No. 731,776. PATENTED JUNE 23, 1903.

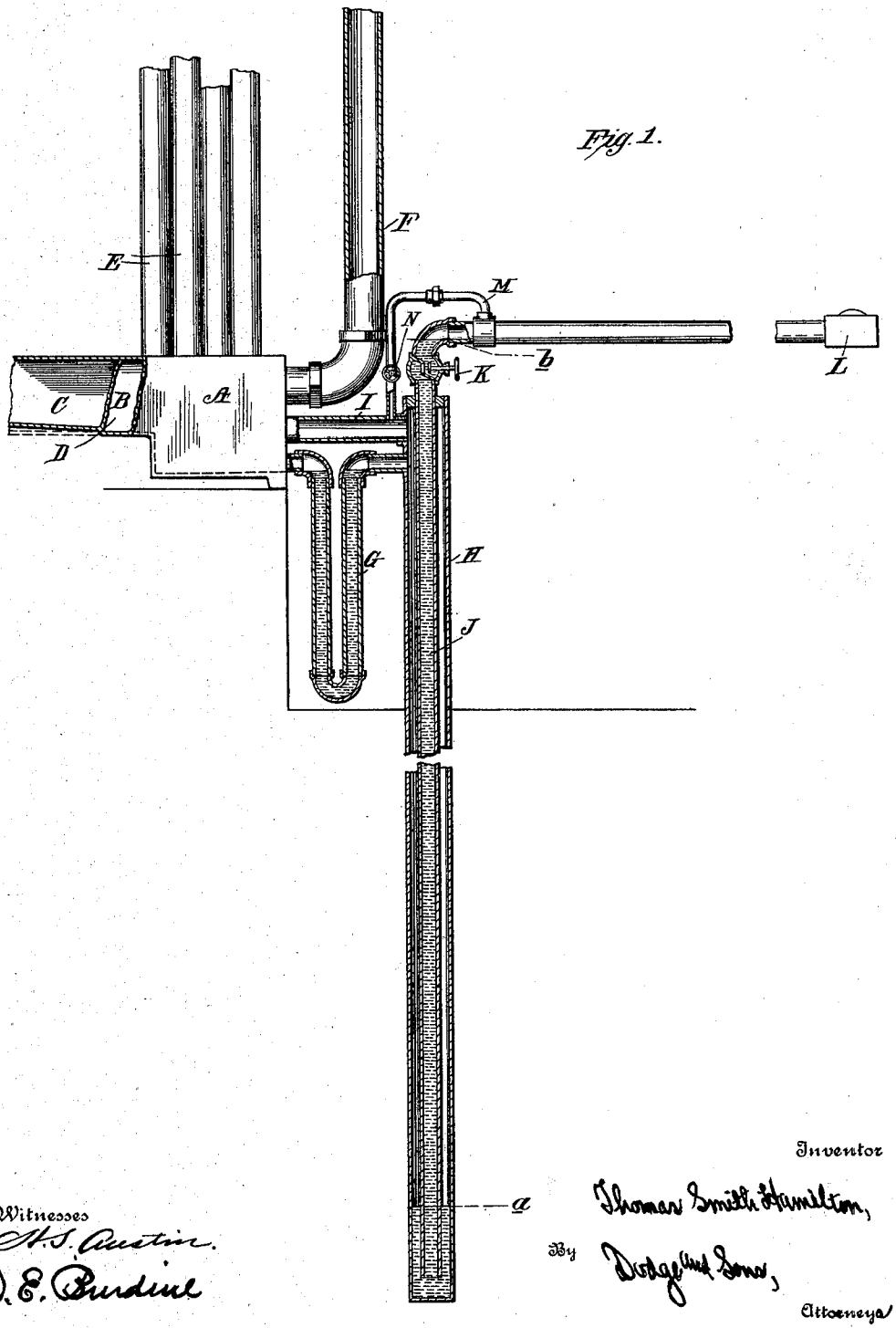
T. S. HAMILTON.

STEAM HEATING SYSTEM.

APPLICATION FILED MAR. 15, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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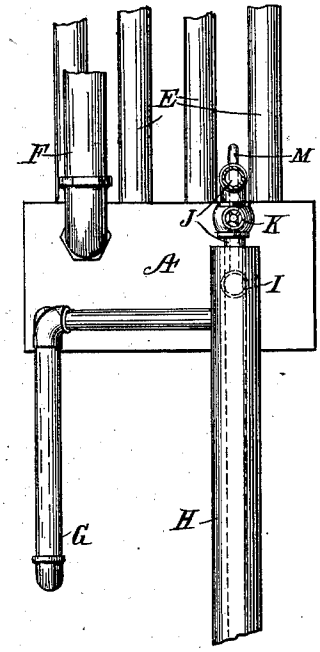


Fig. 2.

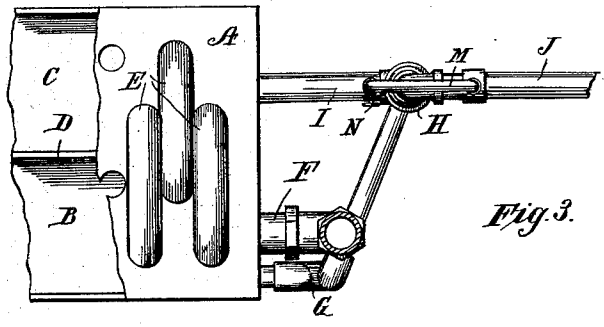


Fig. 3.

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UNITED STATES PATENT OFFICE.

THOMAS SMITH HAMILTON, OF LOUISVILLE, KENTUCKY.

STEAM-HEATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 731,776, dated June 23, 1903.

Application filed March 15, 1902. Serial No. 98,402. (No model.)

To all whom it may concern:

Be it known that I, THOMAS SMITH HAMILTON, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Steam-Heating Systems, of which the following is a specification.

My present invention pertains to steam-heating systems the construction and advantages of which will be hereinafter set forth, reference being had to the annexed drawings, wherein—

Figure 1 is a vertical diagrammatic sectional view partly in elevation; Fig. 2, an end elevation of a portion of the apparatus, and Fig. 3 a top plan view.

The object of the present invention is to provide means for drawing the air and water of condensation from a radiator or similar heating device which is supplied with exhaust-steam, thus in the first instance causing the withdrawal of the air from the radiator and the consequent entrance of steam thereto and after the radiator is filled with steam to constantly withdraw the water of condensation and the air which is freed from the steam as it is condensed, and this without withdrawing the steam itself.

Referring to the annexed drawings, which show one embodiment of my invention, A denotes the base of a radiator divided longitudinally into two chambers or compartments B and C by a vertically-disposed wall or partition D. The chambers are connected to each other by loops E, as is usual in heaters of this type.

F denotes the pipe leading from the source of exhaust-steam and communicating with chamber or compartment B. A bleeder G is likewise connected to this compartment, the opposite end of the bleeder communicating with a well or column H, which extends down below the floor line or level of the radiator to a considerable extent. A drain I affords communication between compartment C and the well or column H.

Extending down into well H, nearly to the bottom thereof, is a pipe J, which is provided with a valve K and extended to and connected with an exhausting device or vacuum-pump L.

A pipe M extends from drain I to pipe J, being connected thereto at a point above valve K. Said pipe M is likewise provided with a valve N.

The operation of the apparatus is as follows: When the exhaust-steam first enters the radiator or heater through pipe F, valve K is closed and valve N opened, the exhauster drawing the contained air from the radiator and causing the steam to quickly enter and fill the same. The water of condensation will soon fill up the column H, passing into the same through drain I and bleeder G, the latter serving not only to remove any water of condensation from section or chamber B, but also to remove the free water which is carried in by the exhaust-steam. As soon as the well or column is filled the valve N is nearly closed and valve K opened wide. The water-level then rises in the inner pipe J and falls in the outer pipe H until the pressure due to the effective column of water, marked *a b*, in pipe J plus pressure due to the exhauster L (which pressure is of course negative) balances the pressure due to the steam in the radiator. Now water of condensation flowing into the well H from the radiator causes the water-level *a* to rise in said well, thus shortening the effective column of water *a b* and disturbing the equilibrium of the apparatus. At such time the water will pass from the upper end of pipe J to the exhauster, and consequently the column of water, indicated by *a b*, will be maintained of a constant effective length. From this it will be seen that the radiator is kept free from water and air at all times, the air passing through pipe M past the partially open valve N and the water of condensation flowing into the well and maintaining the same level therein as long as the same relative difference in pressure is maintained between the radiator and the exhauster. The water-level will vary or adjust itself in consonance with the varying degree of pressure in the radiator.

The well and its pipe, which, in effect, form a "trap" and may be so termed, may be of any desired length to accomplish the purpose in view. The longer they are the higher the degree of pressure that may be used in the heater or radiator. The dimensions may be varied to suit each installation, the degree of

pressure to be carried in the heater or radiator and the efficiency of the exhauster or vacuum-pump being the controlling factors. In any event the column of water maintained must be of such length that it cannot be lifted by the pressure of the steam, which would force the water out and permit the steam to enter and destroy the vacuum in the pump.

In ordinary cases a pipe from twenty-two to thirty feet long will maintain a column equal to the amount of pressure in the heater, for, as is readily understood, no one can afford to carry very much back pressure on the engine, which would be the case were a great pressure permitted in the heater when exhaust-steam is being used.

In the condensation of steam there is liberated a certain amount of air, and the apparatus above set forth removes this air, and thus keeps the radiator or heater free therefrom at all times.

It is to be understood that I do not limit myself to the use of the particular radiator or heater shown, nor to the particular arrangement of the pipes or parts, as any form of heater may be employed, and any arrangement which maintains the water column or seal between the radiator and the exhauster, with the escape-pipe for the air, will suffice.

Having thus described my invention, what I claim is—

1. In combination with a heater; a source of steam connected thereto; a water-column connected to said radiator; an exhauster connected to the opposite upper end of the column and serving to elevate the water therein; and a normally-restricted air-passage likewise in communication with the heater and the exhauster.

2. In combination with a heater; a source of steam leading thereto; a trap connected to the heater and extending below the same; an exhauster connected to the upper end of the trap; a valve located intermediate the exhauster and the trap; an air-passage extending from the heater and communicating with the exhauster; and means for controlling the passage of air therethrough.

3. In combination with a heater; a source of steam leading thereto; a well communicating with said heater; a pipe extending down into said well to a point near the bottom thereof; an exhauster connected to the upper end of said pipe; a valve interposed between the exhauster and the pipe; an air-passage extending from the heater and communicating with the exhauster; and a valve located in said passage.

4. In combination with a heater provided with two compartments B and C in its base; a source of steam entering compartment B; a well communicating with compartment C; a pipe extending down into said well; an exhauster connected to the upper end of said pipe; a valve interposed between said exhauster and pipe; an air-passage extending from compartment C and communicating with the exhauster; means for controlling the passage of air therethrough; and a bleeder extending from compartment B to the well.

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

THOMAS SMITH HAMILTON.

Witnesses:
C. C. MENGEL,
H. P. ROBERTS.