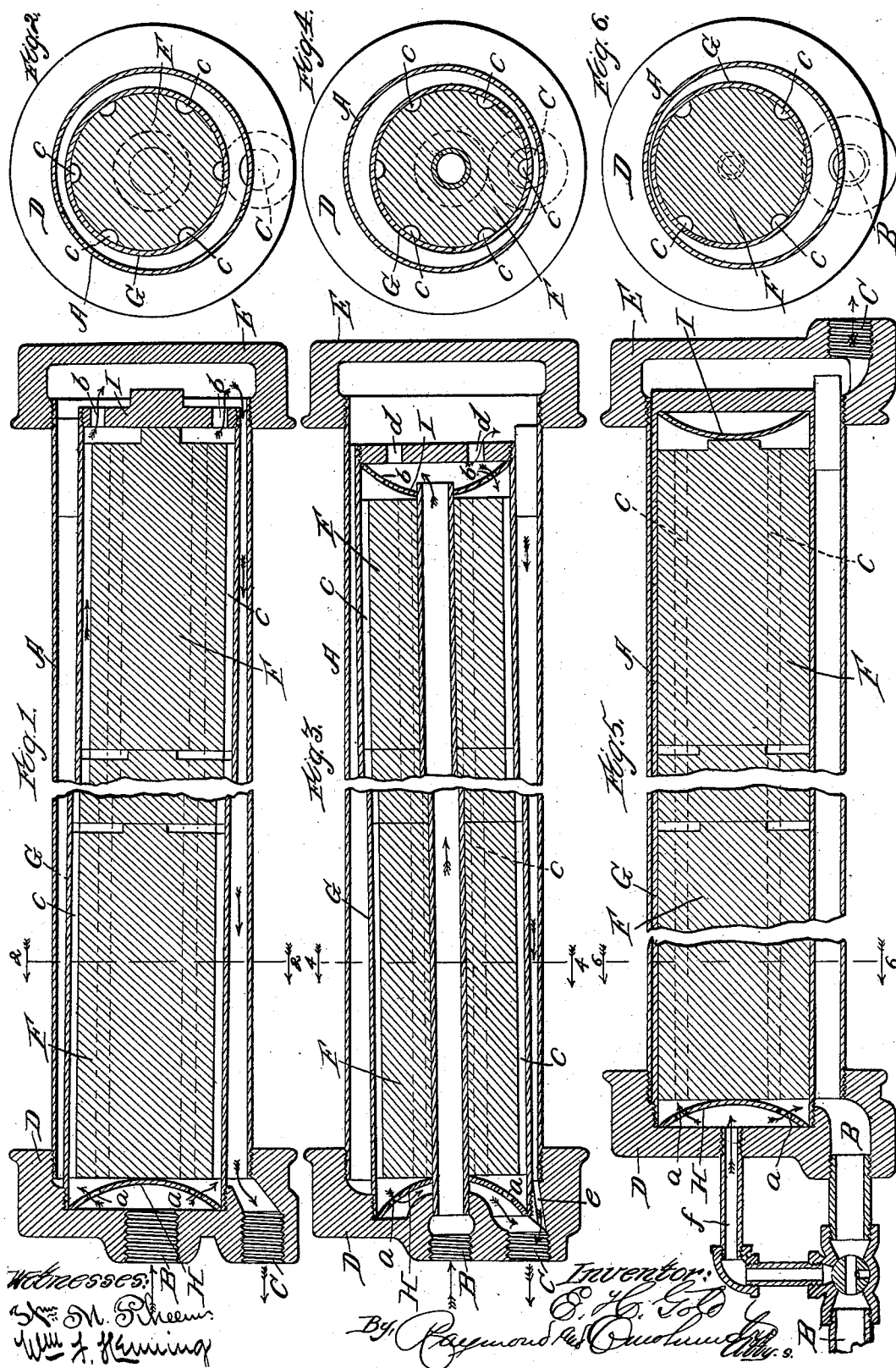


2 Sheets—Sheet 1.

Patented Nov. 27, 1894.

No. 529,723.



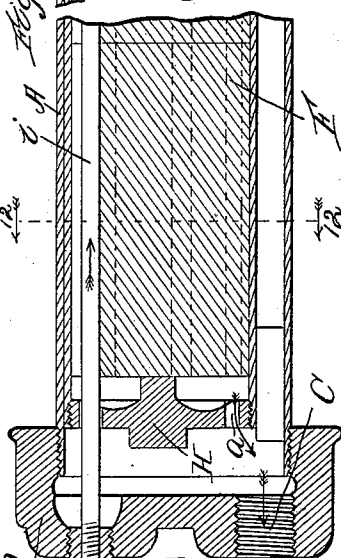
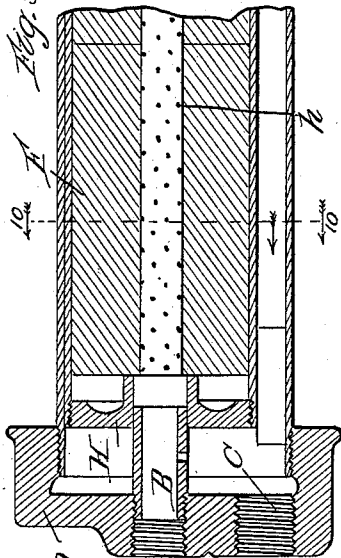
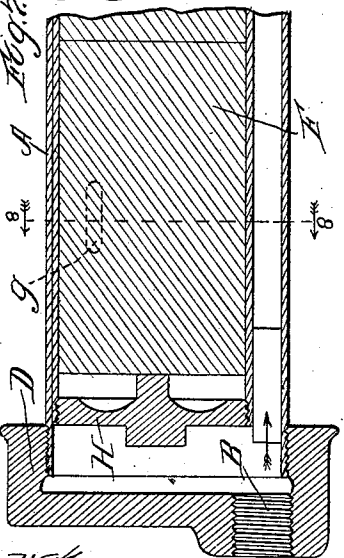
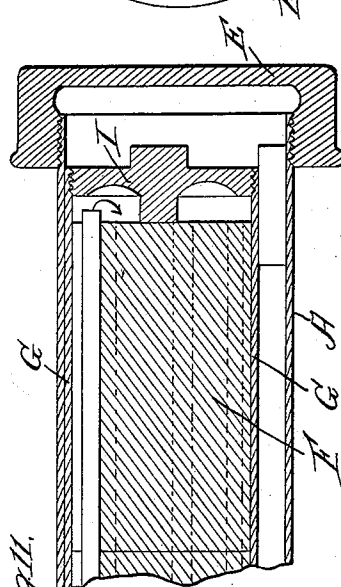
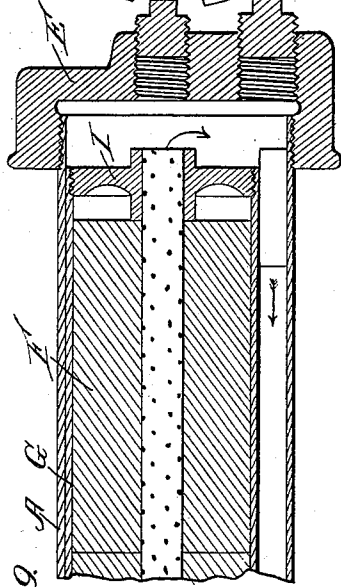
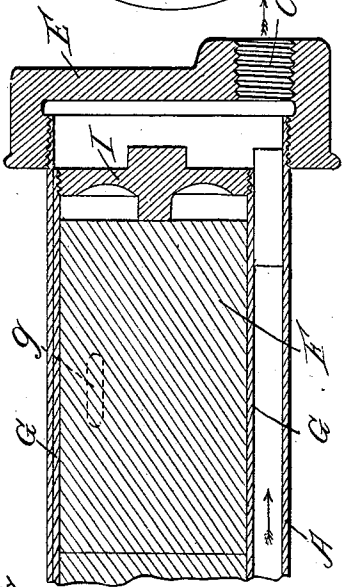
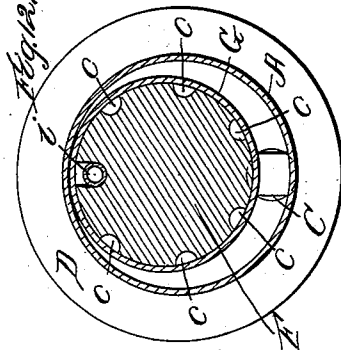
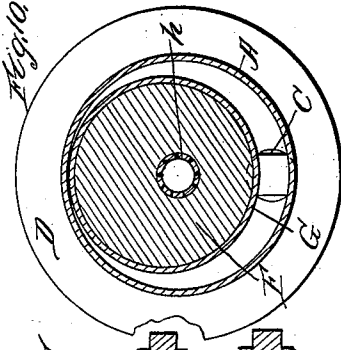
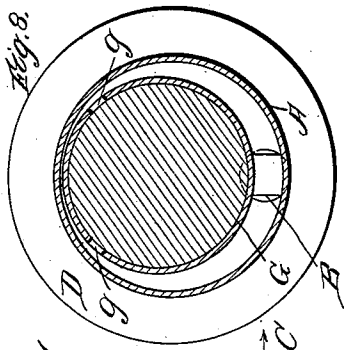
(No Model.)

2 Sheets—Sheet 2.

E. H. GOLD.
CAR HEATER.

No. 529,723.

Patented Nov. 27, 1894.



Witnesses:

Wm. J. Rheaum
J. J. Rheaum

By Raymond

Inventor:
E. H. Gold
Cushman

UNITED STATES PATENT OFFICE.

EGBERT H. GOLD, OF CHICAGO, ILLINOIS.

CAR-HEATER.

SPECIFICATION forming part of Letters Patent No. 529,723, dated November 27, 1894.

Application filed June 1, 1894. Serial No. 513,161. (No model.)

To all whom it may concern:

Be it known that I, EGBERT H. GOLD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car-Heaters, of which the following is a specification.

This invention relates to improvements in that class of car-heaters known as "storage heaters," in which an internal storage tube or chamber is contained in the steam-pipe, for the purpose of storing and retaining heat after the steam is turned off, many forms of such heaters being now well known in the art, such as those in which the storage tube is both sealed and open and the other class in which the storage portion of the heater is a filling of clay or terra cotta for the steam-pipe.

My invention has more particular relation to that class in which the storage device consists of this terra cotta filling, which as now applied to the heaters, has proven objectionable because of the scaling and fracturing of the clay filling due to numerous causes, which results in the scales and broken portions of the clay or terra cotta being driven through the steam-pipes and lodging in the various valves and traps to such an extent as to render them inoperative and requiring a loss of time, a loss of train service, and involving considerable expense, to restore the heating system to a condition of practical usefulness.

The prime object of this invention is to have a clay or terra cotta storage heater of such character that the liability of the clay or terra cotta to scale or break in small parts is reduced to the minimum, and such scale or broken parts as result in practical use of the heater are rendered harmless by being prevented from getting into the traps, valves, couplings and other parts of the heating system. This object is attained by the devices illustrated in the accompanying drawings, in which—

Figure 1 represents a central longitudinal section through a heater embodying my invention; Fig. 2, a transverse vertical section on the line 2—2 of Fig. 1; Fig. 3, a similar view of a different form of storage heater embodying my invention; Fig. 4, a transverse vertical section on the line 4—4 of Fig. 3; Fig. 5, a central longitudinal section of still another

form of storage heater embodying my invention; Fig. 6, a transverse vertical section on the line 6—6 of Fig. 5; and Figs. 7, 8, 9, 10, 11, and 12 illustrate longitudinal and transverse sections of modifications of my heater, as described in detail farther on.

Similar letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to these drawings: A indicates the outer shell or casing of the heater provided with a steam inlet and outlet B—C respectively, which in some of the forms shown are both at the same end of the heater, while in other forms they are shown as at opposite ends, a difference which is wholly immaterial to the present invention. This outer shell or casing is provided at its ends respectively with removable caps or covers D—E for convenience of filling and inserting and removing the storage tube. This storage tube in each case consists of a series of blocks F of clay or terra cotta, inclosed within a tube G, of less diameter, and slightly less length than the outer shell or casing, in which it is not only preferably eccentrically located, so as to provide a steam space around the same, but is also preferably located in an inclined position with relation to the outer tube for the purpose of draining any surplus water of condensation. This inner storage tube G in each case is provided with heads H and I at the opposite ends thereof for the double purpose of firmly retaining the clay or terra cotta blocks F in position, and also to prevent the passage into the steam-chamber of the outer shell, and, consequently, into the steam-pipe of the system, of any scale or broken portions of the clay or terra cotta blocks resulting from use and the usual wear and tear of such parts under the conditions of their service.

The principle of operation of all of the heaters herein shown, so far as my present invention is concerned, is the same in all the different forms of heaters shown in the drawings, that is to say, when the steam is turned on, it not only heats the blocks in the storage tube, but also comes into contact therewith, and by condensation thoroughly saturates the blocks with water of condensation at as high a temperature as it is possible to do with the live steam, making them storage heaters

of the maximum efficiency as well as durability. The minor features of difference in accomplishing this result will best be understood by a description of each of the apparatuses shown in the drawings.

The apparatus shown in longitudinal section in Fig. 1 and in cross-section on the line 2, 2, in Fig. 2, has perforations *a—b* in the ends *H—I* of the internal tube, and the blocks *F* are provided with longitudinal peripheral grooves *c*. Hence, when steam enters the inlet *B* and impinges against the head *H*, the steam is deflected through the openings *a* and the passages *c*, thence out through the openings *b*, and is exhausted or discharged through the outlet *C*, passing back to said outlet around and on the outside of the storage tube *G*, thus both saturating and heating the storage blocks *F* on its initial entry into the heater, and completing the heating thereof during its passage through the steam space of the outer shell.

The heater shown in longitudinal section in Fig. 3 and in transverse section on the line 4—4 in Fig. 4, differs from that shown in Figs. 1 and 2 only in that the steam first passes through a pipe in the center of the blocks *F* to the inner end of the heater from whence part of it passes back through the openings *b*, passages *c* and openings *a* to the steam outlet while the remainder passes through the openings *d* in the supplemental head of the tube *G*, and thence back on the outside of said tube, being exhausted to the outlet-port *C* through one or more ducts *e*, made in the end-cap *D* of the outer shell or casing.

In the heater shown in longitudinal section in Fig. 5 and in transverse section on the line 6—6 in Fig. 6, the steam supply pipe is provided with a valved branch *f* which, whenever desired, delivers steam into the chamber formed between the cap *D* of the outer shell or casing and the head *H* of the storage tube, which latter is provided with perforations *a* so as to afford access for the steam to the blocks *F*; but the opposite head *I* of the storage tube is imperforate, and the steam when turned on through the valved branch pipe *f* is simply intended to saturate and partially heat the blocks in the storage tube, the remainder of the steam passing through the heater outside of the storage tube as in the previously described forms but differing therefrom in being discharged at the opposite end of the heater instead of returning to an outlet-port at the same end of the heater with which the supply-pipe is connected.

The heater shown in longitudinal section in Fig. 7 and in cross-section on the line 8—8 in Fig. 8, differs from all of the heaters previously described in that the clay or terra cotta blocks *F* completely fill the storage tube *G*, circumferentially, while the said tube is provided with imperforate heads and slots or openings *g* in the sides thereof and preferably near the top so that the steam may have access to the said blocks for the purpose of

saturating the same but does not circulate through passages in the blocks as in the previously described constructions. I may here state that substantially the same result would be accomplished if the openings *g* were omitted and the hermetically sealed storage tube *G* were filled with previously saturated clay or terra cotta blocks, as with a storage tube so sealed no appreciable evaporation would occur; and in point of fact the construction shown in Fig. 5 is a practically hermetically sealed storage tube excepting that it is provided with means for saturating the blocks of the storage tube at such intervals as saturation may be desired.

In the heater shown in longitudinal section in Fig. 9 and in transverse section on the line 10—10 in Fig. 10, the steam passes through a perforated pipe *h* extending centrally through the blocks *F* and the heads *H* and *I* of the storage tube *G*, returning on the outside of the storage tube and escaping through the outlet *C* in the manner previously described. In this construction the steam gains access to the storage blocks for saturating the same through the perforations in the pipe *h* which is directly connected with the inlet opening *B* so that the steam in its initial introduction into the heater must pass through said pipe and first saturate and partially heat the blocks in the storage tube. Yet another construction is illustrated in the heater shown in the longitudinal section in Fig. 11 and in transverse section on the line 12—12 in Fig. 12, in which the inlet pipe *i* extends the length of the storage tube *G* and discharges the steam into the chamber formed between the head *I* of said tube and the end of block *F*, passing back through the longitudinal peripheral passages *c* and escaping through the outlet *C* by way of the ports *a* in the head *H* as before described. In all of these constructions the clay or terra cotta filling for the storage heater is contained and confined within a practically closed tube or casing so that no matter what scaling or breaking of the clay or terra cotta blocks occurs in practice, such scales or broken particles will be caught and held in the storage tube and thereby be prevented from passing into the steam-pipe and thence to the various valves and traps of the steam heating system, which would soon become clogged beyond usefulness. The importance of avoiding this difficulty cannot be over estimated, for it will be borne in mind that in the coldest weather, when the greatest heat is required, there is the greatest liability to scaling and chipping or breaking of the clay or terra cotta filling, and the most disastrous results would occur at such time from the choking or clogging of the valves or traps which, besides rendering the system useless and inoperative, and throwing the cars out of service, is also liable to result in the freezing and bursting of the pipes due to an excessive accumulation of water of condensation in the pipes on account of the choking of the traps; besides which con-

siderable expense and loss of time is involved in removing, cleaning and replacing the various traps and valves before the cars can be again used. All these difficulties are

5 overcome by my invention which in its broadest form consists of a clay or terra cotta filling for the storage tube, and in the more limited sense, of a clay or terra cotta filling for the storage tube to which the heating steam has
10 access for the purpose of saturating the filling.

In conclusion I will state that while I have specified the filling as composed of clay or terra cotta, I do not desire to limit my invention to any particular substance as my invention in its broadest sense is intended to
15 comprehend a filling of sand, broken brick, terra cotta, or any vitrified or unvitrified material that will subserve the intended purpose.

20 Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A storage car heater comprising an outer shell having a steam inlet and an outlet, an
25 internal storage tube and a filling of clay or

terra cotta for said internal tube, substantially as and for the purpose described.

2. A storage car heater comprising an outer shell or casing having a steam inlet and an outlet, an internal storage tube, a filling of
30 clay or terra cotta for said internal tube, said filling being exposed to the action of the steam let into said heater, substantially as and for the purpose described.

3. In a storage car heater, the combination
35 with an outer shell or casing, having a steam inlet and an outlet, an internal storage tube of less dimensions than said outer shell, the space between which tube and shell constitutes a steam-chamber, a filling of clay or
40 terra cotta for said internal tube, said tube and filling having openings and passages therein whereby the steam let into said heater comes in contact with said filling, substantially as described.

EGBERT H. GOLD.

Witnesses:

CHAS. B. BOWEN,
M. E. SHIELDS.