

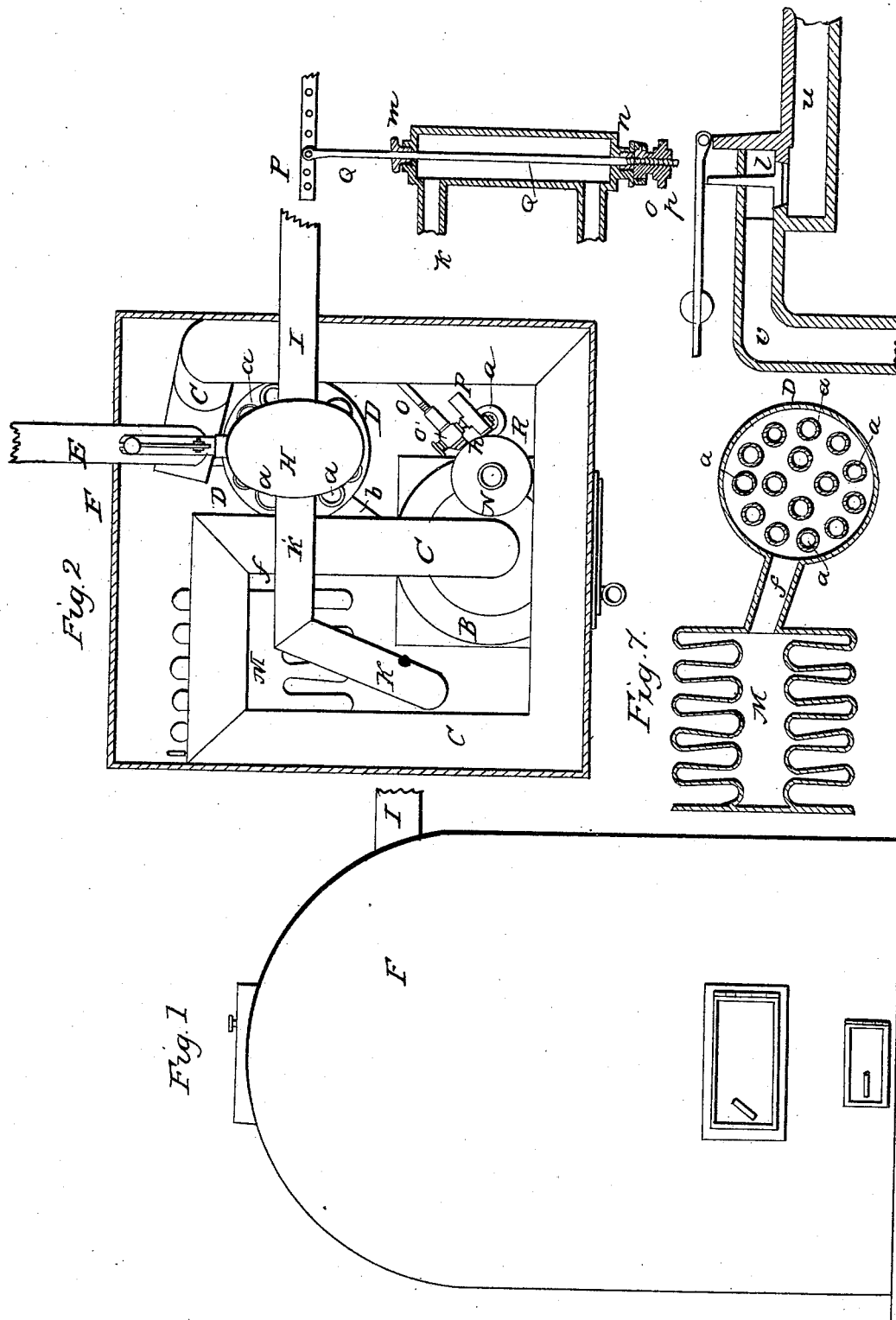
S. WHITMARSH.

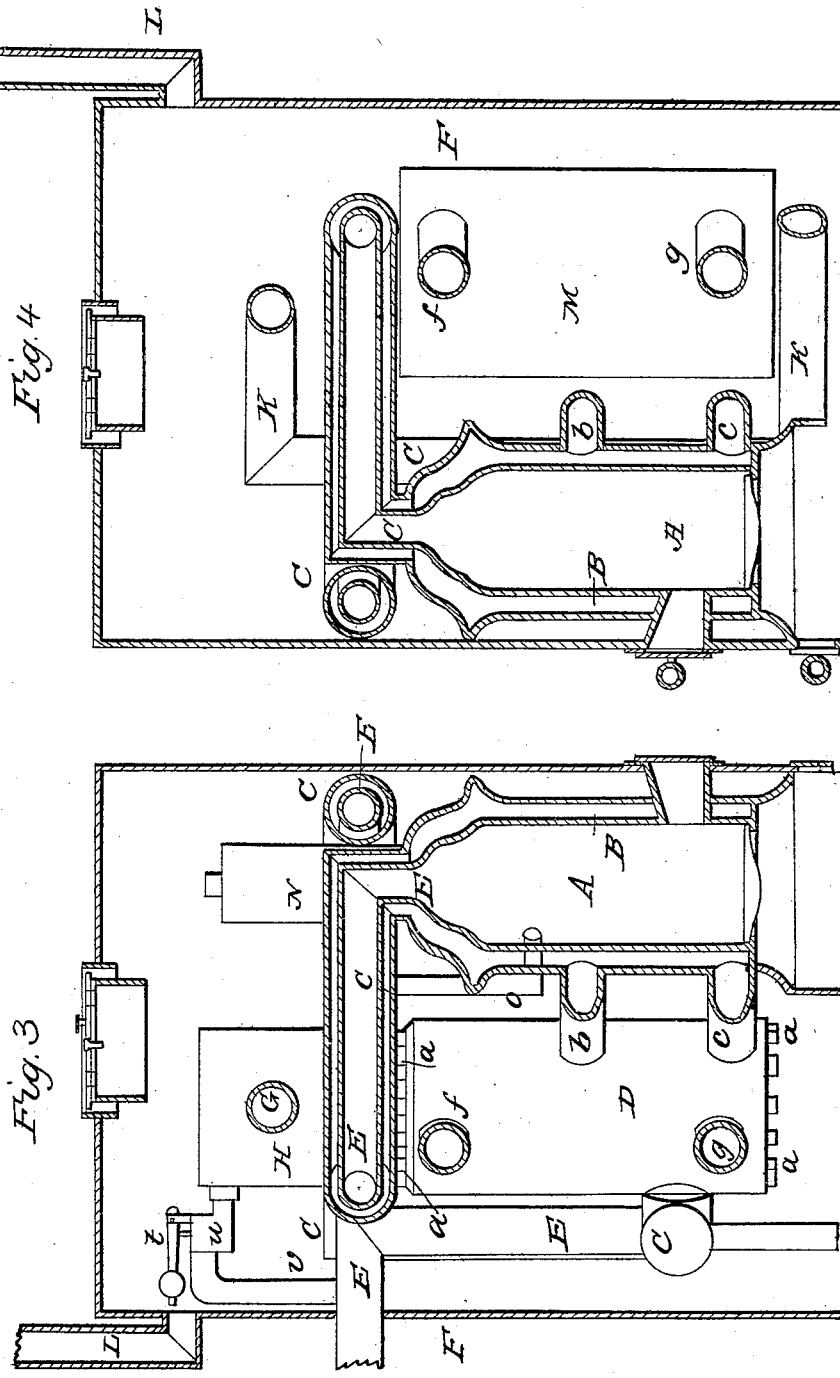
3 Sheets—Sheet 1.

Steam Heater.

No. 6,118.

Patented Feb. 20, 1849.





S. WHITMARSH.
Steam Heater.

3 Sheets—Sheet 3.

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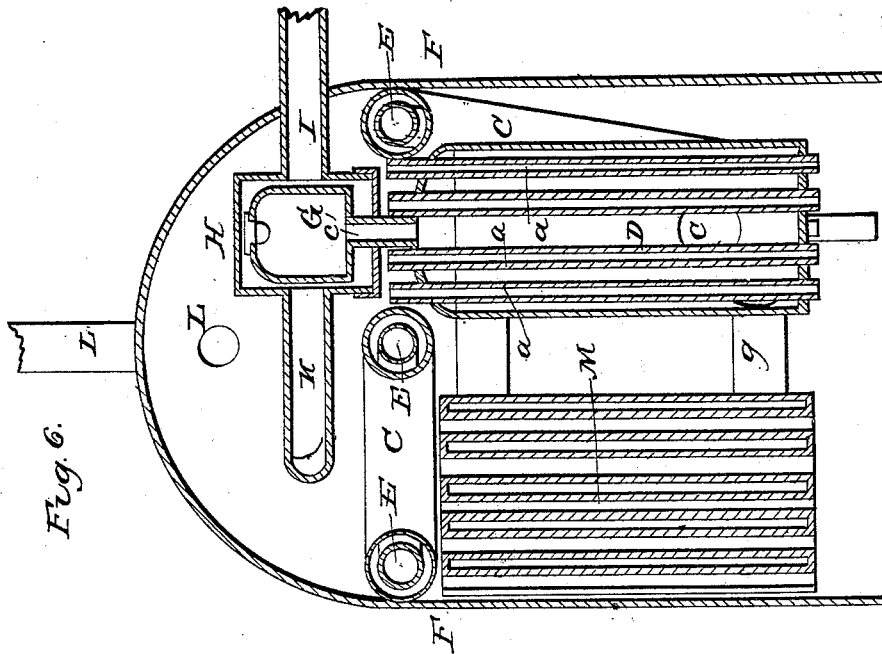
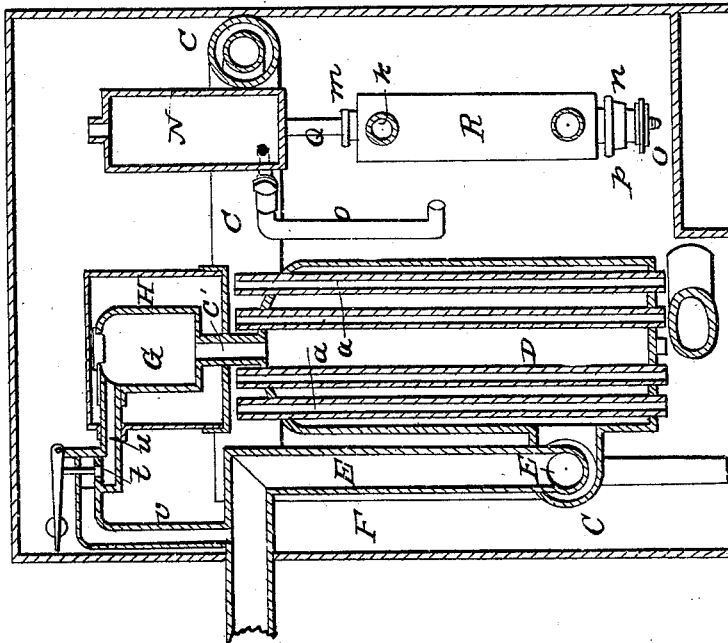


Fig. 5.



UNITED STATES PATENT OFFICE.

SAMUEL WHITMARSH, OF NORTHAMPTON, MASSACHUSETTS.

IMPROVEMENT IN APPARATUS FOR WARMING APARTMENTS.

Specification forming part of Letters Patent No. 6,118, dated February 13, 1849.

To all whom it may concern:

Be it known that I, SAMUEL WHITMARSH, of Northampton, in the county of Hampshire and State of Massachusetts, have made an invention of a certain new and useful or Improved Apparatus for Heating Apartments by Heat Radiated from Vessels Containing Hot Water, my said invention being termed a "Calorifere;" and I do hereby declare that the same is fully described and represented in the following specification and accompanying drawings, letters, figures, and references thereof.

Of the said drawings, Figure 1 denotes a front elevation of the said calorifere. Fig. 2 is a top view of it, the upper part of the inclosing case being supposed removed in order to exhibit the situation of various of the parts. Fig. 3 is a vertical central and longitudinal sections taken through the furnace and so as to exhibit the parts on the right thereof. Fig. 4 is a similar section, but taken so as to exhibit the parts on the left of it. Fig. 5 is a vertical and longitudinal section taken through the condenser and supply-cistern. Fig. 6 is a vertical and transverse section taken through the condenser.

A, in the said figures, exhibits a chamber of combustion, either provided with a grate and other appliances for burning wood or coal or with a suitable lamp or contrivance for the combustion of alcohol or some other liquid or aeriform material. The said chamber A is entirely or partially surrounded by a water chamber or vessel B, out of the top part of which a pipe C leads and is caused after being bent in any desirable manner to open into the lower end or part of a cylindrical or other proper-shaped radiator or close water-vessel B.

The smoke-pipe E leads out of the top of the chamber A, thence entirely within and through the pipe C, (so as to be entirely and always surrounded by the water therein,) and finally passes out of the said pipe C near its lower end, and from thence passes upward within the inclosing chamber or case F, and thence through the side of the same, from whence it may be carried to and be made to open into a discharge flue or chimney.

The radiator D consists of a close cylindrical vessel having a series of tubes *a*, &c., extending through it fastened at their ends

to the heads of the vessel, and made entirely open at both ends of each, so as to allow the air in the air chamber or case F to circulate freely through each of the said tubes as well as in contact with the outer surface of the said radiator. The water chamber or vessel B is also connected with the said radiator by two short pipes *b c*, which are so disposed as to promote or permit the free circulation of water from one vessel to the other.

Directly above the radiator D is a steam or vapor condenser G, which consists of a close vessel of any suitable shape so connected to the radiator by a short pipe *c'* as to enable any steam or vapor generated from the water to pass from the radiator into the said condenser and be condensed and afterward flow back again. This condenser is arranged or placed within a cold-air chamber or case H, which is made to surround the condenser on all sides, and so closely as to cause the current of cold air which, is received into it through an induction-pipe I, to flow into the chamber and spread itself in direct contact with all or nearly all the external surface of the condenser. After thus passing in contact with the condenser the air rushes through a pipe K, which leads out of the chamber H on the side opposite to that through which the air flows and is conducted by said pipe K downward toward the bottom or lower part of the chamber F, and then is discharged into the said chamber, and after circulating in contact with the heated surfaces of the radiator or radiators, hot-water chamber, and pipes and becoming heated thereby finally makes its escape through one or more pipes L, which are so arranged as to lead the air so warmed to any one or more apartments it may be desirable to supply with it.

M is another radiator or close vessel, made in horizontal section as seen in Fig. 7, each of its two opposite sides being bent in a serpentine manner in order to obtain a greater extent of heating-surface than could be produced were they made straight. This radiator is connected with the first one by two or more pipes *f g*, so arranged as to allow the water to circulate freely from one to the other, and vice versa.

There may be any desirable number of radiators used within the chamber F, according to its capacity to receive them.

The next portion of my invention is the apparatus for regulating the consumption of fuel so as to maintain any desirable uniform temperature. For this purpose I make use of a vessel or reservoir N, arranged in some suitable position above and near the chamber of combustion. This vessel is intended to hold alcohol or some fluid combustible mixture or matter which is to be burned in the furnace or chamber of combustion, and which is to be conveyed into the said chamber by means of a pipe O, leading from the vessel N into the said chamber. The said pipe has a stop-cock O' applied to it in such manner as to enable me to open or cut off the communication between the vessel or supply-cistern N and the furnace or fire-chamber. The valve of the said cock has a lever P extended from it, the said lever being jointed to the upper end of an upright rod Q, which passes down through a long cylindrical vessel R, arranged by the side of and made to communicate with the water-chamber B by one or more pipes *k* and in such manner as to permit the water of said chamber B to freely circulate through the cylinder R. The rod Q passes through two stuffing-boxes *m n*, affixed on the two ends of the cylinder, and said rod has a screw *o* made on its lower end. A screw-nut *p*, affixed to the stuffing-box in such manner as to be capable of being revolved either in one direction or the opposite, but otherwise stationary in position, receives the screw *o* through it and screws thereon. This nut serves to adjust the rod Q to the valve of the cock when opened to the extent necessary for the required flow of the combustible fluid into the fire-place—that is, such a flowage as will cause the fire to burn with an intensity proper to maintain the water of the different water-vessels at such a constant temperature below the boiling-point (212°) as may be desirable or necessary to preserve a uniformity of temperature of the air discharged into the apartments to be warmed. As the rod Q passes through the hot water it will be expanded by the heat thereof, and it should be so adjusted to the valve of the cock that when expanded and the air has been warmed to the degree of temperature required it (the said rod) shall close the valve to the extent sufficient to permit such a flowage of the fluid out of the supply-cistern as may be necessary to keep up the fire to the desirable and constant intensity.

If desirable, the condenser may be provided with a safety-valve and pipe leading therefrom into the smoke-discharge flue, so that in case the steam should not be condensed as fast as made, but should accumulate to such extent as to produce an injurious pressure

above that of the load on the said safety-valve the valve would be opened by said pressure and discharge the surplus steam into the chimney or smoke-pipe. In the drawings, the said safety-valve is shown at *t*, *u* being the pipe leading from the condenser to the valve-case, and *v* the pipe to conduct the waste steam from the valve-case to the smoke-discharge pipe. I do not consider such an addition as making any part of my invention, but simply as a matter which may at any time be used, if deemed advisable.

I do not limit my invention to the precise form or forms of arrangement of the furnace pipes and radiators or other parts, as above specified, as the same, in whole or in part, may be varied without producing any material change in the invention.

My object in making the said invention has been to produce an efficient, economical, and safe apparatus for heating air by the circulation of hot water through suitable radiating vessels, and to provide the same with such a contrivance as would not only prevent explosions of the pipes or water-vessels in consequence of the generation and accumulation of steam therein, but would condense said steam and return it in the state of water into the radiators or heating-vessels. Besides the above I have sought to regulate the supply of fuel (in case a combustible liquid is employed) so as to maintain an equality of temperature of the air warmed by the apparatus. This latter portion of my invention will be more particularly useful in a small and portable calorifere for warming single apartments. Such a contrivance, although varying in shape, but retaining all the essential elements of my invention, I have constructed or have in process of construction.

What I claim as my invention is—

1. The combination of the vapor-condenser with one or more radiators and the water-chamber surrounding the furnace, also the arrangement of the said condenser and air inlet and outlet pipes of its external case in such manner that the cold air, previous to its entrance into the air-heating chamber, shall be brought to impinge directly against the condensing-vessel.

2. The above-described mode of making one or more sides of the radiator M—viz., serpentine in transverse section—essentially in manner and for the purpose as specified.

In testimony whereof I have hereto set my signature this 10th day of August, A. D. 1848.

SAMUEL WHITMARSH.

Witnesses:

WILLIAM O. GORHAM,
WILLIAM ALLEN, Jr.