

(No Model.)

J. LEWIS.
HEATING APPARATUS.

No. 442,191.

Patented Dec. 9, 1890.

Fig. 1.

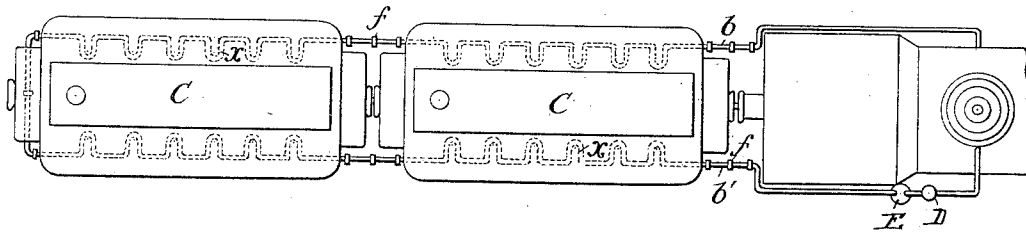
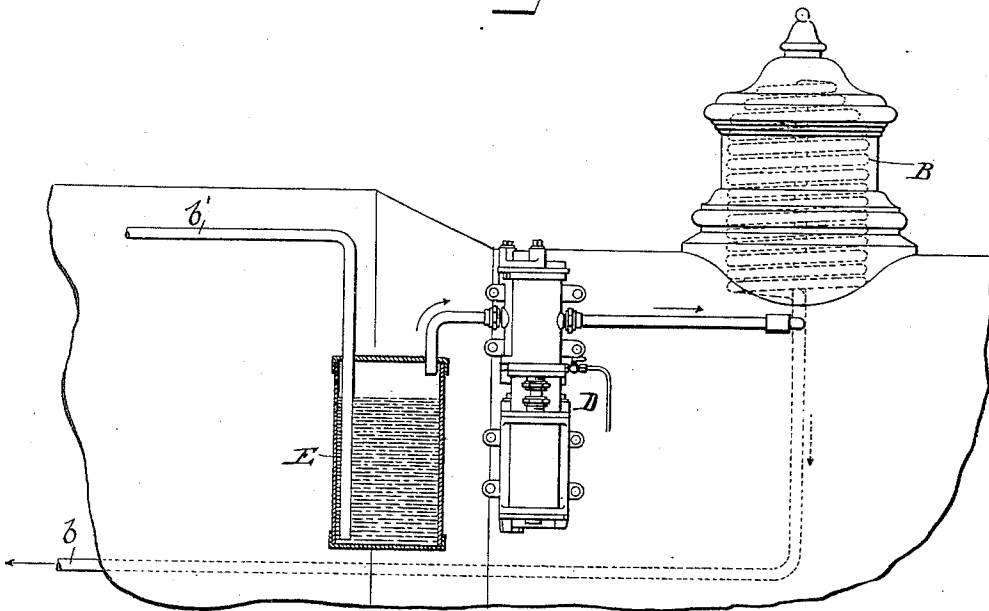


Fig. 2.



WITNESSES

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JAMES LEWIS, OF OIL CITY, ASSIGNOR OF NINE-SIXTEENTHS TO FRANK M. ASHMEAD, OF HULTON, E. C. PALMER, OF ALLEGHENY, AND JOHN GRIPP AND GEORGE R. MILLER, OF PITTSBURG, PENNSYLVANIA.

HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 442,191, dated December 9, 1890.

Application filed June 3, 1890. Serial No. 354,096. (No model.)

To all whom it may concern:

Be it known that I, JAMES LEWIS, a citizen of the United States, residing at Oil City, Venango county, State of Pennsylvania, have
5 invented certain new and useful Improvements in Heating Apparatus, of which the following is a specification.

In that class of heating apparatus illustrated in Letters Patent No. 372,032, granted
10 to me October 25, 1887, a current of cold air is received into a channel which is heated externally by steam or otherwise and communicates with a succession of radiators, so that the heated air is forced through the channel
15 to heat said radiators and thereafter escapes to the atmosphere. This mode of heating had proved advantageous and economical, but has also proved to be of limited applicability, first, because of the incapacity of the air to retain heat for over a very limited length of
20 time, and, secondly, because of the necessity of constantly raising the inflowing air from the external temperature to that of the heating-current. In the course of experiments I have found that a very slight addition of
25 moisture to the atmosphere and the circulation of the air obviates these objections, so that it is practicable to heat to any required temperature all the radiators in a train of any
30 required length.

In carrying out my invention I provide, in connection with the radiators and circulating-pipes, a heater, means for circulating the air, and means for maintaining a substantially-uniform degree of moisture therein, all of which
35 will be described in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of a railway-train
40 showing my improvement. Fig. 2 is an enlarged view of the air-heater, air-propelling device, and air-moistening apparatus.

The general arrangement of the radiators *x* in the successive cars *C* of a train is illustrated in Fig. 1, in which *b b'* represent the forwarding and return pipes or channels of the system connected in line between the cars by suitable flexible couplings *f*, the two
45 pipes *b b'* of the rear end of the last car being coupled to communicate.

Upon the locomotive or any other car when a special heater is used I arrange a coil *B* or other device having a channel for the air, which is put in circuit with the pipes *b b'*, and which when on the locomotive is arranged
55 within the boiler, combustion-chamber, fire-box, or in any other position, when it will be heated and maintained hot, and I arrange at any desired point a steam-pump *D*, or a blower-injector, or any other air-propelling
60 apparatus, whereby the air is compelled to pass through the coil to be heated, and is then driven through all the radiators and pipes of the circuit back to the pump and again into the coil. By this means the temperature of
65 the air is maintained without that loss of fuel which results from admitting a constant supply of cold air into the circuit and discharging the partially cooled air to the atmosphere.

While there is a decided advantage from
70 thus continuing circulating the air, I have found that with long trains it is not possible to maintain the more distant radiators at the proper temperature, and I have discovered that this may be remedied by moistening the
75 air.

As a means of automatically supplying a practically uniform amount of moisture to the air in circulation, I prefer to pass it through a tank of water *E*, as shown in Fig. 2.
80 Thus in passing through the tank *E*, if the air contains an excess of moisture, it will leave a portion of it condensed in the tank. If it be very dry it will take up some moisture, and if it be sufficiently moistened it will not
85 be altered. Of course the amount of moisture taken up will depend in a measure upon the temperature of the air as it passes through the water, and for this reason I prefer to locate the tank at a point where the air is not
90 too hot—as, for instance, in the return-passage to the heater. The best location in each particular case will depend upon the kind of heater, the apartments to be heated, and other circumstances, and must be governed thereby.

The addition of a very slight amount of moisture insures not only a higher initial temperature of the fluid, but also increases its capacity to take up and retain the heat imparted
100 to the coil, so that even in extremely long

trains there is no difficulty in heating and keeping at the proper temperature the radiators farthest from the heater.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. The combination, with the endless air-circulating system including the pipes, heater, radiators, and propelling apparatus, of means
10 for automatically maintaining a substantially uniform degree of moisture in the air in the circulating system, consisting of a tank included in said system and provided with water through which the air passes, substantially
15 as described.

2. The combination, with the endless air-circulating system including the pipes, heater, radiators, and air-propelling apparatus, of a water-tank arranged in the return air-passage to the heater and having the inlet-pipe
20 arranged below the water-level in the tank, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES LEWIS.

Witnesses:

CHARLES E. FOSTER,
W. S. MCARTHUR.