I. C. RICHARDSON.

Steam Heating Apparatus.

No. 164,935. Patented June 29, 1875.

Fig. 4.

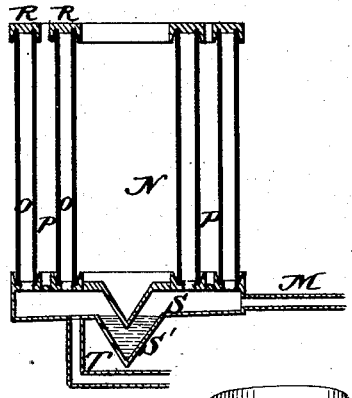


Fig. 3.

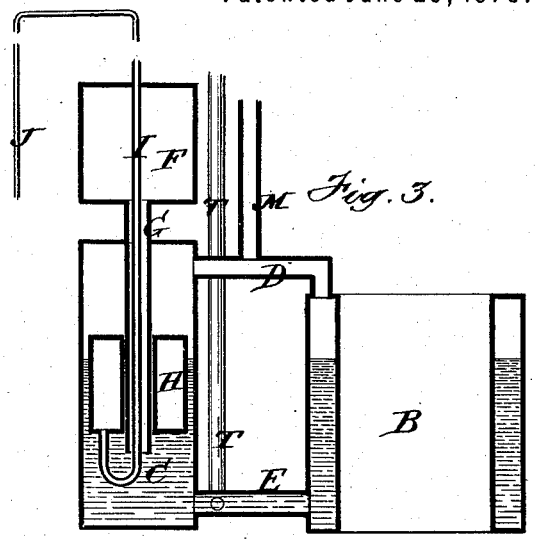
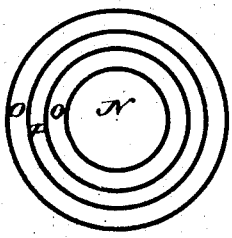


Fig. 5.



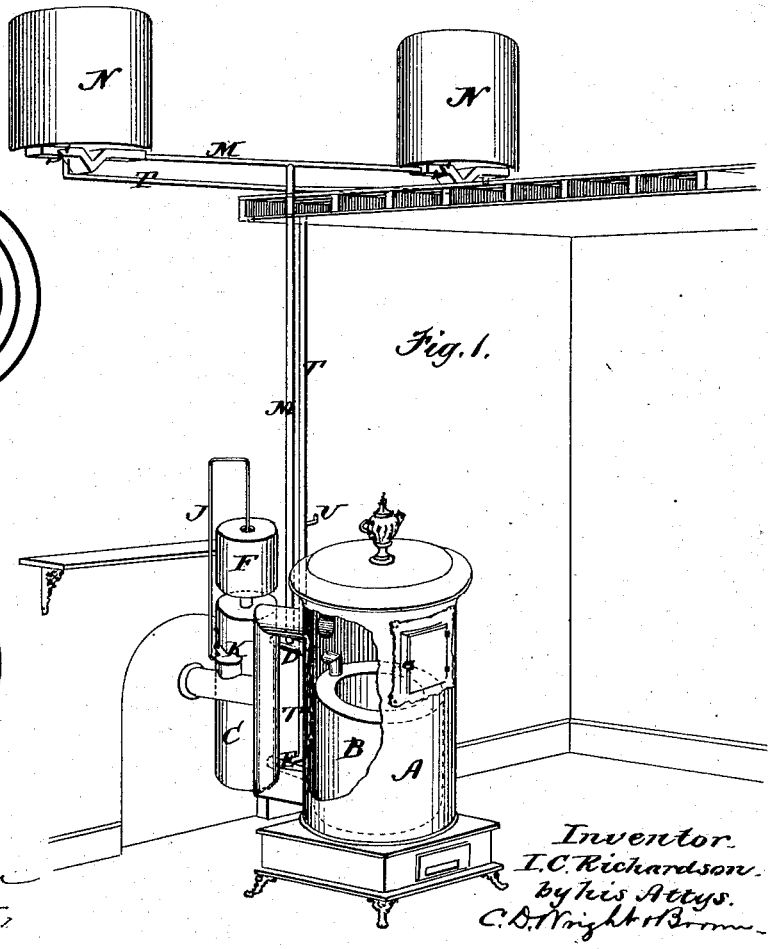
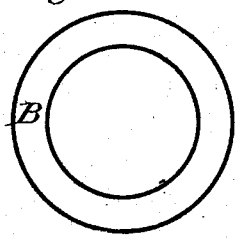


Fig. 1.

Fig. 2.



Witnesses.
A. L. Denison
Saml. M. Barton.

Inventor.
I. C. Richardson.
by his Attys.
C. B. Wright & Brown.

UNITED STATES PATENT OFFICE.

ISAAC C. RICHARDSON, OF NASHUA, NEW HAMPSHIRE.

IMPROVEMENT IN STEAM-HEATING APPARATUS.

Specification forming part of Letters Patent No. **164,935**, dated June 29, 1875; application filed March 27, 1875.

To all whom it may concern:

Be it known that I, ISAAC C. RICHARDSON, of Nashua, in the county of Hillsborough and State of New Hampshire, have invented certain Improvements in Steam-Heating Apparatus, of which the following is a specification:

In the accompanying drawing, forming part of this specification, Figure 1 is a perspective view, showing my invention in practice. Fig. 2 is a transverse section of the boiler. Fig. 3 is a vertical section of the boiler and reservoir, and Figs. 4 and 5 are sectional views of one of the radiators.

My invention has for its object to utilize all the heat generated by an ordinary heating or cooking stove, and render such heat available for warming not only the apartment in which the stove is located, but other apartments more or less distant; and to this end my invention consists in the devices for carrying said object into effect, as I will hereinafter more particularly describe, and point out in the claim.

A represents a heating-stove of any suitable construction, preferably cylindrical. B is a boiler, so constructed as to be placed within the stove, and form what I call a "water-lining" to the fire-pot, taking the place of the fire-brick lining. In case the stove is cylindrical, the boiler will be made annular, as shown, and of course the shape of the boiler may be varied to adapt it to different stoves, the only requisite being that it shall surround or partially surround the fire-space, so that its contents shall be exposed to the heat as fully as possible. The boiler thus constructed, located, and heated, may be supplied with water in any desired manner. I prefer in most cases to provide a reservoir, C, located usually behind the stove, and connected to the top and bottom of the boiler by substantially horizontal tubes D E, the reservoir being of such length as to extend above the top of the boiler. F is a chamber located above the reservoir C, and connected to the latter by a tube, G, extending from the bottom of the chamber nearly to the bottom of the reservoir, as shown in Fig. 3. This chamber has a removable cover, or other suitable means for admitting water to supply the reservoir and boiler, and in case the reservoir becomes full, the surplus water, if any, rises through the tube G into the chamber. H is a float which rests on the water in the reservoir. This float is composed of a hollow chamber, from the bottom of which projects a small tube, I, which is bent upward and extends through the tube G and chamber F, terminating in a bent rod or stem, J, which is bent downward, and is connected at its lower end to the arm of a valve, K, the latter opening an orifice in the stove-pipe L, when the water in the reservoir and boiler sinks below a certain level, thereby checking combustion in the stove, and preventing the boiler from becoming entirely dry from evaporation. M is a tube connected to the horizontal tube D, and extending out of the apartment in which the stove A is located. The tube M is connected to radiators N N in other apartments, as shown in Fig. 1, said radiators being heated by steam passing from the boiler B through the tube M. The radiators N are preferably composed of vertical annular steam-chambers O O of any desired number, separated by annular air-spaces P P, which are open from top to bottom.

I prefer to connect the annular chambers O, the walls of which may be of sheet metal, or other like material, by flanged and grooved rings R R, as shown in Fig. 4, the rings R having annular grooves, which receive the ends of the cylinders, forming the walls of the steam-chambers. The chambers O are connected by a flue or chamber, S, extending across the bottom of the radiator, and connected at one end with the steam-tube M, and at the other with a tube, T, adapted to carry the water of condensation from the radiator to the reservoir and boiler. Direct communication between the opposite ends of the flue or chamber S, and also between the tubes M and T, is prevented by a downwardly-projecting elbow or angle, S′, in the center of the flue, which angle being filled with the water of condensation, prevents direct communication between the opposite ends of the flue; consequently, when steam is admitted into the radiator, it passes into its annular chambers on one side first, gradually expelling the cold air, which passes out through the tube T, and escapes out through a side vent, U.

A simple, cheap, and efficient steam-heating apparatus is thus produced, which is adapted to heat two or more apartments with the same amount of fuel that is required in an ordinary stove to heat one of such apartments. The boiler, taking the place of the fire-brick or other lining of the fire-pot, not only receives the heat and sends it in the form of steam to other apartments, but radiates a considerable portion of it into the apartment in which the stove is located, so that there is no appreciable loss of heat in the atmosphere surrounding the stove.

The chamber F over the reservoir C acts as a receptacle for the surplus water, and as a means for filling the reservoir. Its tube G, extending below the ordinary water-level, prevents the escape of steam from the reservoir to the chamber F and into the apartment. This tube also serves to guide the tube or stem I of the float H, operating the valve K, as above described. The tube I is for the purpose of allowing the escape of air from the float H when the water is heated, and its subsequent return when the water is cooled, thus preventing the bursting of the float. The float may be connected to an automatic cock in such manner as to admit water to the reservoir when it sinks to a certain level, and check it at a higher level. The boiler can be adapted to a furnace, if desired, and may form a part of the stove or furnace, or be attached as a separate part. Suitable cooking apparatus may be substituted for the radiators, and such apparatus, as well as the radiators, may be located in the same apartment as the stove.

I claim as my invention—

The radiators N, composed of the concentric chambers O O, separated by annular air-spaces P P, and held in position by flanged and grooved rings R R and the transverse-angled flue S, combined with the tubes M T and boiler B, substantially as described, for the purpose specified.

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

ISAAC C. RICHARDSON.

Witnesses:

PARIS H. HILL,

AARON W. SAWYER.