

(No Model.)

E. A. QUISENBERRY.
CAR HEATER.

No. 501,361.

Patented July 11, 1893.

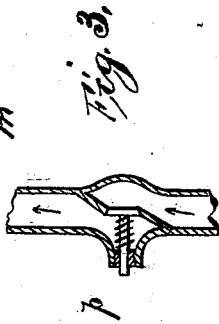
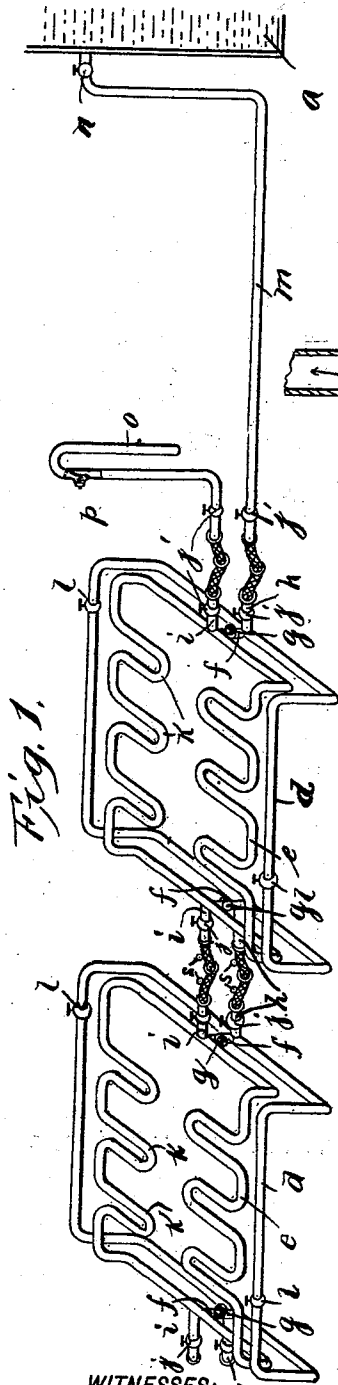
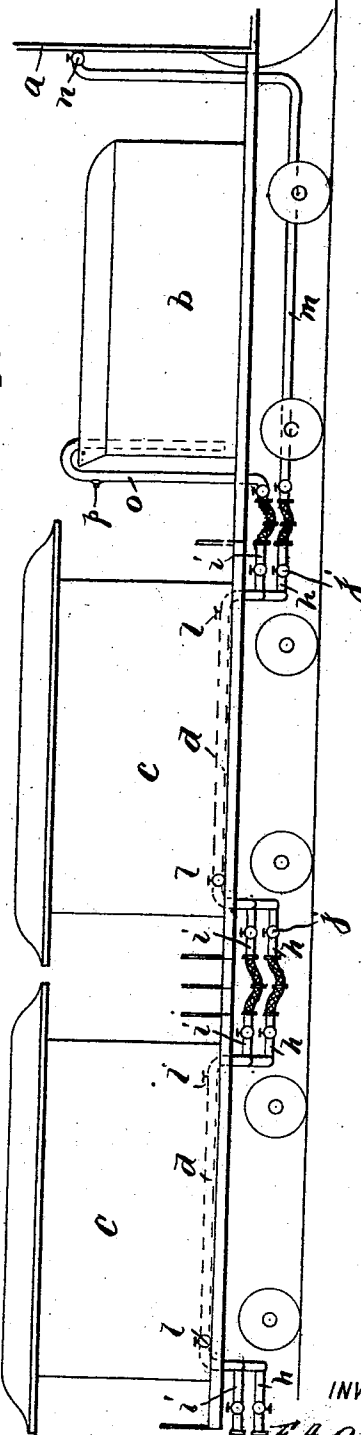


Fig. 2.



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CAR-HEATER.

SPECIFICATION forming part of Letters Patent No. 501,361, dated July 11, 1893.

Application filed April 7, 1892. Serial No. 428,162. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. QUISENBERRY, of Lexington, in the county of Rock-bridge and State of Virginia, have invented certain new and useful Improvements in Car-Heaters; 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 the letters of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in systems for heating railroad cars or trains.

The object of this invention is to provide an improved system for heating trains from the locomotive boiler, whereby a constant circulation through all the train pipes is maintained by the pressure in the boiler, thereby avoiding all danger of freezing in the couplings between the cars, and wherein a constant pressure is maintained in the train pipe so that all danger of bursting couplings or other parts by excessive pressure is avoided.

A further object of this invention is to provide an improved system for heating trains wherein a constant circulation of hot water is maintained through the train pipes from the locomotive by the pressure therein and without forcing or drawing means such as pumps or injectors, and wherein the discharge from the train pipes has an automatic pressure regulator which prevents a too rapid passage of the hot water through the train pipes and maintains an even pressure therein so that the pipes or connections cannot be injured or burst by excessive pressure.

A further object of the invention is to provide an improved system for heating trains wherein the conduit extending throughout the train is made up of a supply and a return conduit each looped in the cars and provided with a single connection between the cars, the loops of the supply and return conduits in the cars located in proximity to each other so that the highly heated constantly circulating fluid in one conduit imparts its heat to the fluid in the other conduit, whereby the heat in the conduits is equalized and all parts of the cars evenly heated, and the heat in the separate

cars can be easily controlled by valves in the sides of the looped pipes.

The invention consists in certain novel features of construction and in combinations of parts more fully described hereinafter and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a diagrammatical view illustrating the system or arrangement of the pipes and conduits of the system. Fig. 2, is a sectional elevation of a train provided with my invention. Fig. 3 is a detail sectional view of the pressure regulator in the discharge end of the return conduit.

In the drawings the reference letter *a*, indicates the boiler of the locomotive.

b, indicates the tender carrying the supply of feed water and connected to supply the boiler, as usual.

c, indicates the car or cars of a train. Each car is provided with a looped or continuous or double supply train pipe *d*, and with a corresponding double or looped return pipe *e*. Each return pipe and each supply pipe has parallel side branches or portions extending the length of the car on opposite sides thereof, and the ends of the side portions are dropped at the ends of the car as shown so that the cross connecting ends of the looped pipes are, preferably, located one above the other. The ends of the inner return pipe are located, preferably, above and parallel with the ends of the outer supply pipe. At opposite ends of the car the two ends of the looped supply and return pipes are connected by a central vertical pipe *f*, provided with a central cut off valve *g*. The main stems or portions *h*, *i*, of the supply and return conduits extend respectively, from the lower and upper ends of these vertical connecting pipes *f*, and connect the looped pipes of the various cars to form the complete conduit from the locomotive boiler through the looped pipes *d*, and main connecting pipes *h*, and back through the looped pipes *e*, and their main connecting pipes *i*, to the tender. Each main stem or portion is provided with a cut off valve *j*, and a section of flexible pipe carrying a coupling member so that the main stems or portions can be coupled together between the cars. Thus, the rear end of the last car of the train has valves *j* closed and the valve *g* in pipe *f* connecting

the rear ends of the looped pipes of said car are opened, so that the hot fluid flows up from the supply pipe into the return pipe through the vertical pipe *f*. The intermediate looped pipes have valve *g* closed and the valve *j* open so that the liquid has a continuous open course from the boiler back to the pipe leading into the tank.

k, indicates the heating pipes or coils connected with and opening into and preferably forming a part of the sides of the double return pipes. These coils can be arranged in any suitable manner preferably, such as shown, wherein the coils are formed to extend beneath the seats with both ends opening into opposite sides of the double return pipes. These coils or heating pipes have their outer ends slightly elevated so that all water of condensation will run off back into the return pipes, and from thence to the depressed lower ends of the double pipes where it can flow out the main pipes when uncoupled. This feature is also of advantage when hot water is employed as it enables all water to be drawn off from the pipes.

The sides of the supply pipes can be provided with regulating valves *l* for regulating or cutting off the flow of water through the pipes.

m, indicates a portion of the main branch of the supply conduit opening into the locomotive boiler at a point below the water line and extending rearwardly and provided with a coupling at the rear end of the locomotive to couple with a corresponding pipe extending along the tender and provided with a coupling at its rear end to unite with the supply pipe of the first car. This pipe *m*, is provided with a controlling valve *n*, in the engineer's cab whereby he can regulate or entirely cut off the flow of water from the boiler. This is a feature of great importance for when the engine is not required to perform heavy work a full head of water can be permitted in the supply pipe, but the flow can be partially or entirely cut off when the engine is pulling up grade or required to do very heavy work and all the steam and water is needed.

The tender is provided with the end of the return conduit formed by a pipe *o* coupled to the looped return pipe of the first car of the train and from thence extending into the tender, preferably up over the top of the same and then down so that its discharge end will be located near the bottom of the tank whereby the steam or hot water returned from the cars is discharged into the feed water which is heated thereby. Hence said water when discharged into the boiler will evaporate into steam rapidly and will not have the injurious influence upon the boiler that cold water has. Furthermore it prevents the water freezing in the supply pipe from the tender to the boiler. This is a feature of importance as water is apt to freeze in these pipes in intensely cold weather, and heretofore means such as steam

pipes or an extra fire have been necessary to keep these pipes warm.

The pipe *o*, is provided with a suitable pressure regulator *p*, so constructed as to maintain a desired pressure in the train pipes and when the water in the pipes is under greater pressure than is desired this regulator permits relief and discharge into the tank. The regulator preferably consists of a spring valve opening up so that excessive pressure in the train pipes and conduits forces the valve from its seat and permits escape of water into the tender. The valve is so constructed that the tension of the spring can be varied by a nut or other means so that any desired pressure can be maintained within the pipes.

Great advantages are attained by the peculiar arrangement of the double or looped supply and return pipes within the car for equal pressure is maintained on both sides of each supply and return pipe and both sides of the car are equally heated, and furthermore by connecting the heating pipe with the return pipes on both sides the excessive heat in the heating pipe is avoided. By the peculiar arrangement of the looped pipes in the cars having the main connecting pipes between the cars and the vertical connecting pipe, any car can be coupled into the heating conduit and the conduit can be returned at the end of the last car, whereby the cars do not have to be arranged in any particular manner in making up the train. This system is equally applicable for steam or hot water.

The flexible pipe sections carrying the coupling are provided with loops, eyes or other means *s*, by which the trainmen can uncouple the pipes with suitable hooks or other instruments without burning their hands.

The main connecting pipes *h*, are preferably, of such diameter relative to the looped pipes, as to supply the loops, *i. e.*, the connecting pipes are usually about twice the diameter of loops or branches. This system is also well adapted for heating buildings.

Great difficulty is experienced with the ordinary train heating apparatus during very cold weather, because of the insufficient heating of the rear cars, usually the sleepers and parlor cars of a train and also because of the freezing of the heat connection couplings between the cars. These difficulties are in a large measure due to insufficient circulation of the heating medium, and because of the old arrangement of the heating and circulating pipes. By my peculiar arrangement of the train conduits the heating medium is conveyed directly under pressure from the locomotive throughout all the cars to the rear end of the train and through the heating coils or pipes thereof, so that the medium does not lose its heat by passing through heating coils on its way to the rear end of the train but is carried directly to the rear car and then comes back through the heating coils. By this arrangement the rear end of the train is thor-

oughly heated, and the thorough and perfect circulation prevents freezing at any point, and the looped arrangement of the pipes maintains a thorough and even heating of all parts of the cars and tends to equalize the heat in the looped supply and return pipes by induction as these looped pipes are in proximity to each other in the cars. Furthermore by means of the valves in the looped pipes the heat can be easily controlled in each car so that the heating medium can be confined to one side only of the supply pipe and thereby reduce the radiating surface in the car and so that more heat will be carried rearwardly.

It has been found to be a feature of great advantage to carry the heating medium in constant circulation throughout the train by means of the pressure in the boiler and maintaining the fluid at the proper pressure in the train conduit by the automatic pressure regulator at the discharge end of said conduit so if the amount of fluid entering the conduit is very small the outflow will be correspondingly small and vice versa, and hence all danger of breakage of pipes or connections by excessive pressure is avoided, and yet a constant circulation is permitted and the proper pressure is maintained in the train pipes. My system and arrangement are far superior to such devices as draw or force water through pipes in the cars by pumps or injectors and have a rigid cock or valve to regulate the outflow and which must be turned more or less open or closed according to the position of the valve controlling the inflow into said pipes, as in these old constructions excessive pressure will occur in the pipes and cause a rupture somewhere as it is impossible to always set the valve controlling the outflow at the proper point with respect to the valve controlling the inflow. Furthermore this old arrangement requires constant attention.

This invention bears no resemblance to those old car heaters wherein a pump forces hot air through a heater into a reservoir tank in a car and provided with a safety blow off such as provided on any steam boiler.

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

1. In a train heating system, the supply conduit from the locomotive boiler, the supply conduit in each car being looped so that the sides are located on opposite sides of each car, a return conduit discharging into the boiler water supply, said return conduit being looped in each car so as to pass down opposite sides thereof, as described.

2. In a train heating system, the supply conduit from a fluid heating supply extending through the cars, the conduit in each car forming a complete loop, said loops connected between the cars by single connections, the return conduit formed into loops in each car

having the radiator pipes, said loops connected between the cars by separate connections, substantially as described.

3. In a car heating system, the supply conduit in a car formed into a complete loop extending along opposite sides of the car, the opposite ends of the loop respectively provided with single connections to couple with the corresponding pipes of adjacent cars, and the return conduit in said car formed into a complete loop extending along opposite sides of the car and provided with end connections to couple to corresponding pipes of adjacent cars, substantially as described.

4. The train heating system comprising the looped supply pipes in each car, connections between the cars connecting the ends of said supply pipes, the looped return pipes in each car connected between the cars, and valved connections between the corresponding ends of the looped supply and return pipes in each car, substantially as described.

5. The train heating system composed of a continuous conduit throughout the train from the locomotive boiler back to the feed water supply of the locomotive, the supply connections of the conduit being looped in each car so as to extend on opposite sides thereof, the return connections being correspondingly looped in the cars so that the loops of the return and supply connections are in proximity to each other in the cars and the heat in the same is equalized and all parts of the cars are evenly heated, substantially as described.

6. The train heating system comprising the continuous open circuit throughout the train from the locomotive boiler back to the feed water supply to the boiler, said circuit comprising the supply and the return conduits, both conduits being in the form of separate parallel loops in the cars, said loops connected by separate single connections between the cars, the supply conduit extending directly through the cars to the rear end of the train without radiating coils, and the return conduit provided with radiating coils, substantially as described.

7. The train heating system comprising the supply and the return conduits, each conduit being looped in the car so as to extend down opposite sides thereof, and so that both loops are in about the same horizontal plane, the ends of the loops at the ends of the car being dropped and located one above the other and provided with single connections for coupling between the cars, substantially as described.

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

EDWARD A. QUISENBERRY.

Witnesses:

H. E. PECK,
C. M. WERLÉ.