(No Model.)

C. YOUNG.

LIQUID HEATER.

No. 434,225. Patented Aug. 12, 1890.

Fig. 1.

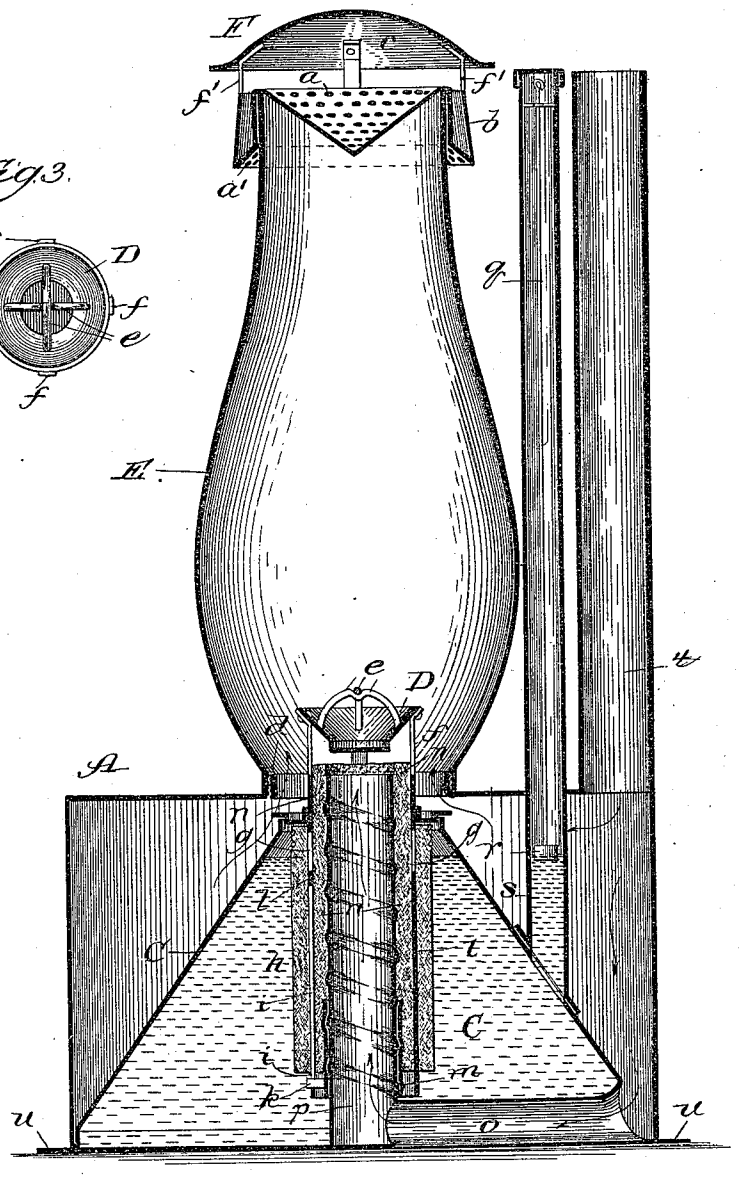


Fig. 3.

Fig. 4.

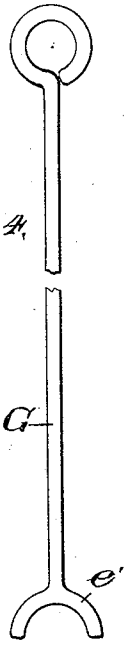
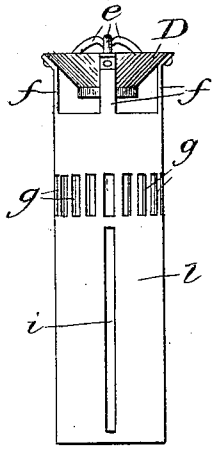


Fig. 2.



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UNITED STATES PATENT OFFICE.

CHARLES YOUNG, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS TO WILLIAM P. CORTIS AND JAMES W. BOYDEN, BOTH OF SAME PLACE.

LIQUID-HEATER.

SPECIFICATION forming part of Letters Patent No. 434,225, dated August 12, 1890.

Application filed September 25, 1889. Serial No. 325,068. (No model.)

To all whom it may concern:

Be it known that I, CHARLES YOUNG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Liquid-Heaters, of which the following is a specification.

My invention relates to the class of devices which heat liquids by immersion therein, and it is intended particularly for heating the water of bath-tubs, tanks, and drinking-troughs for animals, and for preventing the freezing of milk in cans by heating a reservoir of water within which the cans are placed.

The nature of my invention and the specific construction of the devices which I employ for accomplishing the objects sought will be clearly understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a central vertical section of my heater; Fig. 2, a detached view in elevation of the outer wick-tube of the burner and its attachments; Fig. 3, top view of the burner, showing the flame-deflector with the device upon it by means of which the wick is raised and lowered through the medium of a key; and Fig. 4, a view in elevation of the key employed for this purpose.

The particular burner employed, aside from certain attachments to it, which will be hereinafter described, forms no part of my invention, and it is not necessary that this "burner" (by which term is included not only the raising and lowering device for the wick, but also the auxiliary feeding-wick) should be employed; but other Argand burners partaking, preferably, of the nature of the ordinary student-lamp burner may be substituted without in any way affecting the features which constitute my invention.

In the drawings, A is an air-reservoir, which may be of any desired form, though I usually make it rectangular.

t is a vertical air-tube extending upward from the air-reservoir A to a height sufficient to bring its upper end above the surface of the liquid within which the heater is immersed.

C is an oil-reservoir fixed within the interior of the air-reservoir A and provided with a vertical oil-feed pipe *s* extending to about the same height as the air-feed pipe *t*.

Within the tube *s* is a level-indicator comprising a float *r*, having a stem *q* extending to such a height that its rise and fall may be observed at the upper end of the tube, and the level of the oil in the reservoir thus determined. I commonly make the oil-reservoir C in the form of a conic frustum, as shown, though the shape is not material, so long as an air-space of adequate capacity is formed about its exterior.

From the base of the air-reservoir A the wick-tube *p* extends vertically up through and above the oil-reservoir C, and *o* is a tubular passage connecting the air-space surrounding the oil-reservoir C with the base of the wick-tube *p*.

Surrounding the tube *p* is the flame-wick *n*, secured to the screw-collar *m*, which turns freely upon the threads of the tube *p* in the usual way, and to this collar *m* the sleeve *l* is connected by means of the lug *k* upon the screw-collar *m*, which lug enters the slot *i* in the sleeve *l*, whereby the turning of the sleeve raises and lowers the flame-wick. The feed-wick *h* is securely fastened at its upper end to the sleeve *l* and feeds by capillary attraction through the slots *g* therein. As before stated, these features of the burner alone form no part of my invention, and they are only described in detail here in order that other features about to be described may be the more readily understood. The sleeve *l* extends above the top of the air-reservoir A and is provided upon its upper end with strips *f*—three or four in number—supporting the flame-deflector D of refractory material. Upon the upper side of the flame-deflector and firmly secured to it are the two cross-wires *e* for permitting the height of the flame-wick to be regulated.

E is a metal chimney screwed to a flange *d* upon the top of the air-reservoir.

Particularly when the device is employed for open-air service it is desirable to shield the flame from the wind, and for this purpose a hood F is employed, which fits over the top of the chimney, as shown. This hood comprises the crown *c*, supported upon the

double-walled collar *b* by strips *f'*. The collar *b* is extended into a conical perforated diaphragm *a*, which enters the top of the chimney E, and the base of the collar consists of the oblique annular perforated plate *a'*.

G is the key employed to operate the raising and lowering device by insertion through the top of the chimney, and it consists of a metal rod having a suitable handle and provided upon its lower end with prongs *e'* to engage the cross-wires *e*. Flanges *u* are provided upon the lower side edges of the air-reservoir to be inserted in grooves on a weighted base, if necessary, to prevent the device from floating.

In operation the lamp is lighted, the chimney E being removed for this purpose, and the device immersed in the liquid to be heated to a depth which will leave the upper ends of the chimney E and feeding-tubes *t* and *s* above the surface. The height of the flame is regulated, when necessary or desirable, by means of the key G, inserted through the top of the chimney, as before described, and the deflector, spreading the flame toward the surface of the chimney, causes an intense heat, which is rapidly imparted to the surrounding liquid. The hood F, while it permits a ready exit of the products of combustion and unconsumed air, prevents the wind from blowing down the chimney and rain from entering it, the crown *c* serving as a water-shed, and air-currents striking the chimney being deflected upward through the perforations in the base *a'* into and through the interior of the collar *b* and out through the space above. Should any current of air be directed downward upon the internal diaphragm *a*, it is deflected upward by the form of the diaphragm and its effect rendered insignificant. Obviously all external connections which would be below the surface of the liquid to be heated when the device is in operation should be made perfectly water-tight.

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

1. In an apparatus for heating liquids by immersion therein, the combination of the air-reservoir A, provided with the supply-tube *t*, the oil-reservoir C, inclosed within the air-reservoir A, and provided with an Argand burner and having the air-duct *o*, connecting the surrounding air-space with the interior of the burner, and a metallic chimney E, surmounting the air-reservoir A and inclosing the upper portion of the burner, substantially as described.

2. In an apparatus for heating liquids by immersion therein, the combination, with an oil-reservoir provided with a threaded wick-tube *p*, having a screw-collar *m* thereon, of the flame-deflector D, connected with the screw-collar *m* and provided with the cross-wires *e*, a metallic chimney inclosing the upper portion of the burner, and an air-feed for the lamp impervious to water, substantially as described.

3. In an apparatus for heating liquids by immersion therein, the combination, with the air-reservoir A, having the air-duct *t* extending upward therefrom, oil-reservoir C, inclosed within the air-reservoir and provided with a threaded wick-tube *p* having a screw-collar *m* thereon, of the flame-deflector D, connected with the screw-collar *m* and provided with the cross-wires *e*, a metallic chimney surmounting the air-reservoir and inclosing the top of the burner, and air-passages connecting the air-reservoir directly with the chimney and also with the base of the wick-tube, substantially as described.

4. In an apparatus for heating liquids by immersion therein, the combination of the air-reservoir A, having the supply-tube *t* extending upward therefrom, metallic chimney E, surmounting the air-reservoir, oil-reservoir C, inclosed within the air-reservoir, threaded wick-tube *p*, extending from the base of the air-reservoir through the oil-reservoir and above the top of the air-reservoir and communicating at its base by an air-duct *o* with the interior of the air-reservoir, screw-collar *m* for carrying the wick fitting upon the threaded wick-tube *p* and provided with the lug *k*, rotary sleeve *l*, surrounding the wick-tube *p* and provided with the slot *i*, receiving the lug *k*, flame-deflector D, supported above the top of the sleeve *l* by metal strips *f*, and means upon the flame-deflector for receiving a turning-key when inserted downward through the chimney, whereby the flame may be regulated, substantially as described.

5. In an apparatus for heating liquids by immersion therein, the combination of the air-reservoir A, having the air-tube *t* extending upward therefrom, metallic chimney E, surmounting the air-reservoir and communicating with the interior thereof, and oil-reservoir C, provided with the feed-tube *s*, extending upward, level-indicator *r q* within the feed-tube *s*, and an Argand burner connected with the oil-reservoir and communicating with the interior of the air-reservoir, substantially as described.

6. In an apparatus for heating liquids by immersion therein, the combination, with the air-reservoir A, having the tube *t* extending upward therefrom, metallic chimney E, surmounting the reservoir A, and oil-reservoir C, inclosed within the air-reservoir and provided with an Argand burner receiving its air-supply from the reservoir A, of a hood F, fitting upon the upper end of a chimney and comprising the double-walled collar *b*, having the oblique perforated base *a'*, conical perforated diaphragm *a*, and crown *c*, supported above the collar *b* by metal strips *f'*, substantially as described.

CHARLES YOUNG.

In presence of—
J. W. DYRENFORTH,
M. J. FROST.