

(No Model.)

F. LEADBEATER.

OIL BURNING APPARATUS FOR STEAM BOILERS.

No. 409,846.

Patented Aug. 27, 1889.

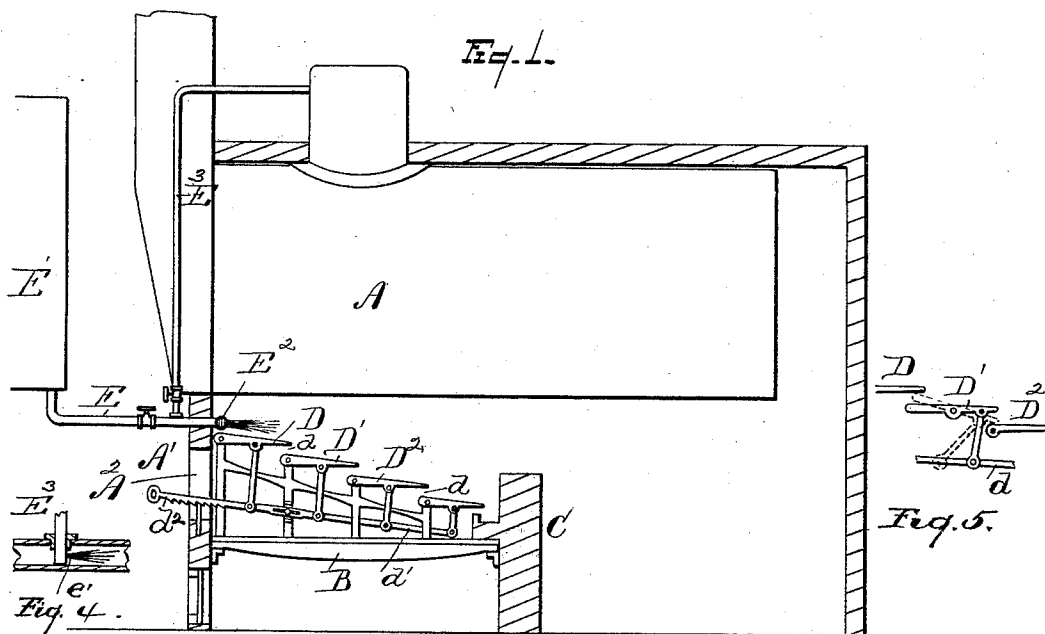
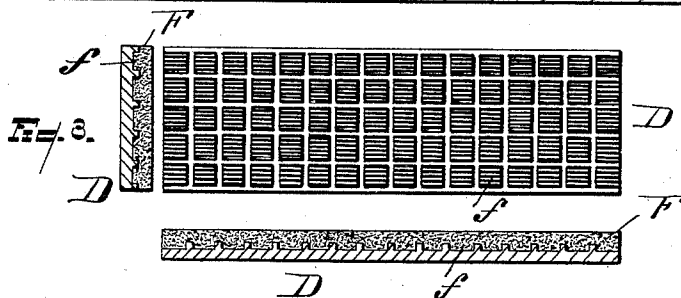
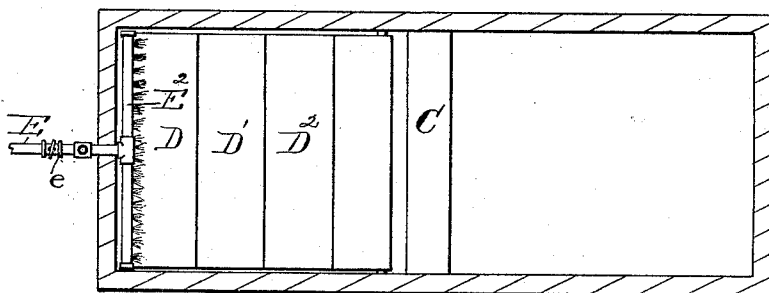


Fig. 2.



WITNESSES

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FREDERICK LEADBEATER, OF DETROIT, MICHIGAN.

OIL-BURNING APPARATUS FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 409,846, dated August 27, 1889.

Application filed October 20, 1888. Serial No. 288,708. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK LEADBEATER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Oil-Burning Apparatus for Steam-Boilers; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

In the drawings, Figure 1 is a longitudinal section and elevation of a boiler-furnace illustrating my invention. Fig. 2 represents a horizontal section showing parts in plan. Fig. 3 is a plan view of one of the diffusing-plates, with longitudinal and transverse sections of the same. Figs. 4 and 5 are detail views.

It is the purpose of my invention to produce an efficient and inexpensive appliance, whereby crude petroleum may be burned within a steam-boiler furnace; and to this end my invention consists in an oil-burning apparatus comprising a series of oil-diffusing plates arranged at different levels, one in advance of another, and each inclined slightly downward at its forward end, where it overlaps the next succeeding lower plate, a longitudinally-perforated oil-discharge pipe being located transversely above the upper diffusing-plate and in communication with an oil-supply pipe, into which leads a steam-injecting pipe that discharges in the direction of the flow of the oil, so as to prevent any reflux of gas toward the oil-tank.

In carrying out my invention, A represents a steam-boiler.

A' is the boiler-front.

B is the grate.

A² is the fuel-door.

C is the bridge-wall, which may or may not be employed.

D D' D², &c., represent a series of plates, which I term "diffusing-plates."

E is the oil-supply pipe, which leads from a tank E'. The oil-pipe is terminated with a cross-pipe E², which is perforated at short intervals with small orifices for the outflow of the oil onto the top plate D.

e is a suitable valve for regulating the feeding of oil to the furnace.

The general operation of this part of the invention will now be understood. Oil discharging from the small orifices onto the top plate D is there ignited, and flows forward over the plate, which is slightly inclined toward the front. As it flows forward, it drips down onto the next plate D', and from thence to each succeeding plate D², &c. The spaces *d* between the plates afford free ingress for the air, which enters through the feed-door, and so an abundant supply of oxygen is provided to effect a thorough and complete combustion of the oil. As the furnace warms up, the plates D D' D², &c., become very highly heated, and, in connection with the oxygen, quickly convert all carbonaceous matter into a gaseous and inflammable state, the whole being thoroughly consumed without the formation of smoke.

d' represents any suitable lever mechanism connected at one end to the corresponding diffusing-plate, and at the other end to a suitable handle which projects to the exterior of the furnace. These plates D D' D², &c., are hinged or pivoted, so that by drawing upon the handle *d*² the plates may be so tilted as to widen or contract the air-throats *d* between them. This of course may be accomplished by pivoting all the plates; or it might be accomplished by pivoting every alternate plate at its middle point, as indicated by the plate D', shown in the separate view at the right of Fig. 1, for by tilting this one plate it is manifest that it would contract the air-throats *d* both above and below it.

E³ is a small steam-pipe, which leads from the steam-space of the boiler down to and terminates within the oil-supply pipe. I either plug up or weld the lower end of this pipe and provide an orifice *e'*, opening therefrom, so as to throw a jet of steam in the direction of the flow of the oil. This serves to prevent the possibility of a back surge of gas or vapor through the pipe to the tank.

The plates D D' D², &c., may be faced on their upper sides with fire-clay, or with fire-brick or tiling. This is shown at F in Fig. 3, and in order to prevent this fire clay, brick, or tiling from working off from the plates by

the effects of expansion and contraction I prefer to form the plates with recesses *f*. These recesses may extend in a direction longitudinally of the plate, or they may extend
5 both longitudinally and transversely of the plate; or instead of the recesses there may be ribs or flanges formed upon the plate for a like purpose, the object being to permit the fire clay, brick, or tiling to set into the said
10 recesses, and so be held against displacement when in use.

Of course the plate may be cast from iron or other refractory material which may stand the heat without the necessity of any lining,
15 as above. I would therefore have it understood that I purpose to employ the said plates either with or without the said lining.

Of course, instead of fire-clay, any highly-refractory substance may be employed—as,
20 for instance, a compound having asbestos as its base, or mineral wool, plumbago, or other refractory substance.

Air may enter through the fuel-door alone, or through the ash-pit door alone, or through

both, and the device, as is shown by the drawings, be readily adapted for insertion into any ordinary furnace and to rest upon the grates of the same.

What I claim is—

In an oil-burning apparatus for boiler-furnaces, the combination, with a series of oil-diffusing plates arranged at different levels one in advance of another and each inclined slightly downward at its forward end, which overlaps the next succeeding lower plate, of
30 a transverse longitudinally-perforated discharge-pipe located above the upper diffusing-plate, an oil-supply pipe communicating with said discharge-pipe, and a steam-injecting pipe leading into the oil-supply pipe,
35 substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

FREDERICK LEADBEATER.

Witnesses:

M. B. O'DOHERTY,
SAMUEL E. THOMAS.