C. S. Heath
by Geo. W. Ager
Atty

(No Model.)

3 Sheets—Sheet 3.

F. S. HEATH.

CAR HEATER.

No. 257,325. Patented May 2, 1882.

Fig. 4.

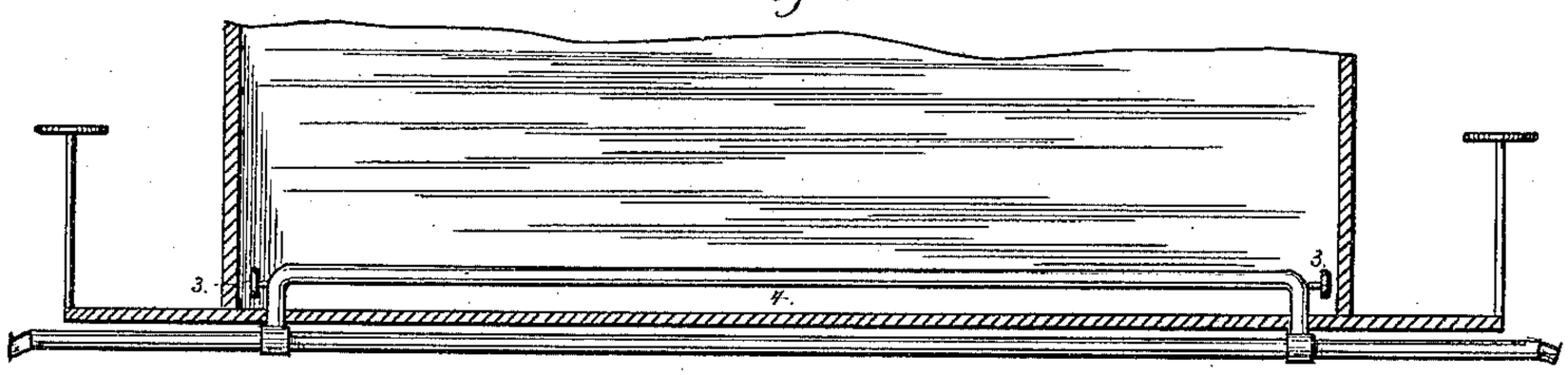


Fig. 5.

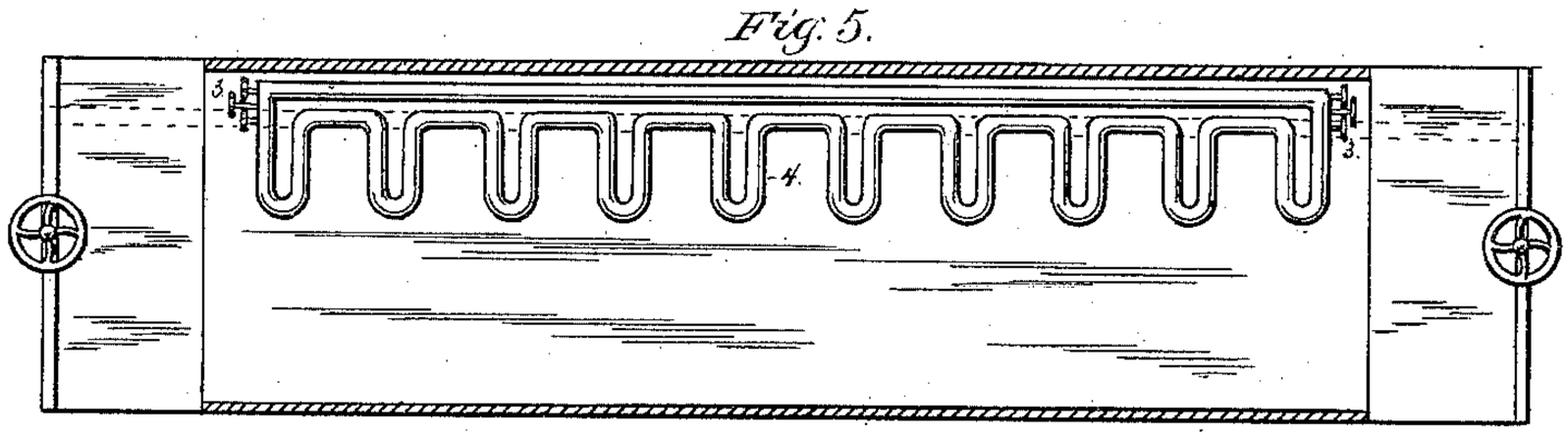


Fig. 6.

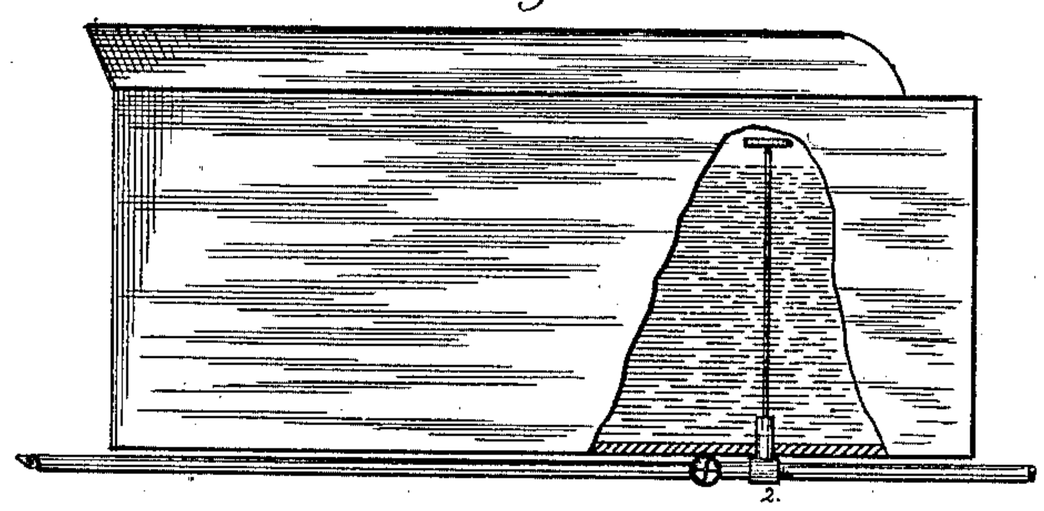
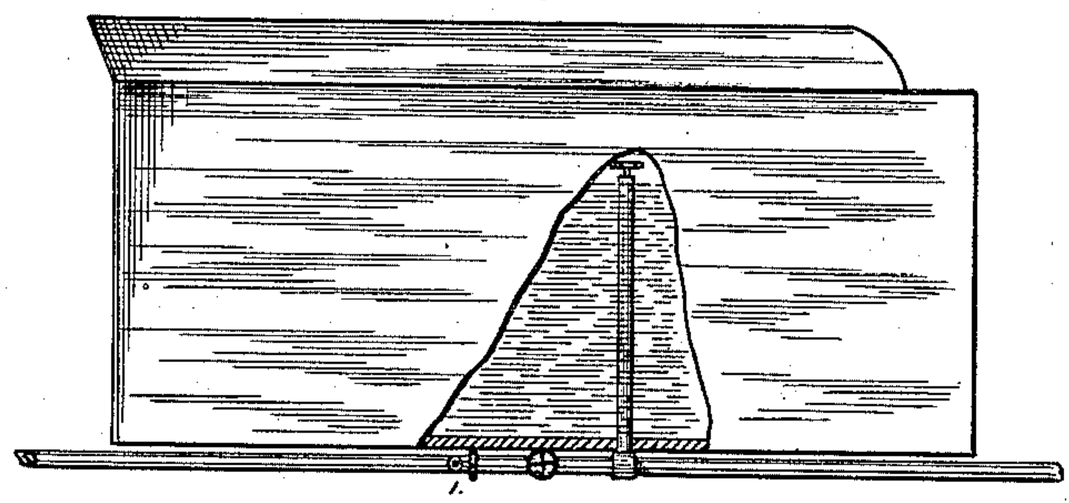


Fig. 7.



WITNESSES

J. C. Clark

John C. Schroeder

INVENTOR

Francis S. Heath

by Geo. W. Dyer,

Attorney

UNITED STATES PATENT OFFICE.

FRANK S. HEATH, OF CORRY, PENNSYLVANIA.

CAR-HEATER.

SPECIFICATION forming part of Letters Patent No. 257,325, dated May 2, 1882.

Application filed February 15, 1882. (No model.)

To all whom it may concern:

Be it known that I, FRANK S. HEATH, of Corry, in the county of Erie and State of Pennsylvania, have invented a new and useful Improvement in Heating Railroad-Cars; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object I have in view is the heating of railroad passenger-cars in a way which shall be economical for the railroad companies and safe for the passengers; and the invention consists broadly in the employment of one or more continuous circuits of water-pipe which extend the entire length of the train, or so much of the same as may be desirable, and, passing through the fire-box of the locomotive in one portion of the circuit, the water in such pipe or pipes is heated, and caused thereby to circulate the whole length of the train and return again and repass through the fire-box, and continue this circulation as long as may be needful.

Prior to my invention passenger-cars for railroads had been warmed by heating-stoves of various kinds placed in such cars, some using simply radiant heat, others heating water or air in pipes which passed throughout each car and was confined to the same.

Inventions had been made for warming trains of passenger-cars by taking steam from the boiler of the locomotive or hot water from the water-jacket of the fire-box and conducting the same through pipes leading from one car to the next. I am not aware, however, that any person except myself has attempted the employment of continuous circuits of water-pipes, a part of which circuit passes through the fire-box of the locomotive.

As it is evident that my invention can be varied very greatly in the construction and arrangement of parts, I proceed to describe one of such arrangements which I deem quite satisfactory, calling attention to the drawings accompanying this specification, in which—

Figure 1 is a central vertical section through the locomotive and tender; Fig. 2, a view from above of the interior of the fire-box, and Fig. 3 a bottom plan of that portion of the tender containing the water-tank; Fig. 4, a vertical section through the bottom of a car; Fig. 5, a longitudinal section of the same; Fig. 6, an elevation of a railroad-locomotive tender with one of the side walls broken away, showing the water-feed to a heating-pipe; Fig. 7, a similar elevation, showing a discharge water-pipe and air-valve in position.

In the fire-box A of the locomotive there is now largely used a fire-brick deflector, B, which passes across the center of the fire-box from about the bottom of the flue-section to above the door, supported on pipes *a a*, which extend from one portion of the water-jacket to another. Water-pipes C C pass under the water-tank D of the tender, at which point they are tapped by branch pipes *b b*, leading down from the water in the tank, which branch pipes should have suitable check-valves. The pipes C C extending forward are bent down, so as to enter the fire-box under the grate *c*, thence are bent upward through the grate at the sides or the flue end of the fire-box and wound around the deflector B one or more times, then carried out of the fire-box near its upper part, then conducted down so as to pass under the tender and under the platforms and above the floors of the passenger-cars, and there be arranged at the sides or under the seats, or in both ways, or in connection with radiators, or in any known and approved manner. When these pipes containing hot water pass under the tender there should be branch pipes *d d* leading up into the water-tank and suitable stop-cocks, so that when the locomotive and tender are not connected with a train the current of hot water is continually discharged into the water of such tank, and the temperature of the same is raised thereby.

From one car the pipe-circuit before mentioned passes to the next by suitable connections, and so on through the train, each car having at each end cross-pipes and suitable valves, so that the circuit can be made continuous and the return-circuit instituted in any car. When the extreme end of the last car on the train is reached by the cross-pipes before mentioned the circuit is completed, and the pipes here marked C′ C′ are led back through the several cars and under the water-tank to the point where first I have described them.

It will be understood that all parts of pipes

exposed to the air should be protected from cold by any well-known means. Thus it will be perceived that there are two continuous circuits of water-pipes, the water in which having been heated in the fire-box of the locomotive passes through the whole train, warming each car, and returns to be heated again, thus keeping up a constant circulation. In connection with this system it will be understood that cold water in the first instance by gravity and the natural pressure in the tank passes along the pipes C C until it comes under the influence of heat in the fire-box of the locomotive. Back pressure toward the tank being prevented by suitable valves, the water rises in such pipes, passes around the deflector B, and so on in its circuit throughout the train and in its return, as described, suitable cocks at proper points allowing the escape of air until the pipes are free of air and full of water.

When the train is disconnected from the locomotive the water in the pipe-circuit must be left free to flow back into the tank, provision being made for the same by a stand-pipe, as shown in Fig. 7, and be cut off from flowing to the rear. When the train is connected then the heating-water is permitted to flow through the train into the last car, where the return-circuit is made. An air-valve (shown in Fig. 7 as 1) is opened when the water is permitted to enter the stand-pipe 2, (shown in Fig. 6,) this water passing into the fire-box to be heated, as before explained, and returning to the air-valve 1 and forcing the air out before it, which will be indicated by the presence of the water, when the air-valve should be closed, as also similar ones in succession along the circuit as may be needed.

When it is desired to shut off the heat in any car stop-cocks (shown at 3 in Figs. 4 and 5) may be used to cut off the current from the pipes 4, arranged in the usual coils under the seats, which pipes 4 are shown in elevation in Fig. 4, as well as their connection with the main pipe, and when so cut off from the coils 4 the heating-water will flow along the main circuit.

It is apparent that in some instances one complete circuit may be employed instead of two, or that more than two may be employed, and that the circuit could be arranged by skillful mechanics in a way quite different from that described without departing from my invention. It is also evident that, as many locomotives do not use the deflector B or its equivalent, many modes of arranging the water-pipes within the fire-box could be devised without invention other than those I have described; also, that the water-pipes described may in some instances, if desired, pass above the platforms, instead of beneath them, as I have previously described.

It will be apparent from the above description that my system of heating will add little or nothing to the expense of making and maintaining proper steam-pressure in the boiler, and will avoid the well-known danger to life and property attending the use of heaters in position in the cars.

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

A continuous circuit or circuits of water-pipe for heating cars extending from the fire-box of a locomotive throughout the train and returning through the fire-box, the water within said pipes being heated in passing through the fire-box, substantially as described.

This specification signed and witnessed this 7th day of February, 1882.

FRANK STOWE HEATH.

Witnesses:
LEWIS CROSBY,
M. N. BAKER.