

(No Model.)

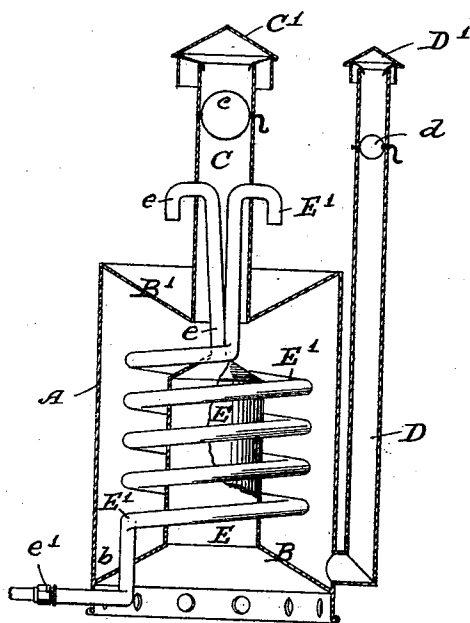
G. W. BUTTERFIELD.
WATER HEATER.

2 Sheets—Sheet 1.

No. 414,939.

Patented Nov. 12, 1889.

Fig. 1



Witnesses

W. B. Hour

A. M. Johnson

Inventor

George W. Butterfield
By His Attorney J. B. Hurst

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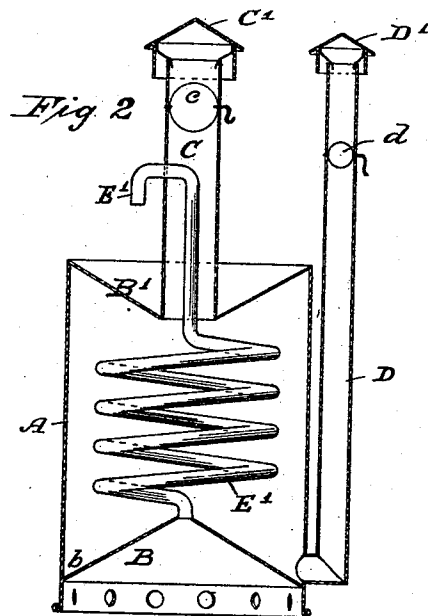
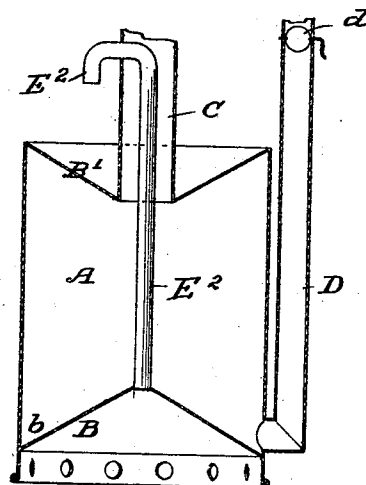


Fig. 3



Witnesses

W. B. Howe

A. M. Johnson

Inventor

George W. Butterfield
By *his Attorney J. B. Thurston*

UNITED STATES PATENT OFFICE.

GEORGE W. BUTTERFIELD, OF LYNDON, ASSIGNOR TO J. C. EATON & CO.,
OF LYNDONVILLE, VERMONT.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 414,939, dated November 12, 1889.

Application filed February 21, 1889. Serial No. 300,697. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. BUTTERFIELD, a citizen of the United States, residing at Lyndon, in the county of Caledonia and State of Vermont, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

This invention relates to that class of water-heaters adapted for use within doors—i.e., in troughs sitting in barns and the like, where it would not be advisable to use wood or coal as fuel.

The invention consists of a cylinder or case adapted to be wholly submerged, having water-tight heads formed concave or conical and provided with one or more water-circulating passages from its bottom to its top, and tubes for admitting air and carrying off smoke, all of which will be fully set forth in the following specification and claims and clearly illustrated in the accompanying drawings, forming an inseparable part thereof, of which—

Figure 1 represents a vertical sectional view of a heater provided with two water-circulating tubes—one a vertical cylinder and the other coiled spirally around it. Fig. 2 shows a heater having a single water-circulating tube formed into a spiral coil. Fig. 3 shows a modification of Fig. 2.

Heaters adapted for heating water for stock and designed to use wood or coal for fuel, where the troughs containing the water are under cover, are more or less objectionable, inasmuch as the rates of insurance are increased and the necessary removal of ashes consumes too much time. To overcome these objections, oil-lamps have been substituted for other fuel, said lamps being inclosed within a water-tight case, which is adapted to be submerged under water; but such heaters do not fulfill the requirements, as the heat obtained from a lamp is not sufficient to rapidly raise the temperature of the water. In order to do this, the oil must be burned while in direct contact with the submerged shell or case, or, at least, the flame created thereby must come in contact with the sides and top of said case; and this is precisely what I am

enabled to accomplish in a heater of my improved construction.

To the shell or case A, which may be of Russia or galvanized iron, I solder or otherwise secure the conical or concave heads B B', formed of the same material, taking care that the joints are made perfectly water-tight. In the head B one or more openings may be formed for the admission of one or more water-circulating tubes, to be hereinafter explained, and in the head B' a central opening is provided of the proper size to accommodate a smoke-pipe C.

A draft-pipe D takes air above the surface of the water in the trough, conducting it thence to the lower part of the case A, and any convenient material (preferably a substance which is non-combustible) which will readily absorb oil is dropped down the smoke-pipe C and allowed to remain upon the bottom head B. As the inner surface of said head is convex, the non-combustible brick or other absorbent is lodged upon the outer edge of said head and against the case A at a point designated at *b*, and oil may be supplied, as required, through the draft-tube D, whence it distributes itself around the outer edge of the bottom head B, and in burning the flames follow the sides of the case (more or less) in their course to the smoke-pipe C. The shell or case A should be supported in a tub or trough in a manner to enable the water to circulate underneath the bottom B either by providing said case with suitable feet or as shown in the drawings, and a tube E, having one end secured to the bottom head B in a central opening formed for the purpose, and the other end connected by a small tube *e* to the smoke-pipe C, at one side, forms an interior circulating medium for the water. In order to get the most benefit or best results from water-circulating tubes, however, a smaller tube or pipe E', which may be connected by a coupling *e'* with a pipe for supplying water to the trough or tub in which the heater is placed, may be introduced either by means of an opening in the bottom head B or the lower part of the interior shell or tube E, rising within the space between the

latter tube and the cylinder A in the form of a coil, passing through one side of the smoke-pipe C, as seen in Fig. 1.

After oil has been introduced in the manner hereinbefore specified, by dropping a lighted match down the draft-tube D the oil is ignited and a very powerful heat is the immediate result, as the shell or tube E and the coil E' greatly increase the radiating-surface. Where less heat is required, or for the purposes of economy, the heater may be constructed with simply the coil E', as in Fig. 2, or with a small straight pipe E², as in Fig. 3.

The heads B B' may be made flat; but I prefer to make them conical or concave, as shown, thereby obtaining additional heating-surface.

The cylinder A may be submerged to any depth desired, so long as the smoke and draft tubes C D extend above the surface of the water, and dampers *c d* may be placed, respectively, in each, if desired; and in case it is desired to use the heater in a tub or trough which is not under cover, caps or covers, respectively, C' D', may be attached to the pipes C D.

Having described my improvements, what I claim as new, and desire to secure by Letters Patent, is—

1. A water-heater consisting of a cylinder

having concave heads, an interior water-circulating tube, and suitable draft and smoke pipes, substantially for the purpose set forth.

2. A water-heater comprising a cylinder having concave heads, an interior water-circulating pipe-coil, substantially as shown, and suitable draft and smoke-conducting pipes.

3. A water-heater comprising a cylinder having concave heads, suitable draft and smoke-conducting pipes, and one or more interior water-circulating tubes connecting the lower concave head with apertures formed in the said smoke-pipe, all substantially for the purpose shown.

4. A water-heater comprising a cylinder having concave heads and an interior cylindrical water-circulating tube, a smaller water-circulating pipe-coil interposed between the outer cylinder and said water-circulating cylinder, and suitable draft and smoke-conducting pipes, all formed and connected substantially in the manner shown.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE W. BUTTERFIELD.

Witnesses:

W. J. STANTON, Jr.,

B. F. LINCOLN.