W. H. RICHARDSON.

Air and Water Heaters.

No. 167,120. Patented Aug. 24, 1875.

FIG. 5.

FIG. 1.

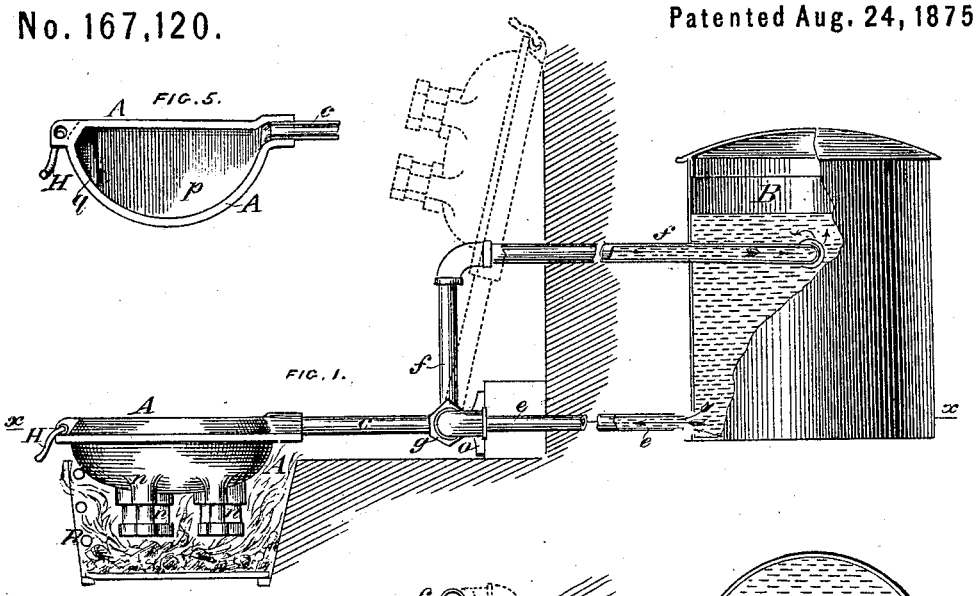


FIG. 2.

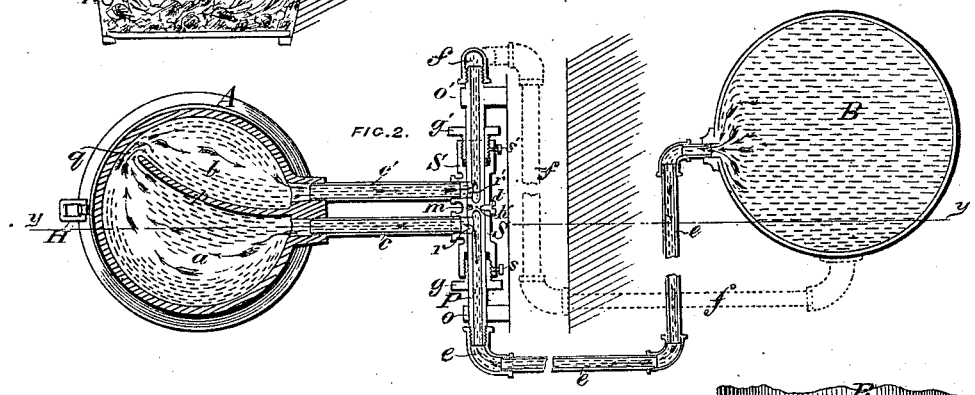


FIG. 3.

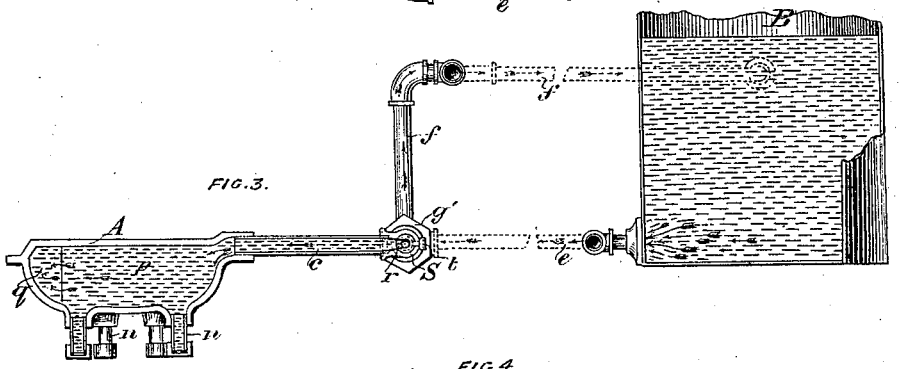
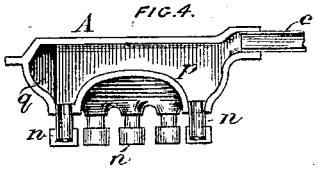


FIG. 4.



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WILLIAM H. RICHARDSON, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN AIR AND WATER HEATERS.

Specification forming part of Letters Patent No. **167,120**, dated August 24, 1875; application filed April 5, 1875.

To all whom it may concern:

Be it known that I, WILLIAM H. RICHARDSON, of the city and county of San Francisco, State of California, have invented an Improved Air and Water Heater, of which the following is a specification:

My invention consists, essentially, of a closed metallic vessel provided with an inner partition, so that when adjusted over a fire in a fire-range it may partially separate, and cause a current of the heated and outflowing from the cold and inflowing air or water, which is made to enter and exit by pipes fitted thereto, by reason of said vessel, with pipes attached, being made adjustable by a connecting-socket onto a fixed pipe placed transversely to it, communicating with an air or water supply, and provided with central partition for sepating, and openings for leading to these induct and educt pipes, in such manner that this vessel, with pipes and socket attachments, shall cause this fixed pipe, provided with openings, to act with it as a double faucet by opening and closing the same, and producing a flow or stoppage from the supply, accordingly as it assumes, by adjustment, a horizontal or vertical position; the object of my invention being to heat a vessel of water for a bath or other purposes, or to heat the air in a room or rooms by means of this adjustable improved attachment fitted to a fire-range, whereby it may readily be placed in position over a grate for service, or may be pivoted backward out of the way when not required for use.

Figure 1 is a longitudinal elevation of the adjustable surface-heater with attachments embodying my invention, with a grate and part of the apparatus shown in section. Fig. 2 is a sectional plan of Fig. 1 through the line *x x*. Fig. 3 is a vertical longitudinal section of Fig. 1 through the line *y y*. Fig. 4 is a vertical longitudinal section of another form of surface-heater, which is fitted to a range similarly to that shown in Fig. 1. Fig. 5 is a vertical longitudinal section of a form of heater adaptable to ordinary stoves.

This device is intended to take the place of, as being more serviceable and useful than, the fixed side tanks or boilers provided on fire-ranges, as also pipes and boilers for heating rooms by hot water or steam, as the air contained in a room or rooms can be readily made to pass through this apparatus, and be heated to the temperature required in a similar manner to that in which water is heated.

With reference to the drawings, A A is a closed metallic vessel, provided with an inner partition, *p*, which divides it into two compartments, *a* and *b*, of unequal size, leaving an opening, *q*, that establishes a communication between them. *c* is the pipe attached to this vessel, A A, leading directly to the compartment *a* and *c'*; the fixed pipe leading to the smaller compartment *b*, and at the other ends of these pipes a metallic cylindrical socket, S, is attached. Into this socket S a pipe, P, is fitted, and made air and water tight with it by stuffing-boxes *g g'*, set in position by set-screws *s s'*, respectively. This pipe P is divided into two separate chambers by being midway provided with a partition, *k*, and at the same place an annular groove, *m*, is arranged, so that when a set-screw, *t*, is fixed into this socket S, and fitted into this groove *m*, and this pipe P is adjusted in position to a range by fixed and loose brackets *o' o*, respectively, the vessel A A, with attached pipes *c c'* and socket S, may pivot on the fixed pipe P, and when in a horizontal position have these pipes *c c'* in line with the openings *r r'*, respectively, provided in the same, so that, if ordinary gas-pipes *e f* be attached to the ends of the pipe P, and be made, respectively, to communicate with the lower and upper part of a vessel, B, filled with water, this water will flow through the pipe *e* to the pipe *c* into the compartments *a* and *b* of the vessel A A, and into the pipe *c'*, fill the pipe *f*, and return to the vessel B on a current being established; and when the vessel A A, with attachments, is pivoted backward onto the range R in a vertical position, as shown in dotted lines in Fig. 1, it will retain its contents, and the pipes *c c'* will be closed. Thus the socket S, with attached pipes *c c'*, acts with the fixed pipe P, provided with openings *r r'*, as a double faucet. The vessel A A is flat at the top, but may be of three different shapes at the bottom, so as to have as much heating-surface as possible, and to suit the particular range or stove to which it is to be adapted. Thus, in Figs. 1, 2, and 3, it is made convex and provided with nipples

n n n, and in Fig. 4 it is made concave, so that the flame of the fire may be caught in the hollow and lick round these nipples, and, when required to be fitted to an ordinary stove, is semicircular in form, without any nipples—somewhat like a globe cut in half—as shown in Fig. 5.

The action of this apparatus is as follows: When required for use the handle H is taken hold of, and the vessel A A, with attached pipes *c c'* and socket S, pivoted to the horizontal position shown in Fig. 1, so that it shall be exposed to the heat of a fire in a range, R, and if in communication with a vessel of water, B, as described, it will be immediately filled with this water. Now, as the heat from the grate warms the water in the compartments *a* and *b*, there will be a natural tendency for it to rise, and the water in the compartment *b* will commence to ascend the pipe *f*, causing the water from *a* to follow; but the remaining water in *b* having been already partially heated, that flowing from *a* will be heated still more, so that the water in the compartment *b* will always be hotter than that in *a*, and a strong current will soon be produced, thus causing, in a comparatively short period of time, the whole of the water in the vessel B to become hot.

In applying this apparatus to the heating of air the pipes *e*, *f*, P, *c*, and *c'* are made of larger dimensions, say about four inches in diameter, and the pipe *e* that receives the cold, fresh air is brought in from the outside of a building, at the lower part thereof, while the pipe *f*, for the delivery of the hot air, is carried through the flooring, so as to enter the lower part of a room or rooms requiring to be heated; also, this heating-vessel A A is made larger than that represented as being used for water, and may be made in the form of an oblong square-shaped box with flat bottom.

I am aware that the use of a pivoted or swinging heating-vessel in this connection is not new, and also that circulation has been effected in the heating-vessel by having the two pipes open into it at different heights. Neither of these features do I, therefore, claim broadly.

I claim as my invention—

1. The surface-heater A A, provided with inner partition *p*, opening *q*, fixed pipes *c c'*, and socket S attached thereto, operating with the fixed pipe P, provided with outlets *r r'*, groove *m*, set-screw *t*, conducting-pipes *e f*, and water or air supply B, substantially as and for the purposes herein set forth.

2. The vessel A A, provided with partition *p*, that divides it into unequal but communicating compartments *a* and *b*, whereby, through the induct and educt pipes *c c'*, a current may be established, as described, substantially as and for the purposes specified.

WILLIAM H. RICHARDSON.

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