

A. A. MOHN.
 LIQUID HYDROCARBON BURNER OF THE INJECTION TYPE,
 APPLICATION FILED DEC. 4, 1919.

1,339,709.

Patented May 11, 1920.
 2 SHEETS—SHEET 1.

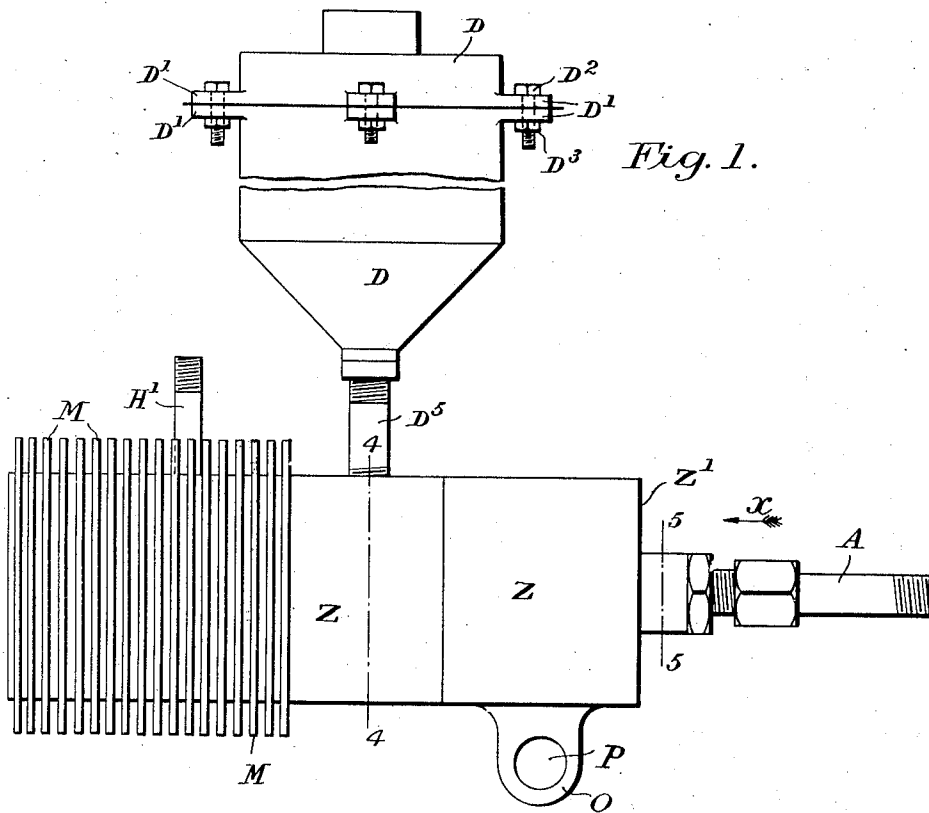
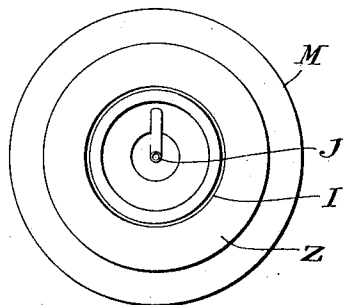


Fig. 2.



Inventor:

A. A. Mohn
 by C. P. Guepel
 his attorney

A. A. MOHN.
LIQUID HYDROCARBON BURNER OF THE INJECTION TYPE.
APPLICATION FILED DEC. 4, 1919.

1,339,709.

Patented May 11, 1920.
2 SHEETS—SHEET 2.

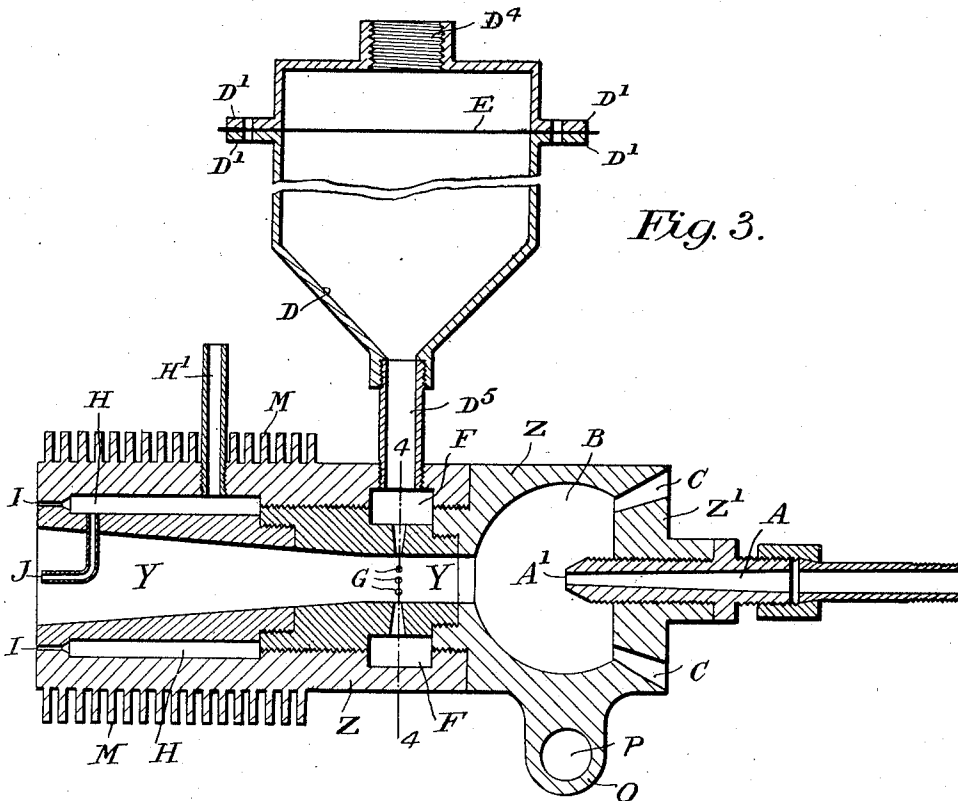


Fig. 3.

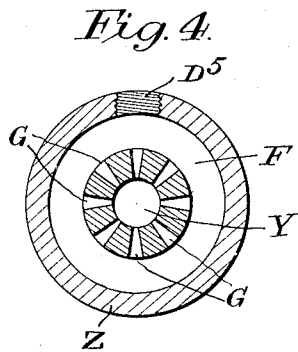


Fig. 4.

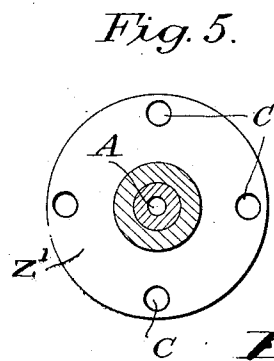


Fig. 5.

Inventor:

A. A. Mohn
by C. P. Joseph
his Attorney

UNITED STATES PATENT OFFICE.

AUGUSTUS A. MOHN, OF LONDON, ENGLAND.

LIQUID-HYDROCARBON BURNER OF THE INJECTION TYPE.

1,339,709.

Specification of Letters Patent.

Patented May 11, 1920.

Application filed December 4, 1919. Serial No. 342,461.

To all whom it may concern:

Be it known that I, AUGUSTUS ALBERT MOHN, engineer, a subject of the King of Great Britain, residing at 177 Mount Pleasant Road, Tottenham, London, England, have invented certain new and useful Improvements in or Relating to Liquid-Hydrocarbon Burners of the Injection Type, of which the following is a specification.

This invention refers to improvements in or relating to liquid hydro-carbon burners of the injection type.

Heretofore liquid hydro-carbon burners of the injection type have been proposed comprising a barrel portion provided with a central longitudinal passage extending from end to end of the burner, a compressed air inlet at the rear end adapted to deliver under pressure an air jet in alinement with the longitudinal axis of said passage and thus deliver said air under pressure direct through said barrel, an annular enlargement near the rear end of said barrel coinciding with and slightly in advance of said compressed air inlet with an inlet or inlets for admitting atmospheric air or/and gases or/and steam laterally into said enlargement viz. in a direction at right angles to the longitudinal axis of said passage, an inlet or inlets for delivering liquid hydro-carbons laterally into said barrel or passage at a point along same in advance of said annular enlargement, and an annular steam jacket toward and around the outlet end of said barrel or passage adapted to deliver—through the nose end of the burner—a ring of steam around the jet of mingled air and liquid hydro-carbons as said jet issues from the outlet end of said barrel or passage; see for example British patent specification No. 2590 of 1914.

Now the present invention relates to liquid hydro-carbon burners of the injection type wherein air (which may be either cold air and heated air or a mixture of heated air and steam) is injected under pressure coaxially with the longitudinal axis of the tubular body-portion of the burner (or barrel of the burner) into an annular enlargement around said compressed air inlet near the rear end of said barrel and having means to deliver liquid fuel into said barrel or passage of the burner at a point in said barrel in advance of said compressed air inlet and annular enlargement, and having an annu-

lar chamber surrounding the forward portion of the barrel; and the present invention consists of or comprises the following improvements viz:—

(a) A circular chamber of approximately hemi-spherical shape around the end of the compressed air inlet which is four times—or more than four times—the diameter of the rear end of the conical bore of the burner.

(b) Means to deliver jets of air, preferably converging jets of air (which may be cold air or heated air) into the said circular chamber around the end of the compressed air inlet, for example a series of holes or passages (which may be tapered holes or straight passages) arranged at an angle to the longitudinal axis of the compressed air inlet and such converging holes or passages may be arranged at (*e. g.* through) the rear end of the burner.

(c) Means for heating and straining the liquid hydro-carbons before delivering same into the burner passage or barrel where same mingle with the air jet under pressure.

(d) Means for delivering said heated and strained liquid hydro-carbons equally all round into the said burner passage or barrel.

(e) The provision of a central jet of heated air at the nozzle or outlet end of the burner adapted to deliver a supply of heated air into the midst of the jet of mingled fuel and air as it issues from the burner outlet—either with or without delivering a ring of heated air (or ring of jets of heated air) around said jet of mingled fuel and air issuing from the outlet end of the burner.

(f) Means to assist or facilitate the heating of the air delivered at aforesaid outlet end of the burner; such means comprising “gills” or fins or the like (such as employed on “radiators”) fixed formed or mounted, circumferentially or otherwise, around the exterior of the burner outlet end and extending as far back as desired toward the rear end of the said burner.

And in order that my invention may be easily understood and readily carried into practice I will now proceed to fully describe same with reference to the accompanying drawing in which:—

Figure 1 is a view in side elevation of the burner according to the present invention

with the tank or reservoir for heating and straining the liquid hydro-carbon fuel employed in the said burner.

Fig. 2 is an end view of the outlet end of said burner.

Fig. 3 is a longitudinal vertical section through said burner and reservoir for heating the liquid hydro-carbons employed as the fuel in said burner.

Fig. 4 is a cross-sectional view of the burner on the line 4—4 Fig. 1 and Fig. 3.

Fig. 5 is a view of the rear end of the burner *i. e.* on the line 5—5 Fig. 1, looking in the direction of the arrow *a* Fig. 4.

A is the compressed air inlet passage terminating at A¹ in the annular enlargement B surrounding said end A¹ of the air injector.

C C are the converging air passages through the rear end Z¹ of the burner body Z; in the arrangement illustrated four such air inlets C are shown spaced equi-distantly apart around the rear end Z¹ of the burner and all equally inclined to the longitudinal axis of the injector A, so that the air coming through these inclined passages C will converge equally (or tend to converge equally) in the chamber B.

D is a reservoir or chamber (which becomes heated as hereinafter explained) for holding the supply of liquid hydro-carbons which may for example be either tar or anthracene oil with a high percentage of pitch and such supply of liquid hydro-carbons is thereby heated in said reservoir D.

This reservoir D is screwed or rigidly fixed to the body Z of the burner and consequently becomes more or less heated as the body of the burner Z becomes heated when in operation.

E is the sieve or strainer which is mounted in any suitable manner inside the reservoir D so as to completely divide same; for example this sieve or strainer E may conveniently be mounted, as illustrated in the drawings, by forming the reservoir D in two parts each provided with lugs D¹ and the outer side of the sieve E is clipped between said lugs and the latter secured together by bolts D² and nuts D³. The tar or other liquid hydro-carbon fuel is delivered through the passage D⁴ into the upper part of the chamber D where same is heated and filtered or strained by passing through the sieve or strainer E into the lower part of the chamber D and thence is delivered through the passage D⁵ into the annular passage F (surrounding the central passage or bore Y) of the burner whence the liquid fuel is delivered through the passages G into the central bore Y of the burner.

The supply of heated (and strained) tar or other liquid hydro-carbons is thus delivered through this ring of holes C all around into the passage Y where same meets and

mingles with the jet of air under pressure coming from the injector nozzle A¹.

The central bore or passage Y through the burner is of conical or tapered form *i. e.* tapering outwardly toward the outlet end— as shown in Fig. 3.

H is an annular chamber in or toward the outlet end of the burner Z; to which chamber air under pressure—which may advantageously be heated air—is supplied (from any suitable source) through the pipe H¹; and from this annular chamber H (surrounding the outlet end part of the passage Y) the air is delivered (a) through the fine circular outlet I in the form of a ring or envelop surrounding the jet of mingled fuel and air as the latter issues from the outlet end of the burner and (b) through the centrally located air jet outlet J which delivers said jet of air therefrom into the midst of the said jet of mingled fuel and air as the latter issues from the outlet end of the burner.

M are the "gills" or fins arranged circumferentially around the exterior of the burner at the outlet end and extending as far back along the burner as desired, for instance arranged on the exterior for nearly half the length of the barrel as illustrated in the drawings.

O is a lug on the underside of the burner Z provided with hole P therein for the purpose of mounting the burner in any suitable support (not shown) in such wise that the burner can be tilted (elevated or depressed) or otherwise adjusted in position for use.

This burner is specially designed and constructed to suit all requirements for burning either light or heavy liquid hydro-carbons for example tar or anthracene oil with a high percentage of pitch can be used as aforesaid, and an absolutely clear and smokeless flame is obtained.

An especial object (*inter alia*) of the present invention is:—to atomize the liquid fuel into the finest possible spray before it leaves the burner nozzle and to rapidly form a gaseous flame as it passes through the burner muffle or opening into the furnace.

This burner provides for increasing the temperature of the fuel and air *viz.* compressed air is passed through the injector tube A into the burner to create a vacuum for the purpose of sucking in atmospheric air through the ports G into the vacuum before said air reaches outlets G through which the liquid fuel is delivered. This high air pressure current passes along through the passage Y and atomizes the fuel oil coming through the perforations G into said passage and passes through the conical shaped passage Y through the burner and thence into the furnace.

According to the fuel oil used larger or smaller holes G can be provided.

A hot air chamber H is also provided at the front (outlet) end of the burner, being near the furnace and the provision of the gills M insures a quick heating up of the air under pressure in said air chamber H.

By regulating the two air inlet pipes A and H¹ (or either of said pipes) by means of a suitable valve thereby a longer or shorter flame may be produced viz. to produce a longer flame the pressure of air is increased, and vice-versa.

The reservoir or vessel D containing the tar, etc., is heated up by the created heat of the furnace and by conduction from the burner body Z, and thus the tar, etc., is heated to a very fluid condition before passing into the tubular central passage Y of the burner, thereby preventing any clogging or blocking or carbonizing of the burner, and moreover great calorific intensity is thereby obtained and also a very perfect combustion.

Instead of air (or instead of a mixture of air and steam) being injected under pressure through said injector A A¹ as aforesaid, I may if desired inject only steam (which may be superheated steam) through the said injector A A¹.

What I claim is:—

1. A hydrocarbon burner of the injector type comprising a barrel having a central passage, an enlarged mixing chamber at the rear end of said barrel into which said central passage opens, a jet pipe projecting into said mixing chamber and having a nozzle spaced from and opposite said central passage, the rear end of said mixing chamber having converging air inlets which direct the air toward the space between said central passage and said nozzle, an annular chamber

surrounding said barrel in front of said mixing chamber, said barrel having lateral passages connecting said annular chamber and said central passage, a pipe mounted in said barrel and opening into said annular chamber, and a hydrocarbon reservoir mounted on said pipe.

2. A hydrocarbon burner of the injector type comprising a barrel having a central passage, an enlarged mixing chamber at the rear end of said barrel into which said central passage opens, a jet pipe projecting into said mixing chamber and having a nozzle spaced from and opposite said central passage, the rear end of said mixing chamber having converging air inlets which direct the air toward the space between said central passage and said nozzle, an annular chamber surrounding said barrel in front of said mixing chamber, said barrel having lateral passages connecting said annular chamber and said central passage, an annular air chamber surrounding said barrel in front of said annular hydrocarbon chamber and provided with delivery orifices at the front of the burner surrounding the main orifice of said central passage and with a bent delivery tube adapted to deliver air centrally of said central orifice, and means for supplying compressed air to said air chamber.

3. A burner barrel having a central passage, an annular chamber surrounding said passage, and means for supplying heated compressed air to said annular chamber, said barrel having a series of external radiator gills or fins opposite said annular chamber.

A. A. MOHN.