

No. 707,361.

Patented Aug. 19, 1902.

J. Q. C. SEARLE, Dec'd.

J. E. SEARLE, Executrix.

**RAILWAY CAR HEATING APPARATUS.**

(Application filed Mar. 23, 1888. Renewed Aug. 26, 1898.)

(No Model.)

2 Sheets—Sheet 1.

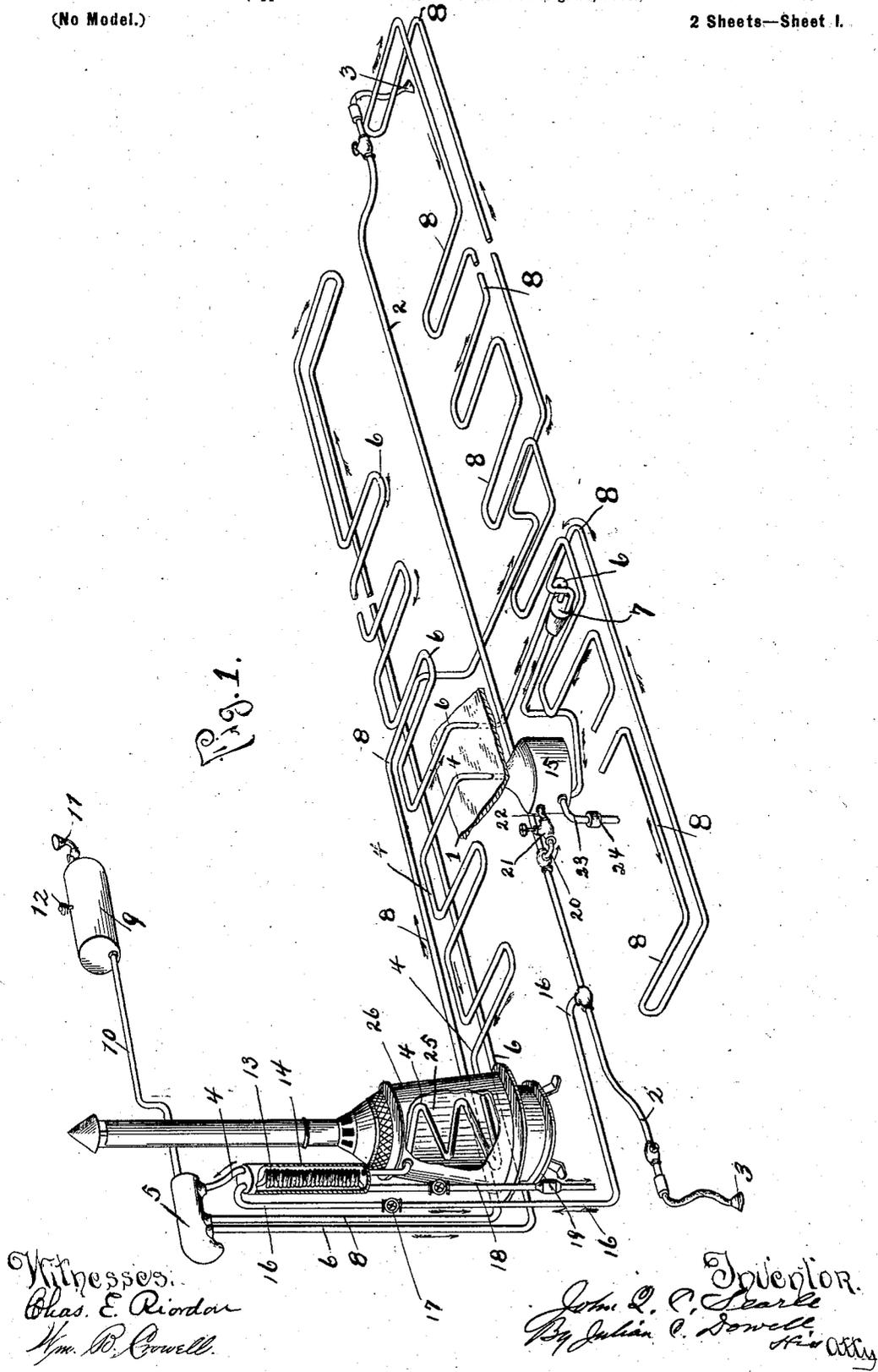


Fig. 1.

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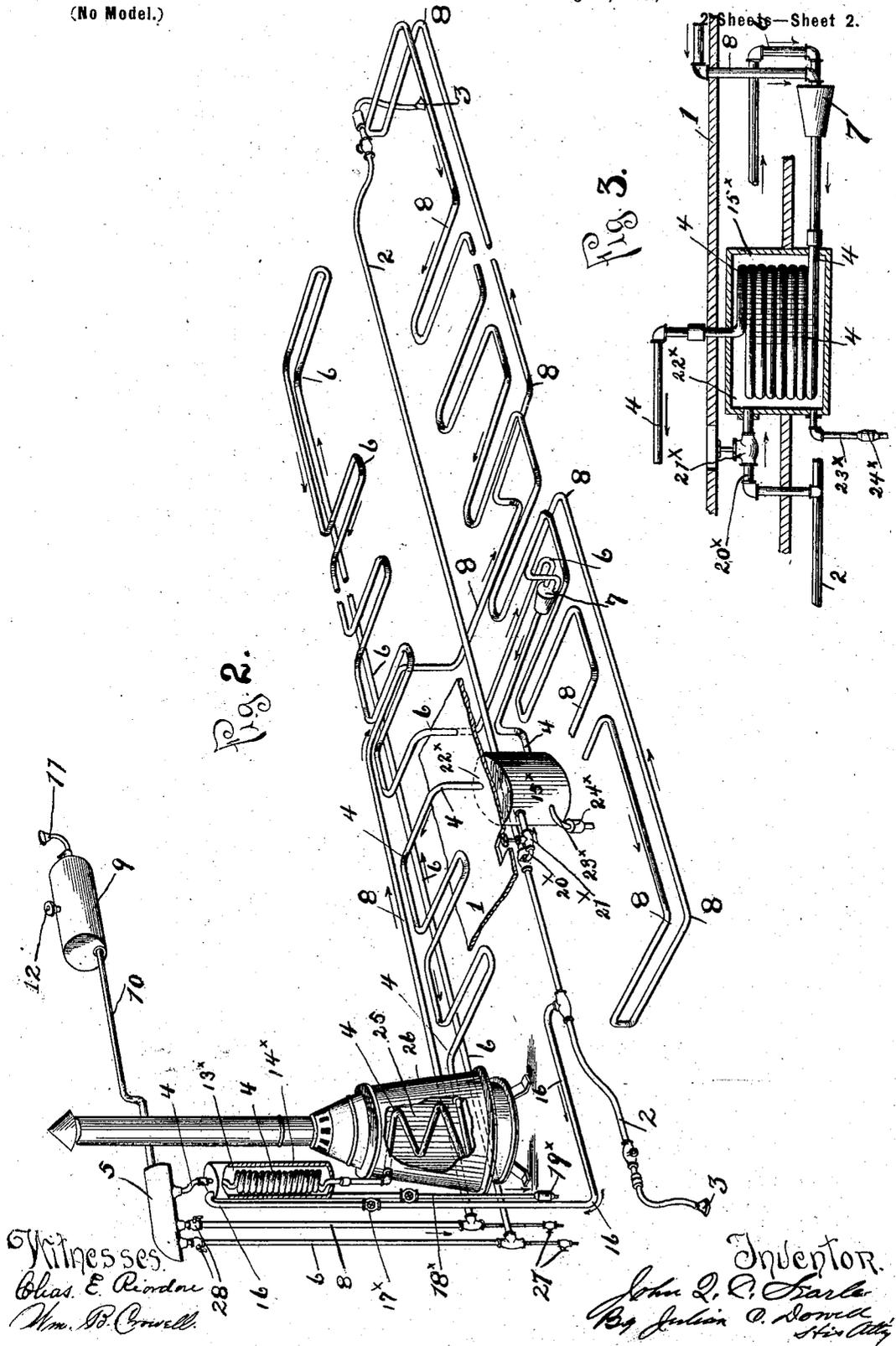


Fig. 2.

Fig. 3.

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# UNITED STATES PATENT OFFICE.

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OF SAID JOHN Q. C. SEARLE, DECEASED.

## RAILWAY-CAR-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 707,361, dated August 19, 1902.

Application filed March 23, 1888. Renewed August 26, 1898. Serial No. 689,616. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN Q. C. SEARLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Railway-Car-Heating Apparatus, of which the following is a specification.

This invention relates to that class of circulatory systems in which a liquid after being heated and freed of air and steam may be employed for warming purposes in railway-cars and in other structures when required, the heat being derived from a main or prime source of heat-supply, preferably from a steam-boiler or other suitable heat-generator.

In carrying out my invention I preferably employ a circulatory system that includes a heat-radiating portion and has an ascending pipe on one side thereof and a descending pipe on the other side thereof, a heater located at substantially the lowest point of the circuit, and means for transferring heat derived from a main source of heat-supply into operative contact with the circulating liquid in said heater, and in some instances, if desired, I may employ a circulatory system that includes a heat-radiating portion and has an ascending pipe on one side thereof and a descending pipe on the other side thereof, a heater in the ascending pipe or upon one side thereof, and a second heater located below the first-named heater and at substantially the lowest point of the circuit. These heaters or either of them may be of any desired character—that is to say, the heat may be derived from any suitable source; but when my invention is employed for warming railway-cars it is preferable that one or more of said heaters derive the heat from a common source—such, for instance, as the locomotive-boiler, which is the most convenient, or a special heat-generator adapted to heat the circulating liquid—and to this end I preferably employ a main steam-pipe or other suitable mechanism adapted to be connected to a main or prime source of heat-supply and also with one or a plurality of heaters adapted to impart heat to the circulating liquid.

In practice one or more heaters may impart heat to the said liquid by being in oper-

ative connection with the main source of heat-supply.

The operative connection or contact may be effected in various ways—such, for instance, as letting the heat derived from a main or prime source of heat-supply be carried through a pipe or passage containing the circulating liquid, or, which is the reverse of this, by letting the steam derived from a main or prime source of steam-supply be carried into a pipe or passage which incloses a portion of the system containing the circulating liquid. Provision is also made for heating said liquid by heat derived from an emergency heater in case of a temporary failure of the heat derived from said prime source of heat-supply.

Referring to the drawings, Figure 1 is a perspective view of my improved railway-car-heating apparatus, showing a means for transferring heat derived from a main source of heat-supply into operative contact with the circulating liquid by which said car or other structure is heated. Fig. 2 is a similar view illustrating a modification hereinafter described. Fig. 3 is a detail sectional view of the heaters shown in perspective in Fig. 2, located at substantially the lowest point of the circuit.

The numeral 1 represents the floor of a railway-car or other structure to be heated; 2, a main heat-supply pipe or other suitable means provided with detachable couplings 3, whereby heat derived from a main or prime source of heat (preferably steam) supply may be transferred into operative contact with the circulating liquid by which said car or other structure is heated.

4, Figs. 1 and 2, respectively, represents the ascending pipe on one side, and 8 a descending pipe on the other side, of a circulatory system, both of said pipes having communication at their upper ends, preferably by means of a liquid-dividing fitting 5 and a pipe 10, with an expansion-chamber 9, located at an elevated point, whereby said liquid after being heated may be freed of air and steam, as required.

11 is a funnel-cock for supplying any loss of liquid when required, and 12 is a safety-valve to prevent explosions.

6 is a branch descending pipe having its upper end connected to said fitting 5 and its lower end to a liquid-uniting fitting 7, whereby the heating capacity of the system may be increased without enlarging either of the heaters.

The circulating liquid may be properly and sufficiently heated by heat derived from a main or prime source of heat (preferably steam) supply brought into operative contact with the circulating liquid in the heater 15, or said liquid may be heated by heat derived from a main or prime source of steam-supply brought into operative contact with a portion of said system containing the circulating liquid in the heater 15<sup>x</sup>, as shown in Fig. 3 of the drawings.

In Fig. 1 is represented a circulatory system that has an ascending pipe 4 on one side thereof and a descending pipe 8 on the other side thereof, both of said pipes, preferably by means of said fitting 5 and pipe 10, having communication at their upper ends with said chamber 9, before referred to, and at their lower ends with a heater 15, located at substantially the lowest point of the circuit, whereby said liquid may be heated and afterward freed of air and steam before being employed for warming railway-cars and other structures to be heated.

20, Fig. 1, represents a branch steam-pipe or other suitable means adapted for having communication with a main or prime source of heat (preferably steam) supply and for transferring heat into operative contact with the circulating liquid in said heater 15 and is provided with a hand-valve 21 for regulating the supply of heat to the said liquid, and by means of a short pipe 23 the condensed steam may be conducted into a steam-trap 24 when required.

25, Figs. 1 and 2, represents the combustion-chamber of an emergency heater 26, inclosing a portion of the system containing the liquid to be heated.

20<sup>x</sup>, Figs. 2 and 3, respectively, represents a branch steam-pipe adapted to have communication with a main or prime source of steam-supply and for transferring heat derived therefrom into operative contact with the circulating liquid in said heater 15<sup>x</sup> and is provided with a hand-valve 21<sup>x</sup> for regulating the supply of heat to said liquid, and by means of a short pipe 23<sup>x</sup> the condensed steam may be conducted into a steam-trap 24<sup>x</sup> when required.

14, Fig. 1, represents a heater of similar construction to that of heater 15, before referred to, but located above said first-named heater, and there may be contained in each of said heaters in operative contact with the circulating liquid a steam-heating pipe 13 or other suitable means adapted for heating the said liquid, and a branch steam-pipe 16 is provided with a hand-valve 17 for regulating the supply of heat to the said liquid, and by means of a short pipe 18 the condensed steam

may be conducted into a steam-trap 19, as required.

14<sup>x</sup>, Fig. 2, represents a heater of similar construction to that of heater 15<sup>x</sup>, but located above said heater and adapted for receiving steam derived from a main or prime source of steam-supply and to transfer heat derived therefrom into operative contact with the circulatory system in said heater 14<sup>x</sup>, which is supplied through a branch steam-pipe 16<sup>x</sup>, provided with a hand-valve 17<sup>x</sup> for regulating the supply of heat to the circulating liquid, and by means of a short pipe 18<sup>x</sup> the condensed steam may be conducted into a steam-trap 19<sup>x</sup>, as required, and 25, Figs. 1 and 2, respectively, represents the combustion-chamber of an emergency heater 26, inclosing a portion of said system containing the circulating liquid to be heated.

A valved pipe 27, Fig. 2, may be connected with a pump to fill the pipes of the system with water or other liquid, and a valve 28 may be placed in each of the pipes 8 and 6, Fig. 2, for controlling the liquid while filling the pipes of the system. When the system is connected with a main or prime source of heat-supply, the liquid can be properly heated, preferably by steam supplied to the pipe or passage 13 in the heaters 15 and 14, respectively, or by steam supplied to the chambers or passages of the heaters 15<sup>x</sup> and 14<sup>x</sup>, respectively.

The heaters 15 and 14, Fig. 1, or the heaters 15<sup>x</sup> and 14<sup>x</sup>, Figs. 2 and 3, respectively, may separately or simultaneously form part of a single-flow system and may be arranged so the water or other liquid before passing to the pipes or radiators may be heated in either of the ways hereinbefore described.

The invention set forth herein and shown is not confined to the particular details of construction described, as the principle of my invention may be embodied in various other obvious forms of apparatus different from that illustrated and described and that the location of the various parts within the limitations specified in the appended claims as to the location of the heaters one below another and at substantially the lowest point of the circuit may also to a considerable extent be varied without departing from the principle of my invention, and the heater 26 may or may not be employed as a secondary source of heat-supply, and of course it may be employed independently of said steam-supply—as, for instance, when a car is side-tracked and it is desirable to have it warmed before it is coupled into a train. It will also be understood that the expression used herein to designate the heaters or their location does not necessarily imply a heater inclosed within a pipe or passage, but is to be understood as a term employed in the art to embrace a heater of any suitable description adapted to impart its heat to the liquid in the pipes or passages of the system, and, further, that the prime source of heat-supply comprises a heat-generator of any description or arrangement so long as the heat generated

therein or thereby may be conveyed or transmitted from said prime source of heat by any suitable means adapted to impart heat to the circulating liquid.

5 What I claim, and desire to secure by Letters Patent of the United States, is—

10 1. The combination, of a circulatory system that includes a heat-radiating portion and has an ascending pipe on one side thereof and a descending pipe on the other side thereof, a heater in the ascending pipe or upon one side thereof, and a second heater located below the first-named heater and at substantially the lowest point of the circuit.

15 2. The combination, of a circulatory system that includes a heat-radiating portion and has an ascending pipe on one side thereof, a descending pipe on the other side thereof and an expansion-chamber located above said pipes and having communication therewith,

an emergency heater having a combustion-chamber inclosing a portion of the ascending pipe of said system, a primary heater located at substantially the lowest point of the circuit, and means for transferring heat derived 25 from a main source of heat-supply into operative contact with the circulating liquid in said last-named heater.

3. In combination, a water-circulating system having a radiating portion in the descending pipe or upon one side thereof, a heater in the ascending pipe or upon the other side thereof, and a second heater located below the first-named heater and at substantially the lowest point of the circuit. 30

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