

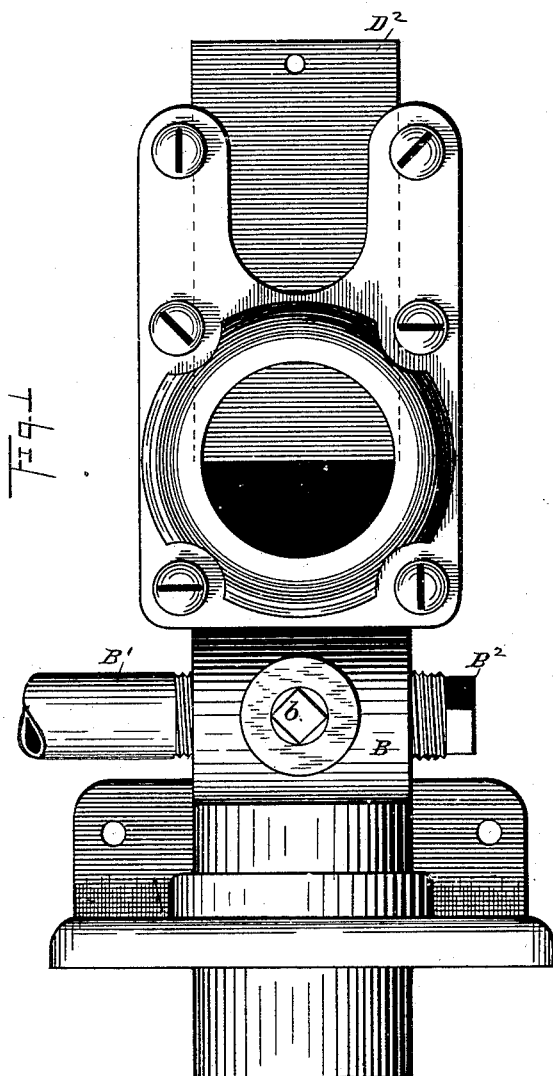
(No Model.)

2 Sheets—Sheet 1.

H. L. MARBACH.  
INJECTOR OIL BURNER.

No. 419,020.

Patented Jan. 7, 1890.



WITNESSES

*Will S. Lowrie*  
*W. R. Edelen*

INVENTOR

*Herman L. Marbach*  
*Leggett and Leggett*  
ATTORNEYS

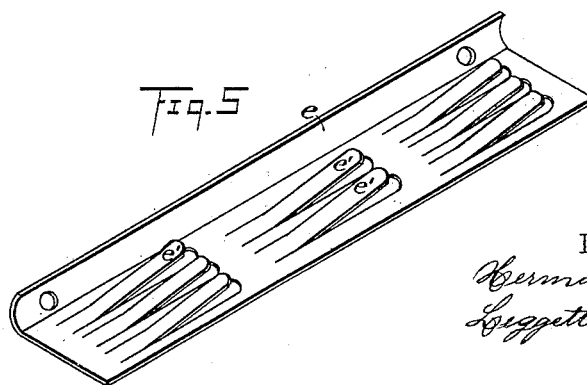
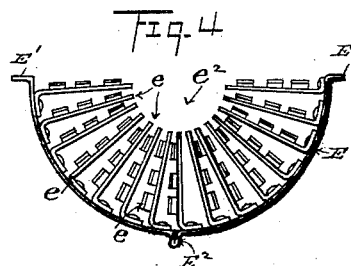
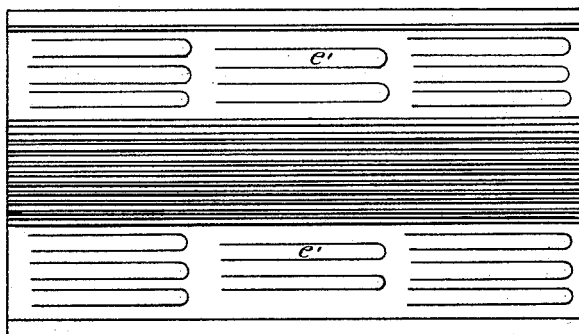
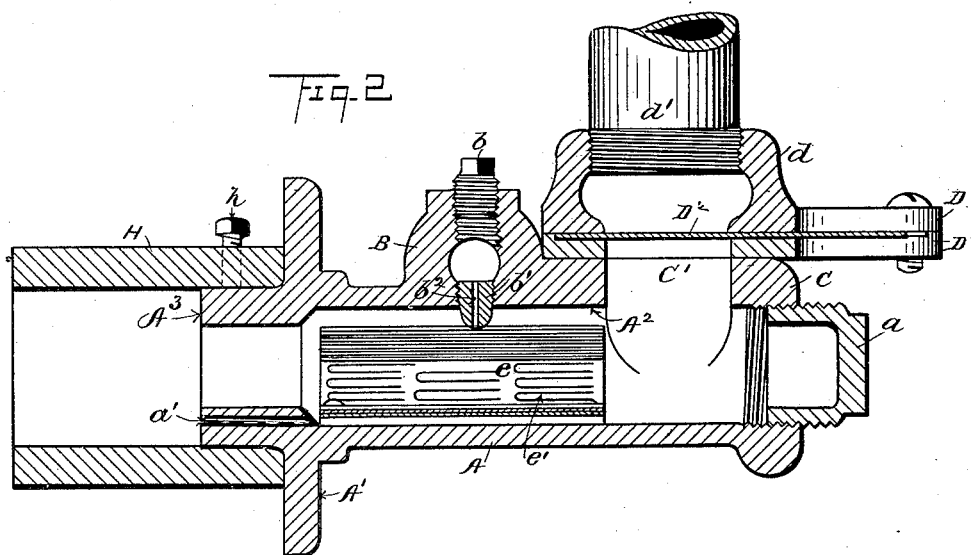
(No Model.)

2 Sheets—Sheet 2.

H. L. MARBACH.  
INJECTOR OIL BURNER.

No. 419,020.

Patented Jan. 7, 1890.



WITNESSES  
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INVENTOR  
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ATTORNEYS

# UNITED STATES PATENT OFFICE.

HERMAN L. MARBACH, OF CLEVELAND, OHIO.

## INJECTOR OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 419,020, dated January 7, 1890.

Application filed September 30, 1889. Serial No. 325,548. (No model.)

*To all whom it may concern:*

Be it known that I, HERMAN L. MARBACH, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Injector Oil-Burners; and I do hereby 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 pertains to make and use the same.

My invention relates to improvements in injector oil-burners designed more especially for burning crude hydrocarbon oil; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claim.

In the accompanying drawings, Figure 1 is a plan. Fig. 2 is an elevation in longitudinal section through the center of the burner. Figs. 3 and 4 are respectively plan and end elevation in detail of the atomizer. Fig. 5 is a view in perspective of one of the plates or wings of the atomizer.

A represents a metal casing, usually of cast-iron, such casing comprising the body of the burner, and having a suitable flange—for instance, as shown at A'—for attaching the burner to the front plate of the furnace or other support. The casing has a cylindrical chamber A<sup>2</sup>, of considerable size, extending the length of the burner; but this chamber is reduced somewhat in size where it extends out through the discharging-nozzle A<sup>3</sup>. At the opposite end the chamber is closed by removable plug a. The casing has an upwardly-projecting boss B, pierced laterally for receiving the oil-supply pipe B', the outer sections of this hole being screw-threaded, and the end opposite the oil-supply pipe being closed by plug B<sup>2</sup>. With such construction the oil-supply pipe may be attached to either side of the burner—whichever is most convenient. Boss B is also pierced vertically, so as to intersect the lateral hole, the upper section of this vertical hole being screw-threaded and closed by plug b. The lower section of the vertical hole is adapted to receive plug b', this latter plug depending, say, a quarter of an inch more (or less) into chamber A<sup>2</sup>. Plug b' has a small orifice b<sup>2</sup>, extending lengthwise through the plug, for delivering the oil into the chamber

below. Casing A is provided on top with a broad flange C, and through this flange and through the walls of the casing is a vertical opening C', of considerable size, leading into chamber A<sup>2</sup> aforesaid. A double cap, comprising plates D D' placed flatwise, the one on top of the other, is secured to flange C by means of screws, as shown. These plates have holes registering with the opening C', as aforesaid. The upper plate D has an upwardly-projecting flange d around the hole, this flange being screw-threaded internally for receiving the air-blast tube d'. The opposing faces of plates D D' are recessed to receive the sliding valve D<sup>2</sup>, by manipulating which valve the air-blast may be regulated or may be entirely cut off, if need be. The air-blast is supplied usually by a fan-blower or air-compressor, and such air-blast is preferably heated before it is delivered to the blower. Underneath the orifice b<sup>2</sup> aforesaid is located the atomizer, constructed as follows:

E is a semi-cylindrical sheet-metal trough, with the edges thereof flanged outward a trifle at E' E', to slightly separate the trough from the walls of the casing, and for the same purpose the trough is ribbed along the bottom at E<sup>2</sup>. To the internal face of the trough are secured a series of sheet-metal plates or wings e, extending lengthwise of the trough and set radially therewith. Each wing e has a series of tongues e' punched from the plate, but leaving the metal at one end of the tongue unbroken. The free end of each tongue stands out a trifle from the plane of the connected wing, and the free ends of the tongues all present toward the discharging-nozzle—that is, in the direction that the air-blast travels. The respective width of wings e is something less than the radius of trough E; hence an unincumbered space is had at e<sup>2</sup> along the axis of the trough, into which space the oil is delivered from orifice b<sup>2</sup> aforesaid. The internal edges of wings e are very close together, almost touching each other, and the oil falls upon these edges, the arrangement being such as to distribute the oil as nearly as may be in equal quantities to the different wings. The air-blast forces the oil along the wings and along the tongues of the wings, and the oil, reaching the free end of the

tongue in infinitesimal quantities, is blown away and atomized by the blast. As shown in Fig. 5, the tongues  $e'$  of a wing  $e$  are not in line with each other lengthwise of the wing, and the oil that may pass between the first lateral series of tongues will be in line with the next series of tongues, so that about all of the oil that traverses a wing  $e$  will be distributed to the different tongues of such wing; but any oil that may possibly escape the different tongues will, on reaching the end of the wing, be substantially in the same condition as the oil on reaching the end of the tongues—to wit, the air-blast, being on either side of each wing, will blow the oil from the end of the wing and atomize it. The air-blast bearing the atomized oil is forced out through the nozzle  $A^3$  aforesaid, where it is ignited and burns fiercely. By reason of the space between the exterior of the trough and the internal face of casing  $A$ , through which space a portion of the air-blast passes, any oil that may find its way to the internal surface of the trough, when it reaches the inner end of the trough, will in like manner be blown away and atomized by the blast.

In starting the burner an inexperienced operator might turn on too much oil, in which case the surplus oil might find its way to the bottom of chamber  $A^2$ , and to prevent an accumulation of oil under such circumstances at the bottom of this chamber, from whence it would eventually be blown out in such quantities that it would not be atomized, a series of small holes  $a'$  are drilled in the discharging-nozzle, these holes entering chamber  $A^2$  flush with the walls thereof, so that any oil

coming in contact with the inner surface of the casing will be blown out through orifices  $a'$  in such small quantities that this oil, if not absolutely atomized, will burn freely in the general combustion had just in front of the discharging-nozzle. The heat is usually intense in the vicinity of the discharging-nozzle, more especially where the furnace is short, and to prevent the end of the nozzle from being burned out I provide a removable sleeve  $H$ , usually of cast-iron, this sleeve fitting over the nozzle, to which it is secured by set-screw  $h$ , the sleeve projecting some inches beyond the nozzle for protecting the latter. If the sleeve in time should be wasted away by the heat, such sleeve can at any time be removed and a new one substituted at a trifling cost.

What I claim is—

The combination, with the casing having discharging-outlet, inlets, respectively, for oil and for air-blast, substantially as indicated, of an atomizer located inside such casing in position to receive the oil and to be swept by the air-blast, such atomizer comprising a trough with internal radial wings extending lengthwise the trough, each wing having a series of tongues extending in the direction that the air-blast travels, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 24th day of August, 1889.

HERMAN L. MARBACH.

Witnesses:

C. H. DORER,

ALBERT E. LYNCH.