(No Model.)

G. D. HISCOX.

CAR HEATER.

No. 501,718. Patented July 18, 1893.

Fig. 3.

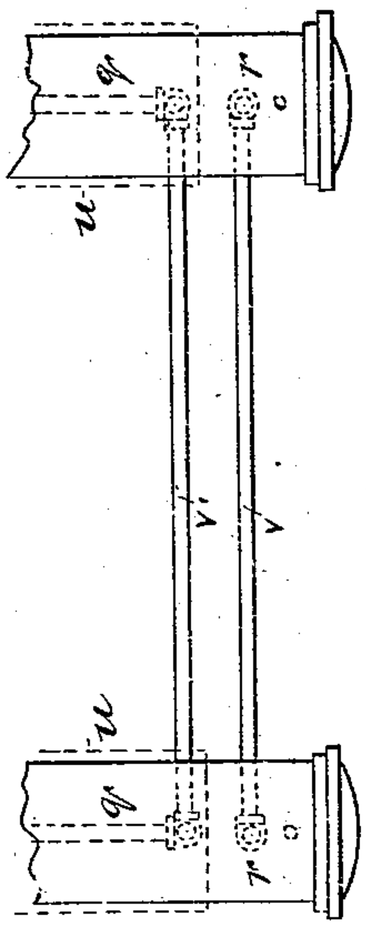

Fig. 4.

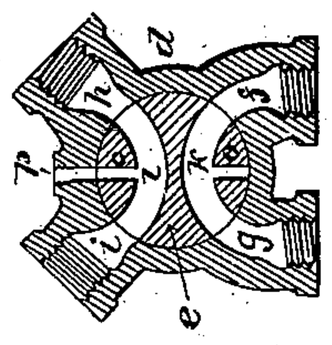

Fig. 1.

Fig. 2.

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UNITED STATES PATENT OFFICE.

GARDNER D. HISCOX, OF BROOKLYN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE STERLING CAR HEATING AND LIGHTING COMPANY, OF NEW YORK, N. Y.

CAR-HEATER.

SPECIFICATION forming part of Letters Patent No. 501,718, dated July 18, 1893.

Application filed December 30, 1892. Serial No. 456,833. (No model.)

To all whom it may concern:

Be it known that I, GARDNER D. HISCOX, a citizen of the United States, and a resident of Brooklyn, in the county of Kings, State of New York, have invented a certain new and useful Improvement in Car-Heaters, of which the following is a specification.

My invention relates to improvements in car heaters, and especially for street railway cars. My heater is of that type, wherein a boiler in the stations of the line is employed to charge the cylinders in the cars with hot water, the radiation from the cylinders warming the car during its trip.

More particularly the purpose of my invention is to improve the system of car heating, so as to facilitate the ready charging of the cylinders with hot water; so as to maintain at all times, (whether the cylinders of a car are being charged or not) a circulation through the system of pipes that lead from the stationary boiler to the car tracks; and so as to retard the radiation from the cylinders in the car, and thereby equalize the temperature during the whole time the car is making a trip; and to effect these several ends with a simple and cheap apparatus.

I accomplish the foregoing purposes, by connecting with the water space of the boiler in the station, a complete return circulating pipe-system, which leads to the vicinity of the car tracks, and by putting in operative connection with this system a pump or other water-forcing engine, which is maintained in constant working so that at all times, and whether a car is connected with the pipe-system or not, there is a complete forced circulation of the hot water out from the boiler and back thereto. In this manner dead ends are prevented, and there is at all times water at a high temperature at the extreme outer end of the pipe system. I apply this constant forced circulation to charging the cylinders of the car by means of a five-way valve of peculiar construction at the extreme end of the circulation, so that, when a car is not being charged, the ports of the valve complete the circulation directly from the flow to the return pipe; but that when a car is coupled up to be charged the ports divert the flow circulation through the cylinders in the car and thence back to the return pipe; and that this change in the circulation takes place solely by shifting the valve, without affecting the pump which maintains the forced circulation, that pump, as before stated, operating continuously whether a car is coupled to the circulating system or not.

Referring to the drawings which accompany the specification, to aid the description: Figure 1 is a general view in section and elevation of my apparatus complete, and showing a car coupled for charging. Fig. 2 is a broken cross section of a car, showing the manner of arranging the cylinders. Fig. 3 is a broken plan view of the cylinders, showing the double cross pipe connections. Fig. 4 is an enlarged detail of the five-way cock in the pipe circulation.

A is a hot water boiler in the station of the street car line, and preferably of the horizontal tubular pattern.

B and C are respectively the flow and return pipes, leading from and returning to the boiler, A. The flow pipe, B, rises to the top of the boiler, and there connects with a short vertical pipe, *b*, that descends into the boiler, just to about the level of the top of the tubes. Should water in the boiler, A, fall below the top of the tubes, no more water can enter the pipe B. The pipe C returns to the lower part of the boiler A. Said pipes B and C, lead underground to a point adjacent to the tracks, and are there turned up above the street level and connected with the five-way cock D, which also has flexible tubes, E, E, that are provided with any suitable quick-coupling devices, F, for coupling with the pipes of a car. Where the pipes B, C, rise above the street level they may be protected by any suitable boxing or casing, and said pipes B, C, will preferably be wrapped their whole length with some good non-conducting felting. I prefer, also, to connect a pump, G, with the return pipe C, in order to maintain constant forced circulation in the pipes B, C, and this pump will work constantly, whether a car is being charged or not, as will be hereinafter explained.

The aforesaid five-way cock D, is constructed in the following manner: *d* is the cock

body, bored for a plug, *e*, and having four principal ports, *f*, *g*, *h*, *i*, ninety degrees each from the adjacent ports, of which *f* and *g* are respectively from and to the boiler, and *h*, *i*, respectively to and from the cylinders in the car. The aforesaid plug, *e*, has through chambers, *k*, *l*, adapted to register with the aforesaid ports, *f*, *g*, *h*, *i*, as shown. Said plug, *e*, also has a blow off cock, *o*, *o*, communicating with each of said chambers, *k*, *l*, and there is a single corresponding port, *p*, in the body *d*, between the aforesaid ports *h*, *i*.

Evidently when the plug *e* is turned to the position of Fig. 4, the pipe B is in communication with the pipe C, which leads directly back to the boiler A, thereby completing the continuous circulation. But if the plug *e* be given a quarter turn in either direction, then the pipes B and C will be in communication with the cylinders, H, H, in the car, and the continuous circulation will be changed without interruption from the boiler A to the said cylinders, H, H, and thence back to the boiler A. In the first case, the circulation takes place through the pipes B and C and the five-way cock D directly from and to the boiler, A; in the second, through the pipe B and five-way cock D to the cylinders, H, H, and back through the five-way cock D and pipe C to the boiler A. But in all cases there is a free continuous circulation, which maintains the water in pipes B and C hot at all times. Moreover when the plug *e* is turned to the first position, the port *o* communicates with the port *p*, and the water in the flexible tubes, E, E, will be discharged and relieved from the boiler pressure.

The cylinders, H, H, (there being preferably two cylinders, one on each side of a car between the wheels, as shown in Fig. 1,) are constructed and arranged as follows:

h' is a cylindrical shell with heads, h^2.

q is a horizontal pipe carried along the bottom of the cylinder H, for equalizing the hot water charge, and passing with an elbow out through the shell, *h'*, to a four-way cock I.

r is a pipe connection leading to the said cock I; and *s* is an air pipe, rising to near the top of the cylinders, H, H, and having a cock, *t*, to be opened by hand when first charging the said cylinder, and afterward as necessary for relieving the cylinders of air. A wrapping of asbestus, or other good non-conductor, *u*, is placed around so much of the shell, *h'*, as is sufficient to retard radiation, and so equalize the temperature of the car during its trip.

v, *v'*, are cross pipes respectively connecting the pipes of the two cylinders.

The aforesaid four-way cock I is similar in its construction to the five-way cock D, except that the former has no blow off, and in place of the said four-way cock I, the pipes *q*, *r*, to and from the cylinders H may terminate in separate free ends, without the four-way cock, I, but I prefer to use said cock, for the purpose of rapid manipulations.

The operation is as follows: A car arriving at the station, to be charged, the aforesaid flexible tubes, E, E, are coupled to the connections of the adjacent four-way cock, I, the said cock I having been turned so as to cut off the cylinders, H, H, from the pipes, B, C. Then the five-way cock D is turned to the position shown in Fig. 1, and finally the cock I is turned so as to put the cylinders H, H, into communication with the pipes B, C. Then hot water enters each cylinder by the pipes *q*, pushing the cool water toward the pipe *r*, and back to the boiler through the pipe C. When the cylinders H, H, are charged, the cock I is closed, and then the hot water cock D is turned to the position of Fig. 4, so that the circulation is cut off from the flexible tubes, E, E. At the same time the blow-off port, *o*, *p*, opens so as to allow the high pressure hot water in the tubes E E to blow out and reduce the pressure to atmosphere. Unless the pressure were so reduced, it would be uncomfortable or even dangerous to uncouple the tubes E E from the car, because of the violent jet of very hot water that would spurt from them. The tubes, E, E, are then uncoupled from the car, which goes on its trip. When necessary to allow the air to escape from the cylinders during the operation of charging, the cock on the air pipe *s* is opened for a short time, being closed as soon as any water is discharged.

Now, having described my improvement, I claim as my invention—

1. In a street car heating system, the combination with stationary hot water boiler of a continuous and complete circulatory system which consists of a flow pipe from the water space of said boiler, a return pipe thereto, a multi-chambered cock at the junction of said flow and return pipes, and tubes from said cock adapted to be connected with corresponding pipes from a water cylinder in a car, substantially as described.

2. In a street car heating system, the combination with a hot water cylinder in a car of flow and return pipes therefrom, a four-way cock connected with said pipes, tubes adapted to connect with said cock and leading to a five-way valve which is connected with the flow and return pipes of a continuous circulatory system, main ports in said five-way valve adapted to connect the tubes with said flow and return pipes and a blow off port in said valve adapted to connect the tubes with atmosphere, a stationary hot water boiler operatively connected with said flow and return pipes, and a pump operatively connected with said return pipes, substantially as described.

3. In a street car heating system the combination of a hot water cylinder in a car, air relief pipe therefrom, a hot water supply pipe longitudinally arranged in said cylinder, a return pipe from one end of said cylinder, a four-way cock communicating with said supply and return pipes, tubes from said four-

way cock to a five way valve which is connected with the flow and return pipes of the main constant hot water circulatory system and has main ports adapted to connect the said flow and return pipes with said tubes and a blow off port adapted to connect said tubes with atmosphere, a stationary hot water boiler operatively connected with said flow and return pipes, and a pump operatively connected with said return pipe, substantially as described.

4. In a street car heating system and in combination with a constant forced hot water circulation and with tubes leading to a hot water cylinder in a car, a five way cock having four main ports adapted to alternate the circulation either directly between the branches of said constant forced circulation or indirectly between the same through the said cylinder in the car, and a blow-off port adapted to communicate with said tubes so as to reduce the pressure therein to atmosphere, substantially as and for the purpose described.

5. In a street car heating system, the combination with a stationary hot water boiler of a continuous and complete circulatory system which consists of a flow pipe from the water space of said boiler, a return pipe thereto, a multi-chambered cock at the junction of said flow and return pipes, and a hot-water cylinder in a car adapted to be connected with said cock by flow and return tubes substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two witnesses.

GARDNER D. HISCOX.

Witnesses:

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