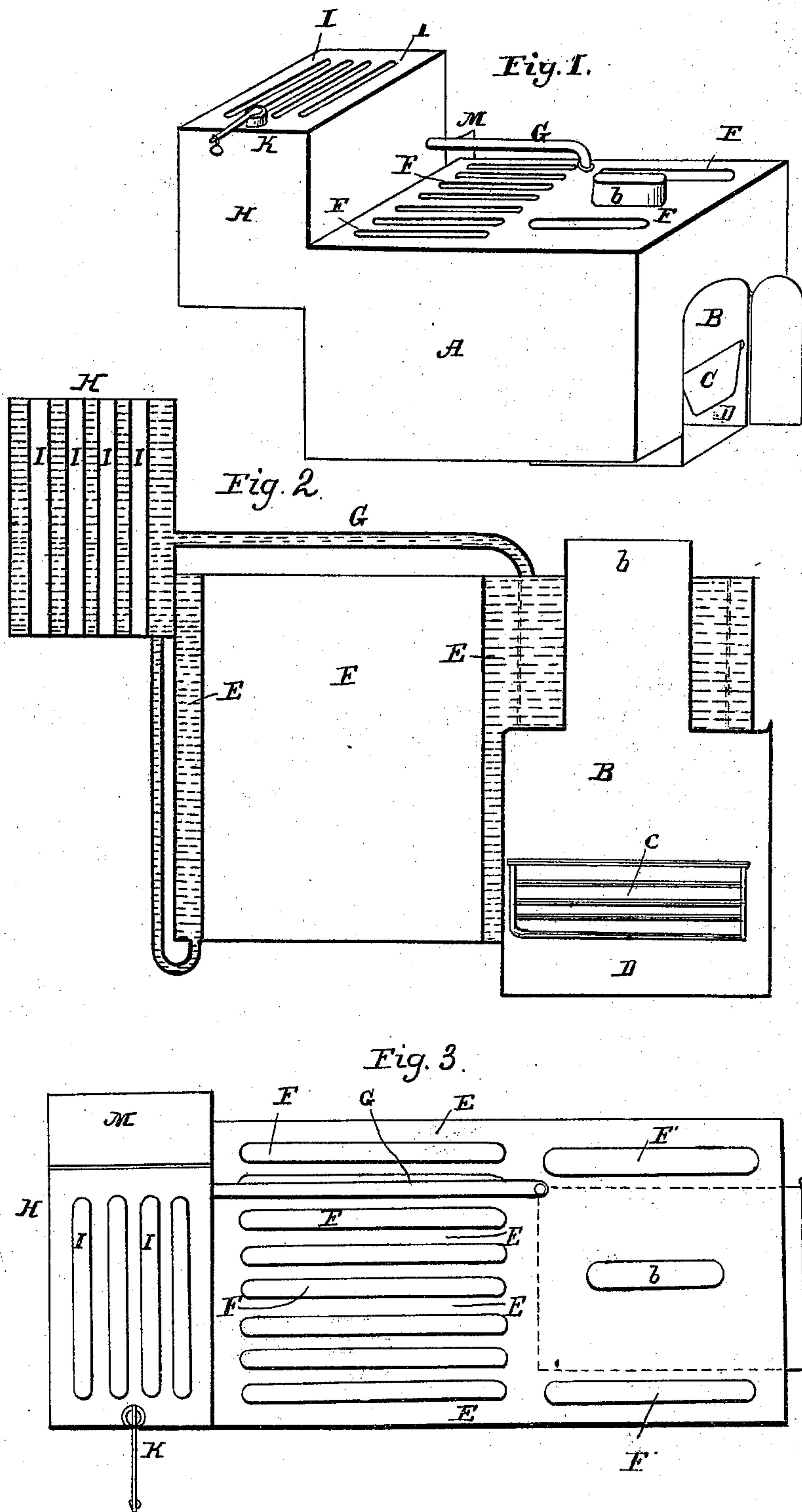


LEEDS & SMITH.

Steam Heater.

No. 10,942.

Patented May 16, 1854.



# UNITED STATES PATENT OFFICE.

LEWIS W. LEEDS AND R. MORRIS SMITH, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN HYDRAULIC HEATERS.

Specification forming part of Letters Patent No. **10,942**, dated May 16, 1854.

*To all whom it may concern:*

Be it known that we, LEWIS W. LEEDS and R. MORRIS SMITH, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Hydraulic Heaters for Warming Buildings; and we do hereby declare that the following is a full, clear, and exact description of the construction and mode of operation of the same, reference being had to the accompanying drawings, making a part of this specification, of which—

Figure 1 is an isometrical view; Fig. 2, a longitudinal and Fig. 3 a top view.

The nature of the invention consists in so constructing a portable hydraulic heater or furnace for warming buildings that it shall in itself possess an immense radiating-surface in contact with the air circulating in the chamber in which the heater is placed by means of the arrangement of the air-tubes in the body of the heater or stove, and at the same time be entirely free from the injurious effects of highly-heated metallic surfaces on the vitality of the air.

We are aware that the employment of hot water has been tried; but in no instance has the employment of so large a surface of radiation been secured in the stove or heater as in the invention now presented; and it will be noticed that by the air-tubes upon the sides of the fire-chamber in connection with the water-walls thereof great advantage must result, as the water most directly heated has immediate means offered in those side tubes of parting with its heat.

The most common arrangement of heating by hot water is either by conveying the heated water to the portion of the building by pipes or by incasing those pipes or tubes (filled with hot water) in a separate air-chamber; but in both these plans difficulties arise from expansion and contraction, or other causes, creating leaks. Besides the expense is greatly increased, and the efficiency of the apparatus impaired on account of long circuits of hot water parting with its heat near the boiler, all of which are avoided in our method of placing the heater or furnace itself in a chamber or small room where the air may be heated with great economy without the slightest danger of being burned or vitiated, and afterward

by suitable pipes this heated air be distributed over the building. From the manner of placing the coals or other fuel in a crib or cradle it gives the advantage of freely transmitting the heat of the mass of fuel by radiation from the sides of the crib, which, impinging directly on the side water-walls of the heater, profitably avoid the immediate contact of the metal of the heater with the fuel. I would further add that from there being a limited circulation of the water it becomes, as it were, a mass heated to the highest temperature below that of steam, which is freely transmitted to all parts of the containing-vessel; also from the quantity of water in this apparatus being materially reduced there is not the slightest difficulty in bringing the furnace into action, and even should there be neglect of supplying fuel for a time, still the heated mass of water and metal would continue its function of heating the circulating air in the pipes.

To enable others skilled in the art to construct our heater, we will proceed to describe it, as follows:

In the several figures, A represents the heater or furnace, being of a parallelogram figure.

B is the fire or grate chamber, in which is suspended by suitable flanges the fuel-crib C, which, for convenience of repair, is removable. This crib is open at the top, the sides and bottom consisting of rods of iron, forming the support for the fuel.

D is the ash-pit; E E E, water-space extending around all the tubes, fire-chamber, and smoke-pipe b.

F F F are various air-pipes at the rear of B, and from their form have large radial surfaces. They are open at the top and bottom of the heater.

F' F' are pipes or tubes like the others, but placed near the inside wall of the fire-chamber.

G is a pipe forming an escape for the steam from the heater A into the condenser and radiator combined, H, placed at the rear of A. This radiator H is also furnished with air-pipes I I, a safety-valve, K, and descending water-pipe communicating with the lower part of the water-space in A.

M is the cold-water-supply tank furnished with a float to regulate the water-supply,



which necessarily is small, as the condensed steam being again returned the supply to the heater is kept up with little loss thereof.

In the construction of the exterior chamber or in the conveyance of the heated air therefrom there is no peculiarity, and the operation of this heater or furnace will be understood, as the cold air is received at the lower portion of the heater, and, passing up and through the numerous air-tubes F F F' F' I I and around the sides of the furnace, it is heated to the degree of boiling water, or 212°, and instead of being scorched, as in other plans, is preserved unvitiated by that cause, and, from its not assuming a degree of heat above boiling, the moisture thereof is preserved and dryness avoided—so common to other furnaces. We need but advert to the greater security against fire, as all parts of the heated metal being in contact with water the risk is lessened.

In addition to the furnace or heater as constructed we have found that by suspending

sheets of iron in these various tubes there is a great increase of the heating property from increased metallic surface thus obtained and the deflection thus produced.

Having described our improved heating apparatus, what we claim as our invention in the construction of heater or stove, and desire to secure by Letters Patent, is—

The arrangement of air-tubes F F F' F', forming a perforated chest, A, containing the water to be heated, in connection with the fire-chamber B therein, thus making a compact portable hot-water apparatus of short circulation and efficient action at a greatly-reduced cost, in the manner set forth.

In testimony whereof we have hereunto signed our names before two subscribing witnesses.

LEWIS W. LEEDS.  
R. MORRIS SMITH.

Witnesses:

CHARLES D. FREEMAN,  
SAMUEL WEBB.