

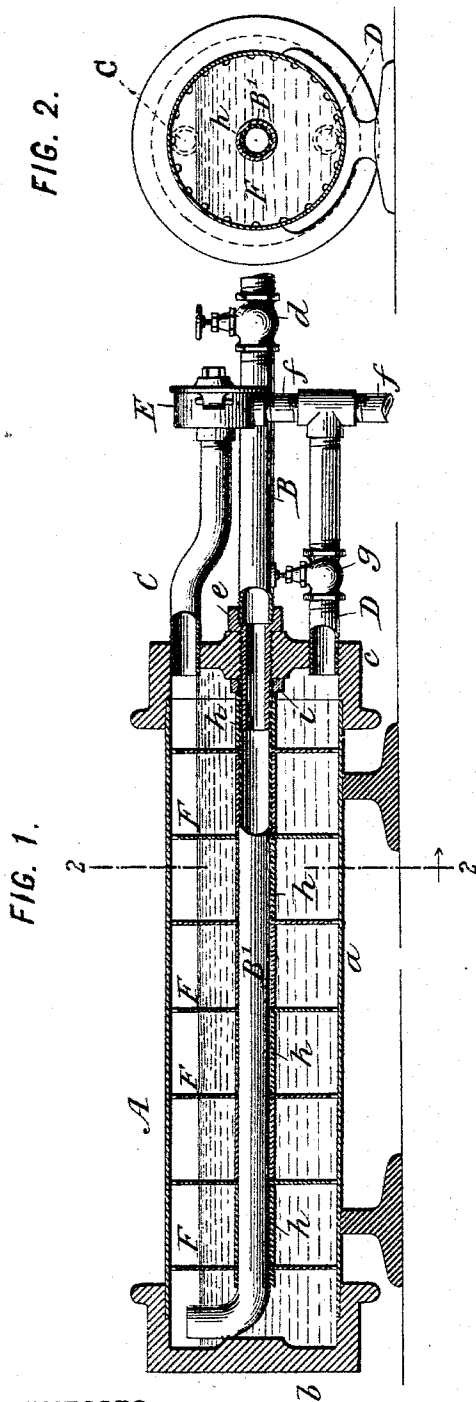
(No Model.)

2 Sheets—Sheet 1.

E. E. GOLD.
STEAM RADIATOR.

No. 584,143.

Patented June 8, 1897.



WITNESSES:

Fred White
Thomas Wallace

INVENTOR:

Edward E. Gold,

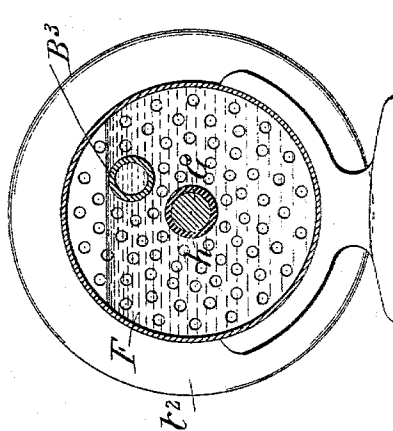
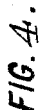
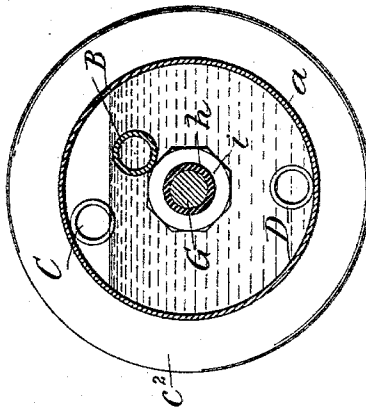
By his Attorneys,

Arthur C. Draper & Co.

2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

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

STEAM-RADIATOR.

SPECIFICATION forming part of Letters Patent No. 584,143, dated June 8, 1897.

Application filed August 28, 1893. Serial No. 484,174. (No model.)

To all whom it may concern:

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

This invention relates to radiators for use in steam-heating, the same being particularly adapted for the heating of railway-cars. For this purpose it is sometimes desirable to have a radiator which shall act as a storage-heater for absorbing a considerable amount of heat and slowly radiating it for a considerable time after the supply of heat is shut off. At other times it is desirable to be able to command a large radiating-surface in order to give off heat rapidly when first heating up a cold car.

The object of my invention, therefore, is to provide an improved construction of radiator which shall admit of rapid heating as a direct steam-heater when required to quickly heat up a car or apartment and which may be subsequently utilized as a storage-heater, if desired.

My improved radiator may be very quickly converted from a storage-heater into a live-steam heater. The heat-storage medium is the water of condensation which accumulates in the radiator by the condensation of the steam.

My invention also provides against any disadvantageous degree of movement or shifting of the body of water within the casing by reason of the motion of the car.

Figure 1 of the accompanying drawings is a longitudinal mid-section, in a vertical plane, showing the preferred construction of my invention. Fig. 2 is a transverse section thereof on the line 2 2 in Fig. 1. Fig. 3 is a longitudinal vertical section showing a modification. Figs. 4 and 5 are transverse sections of Fig. 3, on a larger scale, in planes cut on the lines 4 4 and 5 5, respectively.

I will first describe the construction shown in Figs. 1 and 2.

Let A designate a radiator-casing consisting of an elongated closed vessel arranged horizontally or approximately so. The preferable construction consists of a tube *a*, of wrought iron or steel, constituting the body

of the casing, and closed at its ends by heads *b* and *c*, preferably of cast-iron. The head *c* is formed with three openings, through which pass, respectively, a steam-inlet pipe B, a water-outlet pipe C, and a drainage-pipe D. The steam-pipe B communicates with any suitable source of steam, the admission of which is controlled by a valve *d*. In the particular construction shown a thimble *e*, preferably of brass, is screwed through the head *c* and has an enlarged internally-threaded hexagonal head into which the end of the steam-pipe B is screwed. The thimble *e* projects for a short distance within the head, and over its projecting portion is slipped an auxiliary steam-pipe B', extending within the radiator-casing to the opposite end thereof, where it is turned up and opens near the top of the casing, as shown. Consequently whenever steam is turned on it enters through the pipe B, thimble *e*, and pipe B', by which it is conducted to the farther end of the casing.

The water-outlet pipe C extends to a thermostatic trap E, or any other construction of automatic trap adapted for discharging water, but for closing the discharge to steam. The trap E shown is the well-known Gold thermostatic trap, and requires no description. From the trap a discharge-pipe *f* extends downwardly, passing through the car-floor, and opening beneath the car to discharge upon the track any water that passes the trap. The drainage-pipe D is controlled by a valve *g*, and discharges in any suitable way beneath the floor of the car, preferably by being united to the pipe *f*, so that only one hole need be made through the car-floor.

The operation is as follows: The drainage-valve *g* being closed, steam is admitted by opening the valve *d*. The steam circulates through the casing, and heat is radiated from all portions of the casing, thereby giving an extended radiating-surface, so that proportional to the pressure of steam a more or less high degree of heat is radiated from the casing to the air of the apartment. The escape of steam through the pipe C is prevented by the trap E. As the steam gives up its heat and condenses water of condensation accumulates in the casing, its level gradually rising as long as the steam remains turned on, and for some time after it is turned off. As

the water accumulates the portion of the surface of the radiator which is covered by the water is cut off from direct contact with the steam, and consequently the effective radiating-surface is reduced. This result is not undesirable, because if the apartment is once thoroughly heated not nearly so large a radiating-surface is needed to keep it at the required temperature as that which was required to rapidly heat it to that temperature. In case at any time the temperature of the apartment falls too low while steam is turned on, showing that the radiating-surface is not sufficient, it is only necessary to open the valve *g* and let part of the accumulated water run out, thereby increasing the radiating-surface to any extent desired. When it is necessary to shut off the steam and it is desired to maintain the warmth of the apartment for some time without the admission of any fresh steam—as, for example, in the case of a railway-car when it is disconnected from the locomotive or other source of steam—the radiator is then to be operated as a storage-heater. To this end it is only necessary to maintain the steam fully turned on until sufficient water of condensation accumulates to afford the requisite heat-storing capacity, or, in other words, ordinarily the radiator should be permitted to become nearly or quite filled with water of condensation. It will fill in course of time to the level indicated in Fig. 1, but the level cannot rise higher or but very little higher, because any additional water runs out through the overflow-pipe *C* to the trap *E*, and this portion of water being isolated or cut off from the steam heat by reason of the descending form of the pipe *C* cools after a little time sufficiently to open the trap *E* and permit the water thus accumulated to run out. With the radiator full or nearly full of water, and the mass of water therein heated to a high temperature, the steam may be shut off, and the radiator will then continue to give out heat for several hours. Whenever subsequently it is desired to quickly heat up the car or apartment again, the radiator is first emptied by opening the valve *g*.

My improved radiator cannot be damaged by freezing when filled with water, since a sufficient air-space is always left above the water-level to provide for the necessary expansion of the water as it freezes.

It will be observed that whenever the level of the water rises above the horizontal portion of the pipe *B'* the mass of water will be heated and caused to circulate within the casing by the heat given out by conduction from this pipe, no reliance being placed for heating the mass of water on the downward conduction of heat from the steam in the steam-space above the water-level.

In the case of a railway-car heater the motion of the car while running is liable to cause the mass of water in the radiator-casing to shift and splash about within the casing, thereby making a disagreeable noise. To

prevent this, I subdivide the interior of the casing into a number of small chambers by means of notched or perforated diaphragms or partitions *FF*. These are preferably metal disks notched at their edges, as shown, and fixed at uniform distances apart in any suitable way, the preferable construction being that shown, wherein the disks *FF* are passed over the pipe *B'* in alternation with sleeves *h h* of metal tube, these sleeves serving to hold the disks spaced apart, and the entire combination being made tight by screwing a nut *i* on the threaded end of the pipe *B'* against the terminal one of the sleeves *h*. The notches or perforations in the disks *FF* permit of a ready circulation of the steam throughout the interior of the radiator and permit a sufficiently free circulation of the water to maintain a uniform level, but prevent any sudden displacement of any considerable mass of water.

Fig. 3 shows a modification. The casing is here of the same construction as that first described, except that the head (lettered *c*²) has its holes differently arranged, having holes respectively at top and bottom for admitting the overflow-pipe *C* and drainage-pipe *D*, while the opening through which the steam-pipe *B* passes is arranged near the top, as shown in Fig. 5. The inner continuation of the steam-pipe (here lettered *B'*) extends in a straight line and on a level to the opposite end of the casing, its end not being turned up. Being under the highest water-level this pipe may become filled with water, which, however, is quickly blown out upon turning on steam. For holding the perforated diaphragms or disks *FF* in place I provide in this construction a separate central rod *G*, on which the disks are placed in alternation with the sleeves *h* in the manner that they are applied in Fig. 1 to the pipe *B'*. One end of the rod has a head *h'*, while its other end is threaded, and a nut *i* is screwed on to clamp the disks in place. To maintain the system of disks and their mounting properly in place within the casing, two spiral springs *s s* are interposed between the opposite end portions of the rod *G* and the opposite heads *b*² *c*² of the casing, the springs being held in place by inwardly-projecting bosses *j*, formed on these heads.

The transverse partitions *FF* may be variously constructed, it being only essential that they shall almost but not entirely cut off communication between the chambers on their opposite sides. To this end they may be perforated with holes, as shown in Fig. 4, or they may have notched or serrated edges, as shown in Fig. 2, and in the latter case the notches may be more or less numerous and of any convenient size. The notched disks are preferable to the perforated ones, for the reason that they afford a means for the escape of sediment which may accumulate in the casing, permitting the sediment to be washed out or blown out through the drainage-outlet *D*.

I claim as my invention the following-defined novel features, substantially as herein-before specified, namely:

- 5 1. In a radiator, the combination with its casing, of a series of partitions fixed upon a longitudinal rod or tube in alternation with sleeves *h h*, whereby the partitions *F F* are maintained properly spaced apart.
- 10 2. In a radiator consisting of a casing having a steam-pipe *B'* passing centrally within it, the combination therewith of a series of partitions *F F*, and sleeves *h h* arranged in alternation upon said steam-pipe.
3. In a radiator, the combination with a

casing, a thimble *e* screwed through a threaded 15 opening in the head of the casing and projecting within the interior of the casing, a steam-pipe *B* having a threaded attachment to said thimble, and a steam-pipe *B'* within the casing having its end slipped over the 20 inwardly-projecting portion of said thimble.

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

EDWARD E. GOLD.

Witnesses:

ARTHUR C. FRASER,
FRED WHITE.