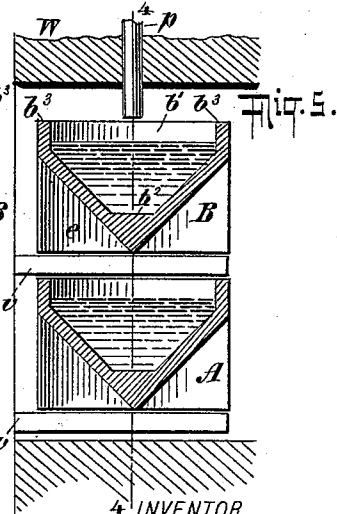
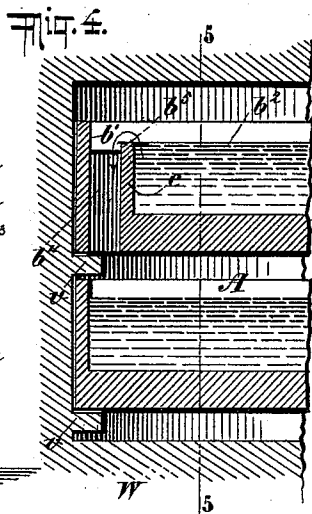
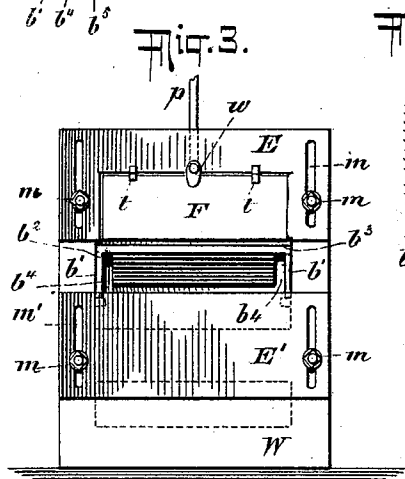
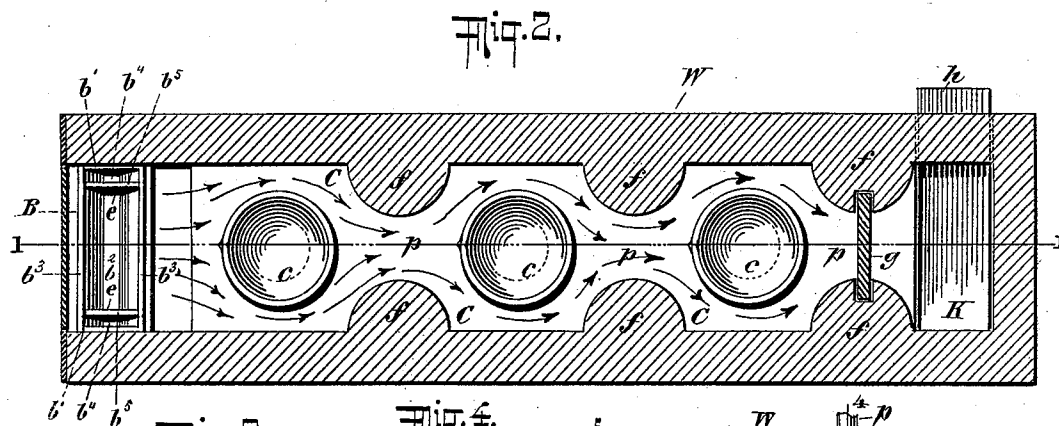
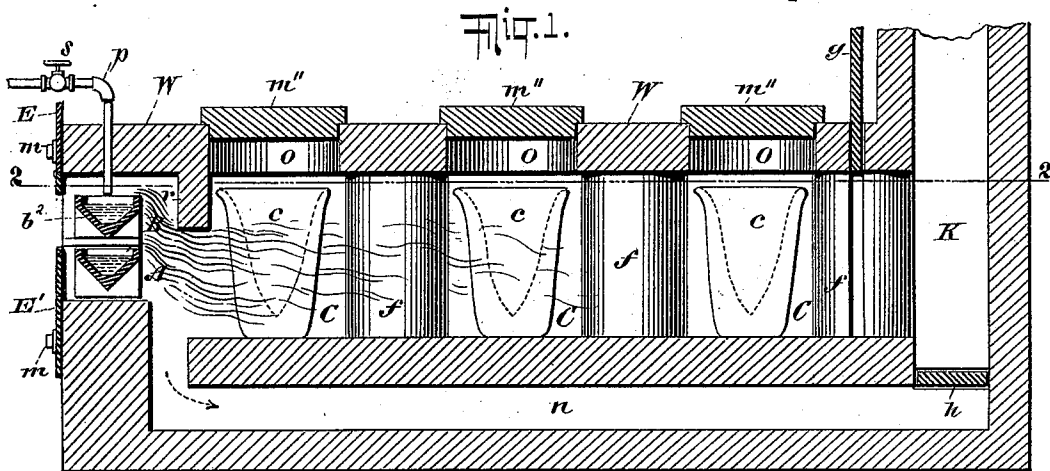


(No Model.)

E. S. SPERRY.
LIQUID FUEL FURNACE.

No. 518,794.

Patented Apr. 24, 1894.



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ERWIN S. SPERRY, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE WALDO FOUNDRY, OF NEW JERSEY.

LIQUID-FUEL FURNACE.

SPECIFICATION forming part of Letters Patent No. 518,794, dated April 24, 1894.

Application filed September 6, 1893. Serial No. 484,915. (No model.)

To all whom it may concern:

Be it known that I, ERWIN S. SPERRY, a citizen of the United States, residing at Bridgeport, in the county of Fairfield, State of Connecticut, have invented certain new and useful Improvements in Liquid-Fuel Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of furnaces in which liquid fuel is burned upon open trays substantially inclosed within an opening in the furnace wall.

The invention has for its object improvements in the burner employed in such a furnace for burning crude petroleum and other heavy hydro-carbon.

Various forms of burners for the class of furnaces under consideration have been heretofore used, but all of them were open to serious objections.

It has been found necessary in practice to provide some means for carrying off the fuel furnished by the supply pipe in excess of the capacity of the burner. To this end, various forms of overflow ducts or conduits have been employed, but all have been found defective in practice, either because the ducts or conduits were too small, thereby becoming clogged with the residual product of the combustion, or because they were difficult to clean out while the furnace was in use, or because they reduced the burning surface of the burner or fire bar. My invention obviates all these objections, and furnishes an improved fire bar in which the overflow ducts or conduits may be readily cleaned while the furnace is in use, and therefore do not become clogged, and in which an unusually large burning surface is obtained. The tray itself is also easier to clean out, and can be cleaned while the burner is in use, a thing which is difficult or impracticable with any of the burners heretofore in use.

In general terms, my invention consists in the use in a liquid-fuel furnace of a burner or fire bar substantially inclosed within the furnace wall, and composed of an open, substantially trough-shaped, tray having along

its front and rear edges, ledges raised above the lateral or end edges of the tray, and projecting beyond the same, said tray being also preferably provided with downwardly extending lips attached to the projecting ledges at their extremities, and forming therewith and with the ends of the tray ducts or conduits for the overflowing fuel.

Reference is had to the accompanying drawings, which are hereby made a part of this specification, and in which similar letters refer to similar parts.

Figure 1 of the drawings represents a longitudinal vertical section of a liquid-fuel furnace, embodying my invention and adapted for melting metals in crucible. The section is taken through the line 1, 1 of Fig. 2. Fig. 2 is a cross-section of Fig. 1 through the line 2 2. Fig. 3 is a front elevation of the furnace, showing the burner and doors. Fig. 4 is a detailed sectional view of a portion of the burner and of the tray for catching the overflowing fuel. The section is taken through the line 4, 4 of Fig. 5. Fig. 5 is a transverse section of Fig. 4 on the line 5 5.

My burner may be employed with any liquid-fuel furnace of the class described; but I have shown it in connection with my own improved furnace, for which I am about applying for Letters Patent, and which is fully described in another application filed by myself at or about the time of filing this application.

In Figs. 1 and 2, W represents the general wall of the furnace, having openings in its top *o, o* closed by lids or covers *m'' m''* through which the crucibles *c, c* are inserted into the crucible chambers C C.

ff are projecting jambs within the body of the furnace designed to narrow the passages *p, p* for the flames between the crucible chambers C, C, and thus cause the flames to pass completely around the crucibles *c, c* and make the melting action uniform.

r is an arch or jamb of fire brick or other refractory material, and of any suitable depth, projecting downward from the roof of the furnace, and used to draw the flame downward before it passes around the first crucible so as to insure its passing around the lower part of all the crucibles. Natural draft

is used through the chimney *k*, regulated by the damper *g*. In order to prevent the flames from going through the crucible openings when the cover is removed, the damper *h* is provided, the opening of which creates a draft through the flue *n* to the chimney *k* the damper *g* being then closed.

B represents the burner in its preferred form, consisting of an open, substantially trough shaped tray *b*² having ledges *b*³*b*³ upon its front and rear edges raised above the level of the lateral or end edges *b*⁵*b*⁵ and extending beyond the latter preferably in each direction.

Attached to the extremities of the projecting ledges and substantially parallel with the ends *e*, *e* of the tray *b*² are downwardly extending lips *b'* *b'* forming, with the ends *e* *e* of the tray *b*² and with the projecting extremities of the ledges *b*³ *b*³, open ducts or conduits *b*⁴ *b*⁴. These ducts or conduits are substantially open passages between the ends of the tray *e*, *e* and the lips *b'* *b'*, being open throughout their whole extent, except at the upper corners where the lips *b'* *b'* are united to the main body of the burner by the projecting extremities of the ledges *b*³ *b*³.

A is a secondary burner, and preferably consists of a plain, open trough shaped receptacle or tray of substantially the same width as the burner B, and long enough to extend in either direction below the ducts or conduits *b*⁴ *b*⁴.

p is a supply pipe having cock S.

The door of the furnace is constructed in detachable plates or portions E, E', which may be raised or lowered by loosening the set screws *m*, *m* working in the slots *m'* *m'*, the plates E, E' being held in any desired position by tightening the set screws. The object of raising or lowering the plates E, E' is to leave the burners B, A wholly or partly uncovered in front, as desired for the purpose of draft.

F is a door in the plate E hinged at *t*, *t* and kept closed, when that is desired, by the lug *w*. The door F may be raised when it is desired to clean out the tray portion of the burner B or for other purposes.

The operation of the burner is as follows: The fuel being allowed to flow from the supply pipe *p*, fills the trough-shaped tray *b*² to the level of its lateral or end edges *b*⁵ *b*⁵. As soon as more oil is added, it begins to flow over the lateral or end edges *b*⁵ *b*⁵, being prevented from flowing over the front and rear edges of the tray by the raised ledges *b*³ *b*³. The overflowing oil passes down the ducts or conduits *b*⁴ *b*⁴ and is received in the auxiliary burner A. When the plates E E' are arranged as in Fig. 3, so as to leave the burner *b*² substantially exposed to view from the front, as preferred by me the conduits *b*⁴ *b*⁴ will then be useful in increasing the draft, the air being drawn through them as well

as between the two burners B and A. The conduits can be readily kept clean when the furnace is in use, it being perfectly easy to pass a poker through them at any time, and the same is true of the burners, there being nothing in the bottom of the trough like portions to interfere with raking. I prefer to employ the auxiliary burner A, but it is not necessary. In place thereof, the overflowing fuel might be allowed to drip upon the floor of the furnace, or some loose refractory material may be kept there which will catch the overflowing fuel and bear the effects of the combustion. The lips *b'* *b'* may also be dispensed with without essentially modifying my invention, the side of the furnace opening in that case forming one wall of the duct or conduit *b*⁴. The burners B and A are preferably supported at their ends upon ledges or bars V V on the side walls of the furnace opening.

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

1. In a liquid fuel furnace, substantially inclosed within an opening in the furnace wall, a burner consisting of an open, substantially trough shaped tray having on its front and rear edges ledges raised above the level of the lateral or end edges of the tray, and projecting beyond the same, said tray being also constructed with downwardly extending lips attached to the projecting edges at their extremities, and forming therewith and with the ends of the tray ducts or conduits for the overflowing fuel, and in combination therewith and below the burner, a suitable open receptacle to receive the overflowing fuel, substantially as and for the purposes set forth.

2. In a liquid fuel furnace the combination of two super-posed burners or fire bars substantially inclosed within an opening in the furnace wall and supported on ledges or projections attached to said wall, the upper and principal burner or fire bar consisting of an open substantially trough shaped tray having on its front and rear edges ledges raised above the lateral or end edges of the tray, and projecting beyond the same, said tray being also provided with downwardly extending lips attached to the projecting ledges at their extremities, and forming therewith and with the ends of the tray overflow ducts or conduits, and the lower or auxiliary burner consisting of an open substantially trough shaped tray of substantially the same width as the principal or upper burner, and long enough in either direction to extend below the ducts or conduits *b*⁴ *b*⁴ and to receive the fuel overflowing from the upper burner, substantially as shown and described.

ERWIN S. SPERRY.

Witnesses:

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