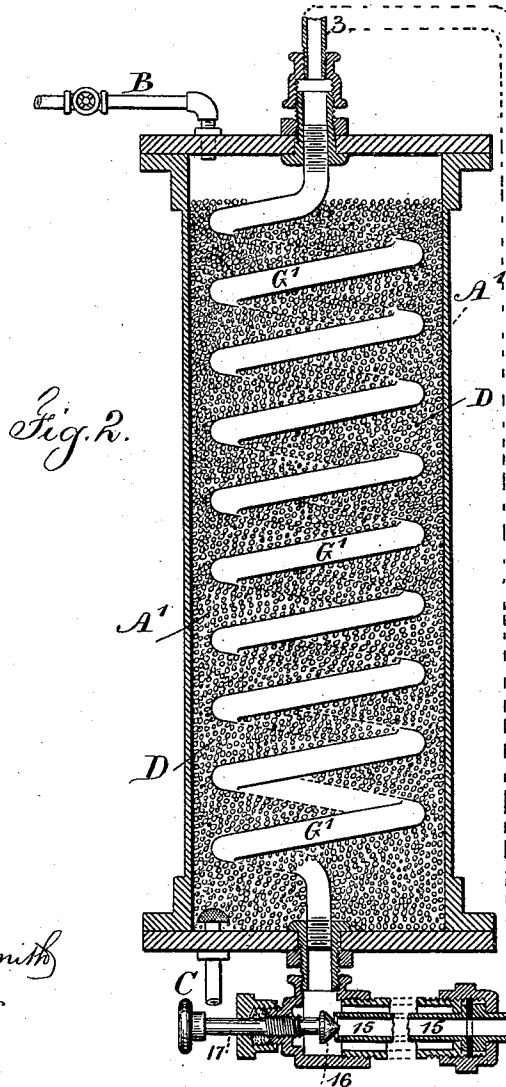
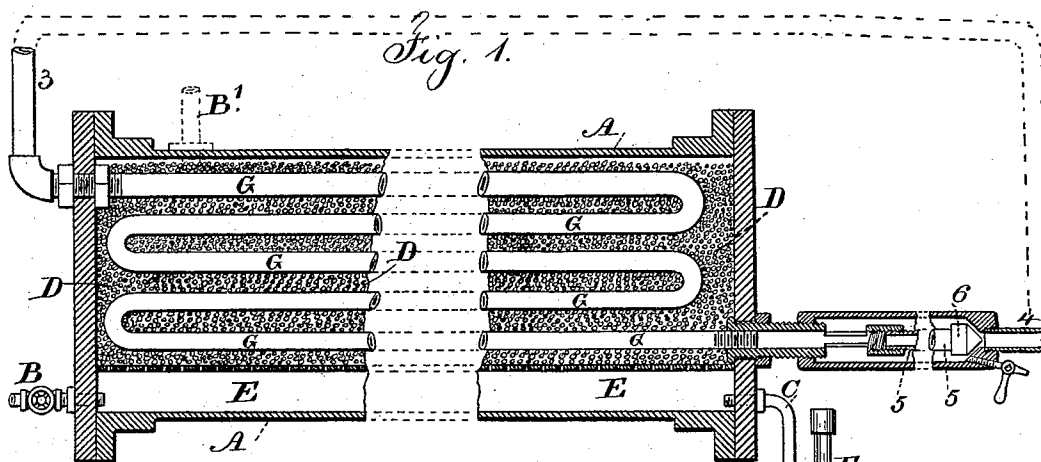


(No Model.)

W. C. BAKER.
HEATING APPARATUS.

No. 496,107.

Patented Apr. 25, 1893.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM C. BAKER, OF NEW YORK, N. Y.

HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 496,107, dated April 25, 1893.

Application filed June 3, 1892. Serial No. 435,339. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. BAKER, a citizen of the United States, residing in the city and State of New York, have invented an Improvement in Heating Apparatus, of which the following is a specification.

In Letters Patent No. 209,793, granted to me November 12, 1878, a car heating apparatus is represented in which a case containing sand or other similar material is provided with a steam pipe passing through the same to form a caloric storage radiator, and in Letters Patent No. 476,972, granted to me June 14, 1892, a case is represented having pebbles or other similar material between which steam is admitted, so as to impart heat directly to such pebbles or similar substances, thereby causing the heating operation to be much more rapid than in the patent first named.

My present invention is designed for storing the heat and giving out the same by a circulating medium, and with this object in view I combine with the holder for the pebbles or other substances and the supply for the steam or other fluid in a highly heated condition, a pipe passing through the case and containing a liquid that is caused to circulate by the action of the heat and to form a radiator for a car, building or compartment.

In carrying out my improvement, the vessel containing the pebbles or other similar substances is adapted to be heated with great rapidity by the steam or other heating fluid passing directly among the pebbles or similar substances, and the heat absorbed by such pebbles is stored and the capacity of the storage depends upon the size of the vessel holding such heat absorbing material, hence a car can receive sufficient heat from a steam supply, while the car is standing still, to maintain the proper temperature of such car during a considerable distance of travel, and where the steam is supplied from the locomotive, the heat absorbing material will maintain the proper temperature for the car during a considerable period of time when the locomotive may be detached from the train, and in the heating of buildings, a receptacle of considerable size can be provided in the lower part of a building for the pebbles or other heat absorbing substances, and steam can be blown into the same under a high

pressure or temperature, so as to rapidly heat up the heat absorbing pebbles and store such heat for use after the steam or other source of heat has been disconnected. This is available where steam is supplied through pipes from one building to another or where a portable boiler may be employed for supplying buildings one after another.

In the drawings Figure 1 is a vertical section illustrative of the improvement when used with a horizontal case. Fig. 2 is a similar view of a vertical case.

The case is to be of any desired size or shape and placed horizontal as represented at A, Fig. 1, or vertical as shown at A', Fig. 2, and the steam or other heating fluid is to be introduced preferably at the lower part of the case by the pipe B, and the water of condensation may pass off by a pipe C, and the pebbles D or other heat absorbing substances are adapted to the free passage of the steam or heating fluid through the interstices between such heat absorbing substances, and where the steam is supplied at the bottom of a case, it is preferable to provide a steam chamber E with a grating or perforated metal for supporting the pebbles. If the steam is admitted above the pebbles by a pipe shown by dotted lines at B', the air may be displaced and driven off downwardly, the steam passing down through the mass of heat absorbing material D, and an automatic air valve may be provided at F to allow the escape of air and to retain the steam.

The pipe G is of a suitable size and it passes through the case A and is surrounded by the pebbles or other heat absorbing substances D. In Fig. 1 I have represented this pipe G as passing backward and forward within the case and forming a coil, and in Fig. 2 the pipe G' is represented as passing upwardly through the case, and the pipe G or G' is to contain a circulating liquid such as brine, and it is to pass off to coils or radiators in the car, building or apartment to be heated, so that the heat from the pebbles will heat the circulating liquid by the conduction of the pipe, and such liquid will rise by the heat radiating pipe 3 outside the case A and return by the pipe 4 to the lower portion of the coil.

Where steam in a highly heated condition is passed into the case, the circulating me-

dium in the pipe G or G' is liable to become too hot, and to heat up the car or building too rapidly and to too high a temperature and at the same time the heat stored up in the pebbles is too rapidly disseminated, and in instances where super-heated steam is used for heating the pebbles, a risk of fire may arise by the circulating medium in the pipe G or G' becoming of a very high temperature. To prevent this occurring, a thermostatic valve is made use of in the return pipe 4 at a suitable distance outside the case A. This thermostatic valve is automatic and it is constructed of an expansible pipe 5 through which the liquid is caused to circulate, and there is a valve 6 at the end thereof, hence this thermostatic valve will be where the circulating medium in the pipes G is of the lowest temperature, and it will open with a low temperature, and as the hot circulating liquid reaches such thermostatic valve, the same will close or partially close and check the circulation throughout the entire system of pipes and radiators G or G', and when the circulating liquid in such pipes G or G' becomes sufficiently cool, the thermostatic valve will open and the circulation be re-established or made more rapid, and by adjusting this thermostatic valve the rapidity in the dissemination of heat from the pebbles or other heat retaining material can be regulated according to the condition of the weather or the requirements of the apparatus.

In Fig. 2 the thermostatic valve is constructed differently from that in Fig. 1. The valve 16 is at the end of the adjusting screw 17, and the expansible tube 15 is within a tube or case, and it expands or contracts under variations in the temperature, and the screw shank passing through a stuffing box and having a handle is easy of access for adjustment.

In my aforesaid patent, No. 476,972, the pebbles within a containing vessel are represented as a means by which heat can be taken up rapidly and without noise by blowing among such pebbles highly heated steam, and in some instances ranges of pipes containing a circulating medium have been made use of, and automatic valves have been provided for regulating the flow of a heating fluid according to the temperature thereof, hence I do not herein claim either of the separate devices.

By associating together a vessel containing pebbles or similar heat receiving material, pipes containing a liquid such as brine forming a circulating system, an automatic valve acting to regulate the speed of circulation according to the temperature, and means for supplying steam among the pebbles or heat receiving substances, I am enabled to store

up heat with great rapidity and without noise and without the risk of subsequent freezing, because any water of condensation is discharged, and at the same time the circulatory system and the automatic thermostatic valve thereof acts in substance to retain the heat within the heat storing vessel, because the circulatory system is checked by the automatic valve so as only to give out heat as demanded for heating the compartment, whereas the heat in the storage vessel would otherwise be too rapidly disseminated and the compartment become too hot, and the storage of heat would not be sufficiently permanent for maintaining the proper temperature in the car or compartment during a sufficient length of time to be usefully available, especially in the heating of cars.

The dotted lines between the pipes 3 and 4 are to illustrate that the pipes for the circulating fluid extend from the pipe 3 and return to the pipe 4, as in any ordinary circulatory system for heating.

I claim as my invention—

1. The combination with a case containing pebbles or other heat absorbing substances and a pipe for supplying steam or other fluid in a heated condition directly among such pebbles or heat absorbing substances, of a pipe passing through the case and forming part of a circulatory system of heating pipes whereby the heat from the heat absorbing materials is transferred to the medium circulating within the pipes substantially as set forth.

2. The combination in a heating apparatus, of a case containing pebbles or other heat absorbing substances, a pipe by which steam is admitted between such heat absorbing substances, a pipe passing through the case and forming part of a circulatory system of heating pipes in which a fluid is circulated by the action of the heat, and an automatic thermostatic valve to regulate the rapidity of circulation of the fluid according to the temperature, substantially as set forth.

3. The combination in a heating apparatus, of a case containing pebbles or other heat absorbing substances, a pipe by which steam is admitted between such heat absorbing substances, a pipe passing through the case and forming part of a circulatory heating system, and an automatic thermostatic regulating valve in the return pipe of the circulating system near the case so as to be acted upon by the coolest liquid circulating in the system, substantially as set forth.

Signed by me this 27th day of May, 1892.

WM. C. BAKER.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.