W. &. R. J. STEWART & C. W. MAKEPEACE.

HYDROCARBON-BURNER.

No. 193,048. Patented July 10, 1877.

Fig. 1.

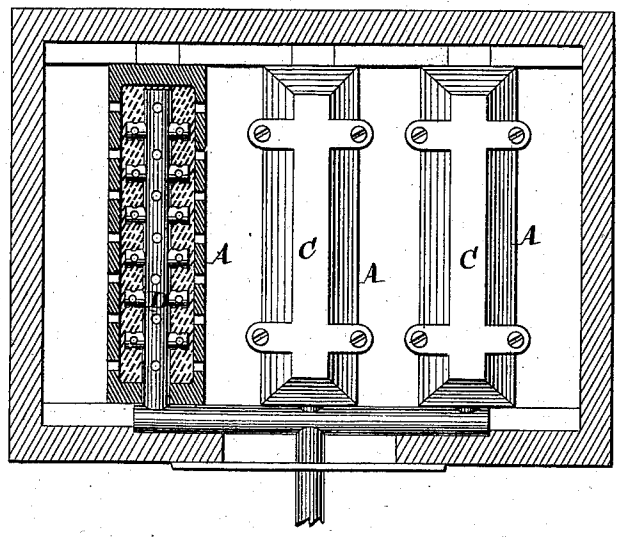


Fig. 2.

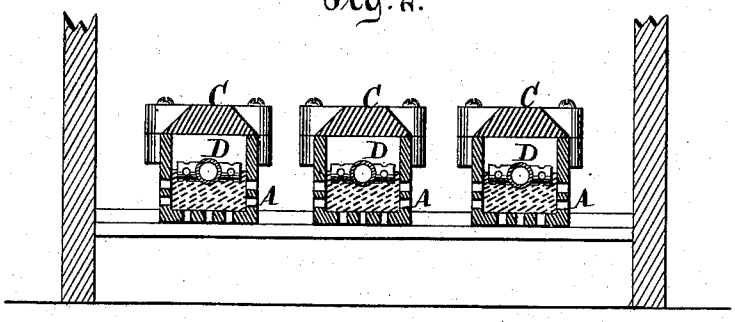
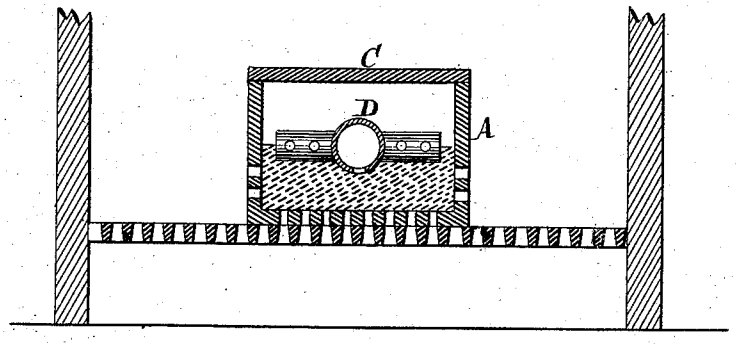


Fig. 3.



Witnesses.
Otto Skufeland
Chas. Wahlers

Inventors.
William Stewart
Robert J. Stewart
Charles W. Makepeace by
Van Santvoord & Hauff
their attorneys

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM STEWART, ROBERT J. STEWART, AND CHARLES W. MAKEPEACE, OF PATERSON, NEW JERSEY.

IMPROVEMENT IN HYDROCARBON-BURNERS.

Specification forming part of Letters Patent No. **193,048**, dated July 10, 1877; application filed June 14, 1877.

To all whom it may concern:

Be it known that we, WILLIAM STEWART, ROBERT J. STEWART, and CHARLES W. MAKEPEACE, of Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Hydrocarbon-Burners for Heating Steam-Boilers and other Furnaces, of which the following is a specification:

In the drawings, Figure 1 represents a horizontal section of a furnace constructed according to our invention. Fig. 2 is a transverse section of the same. Fig. 3 is a like section of a modification thereof.

Similar letters of reference indicate like parts.

Our invention relates to an apparatus for heating steam-boilers and other furnaces; and consists in a box which is closed at the top, and provided with holes in the lower part of its sides and bottom; also provided with a filling of asbestus or other absorbent, and refractory material, and with a feed-pipe, which extends through the interior of the box in a horizontal direction in such a manner that, if the feed-pipe is connected to a tank containing petroleum or any other suitable hydrocarbon liquid, the liquid can thereby be ejected in or upon the filling in the box, so that the liquid is caused to permeate such filling, and thence ooze out through the holes in the sides and bottom of the box, and, if it is ignited at these holes, the box is thereby heated, the liquid is vaporized, and a powerful flame issues from each of the holes.

In the drawing, the letter A designates a box, which, in the example shown in Figs. 1 and 2, forms the body of a grate-bar, but which may be made detached from the grate-bar, as shown in Fig. 3. This box is provided with a cover, C, which is firmly secured in position by screw-bolts or other suitable means, and which can be taken off, so as to obtain access to the interior of the box. In the lower portion of the sides and in the bottom of the box A are formed a series of holes, *a*. The said box A is filled with loose asbestus fibers, pulverized pumice-stone, or any other suitable refractory and absorbent material, and in it is placed, horizontally, a pipe, D, which is perforated and extends throughout the entire length of the box.

Said pipe may be provided with a series of lateral branches, as shown in Fig. 2, and it connects with a suitable tank or vessel containing petroleum, or any other suitable hydrocarbon liquid, the communication between the tank and the pipe D being controlled by a suitable stop-cock.

If the grate-bars are made hollow they are all connected to one and the same oil-tank.

When our heating apparatus is to be used in a furnace with ordinary grate-bars, one or more boxes A, filled with asbestus, are placed loosely on the grate-bars, and the pipes contained in such boxes are connected to an oil-tank.

When the communication between the oil-tank and the pipe D is opened, the hydrocarbon liquid issues from the perforations of the pipes D in fine jets, and spreads rapidly and uniformly throughout the asbestus or other filling, whereby the same is carried to the perforations in the sides and bottom of the box A, and by igniting the liquid issuing from these perforations a very intense heat can be produced and at comparatively little expense.

The hydrocarbon liquid, after having permeated the refractory and absorbent material in the box A, sinks down and oozes out through the holes in the sides and bottom of said box, and if it is ignited at these holes the box soon becomes heated to a high degree, so that the hydrocarbon liquid becomes vaporized, and a powerful blaze issues from each of the holes, forming a large flame which entirely surrounds the box and produces a very intense heat.

In our apparatus all the holes are situated in the lower portions of the sides and in the bottom of the box, and if a proper supply of liquid is kept up a portion of such liquid issues from each of the holes, and all the liquid introduced into the box A is consumed.

Our heating apparatus can be used to great advantage in locomotive and other steam-boilers, in kilns for burning brick, and, in fact, in all places where it is desirable to produce an intense and rapid heat.

The supply of oil to the horizontal pipe is,

of course, regulated, so that it is all consumed and none wasted in the ash-pit.

It will be evident that by having the openings in the bottom of the box, the latter is uniformly heated throughout, and as the oil in the box is transformed into vapors, it issues from all the openings in powerful jets, so as to produce an immense flame; and, further, by extending the feed-pipe through the box in a horizontal direction all the openings in the box are uniformly and evenly supplied with oil.

What we claim, and desire to secure by Letters Patent, is—

An apparatus for heating steam-boilers and other furnaces composed of a box, A, closed at its top and provided with holes in the lower part of its sides and in its bottom, a filling of asbestus or other absorbent and refractory material, and a feed-pipe extending in a horizontal direction through said box, all constructed and operating substantially as described.

In testimony that we claim the foregoing we have hereunto set our hands and seals this 11th day of June, 1877.

WILLIAM STEWART. [L. S.]
ROBERT J. STEWART. [L. S.]
C. W. MAKEPEACE. [L. S.]

Witnesses:
W. HAUFF,
E. F. KASTENHUBER.