July 29, 1924. 1,503,041

J. N. GALBRAITH

FUEL OIL BURNER

Filed July 18, 1923

FIG. 1.

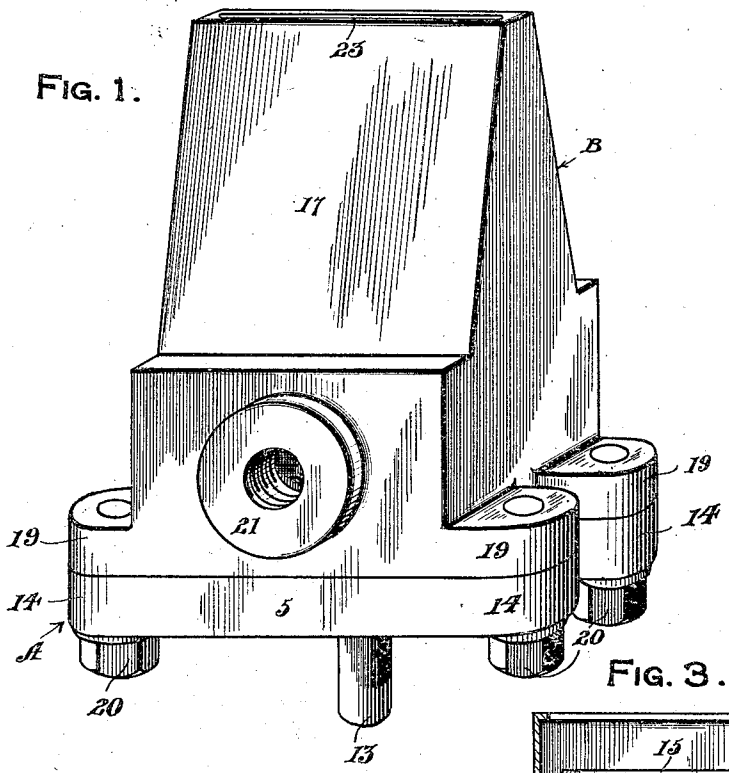


FIG. 2.

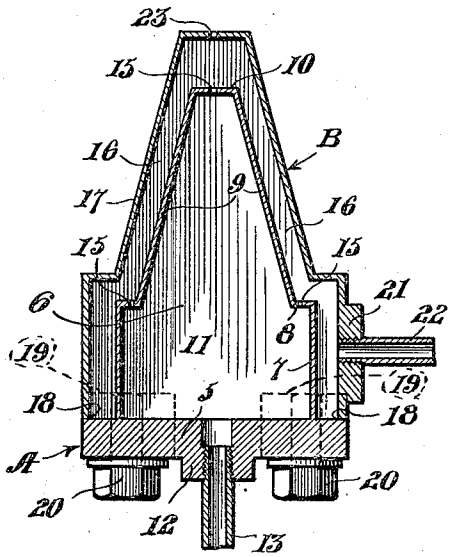
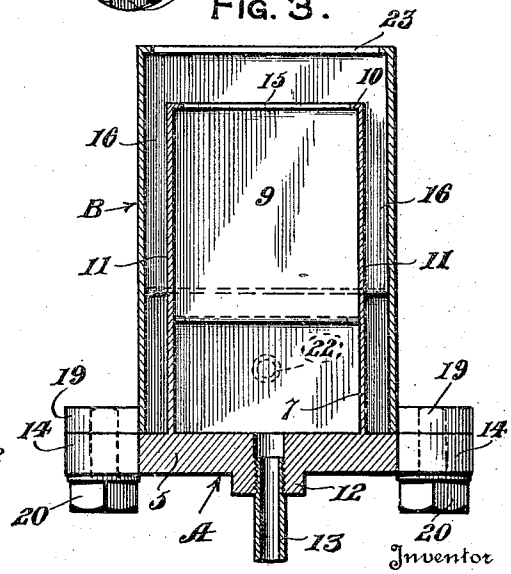


FIG. 3.



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UNITED STATES PATENT OFFICE.

JAMES N. GALBRAITH, OF MEXICO, MEXICO.

FUEL-OIL BURNER.

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To all whom it may concern:

Be it known that I, JAMES N. GALBRAITH, a citizen of the United States of America, residing at the city of Mexico, Mexico, have invented certain new and useful Improvements in Fuel-Oil Burners, of which the following is a specification.

This invention relates to new and useful improvements in oil burners for any of the industrial uses as well as for any and all purposes for which heat may be utilized.

I am well aware of the fact that there are many so called hydro-carbon or oil burners of various kinds and of varying degrees of efficiency. It is my belief, however, that there are many faults existing in not only the principles on which these burners have been based, but also in the matter of the construction of the same. In nearly all of such burners in which the fuel is atomized or sprayed from the burner, the cold fuel is fed to the spraying element in its original state, viscous or otherwise, which results in throwing into the fire box a mass of unatomized matter that remains unconsumed and which aids materially in clogging boiler tubes and connections, to say nothing of the economic loss.

It is an important object of this invention to provide a hydro-carbon burner in which the fuel is subjected to a heat treatment of oil within the burner and then thoroughly mixed with the heating medium employed to accomplish the said treatment.

A further object of the invention is to utilize a medium for heating the fuel while in the burner for the purpose of removing all viscosity and to cause the volatile gases to be liberated after which the said medium is thoroughly mixed with the heated and thinned fuel and gases. This highly heated mixture is then discharged into the fire box or furnace in a perfect degree of atomization insuring complete combustion.

A still further object of the invention is to provide a burner of the above mentioned type which is of simple construction, possessing no parts which could become out of order thereby insuring perfect service at all times, and one that may be placed on the market at a nominal cost.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawing forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a perspective view of the hydro-carbon burner embodying this invention completely assembled,

Figure 2 is a central vertical sectional view of the hydro-carbon burner set forth in Fig. 1, and

Figure 3 is a central vertical sectional view taken through the burner shown in Fig. 1 at right angles to the sectional view shown in Fig. 2.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of this invention, the designating character A indicates one of the two somewhat similarly formed units employed to constitute this burner, the said unit A comprising what I will term a heating chamber. Indicated by the character B is the second unit which is positioned exteriorly of the unit A when the said burner is completely assembled and constitutes a mixing chamber between the outer surface of the said heating chamber A and the inner surface of this mixing chamber unit B.

Referring first to the heating chamber unit A, it will be seen by closely inspecting the various views that a base plate 5 forms a part of this unit and is integrally formed with a shell member that constitutes the heating chamber 6, the said shell having a rectangularly-shaped lower portion 7 which is provided at the top of its end wall with inwardly directed flanges or shoulder portions 8 that are directly connected at their inner edges with the upwardly converging walls 9 which terminate at their upper edges in a relatively small flat top wall 10. The remaining two sides of this chamber or shell being of straight formation as best indicated by the numeral 11 in Fig. 3. Formed integrally with substantially the central portion of the rectangularly-shaped base 5 is a tubular boss 12 which is partially internally screw-threaded for receiving the heating medium feed pipe 13. Integrally formed with the four corners of this rectangularly-shaped base 5 are lug members 14 having centrally positioned therein screw receiving apertures as best shown in Fig. 3. The flange or shoulder portions 8 and flat top wall 10 are provided with longitudinally extending slots 15 for a purpose to be described hereafter.

The outer unit or mixing chamber B con-

sists of a shell or chamber of identically the same shape as the inner chamber 6 with the exception that all of the dimensions of the same are sufficiently greater to provide the mixing space 16 between the two shelves and shown in Figs. 2 and 3. This outer shell 17 is provided with a completely open lower end 18 as best shown in Figs. 2 and 3, there being provided, however, lugs 19 formed integrally with this outer shell 17 and properly positioned for matching with the lugs 14 formed on the base 5 which is a part of the heating chamber or inner unit A. These lugs 19 are provided with internally threaded apertures which vertically aline with the apertures formed in the lugs 14 for the purpose of receiving the screws 20 threaded therein which will properly connect the units A and B in the positions as shown in Figs. 2 and 3. The outer shell 17 is provided in one of its vertical walls forming a portion of the lower part of the same with an integrally formed boss 21 which is provided with a centrally positioned internally threaded aperture for receiving the fuel feeding pipe 22 threadedly inserted therein. The top flat wall of this outer shell 17 is provided with a single longitudinally extending elongated slot 23, as shown in the various views.

The operation of the burner is as follows:—

A heating medium such as steam is fed into the heating chamber 6 through the pipe 13. The hydro-carbon to be burned is fed into the mixing chamber 16 through the pipe 22. The passing of this hydro-carbon or fuel upwardly through the mixing chamber 16 will cause the same to be heated due to its contacting with the heated walls of the inner chamber 6. The cold fuel will be heated by this treatment to a degree at which all viscosity is removed and in which it liberates its volatile gases. The steam fed into the inner chamber 6 will escape into the mixing chamber 16 through the slots 15 wherein it will thoroughly mix with the heated and thinned oil and gases in the said chamber 16. This highly heated mixture will be discharged through the elongated slot 23 formed in the outer shell 17 into the fire box or furnace, in a perfect degree of atomization insuring complete combustion.

By the use of this burner, the economy in both fuel as well as steam is very pronounced, due to the practically perfect atomization of the fuel and its liberated gases by means of the scientific application of steam and the final discharge into the fire box of a highly heated mixture of particles or steam, oil, and its gases, insuring perfect combustion, a high degree of heating power, freedom from carbon, and from waste of unconsumed oil.

It is to be understood that the form of this invention herewith shown and described is to be taken as the preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:—

1. In a burner of the type described, a heating chamber, a mixing chamber surrounding said heating chamber, inlets for said chambers, said chambers each having a plurality of walls extending at right angles to its axis, said heating chamber having a discharge in each of said walls, and said mixing chamber having a discharge in one of said walls only.

2. In a burner of the type described, a heating chamber, a mixing chamber surrounding said heating chamber, said chambers each having an inlet, a plurality of walls extending at right angles to the common axis of said burner formed in each of said chambers, one of said walls in the outer chamber overlying one of said walls in the inner chamber, said heating chamber having a discharge in each of said walls, and said mixing chamber having a discharge in the wall overlying one of the said walls in the heating chamber.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

JAMES N. GALBRAITH.

Witnesses:

O. H. JARRETT,

ERNEST E. EVANS.