A. BURBANK.

Heating Apparatus.

No. 209,650. Patented Nov. 5, 1878.

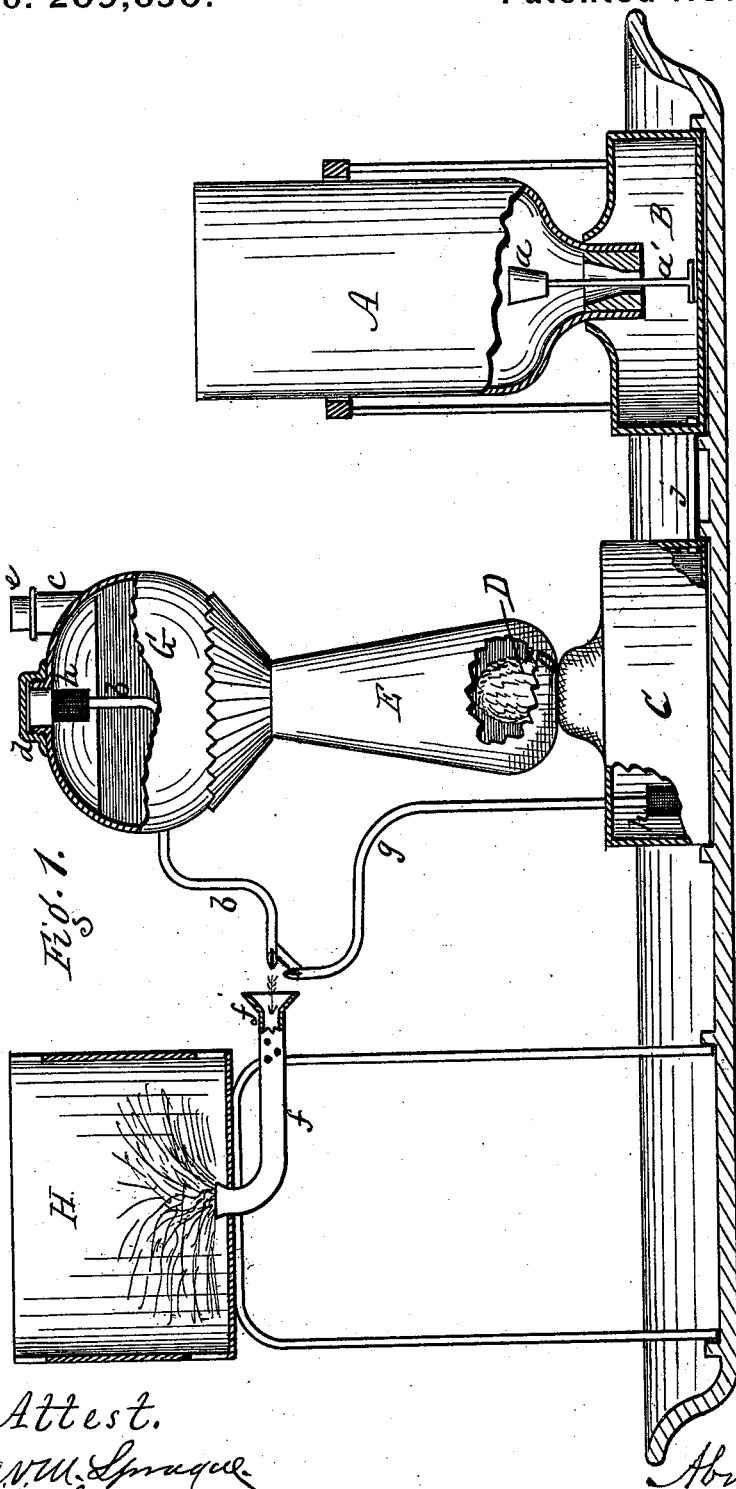

Fig. 1.

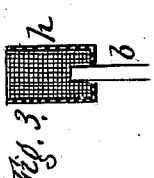

Fig. 3.

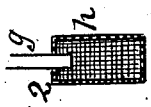

Fig. 2.

Attest.

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UNITED STATES PATENT OFFICE.

ABNER BURBANK, OF ROCHESTER, NEW YORK, ASSIGNOR TO AUSTIN V. M. SPRAGUE, EDMUND OCUMPAUGH, AND GEORGE W. ROSS LEWIN, OF SAME PLACE, ONE-FOURTH TO EACH.

IMPROVEMENT IN HEATING APPARATUS.

Specification forming part of Letters Patent No. **209,650**, dated November 5, 1878; application filed September 5, 1878.

To all whom it may concern:

Be it known that I, ABNER BURBANK, of the city of Rochester, county of Monroe, and State of New York, have invented a certain new and useful Improvement in Heating Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional side elevation of the apparatus arranged as an oil-stove. Figs. 2 and 3 are detail views.

My improvement relates to apparatus for burning kerosene-oil without a wick, whereby much better combustion is attained and a more intense heat is produced than in apparatus where wicks are employed.

The invention consists in the construction and arrangement of parts, hereinafter more fully described.

In the drawings, A indicates an inverted fountain containing the oil, the neck of which rests within a vessel, B, from the bottom of which a feed-pipe, *j*, extends to and opens into an oil-receptacle, C, to the top of which is attached an ordinary wick-burner, D. The fountain A has a valve, *a*, with a stem, *a'*, which, when it rests in vessel B, strikes the bottom thereof and allows the oil to flow out into said vessel, acting in this respect similarly to the ordinary German student-lamp. From the top of receptacle C rises a chimney or heat-conductor, E, the top of which is made flaring, or is otherwise arranged to receive a small steam-boiler, G. This boiler is filled or partially filled with water, and steam is generated therein by reason of the heat beneath. From this boiler proceeds a pipe, *b*, through which the steam escapes. The boiler is provided with an ordinary nozzle, *c*, by which it is filled, and this is stopped by a cork, *e*; or, if desired, a safety-valve may be employed. In the top of the boiler is also a removable cap, *d*, by which the interior may be reached.

H is an open-topped drum or cylinder mounted on a level, or nearly so, with the boiler. From the bottom or through the side proceeds a tube, *f*, having a funnel-shaped outer end, *f'*, which stands toward the boiler.

g is a pipe similar to *b*, which extends from the receiver C up to and just beneath said pipe *b*. The ends of both these pipes are provided with small orifices, and that of *b*, through which the steam escapes, forms an injector, which, blowing across and in close contact with that of *g*, tends to produce a vacuum in pipe *g*, and thereby draws the oil up through said pipe *g* and discharges it with the steam into the open-mouthed pipe or tube *f*, and thence into the cylinder H. The pipe *g* is provided with a cock, or is otherwise arranged to graduate the flow of oil through the same, and the pipe *b* may also be provided with a cock to regulate the steam.

The operation is as follows: The burner D being lighted, steam is quickly generated in the boiler G, and from thence is injected through pipe *b*, drawing the oil up through pipe *g*, and forcing it through tube *f* into the cylinder H, as before described. A large quantity of the outside air is also drawn into the cylinder by the force of the injection. Fire is now communicated to the atomized spray which enters the cylinder, and, the flame being confined therein, an intense heat is at once produced, greatly exceeding that which can be produced by wick-burners. The decomposed gases of the steam, as well as the great volume of outside air which enters, abundantly supplies the combustion so that the oil is all burned.

The cylinder is essential to concentrate and hold the flame, for if not used the spray would be diffused and burn over a great surface. So far as the action of the cylinder and tube is concerned, a jet of impelled air or other fluid might be used with a similar effect as steam, since it would draw up the oil, atomize it, and drive it into the cylinder to be burned.

h h are small wire-cloth screens, of circular or other form, at the ends of the pipes *b g*, which enter the oil-receptacle and boiler. The mesh of these screens is smaller than the orifices at the outer ends of said pipes, so that they will strain the oil and steam, preventing the entrance of particles that might obstruct said orifices. The pipe *b* passes up through the boiler to the top directly under the cap *d*, by

which it comes above the water-line, and also presents the screen in position to be reached. The pipe *b* and screen *h* in the chamber G also serve a highly-important function in preventing priming or the carrying over bodily particles of water from the boiler, which would materially interfere with the operation of the apparatus.

The apparatus above described is adapted to many different purposes, such as oil-stoves for domestic use, tinmen's furnaces, jewelers' and mechanics' uses, &c. The heat is so quickly produced and is so intense as to render it of great service where oil cannot now be used.

It is not at all necessary that the pipe *g* should enter the receptacle C, as shown in the drawing. It may enter or connect with a separate receptacle with the same result.

Having thus described my invention, I claim—

1. A portable heating apparatus for burning hydrocarbons, in which are combined a cylinder, H, having tube *f*, the receptacle C, the chimney or heat-conductor E, the separate boiler G, resting on the chimney, with a pipe, *b*, proceeding from the boiler, and a pipe, *g*, proceeding from an oil-fount, the two pipes uniting in front of the tube *f*, for conveying oil and steam and injecting the oil through said tube to the interior of the cylinder H, substantially as shown and described, and for the purpose specified.

2. In a portable heating-apparatus, the combination of the oil-fount C, chimney or heat-conductor E, and separate boiler G, provided with the pipes *b g*, constituting an injector, the whole forming an attachment capable of raising the oil and injecting the same through pipe *f* into the cylinder H, substantially as shown and described, and for the purpose specified.

3. In a portable heating apparatus such as described, the combination, with pipes *b g*, of the perforated screens *h h*, inclosing the induction ends of said pipes, and having their perforations as small as or smaller than the discharge-orifices of said pipes, as herein shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ABNER BURBANK.

Witnesses:
CHAUNCEY NASH,
A. V. M. SPRAGUE.