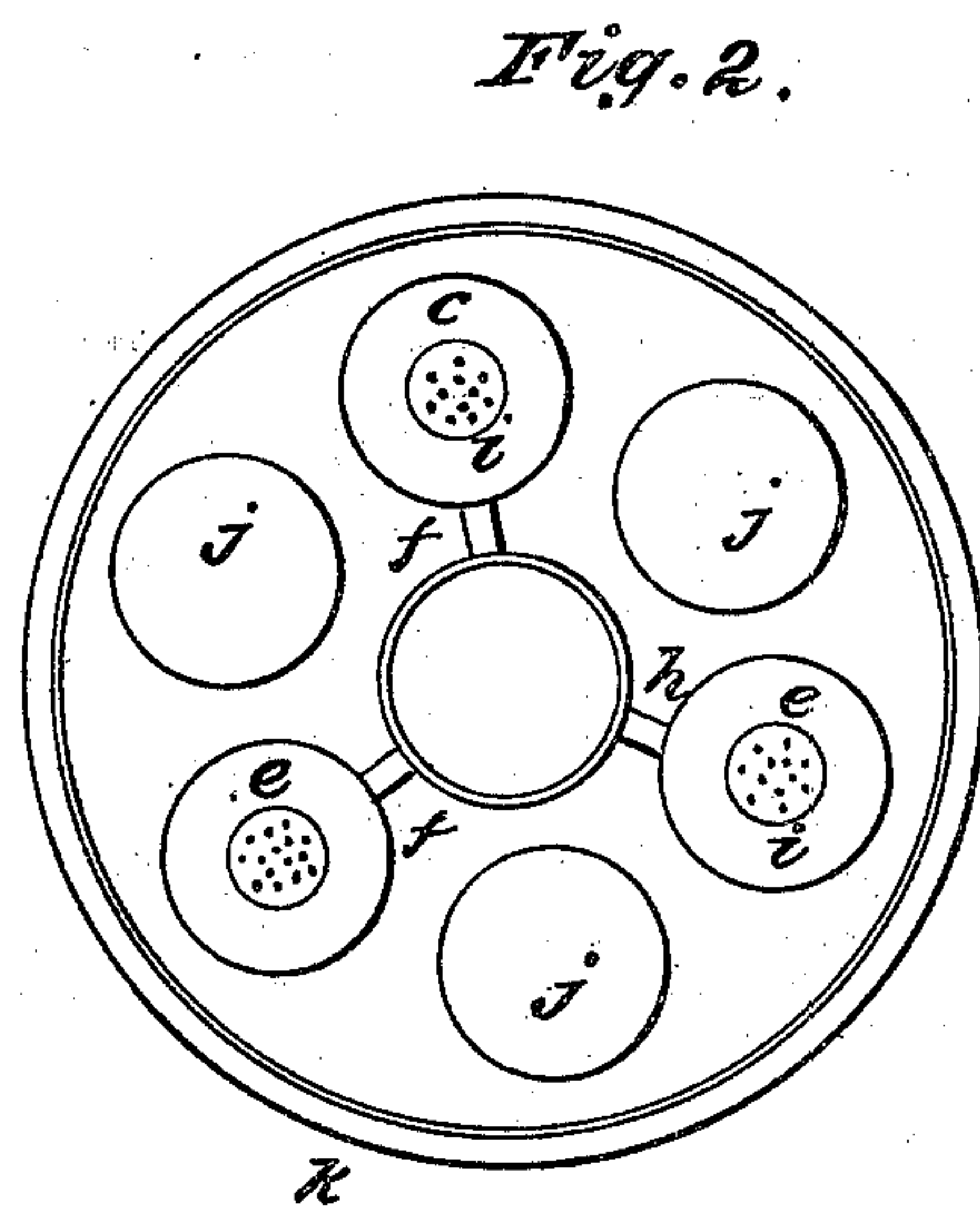
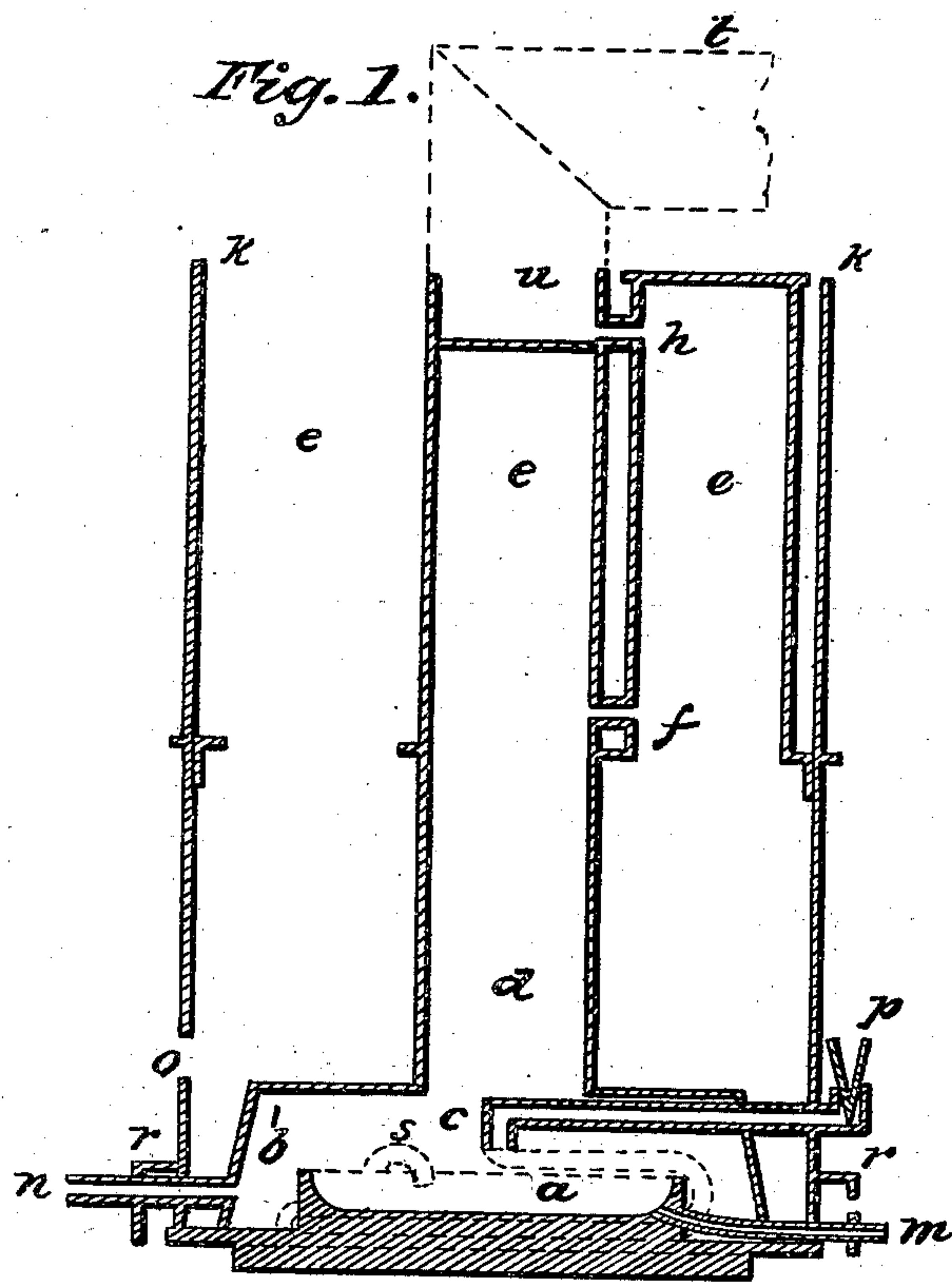


C. C. HALL.  
Steam Heater.

No. 79,826.

Patented July 14, 1868.



*Witnesses:*  
William Henry Clifford  
Henry C. Houston

*Inventor:*  
Charles C. Hall

# United States Patent Office.

CHARLES C. HALL, OF PORTLAND, MAINE.

*Letters Patent No. 79,826, dated July 14, 1868.*

## IMPROVEMENT IN STEAM-HEATING APPARATUS.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, CHARLES C. HALL, of Portland, in the county of Cumberland, and State of Maine, have invented a new and useful Improved Steam-Heating Apparatus; and I hereby declare the following to be a full, clear, and exact description thereof, which will enable others to make and use my invention, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 shows a side sectional elevation of my apparatus.

Figure 2 shows a top plan.

The purpose of my invention is to produce a steam-heating apparatus, which is capable of being operated with a small quantity of steam and water, and which economizes the heat, not only of the steam itself, but the radiation of the heater for the water, as well as the radiation from the steam-heating apparatus itself; also, an apparatus, by which a proper degree of humidity can, if desired, be disseminated into the rooms of a building.

It consists—

First, of a receptacle for the liquid, into which the water is admitted in such quantity as is desirable and requisite for the various degrees of heat, or size of the apartments to be affected.

Second, it consists of a heater, of peculiar construction, communicating with a radiating-apparatus.

It also consists of an arrangement of devices for distributing the steam into radiators, and of a method to allow the steam to pass off.

It further consists of an apparatus to confine and conduct the air from the exterior of the boiler, and also, if desired, that from the exterior of the stove or heater, and lead it into the apartment to be warmed.

*a* shows the water-receptacle, *b* the boiler, surrounding and enveloping the same.

*c* is the tube, for the entrance of the water into *a*.

*d* is the pipe, which leads the steam formed in the boiler up into the radiators.

*e* shows radiators, of any desired size, number, and form.

*f* shows pipes, intercommunicating between the radiators.

*h* shows the escapes.

*i* shows perforations in the tops of the respective radiators.

*j* shows hot-air conductors, whose operation will be hereafter explained.

*k* shows the envelope or cylinder, surrounding the pipes and boiler, and forming an air-chamber.

*m* shows the waste-pipe of the water-receptacle.

*n* shows air-holes, to admit air into the boiler.

*o* shows apertures, to admit air into the air-chamber, and on the outside of the boiler.

*p* shows a device for regulating the quantity of water admitted into the water-receptacle *a*.

*r* shows a device for confining and conducting away impure air occasioned by the combustion of the heating-flame, as, for instance, when gas is employed for the purpose.

*s* shows an extension of *c*, which may be employed, if desired, to further heat the water before its final admission into receptacle *a*. This extension can be made of any convenient material, and, by being coiled around the receptacle *a*, as indicated in the drawing, the water passing through the same before it reaches *a*, will be conducted into the receptacle in a heated state.

*t* shows a communication, which can be so extended as to communicate steam and consequent heat to other apartments.

At *u*, also, a connection can be established, so as to carry off the steam, as, for instance, into a flue, or return it when it has done its duty.

Thus, it will be observed from this description, that the apparatus is freed from steam-pressure, or any liability to explosion, as the steam is not permitted to accumulate beyond the required degree for heating, but is to all purposes beyond that conducted away, as illustrated at *u*.

It is further to be observed that no unnecessary or dangerous accumulation of water can take place in the receptacle *a*, because the pipe *m* regulates the amount therein deposited.



Furthermore, my invention collects not only the heat arising from the production of the steam, but carries upward also hot air, which is conducted into the apartment to be warmed, by the conductors *j*, and all unhealthy dryness to the air is prevented by the minute perforations *i* in the tops of the radiators *e*.

The necessary supply of air with the steam is given by the supply-pipe, as shown at *n*.

The operation is as follows:

I propose to have the same heater or fire which affects the receptacle *a*, also employed to heat the water before its entrance into the regulator *p*. Thus, it will be seen that the water enters the receptacle *a* in a heated state. The degree of speed with which it is allowed thus to enter the receptacle is regulated by the size of the lower point of *p*, which can be made as the user desires, or he can have more than one, and of various sizes. The water thus previously heated, drops slowly into *a*, being prevented from cooling by the position in which it is introduced. Striking or falling upon *a*, it is converted into steam, and rises up into *d*, and is there communicated to any desired number of supplemental radiators, as *e*, by the connecting-tubes *f*. Further heat is also imparted by the hot air rising, and then radiating in the air-chamber, thus superheating the steam after its passage from the immediate effect of the boiler-heat.

After the steam has done its work, it is, in a minute degree, allowed to escape through perforations *i*, imparting thereby an agreeable humidity to the atmosphere of the room, and the remainder is conducted off through *h*, from which it can either be returned, condensed, or allowed to escape entirely away.

It will be seen that should the supply of water fail, still the apparatus would be useful in warming apartments, because it would supply hot air to all rooms with which it may be connected, until water was again supplied.

As the boiler *b* operates without steam-pressure, the steam rises naturally into the conductors, and will not, in consequence, be forced downwards and out of the tube *n*, and as the air is heated in the boiler, there will be a draught of air into the boiler through *n*.

In fig. 1 of the drawings, the cover to the outer cylinder *k* is not shown, for convenience in showing the minute perforations in the top of one of the radiators, but the whole is to be closed, with the exception of the minute perforation *i*, as is illustrated in fig. 2.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The open boiler *b*, constructed and operating as herein set forth and for the purposes described.
2. Combining the air and steam-heat within the boiler, by the means of the pipe *n*, as and for the purposes herein set forth.
3. The minute perforations *i* in the tops of the radiators, as and for the purposes described.
4. The arrangement of the radiators *e* and connecting-tubes *f*, for the purpose of distributing the steam therein, as described.
5. The steam-heating apparatus, as herein described, in which the liability to accident or explosion is obviated, by the prevention of steam-pressure, as herein described.
6. The steam-heating apparatus, as herein described, which is automatic, that is, when the supply of water and the pressure of steam are regulated by the apparatus itself, without the necessity of any care, as herein described, by means of outlet *h*, regulator *p*, pipe *c*, and waste-pipe *m*.

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Witnesses:

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