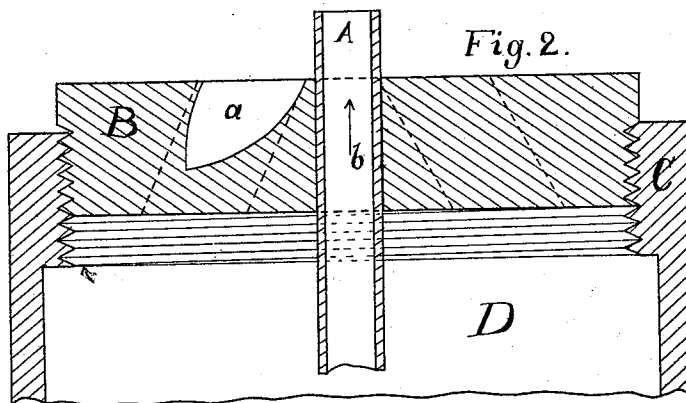
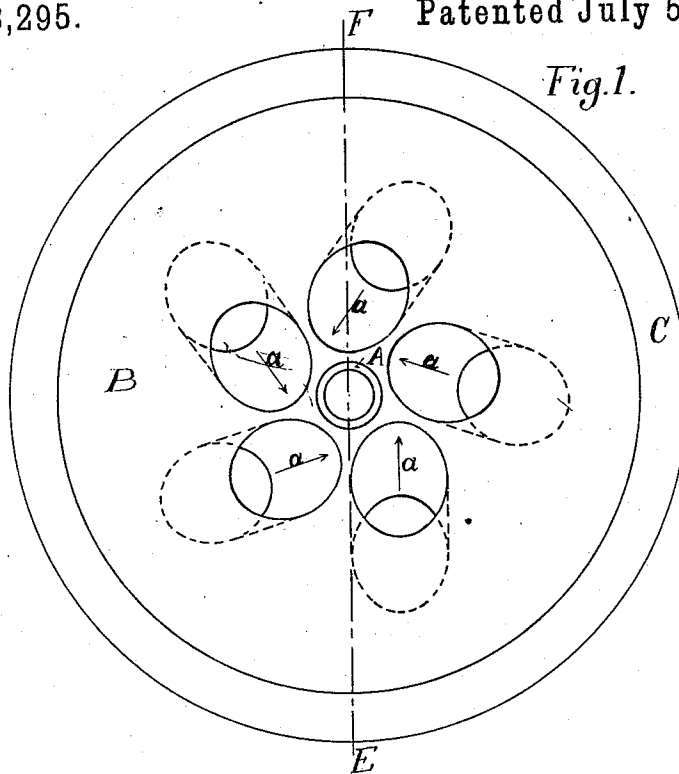


(No Model.)

E. SQUIRE, G. H. COBB & F. M. TOWL.  
LIQUID FUEL BURNER.

No. 478,295.

Patented July 5, 1892.



WITNESSES:

*Burr A. Towl*  
*Robert G. Towl*

EDWIN SQUIRE.  
GEORGE H. COBB. } INVENTORS  
FORREST M. TOWL.

BY

*Forrest M. Towl* ATTORNEY.

# UNITED STATES PATENT OFFICE.

EDWIN SQUIRE, OF MONTCLAIR, NEW JERSEY, GEORGE H. COBB, OF ELMIRA,  
AND FORREST M. TOWL, OF BROOKLYN, N. Y.

## LIQUID-FUEL BURNER.

SPECIFICATION forming part of Letters Patent No. 478,295, dated July 5, 1892.

Application filed September 15, 1891. Serial No. 405,783. (No model.)

*To all whom it may concern:*

Be it known that we, EDWIN SQUIRE, residing at Montclair, county of Essex, State of New Jersey, GEORGE H. COBB, residing at Elmira, county of Chemung, and FORREST M. TOWL, residing at Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Liquid-Fuel Burners, of which the following is a specification.

Our invention relates to that class of burners in which liquid fuel—such as hydrocarbon oil—is atomized and combined with air.

By our invention we cause jets of air to act immediately in front of the burner on a jet of oil tangentially and in an inwardly and forwardly inclined direction, whereby the oil-jet is given a rotary motion, is atomized, sprayed, and commingled with the air and spread by centrifugal force and by the action of the air-jets into a wide conical form best adapted for burning.

Our improved burner comprises a central fuel-passage and a series of air-passages inclining inwardly from their rear ends toward the front and having their axes arranged tangentially to a circle drawn from the axis of the fuel-passage as a center. The jets of air issuing from the air-passages act tangentially upon the fuel-jet outside the burner in an inclined direction, the combined effect being to rotate the oil-jet, spread it by centrifugal force, and carry it forwardly and outwardly to form a conical mass of finely-subdivided and commingled oil and air in the best possible condition for burning.

The accompanying drawings show our improvements embodied in a simple and practical form; but our improvements may be embodied in apparatus differing in details of construction from that shown.

Figure 1 is a front elevation of our burner, and Fig. 2 a vertical central section on the line *ef* of Fig. 1.

The head B of the burner is provided with a central passage, (shown as containing a pipe A,) through which liquid fuel is fed. The pipe A preferably projects a short distance in front of the burner-head, and may connect with any suitable reservoir or source of supply for feeding fuel under pressure. The burner-head in this instance is shown as cir-

cular and screw-threaded on its periphery, being secured to the casing C of an air-chamber D. Air is supplied in any suitable way to this chamber and is delivered through passages *a* to the front or outside of the burner. The passages *a* extend through the burner-head and are arranged obliquely around the central fuel-passage A, being inclined from their inner ends toward the central passage, and they are arranged tangentially thereto—that is to say, the axes of the openings *a* are tangential to a circle drawn from the axis of the fuel-opening A as a center. Thus the air-openings are inclined from their inner ends toward the center; but they do not point directly at the center, and so their axes do not come to a focus, although they do come close together and pass each other, so that the jets of air act on the oil-jet to produce a rotary, whirling, or whirlwind-like motion to throw the oil out into a conical mass, finely subdivided, atomized, and mixed with air.

When we speak of the air-passages as being arranged tangentially to the fuel-passage, we mean that although the air-passages are obliquely arranged and inclined from their inner ends toward the axis of the fuel-passage they do not point directly at the axis of the fuel-passage and their axes do not focus at the axis of the fuel-passage or with each other. After the air-jets leave the burner they cut the oil-jet to an extent sufficient to produce the requisite frictional contact to effect the rotary and outwardly-inclined movement thereof.

When we speak of the axis of discharge, we mean the line of projection of the spraying or atomizing medium, as air or well-known equivalent mediums.

When we speak of the air-passages or their axes of discharge being tangential to a circle of which the axis of the oil-passage is the center, we refer to a circle lying in a plane transverse to said axis, and we do not mean that they are true tangents in the sense that they are in the same plane as the circle, but that they are inclined to the plane of the circle and occupy a tangential relation thereto, as shown in the drawings.

We claim as of our invention—

1. A liquid-fuel burner comprising a cen-

tral fuel-passage and a series of separate and  
distinct rectilinear air - passages arranged  
around it, each of which is inclined inwardly  
from its rear end toward the front and has its  
5 axis arranged tangentially to a circle drawn  
from the axis of the fuel-passage as a center  
and lying in a plane transverse to said axis.  
2. A liquid-fuel burner having a central  
fuel-passage, around which are arranged sep-  
10 arate and distinct passages for the discharge  
of the atomizing medium, the axis of dis-  
charge of each of said latter passages being  
inclined inwardly toward the axis of the fuel-  
passage and tangential to a circle of which

the axis of the fuel-passage is the center and 15  
lying in a plane transverse to said axis, sub-  
stantially as set forth.

EDWIN SQUIRE.

GEORGE H. COBB.

FORREST M. TOWL.

Witnesses as to signatures of Edwin Squire  
and Forrest M. Towl:

BURR A. TOWL,

ROBERT GORTON.

Witnesses as to signature of George H.  
Cobb:

JOHN PILKINGTON,

A. J. McCLATCHEY.