E. E. GOLD.

CONVERTIBLE STEAM CAR HEATER.

APPLICATION FILED MAY 20, 1910.

1,024,626.

Patented Apr. 30, 1912.

4 SHEETS—SHEET 1.

Fig. 1.

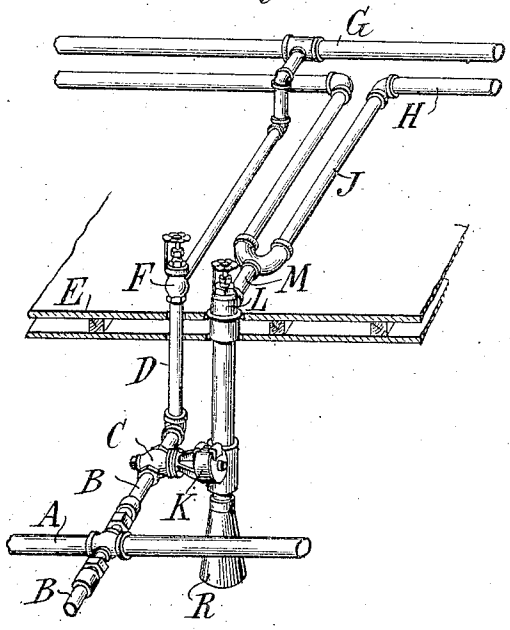


Fig. 2.

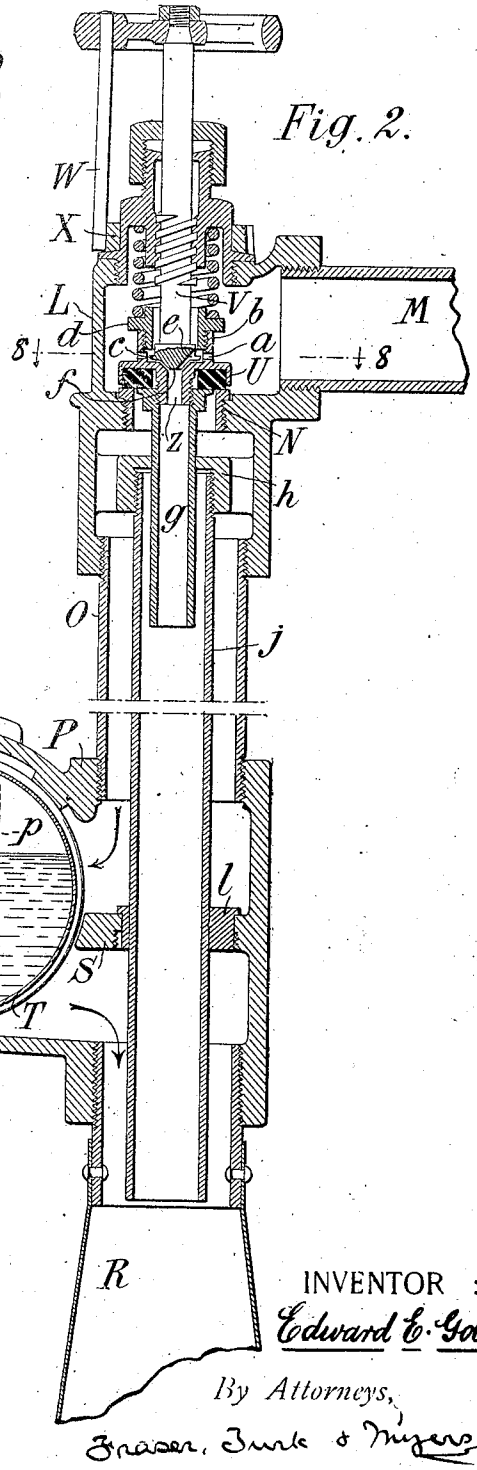
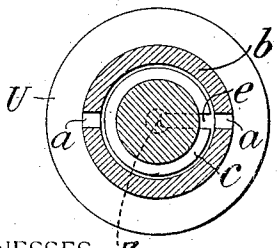


Fig. 8.



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4 SHEETS—SHEET 2.

Fig. 4.

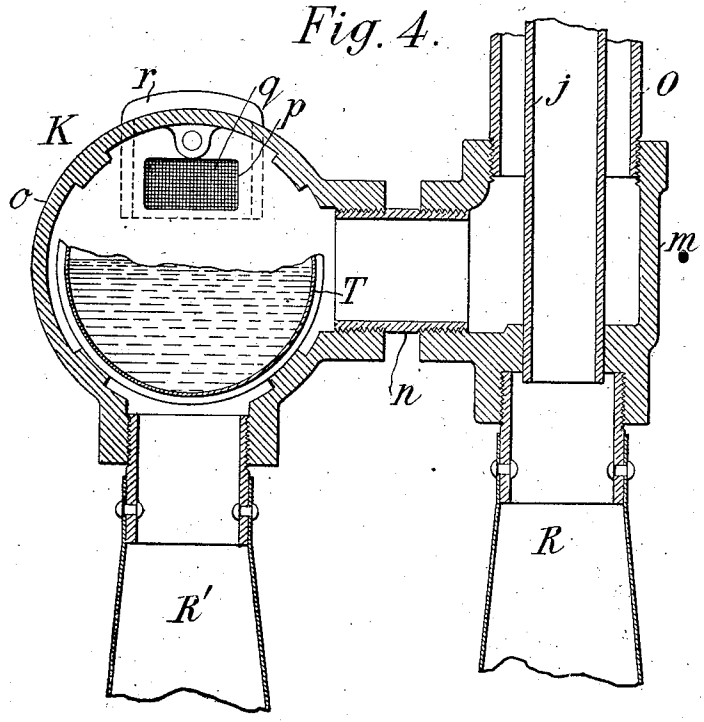
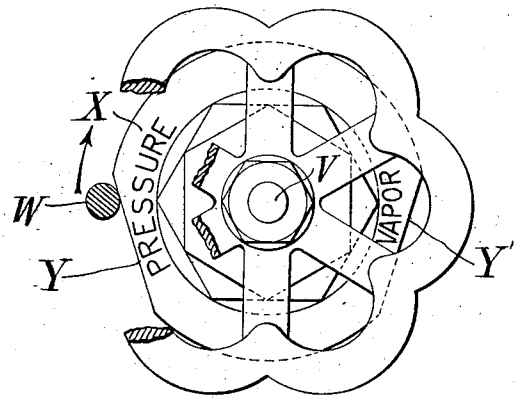


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 5.

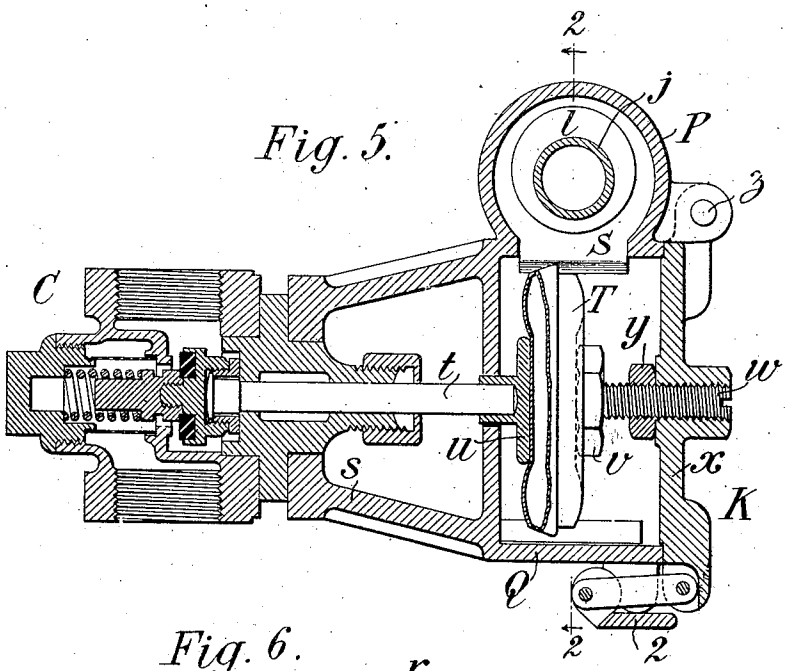
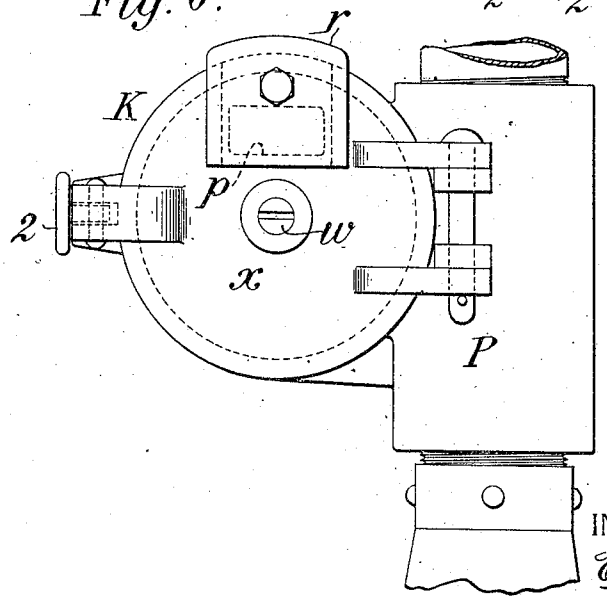


Fig. 6.



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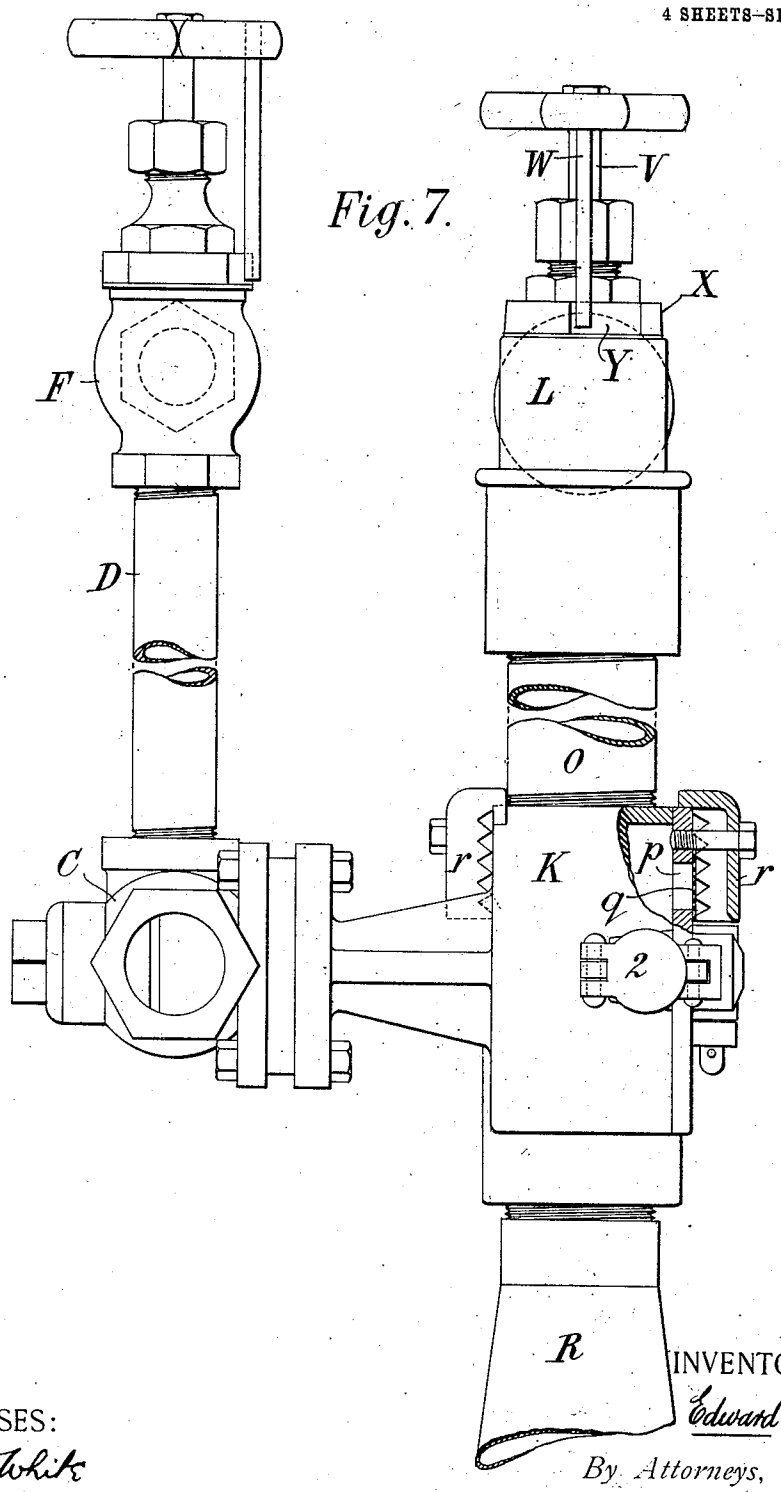
4 SHEETS—SHEET 4.

Fig. 7.



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UNITED STATES PATENT OFFICE.

EDWARD E. GOLD, OF NEW YORK, N. Y.

CONVERTIBLE STEAM CAR-HEATER.

1,024,626. Specification of Letters Patent. Patented Apr. 30, 1912.

Application filed May 20, 1910. Serial No. 562,397.

To all whom it may concern:

Be it known that I, EDWARD E. GOLD, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Convertible Steam Car-Heaters, of which the following is a specification.

This invention aims to provide a steam heating system and features of construction thereof especially adapted to the heating of railway trains, and especially adapted to convertible or interchangeable systems which may be operated either as pressure systems or as vapor systems at will.

The accompanying drawings illustrate embodiments of the invention.

Figure 1 is a view in perspective of the principal parts of the apparatus in connection with a radiator at one side of a car; Fig. 2 is a longitudinal section of the discharge end of said radiator on the line 2—2 of Fig. 5; Fig. 3 is a plan partly in section, of the valve of Fig. 2; Fig. 4 is a section similar to Fig. 2 showing a slight variation in the construction of the lower part of the discharge pipe; Fig. 5 is a horizontal section, and Fig. 6 a side elevation of the mechanism shown in the lower part of Fig. 2; Fig. 7 is an enlarged elevation of the valves and connected parts of Fig. 1 partly in section; Fig. 8 is an enlarged horizontal section of the valve of Fig. 2 on the line 8—8 of said figure.

Referring to the embodiments of the invention illustrated, the train-pipe A runs the length of the car underneath the floor, and is filled with steam at a pressure reduced from that in the boiler, and leads by branches B to radiators at opposite sides of the car. In each of the branches B is an automatic admission valve C, from which a vertical pipe D extends upward through the floor E of the car to a hand admission valve F, whence the steam passes to the inlet pipe G of the radiator, and thence to the return pipes H, and by an approximately horizontal loop J to the discharge mechanism, whence it is discharged into the open air. In the discharge mechanism there are two outlet passages, one of which conducts the steam to a thermostat indicated as a whole by the reference letter K, which governs the automatic admission valve C, and the other of which leads to the atmosphere without contact of the steam with the thermostat. The selection of the passage through which the steam or water of condensation is discharged, is under control of the valve L within the car.

As shown in Fig. 2, the valve L is arranged to conduct the steam to the thermostat K when the valve is opened; or, when the valve is closed, to restrict the outlet opening to such an extent as to permit the discharge of water of condensation with little or no discharge of steam, so as to maintain a pressure of steam in the radiator; so that when the valve is opened the system operates as a vapor system, and when the valve is closed it operates as a pressure system.

The pipe M leading from the loop J enters the side of the valve casing, and the steam and water pass downward through the valve seat N into an outer pipe O, upon the lower end of which is a fitting P including (or attached to) the casing Q of the thermostat, and having two lateral openings, the upper one leading to the thermostat and the latter leading therefrom to a trumpet-shaped extension R designed to conduct the steam a suitable distance below the car; the two openings being divided by a transverse diaphragm S across the pipe portion of the fitting P, and extending substantially to the expansible vessel T of the thermostat, so as to cause the steam to circulate about the expansible vessel.

For shutting off the escape of steam into the outer pipe O, there is provided a valve proper U adapted to rest on the seat N, and having a stem V with a thread of high pitch, so that with less than a complete turn of the stem the valve may be shifted from its open to its closed position. The stem is provided on its upper end with a handle, and with a pointer W which serves also as an impositive lock, being made of spring metal and pressing inward against the boss X or other part of the valve casing. The boss is provided with faces Y and Y′ (Fig. 3) upon which the locking pointer W presses in its two opposite positions, and the inclination of which is such as to tend to force the pointer W farther in the direction in which it has been turned; thus impositively forcing and holding the valve in either its open or its closed position.

The valve U is provided with an opening Z through its center to which the steam has access by way of small ports *a* in a flange *b*

projecting upwardly from the valve. The stem V is engaged with the valve by means of a collar *c* at its lower end adapted to strike the top of the valve U or, when raised to strike the lower end of a sleeve *d* screwed into the flange *b*. The collar *c* is provided with a fine slot *e* extending therethrough so as to permit the passage of water through the openings *a* and the opening Z when the collar is down upon the top of the valve. On the under side of the collar *c* is a tapered extension *f* loosely fitting the flared top of the opening Z but not interfering with the passage of water therethrough. The purpose of the extension *f* is to clear the opening Z of any dirt and to keep it clean so as to permit a free flow of water therethrough. The vertical movements of the valve stem will increase and decrease the area of the restricted opening and the rotary movements will insure the removal of any particles of dirt. This constitutes a continuously open drip orifice. The water of condensation passing therethrough enters a small central tubular extension *g* of the valve proper, which slides through a ring *h* concentrically located in the lower part of the valve casing, and which carries an inner discharge tube *j* passing through the diaphragm S. This pipe *j* therefore constitutes the only discharge pipe when the system is working under pressure. When the system is working as a vapor system the discharge may take place through either the inner pipe *j* or the outer pipe O, the openings to these pipes being proportioned to cause the discharge of sufficient steam through the outer pipe O to secure the desired rapidity of operation of the thermostat. The construction of the diaphragm S permits the securing of a good fit for the inner tube *j* by screwing into the diaphragm an accurately machined ring *l* (Fig. 2).

Instead of providing for a single discharge point, the discharge from the drip pipe and that from the thermostat may be separated as in Fig. 4. In this case the outer pipe O carries a fitting *m* which is closed at its lower end around the inner pipe *j*, and which has a single lateral opening connecting by a short pipe *n* with the casing *o* of the thermostat, which casing is open at its lower end for the discharge of the steam or water through a second trumpet extension R'.

The thermostat is preferably exposed largely to the atmospheric air, and for this purpose the casing is provided at each side near the top with a ventilating opening *p* across which is a fine wire screen *q*, and over the discharge of which is fastened a hollow cover *r* provided, as shown best in Fig. 7, with toothed side edges and an entirely open lower edge so as to permit free circulation of air and at the same time to retard the entrance of dirt. The motion of the train and the location of these two openings at opposite sides, front and back, of the casing, insures a considerable circulation of air through from one to the other. There is also a circulation of air induced upward into the casing and out through the openings which are located near the top of the casing, by reason of the warmth therein as compared with the temperature of the outside air. This ventilation is an important feature in insuring a quick response of the thermostat to the cooling air as soon as the steam ceases to flow against it, and a consequent quick reopening of the admission valve to let in more steam, so that there shall be as nearly as possible a supply of steam in the radiating pipes continuously from end to end.

The automatic admission valve C is indicated in horizontal section in Fig. 5, and is of a construction described in previous applications of mine. The thermostat casing has an extension *s* which is fastened to the casing of the valve C, and the valve stem *t* passes out of the casing through a stuffing box and into the thermostat casing, where it carries a head *u* engaging the inner face of the expansible vessel T, the opposite face of which is held stationary by a head *v* on a bolt *w* carried in the outer face plate *x* of the thermostat casing. The bolt *w* is adjustable from the outside by a notch in its end, and is set in position by a nut *y* within the casing and not readily accessible, so that there is no likelihood of its being tampered with after the thermostat is once properly set. The outer wall *x* of the casing is in fact a door hinged at *z* on a lug on the side of the fitting P, which constitutes part of the casing Q of the thermostat. The door is latched by a link and eccentric latch indicated at 2.

Instead of the drip valve mechanism of Fig. 2 for closing the outlet sufficiently to maintain pressure in the radiator, any usual or suitable pressure mechanism may be substituted.

The described arrangement of the casing of the thermostat K with a door on the outside, is of particular value in increasing the convenience with which the apparatus may be attended to for repairs or renewals. If the thermostat is worn out or otherwise defective, the system may be set for pressure operation, whereupon the thermostat casing can be opened and the thermostatic vessel removed and replaced by a new vessel. This may be done during the run of a train, taking out the old expansible vessel and leaving it out until it is convenient to put in a new one. The system being set for pressure, there is no escape of steam through the thermostat chamber, and the parts are cool enough to be handled. The same facility of access is provided for the two expansible

vessels of Fig. 8 or of Fig. 9, by shifting the course of the discharge away from the vessel which is to be repaired or renewed or withdrawn.

What I claim is:—

A steam heating system for cars including in combination a radiator, a train pipe, a branch pipe leading from the train-pipe to the radiator, an automatic admission valve C in said branch pipe, a discharge pipe M from said radiator, the system having two outlet passages from said discharge pipe, a thermostat K actuating said admission valve and including an expansible vessel exposed to the action of the discharge through one of said outlet passages, the second outlet passage comprising a conduit extending within the first-named passage to a point beyond said expansible vessel, a hand-operated discharge valve which when opened permits the steam to discharge freely through said first-named passage and to operate said thermostat, and which when closed cuts off the steam from the thermostat, said hand-operated discharge valve having a restricted drip orifice which communicates with said second passage and which is always open through said discharge valve so as to permit the escape of water without substantial loss of steam and without effect upon the thermostat when said valve is closed.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

EDWARD E. GOLD.

Witnesses:
D. ANTHONY USINA,
FRED WHITE.