

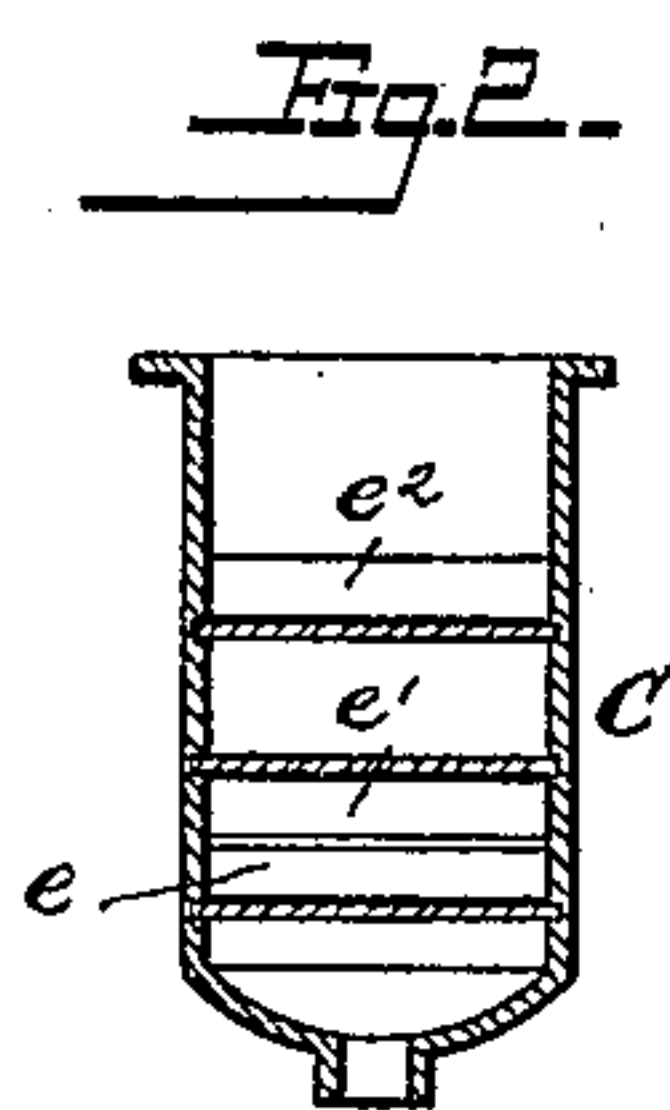
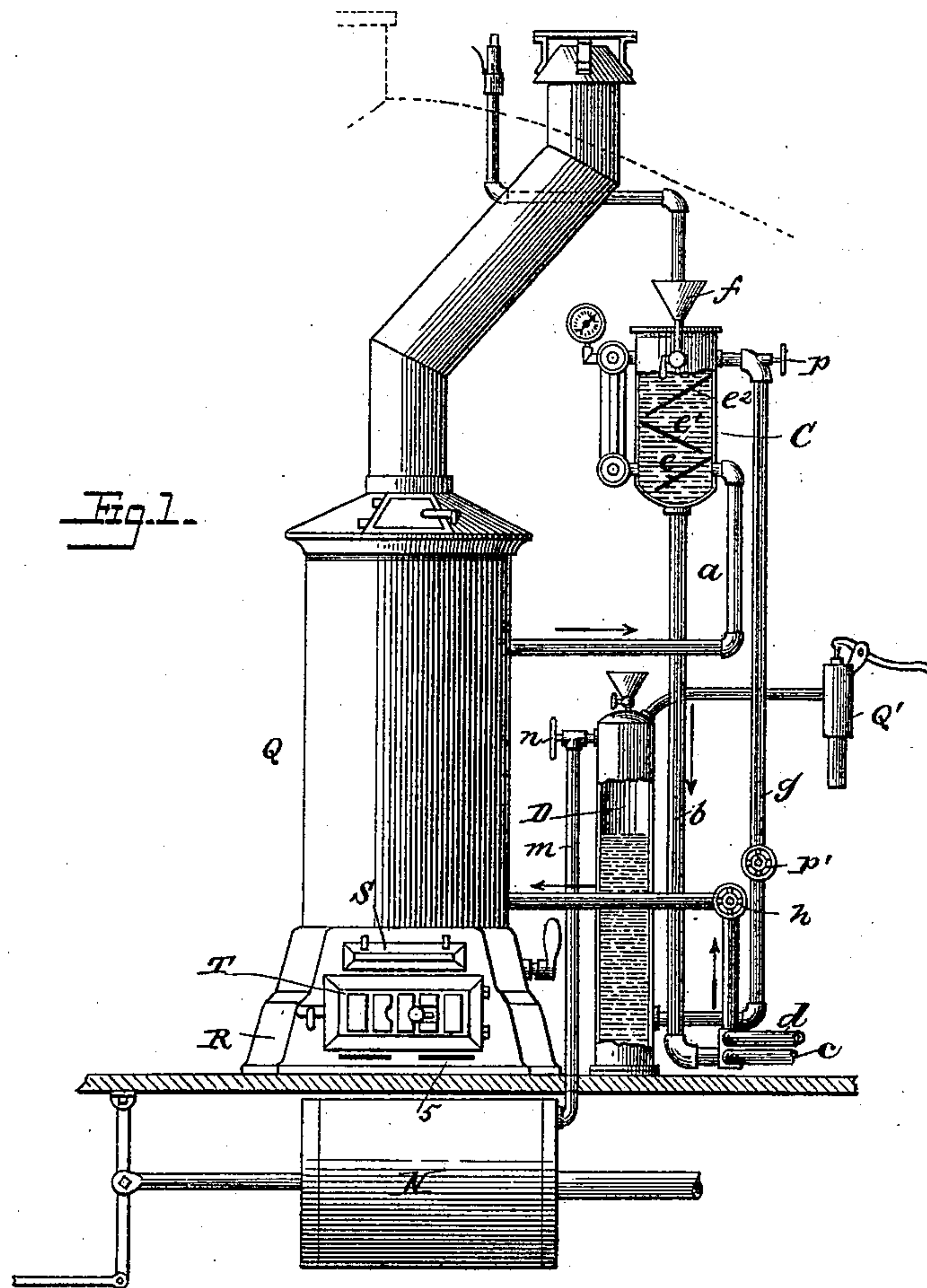
(No Model.)

R. JOHNSON & J. F. BUERKEL.

CAR HEATER.

No. 354,640.

Patented Dec. 21, 1886.



Attest:
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UNITED STATES PATENT OFFICE.

ROBERT JOHNSON AND JOHN F. BUERKEL, OF BOSTON, MASSACHUSETTS.

CAR-HEATER.

SPECIFICATION forming part of Letters Patent No. 354,640, dated December 21, 1886.

Application filed October 13, 1885. Serial No. 179,806. (No model.)

To all whom it may concern:

Be it known that we, ROBERT JOHNSON and JOHN F. BUERKEL, citizens of the United States, and residents of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Car-Heaters, of which the following is a specification.

Our invention relates to that class of heaters in which the heat is conveyed from a stove or furnace to the radiators through the medium of a circulating fluid, and more especially to heaters of the kind intended for railway-cars; and our invention consists in constructing the supply-casing to insure a separation of the vapor from the fluid, in providing a tank for supplying fluid under pressure to the circulating appliances, and in the various details of construction, fully set forth hereinafter, whereby the capacity and efficiency of the apparatus are greatly increased.

In the drawings, Figure 1 is a sectional elevation showing our improved heater as applied to a railway-car. Fig. 2 is a vertical section of part of the supply-casing.

In that class of heating apparatus in which a fluid circulating through pipes constituting conductors, and formed into or connected with radiators, is used, the formation of steam or vapor and the carrying of the steam or vapor with the circulating fluid interferes with the circulation, causes unpleasant explosive sounds, and sometimes results in the burning out of the parts in contact with the fire. Attempts have been made to overcome these difficulties by connecting the conducting and circulating pipes with a chamber intended to receive a portion of the fluid, and also to separate therefrom any particles of steam or vapor, and such attempts have been accompanied with more or less success, but have never remedied all the difficulties.

We have discovered that by providing the separating-chamber with one or more deflectors properly arranged we are enabled to effect the desired results and to also secure other advantages.

In carrying out our invention we use a heater or generator of any suitable construction to permit the flow of liquid through the same, and this heater we arrange adjacent to a fire-

pot, or make it part thereof, as described hereinafter.

In the present case the heater is arranged in a stove, Q, constructed for application to and arranged within a railway-car, and the separators all contained within a casing, C, which communicates through a pipe, *a*, with the top of the heater, and through a pipe, *b*, with the circulating-pipe *c*, the return circulating-pipe *d* leading to a pipe, *h*, extending upward to the heater C, so that the heated water passes upward through the heater and through the pipe *a* into the separator C, then downward to and through the circulating-pipe *c*, and back through the circulating-pipe *d* and connecting-pipe *h* to the bottom of the heater.

Within the casing C, and at such a point as to be struck by the inflowing current from the pipe *a*, is arranged a deflector-plate, *e*, the higher end of which is in contact with the side of the casing above the mouth of the pipe *a*, while the lower end extends nearly to the bottom of the casing above the mouth of the pipe *b*, and in some instances we use one or more additional deflector-plates, *e'* *e''*, extending downward from opposite sides, so as to leave contracted passages below their lower edges.

We have found that by the use of a deflector plate or plates the current of water is directed from the inlet-pipe *a* to the mouth of the outlet-pipe *b*, while any particles of steam or vapor are caused to traverse beneath the deflector-plate and to pass downward beneath the lower edge thereof and upward into the chamber, being thus separated from the current of liquid, which thus flows in an unbroken stream through the pipes. As a result of this arrangement the circulation is effected without noise, without obstruction, and without the burning away of the heater from undue heating of the parts, as results when particles of steam or air are carried with the circulating current.

While the casing C may be of any suitable construction, we prefer to make it of cast metal, the deflector plate or plates being inserted in the mold, and the casing cast so that the edges of the plate will extend into the casing, as shown in Fig. 4, the casing being thereby strengthened and stiffened.

It will be apparent that where the heater is used for heating dwellings the circulating-pipes may be formed into or connected with radiators of any suitable construction, and
5 that the other parts may be differently constructed and arranged.

It may sometimes happen from temporary leakage, evaporation, or otherwise that the supply of water in the casing and circulating-
10 pipes becomes diminished to such an extent as not only to interfere with the circulation, but cause the burning out of the heater. While an additional supply of water or circulating fluid may be introduced through the funnel *f*
15 when the apparatus is cold and not in operation, it is difficult to replenish it when the fluid is heated and under pressure. We therefore combine with the apparatus above described a supplemental tank, D, containing a
20 supply of fluid and arranged below the casing C, connect the tank and casing by a pipe, *g*, communicating with the bottom of the tank and the top of the casing, and then force the fluid from the lower to the higher receptacle
25 by the application of pressure to the surface of the fluid in the tank, or the tank is connected to one of the circulating-pipes or to both circulating-pipe and casing, as shown.

The pressure may be applied to the fluid in
30 the tank in various ways. For instance, a packed piston may be forced down upon it by a weight or otherwise; or a hand-pump, Q', (shown by dotted lines,) may be employed for forcing air into the top of the tank. We
35 prefer, however, to connect the upper end of the tank by a pipe, *m*, with the cylinder or air-chamber N of the air-brake apparatus, so that by turning a cock, *n*, in the pipe *m* the air which is under pressure in the cylinder N
40 may be brought to bear upon the surface of the fluid in the tank D to force the fluid against the pressure in the casing C or circulating-pipe into the latter, the cock *n* being closed as soon as the requisite supply is introduced.
45 The pipe *g* may also be provided with a cock, *p*, so as to cut off the communication between the casing and tank when desired, and a cock, *p p*, will cut off communication between the tank and circulating-pipe.

By the use of a supplemental tank or reser- 50
voir of fluid and means for forcing the latter under pressure into the casing the requisite supply of fluid to the circulating-pipe is always secured, and the difficulties before named are obviated.

We do not herein claim the combination of 55
the water and air reservoir or receptacle with the supply-casing or with the air-reservoir of the braking apparatus; nor do we claim the specific combination of the heater and its re- 60
lated parts, as these will constitute the subject-matter of separate applications for Letters Patent.

Without limiting ourselves to the precise con- 65
struction and arrangement of parts shown, we claim—

1. In a fluid-heating apparatus, the combi-
nation of a boiler, circulating-pipes connected
therewith, a casing greater in diameter than
said pipes and having inlet and outlet ports 70
communicating therewith, and an inclined plate arranged in said casing above and between said ports, substantially as described.

2. A supply-casing containing a steam and
water chamber and provided with an inclined 75
plate above inlet and outlet ports, in combination with circulating-pipes communicating with said ports and with a supply-pipe in communication with the water-circuit, substan- 80
tially as described.

3. The combination of the boiler, circulat-
ing-pipes, and casing provided with a series
of inclined deflector-plates alternately ar-
ranged, substantially as set forth.

4. The cast-metal casing C, combined with 85
the outlet and inlet circulating-pipes and provided with one or more inclined deflectors, the edges of which are embedded in the side of the casing, substantially as described.

In testimony whereof we have signed our 90
names to this specification in the presence of two subscribing witnesses.

ROBERT JOHNSON.
JOHN F. BUERKEL.

Witnesses:

FRANK R. BODWELL,
EDWARD J. JONES.