No. 886,969. PATENTED MAY 5, 1908.

E. H. GOLD.

ART OF HEATING.

APPLICATION FILED APR. 25, 1904.

Fig. 1.

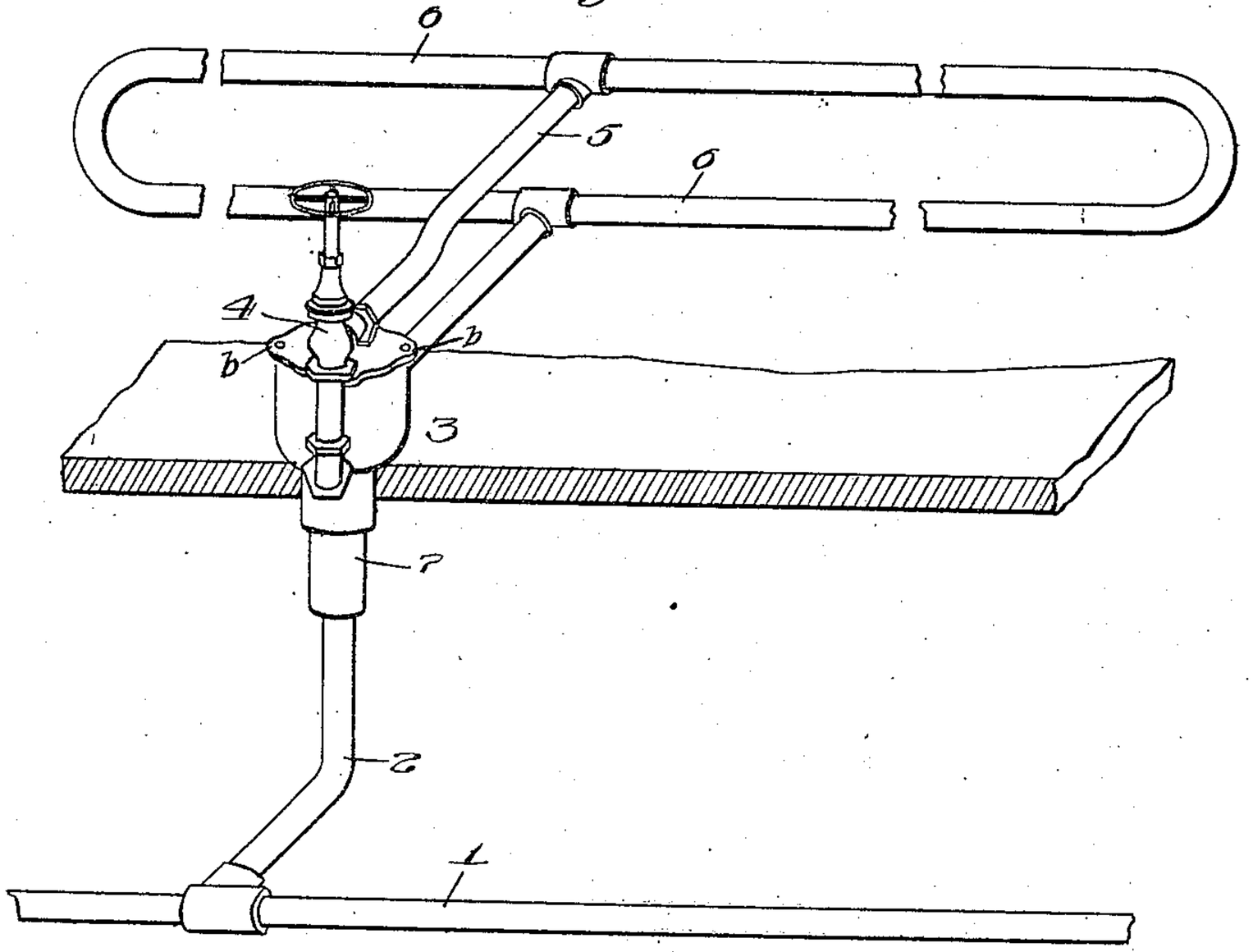
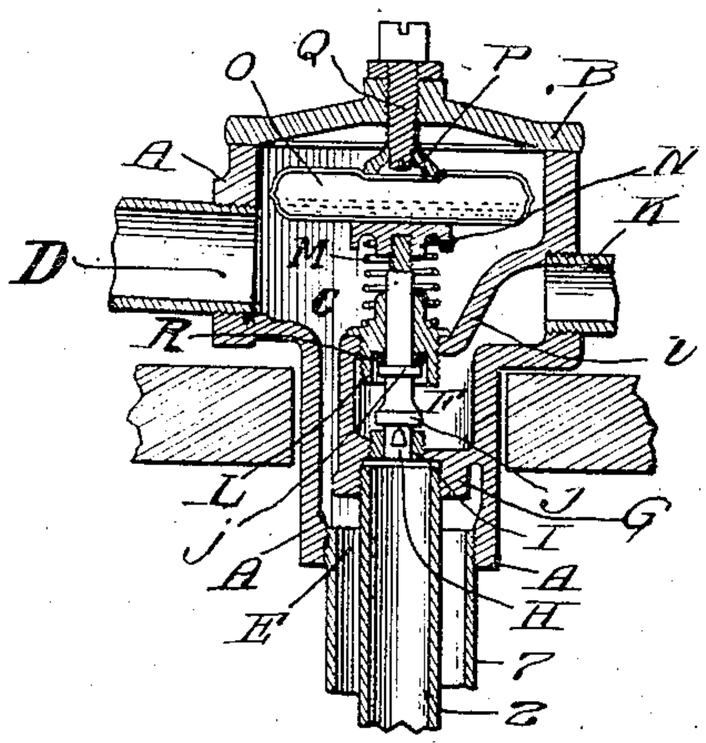


Fig. 2.



Witnesses:
Emil E. Wettmann
Robert H. Weir

Inventor
Egbert H. Gold
By Raymond Barnett
Atty.

UNITED STATES PATENT OFFICE.

EGBERT H. GOLD, OF CHICAGO, ILLINOIS.

ART OF HEATING.

No. 886,969. Specification of Letters Patent. Patented May 5, 1908.

Application filed April 25, 1904. Serial No. 204,672.

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 the Art of Heating, of which the following is a specification.

My invention relates to improvements in the art of heating, and more especially to the art of heating railway cars.

The object of my invention is to provide a reliable, efficient and inexpensive method of heating, whereby an equable temperature is maintained, without unnecessary waste of energy.

While my invention is applicable broadly for accomplishing this result in various kinds of heating, it is among the particular objects of my invention to provide a method for automatically maintaining a substantially uniform temperature throughout a train of cars by direct steam heating from a high pressure source of supply, and to do so in such a manner that in the initial heating of the cars the heating action will be substantially uniform throughout the train and will remain constant regardless of variations in pressure in the train pipe, so long as there is any pressure whatever in the train-pipe. These and such other objects as may hereafter appear are attained by my improved process, which may be conveniently practiced with any suitable apparatus, such, for example, as that shown in my Letters Patent No. 758,436 dated April 26, 1904.

Speaking broadly, my invention consists, primarily, in heating a compartment by means of a heating medium, such as steam, which is substantially confined in any suitable radiator, but is also in open communication with the atmosphere through some outlet from the radiator, and which is automatically maintained in its normal condition by a continuous supply from a relatively high pressure main or source of supply, the inflow from such source of supply being automatically regulated by the thermostatic condition adjacent to the outlet from the radiator, whereby any suitable thermostatic motor is actuated to operate the valve mechanism located between the heating body and said supply.

Applied more concretely to a railway train, I for example heat each car by means of a substantially confined body of steam, in communication with the atmosphere, so that it is always at substantially atmospheric pressure, thereby insuring a gentle heat. To compensate for the loss of steam by condensation, there is a constant renewal of the body of steam by an inflow from the train pipe, which contains steam at high pressure, the rate of inflow being automatically controlled by the thermostatic condition adjacent to the outlet from the radiator, whereby a thermostatically operated inlet valve is operated, so that the inflow of live steam just balances the loss of heating efficiency due to condensation.

As the atmospheric temperature decreases, the rate of condensation will increase and the inflow of live steam will be correspondingly and automatically increased, so that the car is heated by live steam at substantially atmospheric pressure.

The thermostatic device for automatically controlling the inflow may be of any suitable character, such, for instance, as that shown and described in said Letters Patent No. 758,436.

By means of this improved process, I not only maintain a mild temperature, while using live steam at high pressure from the locomotive as a heating medium, but I am enabled, to arrange the opening from the radiator to the atmosphere; so that all traps are dispensed with and the water of condensation will escape to the atmosphere as rapidly as it forms, trapping of the water of condensation is made impossible and freezing of the pipes is absolutely prevented. At the same time, since the radiating pipes of each car of a train can only contain steam at or substantially at, atmospheric pressure, it follows that, in the initial heating of the train, the high pressure steam from the locomotive, at a pressure of anywhere from 40 lbs. to 60 lbs., will quickly fill the train-pipe from end to end of the train and will also quickly supply each car with its column of steam at atmospheric pressure, so that, instead of progressively overheating the cars from the first car backward, I provide a means for obtaining a substantially simultaneous heating of all of the cars of the train, and I also provide a method whereby the train-pipe is quickly filled with live steam, as has been demonstrated by actual tests, so that the train crew can start the train out of the station much more quickly than where other methods of heating are used. Furthermore, by my method each car must be heated with steam at the same pressure, thus insuring a

uniform heat within all cars of the train, and there is no destructive strain upon the fittings due to the excessive expansion and contraction which results where high pressure steam is used in the heating pipes. I also, by any suitable mechanical means, restrict the passage for the flow of the heating medium from the train-pipe into each of the heating pipes of the train, so that, the passage from the train-pipe to the heating systems being restricted, as for example at the port H, while the passage through the train-pipe is free and comparatively large, the rapid filling of the train-pipe with high pressure steam is greatly facilitated.

In the accompanying drawings I have shown such an apparatus as that in my Letters Patent No. 758,436 referred to, which is a suitable form of apparatus for practicing my process.

Figure 1 is a diagrammatic representation of one side of a car heating system. Fig. 2 is an enlarged detail showing a convenient form of thermostatically operated inlet valve.

Like characters of reference indicate the same parts in the various figures of the drawings.

1 is a train-pipe to which steam may be supplied from the locomotive, 2 is a feed-pipe branching from the train-pipe, 3 is the thermostatically operated inlet valve, 4 is a manually operated shut-off valve, 5 is the connecting pipe between the shut-off valve and the radiator, 6 is the radiator, and 7 is the passage pipe open to the atmosphere.

Referring in detail to Fig. 2, A is a casing provided with a cap B which is secured in position by screws passing through lugs *b*. The casing A is provided with a main chamber C connecting with the exhaust end of the radiating system through the port D and connecting with the drip-pipe 7 at the port E. The casing A is also provided with a chamber F which is normally shut off from connection with the chamber C. The bottom of the chamber F is formed by a web G into which is screwed the upper end of the feed pipe 2 which has access to the chamber F through a port H. This port H is preferably an opening through a nipple L which is screwed into the web G, the upper surface of which nipple furnishes a seat for the valve J.

The chamber F connects through a port K with the pipe leading to the shut-off valve 4. The valve J is provided with a collar *j* which is preferably of polygonal outline and is arranged to loosely engage the downwardly projecting wall of the nipple L which is screwed into the web *l*, and which is provided upon its upper surface with a shoulder which affords a seat for the spring M. This spring M carries a collar N, into which is screwed the stem of the valve J and upon which rests the expansible diaphragm O, which is partially filled with alcohol, or other volatile fluid, and is arranged to react against the button P which is held in any desired adjusted position by the threaded stem Q. The stem Q projects through the cap B and is operated and locked in any desired position in any familiar manner.

Mounted upon the stem of the valve J and between the collar *j* and the nipple L is a packing washer R which loosely fits upon the stem of the valve J.

With this apparatus, my process may be practiced as follows: Steam under high pressure is supplied to the train-pipe and flows through the connecting pipes and chambers into the radiator. As soon as live steam has filled the radiator, it will surround the thermostat or diaphragm O and, expanding that diaphragm, will check the inflow of steam to the radiator from the train-pipe. The water of condensation as it forms will escape freely to the atmosphere through the drip-pipe and the consequent reduction in the quantity of steam in the radiating system will result in a cooling of the diaphragm and an opening of the supply valve. The result will be that the apparatus will become so balanced that the inflow to the radiator of high pressure steam from the train-pipe, will balance the loss of steam by condensation, etc., so that the radiator will be kept full of live steam, but, since the radiator opens freely to the atmosphere, the steam within the radiator must always be at substantially atmospheric pressure, and, therefore, at a temperature in the neighborhood of 212 degrees.

While I have shown a convenient form of apparatus suitable for the practice of my process, it will be understood that the drawings only illustrate generically one combination of mechanisms which is suitable for my purpose but, obviously, my invention is not limited to any specific form of mechanism. So, also, while I have explained the practice of my process when atmospheric pressure only is desired in the heating system, it will be seen that it is only necessary to have the heating body in communication with a zone of equal or lower pressure, and that this communication need not be constantly open. The heating body itself is in communication with such zone of equal or lower pressure during the normal operation of the apparatus, as distinguished from those systems which provide merely an outlet for water of condensation, or emergency blow-offs. It will be further noticed that the thermostatic condition of the heating body operates to check the inflow from the supply only when such communication is open.

With this understanding of the fundamental principles of my invention, it is evident that it can be practiced in various ways without departing from the spirit thereof.

I claim:

1. The improvement in the art of heating

which consists in providing a train of cars with a body of comparatively high pressure steam extending lengthwise of the train, providing each car from said high pressure steam with a body of steam at low pressure, said body of steam at low pressure discharging into a zone of the same or lower pressure, and retarding and controlling the flow of steam from the high pressure body to each low pressure body, respectively, solely by the thermostatic condition of the said bodies of steam at low pressure, adjacent to their respective points of discharge.

2. The improvement in the art of heating which consists in providing a train of cars with a body of comparatively high pressure steam extending lengthwise of the train, providing each car with a body of steam at low pressure taken from said high pressure body, said bodies of low pressure steam having discharges to the atmosphere, and regulating the pressure of steam in each of said low pressure bodies by shutting off or retarding the flow of steam from the high pressure body thereto solely by means of the thermostatic action of steam made to discharge from said low pressure bodies, respectively, because of excess pressure therein.

EGBERT H. GOLD.

Witnesses:
O. R. BARNETT,
G. Y. DANKWARD