J. W. GRAYDON.

Railroad Car Heating Apparatus.

No. 212,375. Patented Feb. 18, 1879.

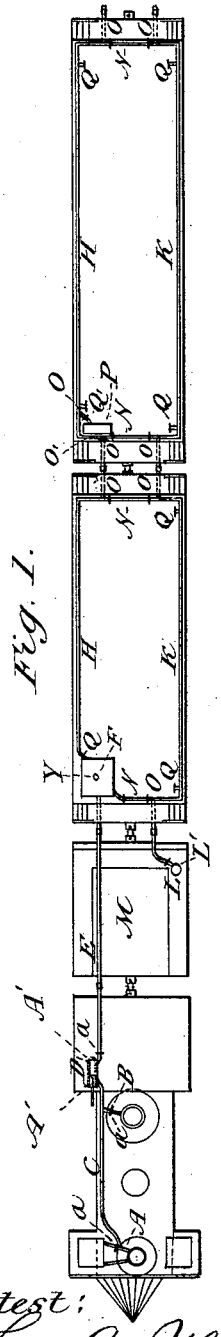

Fig. 1.

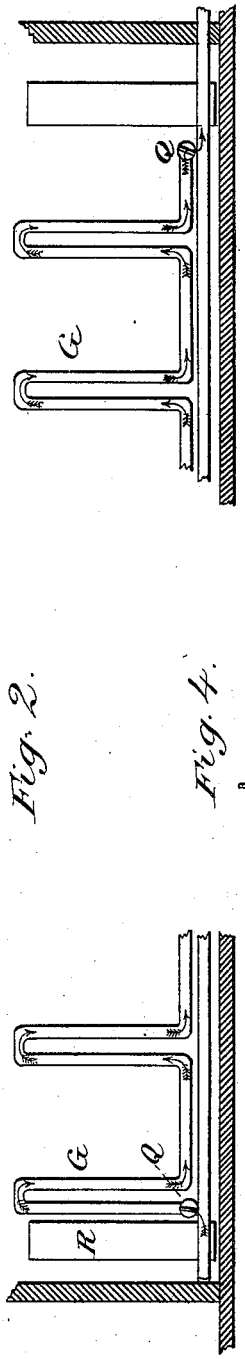

Fig. 2.

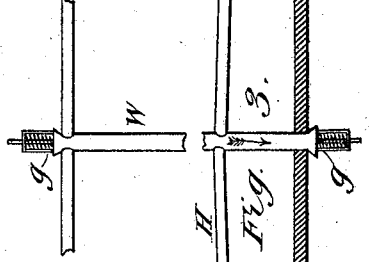

Fig. 4.

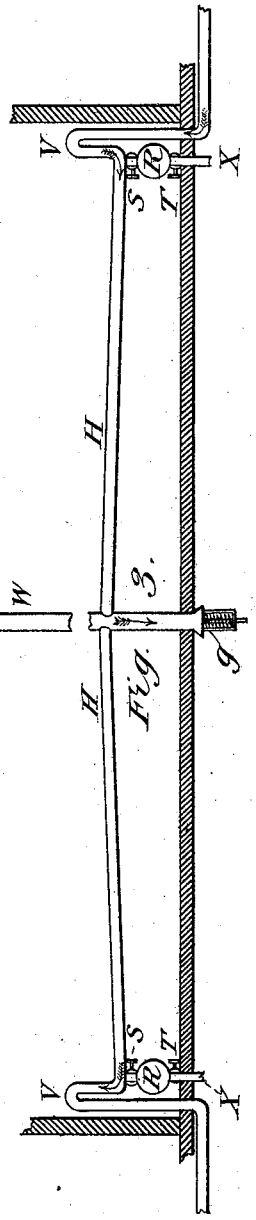

Fig. 3.

Attest:

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UNITED STATES PATENT OFFICE.

JAMES W. GRAYDON, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO THE GRAYDON SAFETY RAILROAD CAR HEATING COMPANY.

IMPROVEMENT IN RAILROAD-CAR HEATING APPARATUS.

Specification forming part of Letters Patent No. **212,375**, dated February 18, 1879; application filed June 18, 1878.

To all whom it may concern:

Be it known that I, JAMES W. GRAYDON, of Washington, District of Columbia, have invented a new and useful Improvement in Railroad-Car Heating Apparatus, of which the following is a description:

The invention relates to an improvement in apparatus for heating cars with a portion of the exhaust and surplus steam from the locomotive; and consists of a series of pipes, an air-pump, reservoirs and water-receivers, safety-valves, and stop-valves, arranged as hereinafter described.

It also consists in the particular arrangement and combination of these several parts, so as to secure a safe, sufficient, and constant supply of steam.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a top view of a locomotive and two cars, showing the means by which the steam is taken from the engine and circulated through the train. Fig. 2 is a horizontal longitudinal section of a car, showing arrangements of heating-pipes in car on one side. Fig. 3 is a vertical longitudinal section of a car, showing supply-pipes and water-receivers; Fig. 4, the arrangement of the safety-valves on top and underneath the car.

The steam is first taken from the exhaust-pipe A, safety-valve B, or both, by pipe C, leading to the air-pump D, which forces it through pipe E to reservoir F in the baggage-car, from whence it is fed to heating-pipes G through supply-pipes H, along the sides of the cars, then across the rear end of the rear car, through its connecting-pipe N, to return-pipe K, which leads on the opposite side of the cars back to the water-tank L in the tender M. The supply-pipes H and return-pipes K in each car are joined at either end by connecting-pipes N, fitted with stop-valves O. The connecting-pipes are used to complete the circuit by opening the two stop-valves O O of the rear car, the stop-valves O on the connecting-pipes forward being kept closed. The circuit can be made in any car should it happen to be the rear one. Small reservoirs P connect with supply-pipes H in each car, also fitted with stop-valves O′. The heating-pipes G connect with supply-pipes H, fitted with stop-valves Q. Supply-pipes H and heating-pipes G have an inclination from the center to each end of the car, where connection is made with water-receivers R by stop-valves S. From the lower part of each water-receiver leads pipe X through the bottom of the car, which pipe is fitted with stop-valve T. Supply-pipe H curves up from water-receiver R at V, then returns to the floor underneath the platform of the car to the flexible metallic joints and coupling between the cars. From the reservoir F leads pipe Y through the top of the car, on the upper end of which pipe is placed a safety-valve similar to that shown in Fig. 4, arranged to lift at any desired pressure. This valve is the ordinary spring safety-valve. Pipe Y continues through the bottom of the car, and has a similar safety-valve attached thereto.

From the center of each car leads a vertical pipe, W, through its top, on the upper end of which pipe is placed a safety-valve. This pipe also leads through the bottom of the car, and has a safety-valve fitted to its lower end. These valves work in the same manner as the ones attached to the reservoir F. The air-pump D is worked by joining its connecting-rod to a suitable working part of the engine.

Attached to the end of the return-pipe K, which enters the tank L, is a spring-valve, L′, arranged to open at any desired pressure.

The operation of the invention is as follows: When the exhaust-steam can be spared from the draft, or the surplus steam is discharged from the safety-valve, the stop-valves *a a* are opened. The air-pump then draws the steam through pipe C, and forces it through pipe E to reservoir F. From the reservoir F the steam is fed to the heating-pipes G through supply-pipes H. When it becomes necessary to clear the pipes from water caused by condensation, valve L′ is opened, and steam is blown through from reservoir F to the tank in the tender, taking with it the water. When a car or cars are to be detached from the engine, the small reservoirs P are first supplied with steam at sufficient pressure to supply the heating-pipes in said cars during such temporary detachment. The pipes in each car or any

coupling between cars can also be relieved from any water by opening the lower valve, T, attached to the pipe X below the water-receiver R, and blowing through from the adjoining car. When there is more exhaust and surplus steam than is needed to heat the cars, it can be blown through the whole circuit to the water-tank in the tender, and be utilized to raise the temperature of the feed-water. In case of collision or other accident, the safety-valves will relieve the pipes of all steam contained therein, as heretofore described.

What I claim is—

1. The combination of pipes A, C, E, H, K, and N with air-pump D and reservoirs F and P, substantially as specified.

2. The combination of pipes H and W, with safety-valves attached thereto, and water-receivers R R, substantially as specified.

3. The system of circulating-pipes, substantially as described, in combination with stop-valves Q, O, S, and T and spring-valve L′, as and for the purpose set forth.

JAMES W. GRAYDON.

Witnesses:

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