J. NEEDHAM.

HYDROCARBON BURNER.

APPLICATION FILED AUG. 18, 1919.

1,346,134. Patented July 13, 1920.

FIG. 1.

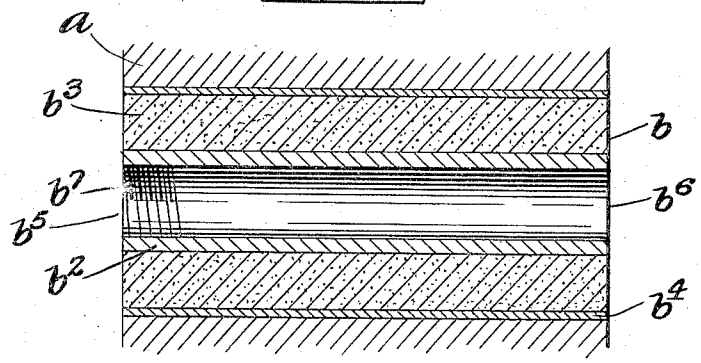


FIG. 2.

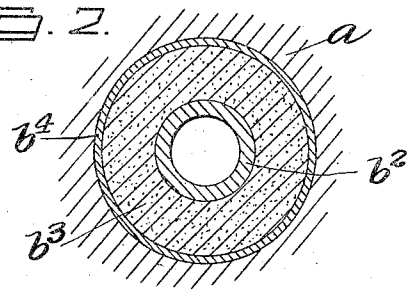


FIG. 3.

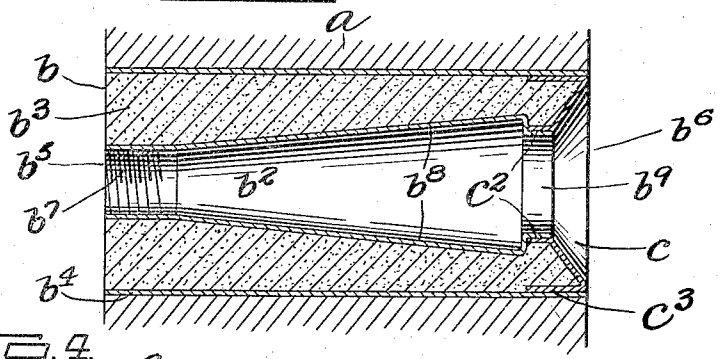
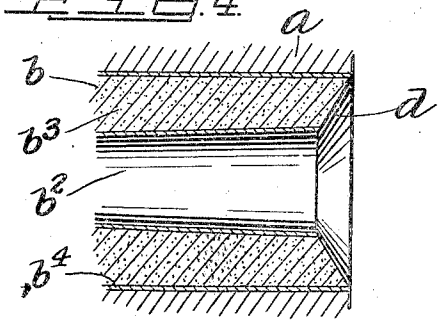


FIG. 4.



Inventor

Joseph Needham,

By his Attorneys

Edgar Tate & Co.

UNITED STATES PATENT OFFICE.

JOSEPH NEEDHAM, OF NEW YORK, N. Y.

HYDROCARBON-BURNER.

1,346,134. Specification of Letters Patent. Patented July 13, 1920.

Application filed August 18, 1919. Serial No. 318,092.

To all whom it may concern:

Be it known that I, JOSEPH NEEDHAM, a citizen of the United States, and residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to what are known as hydrocarbon burners, and particularly to devices of this class designed for use in, or in connection with, furnaces and other heat using appliances or apparatus where a high degree of heat is required, and which use hydrocarbon burners; and the invention relates particularly to the nozzle or means employed for discharging the hydrocarbon, or hydrocarbon mixture, into the furnace or other heat using appliance or apparatus; and the object of the invention is to provide an improved device of this class which is simple in construction and use, and which will be efficient in operation, and will also be strong and durable in its resistance to high degrees of heat, and which will not get out of order or frequently need repair; and with this and other objects in view the invention consists in a device of the class specified, constructed and operating as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Figure 1 is a central longitudinal section of one form of my improved hydrocarbon burner nozzle and showing it embedded in the wall of a furnace;

Fig. 2 a transverse sectional view of the device as shown in Fig. 1;

Fig. 3 a view similar to Fig. 1 but showing a modification; and,

Fig. 4 a similar view showing another modification.

In the accompanying drawing, reference being made to Figs. 1 and 2, I have shown one form of my improved hydro-carbon burner nozzle for use in connection with furnaces or other devices or apparatus employing hydrocarbon fuel, and said nozzle is shown embedded in the front wall *a* of a furnace.

The nozzle *b* comprises a central tube b^2 composed of chrome steel or other material capable of sustaining without destruction a high degree of heat, and the tube b^2 is inclosed in a casing b^3 of asbestos or similar material which will operate as a non-conductor of heat, and which will not be quickly destroyed by high degrees of heat, and the casing b^3 is inclosed in a tube or shell b^4, preferably of Swedish iron, or other metal capable of withstanding a high degree of heat.

In the use of this device it is inserted into, embedded in, or secured in the front wall of a furnace or other heating apparatus or appliance using hydrocarbon fuels, and the end b^5 of the device is the receiving end and the end b^6 the furnace or discharge end.

The receiving end of the central tube b^2 of the device is preferably threaded as shown at b^7, and any suitable burner head or similar device may be employed and connected with the nozzle device for supplying hydrocarbon or hydrocarbon mixtures to the nozzle device, and for this purpose burner heads or hydrocarbon or hydrocarbon mixtures may be supplied to the nozzle device under pressure.

With this construction the central tube b^2 of the nozzle device will be kept comparatively cool by the constant inflow thereinto and discharge therefrom of the liquid fuel, hydrocarbon or hydrocarbon mixtures and the passage of such fuel through the nozzle device will prevent pre-ignition or the burning of the gases or liquid fuels in the nozzle device, and the life of said device in use will thus be prolonged indefinitely, this result being also aided and facilitated by the non-heat conducting casing b^3 of the central tube b^2 of the device.

The construction shown in Figs. 3 and 4 of the drawing is approximately similar to that shown in Figs. 1 and 2, the difference or exceptions being in the form, construction and arrangement of the central tubular member b^2 of the nozzle device and particularly the discharge end thereof.

In the form of construction shown in Fig. 3 the central tubular member b^2 is gradually enlarged in the direction of the discharge end thereof as shown at b^8, and the discharge end is contracted to form a neck or throat member b^9 with which is connected a flaring or conical-shaped mouthpiece *c* provided at its apex with a collar c^2 into which the

neck b^9 is inserted and at its base or discharge end with a flange or rim c^3 which fits in the tubular casing b^4 as clearly shown.

In this form of construction, the asbestos casing b^3 and the metal shell or casing b^4 are also employed the same as in Figs. 1 and 2, and the use of this form of nozzle will be the same as the use of the form shown in Figs. 1 and 2.

The part c and the central tubular member b^2 are both composed of material that will withstand a high degree of heat and the objects of the flaring or conical mouthpiece c in connection with the reduced neck at the discharge end of the central tubular member b^2 are to protect the asbestos casing b^3 at the discharge end of the nozzle and to aid in the control of the discharge of the hydrocarbon mixture or mixtures into the furnace under pressure, and by means of this particular construction, or the shape or form of the parts b^9 and c, the form of the gaseous body discharged into the furnace may be controlled as well as the point or points at which combustion actually takes place with reference to the discharge end of the nozzle, said point or points being brought closer to, or at a greater distance from the discharge end of the nozzle according to the pressure with which the hydrocarbon mixture is discharged into and through the nozzle device, and the passage of said mixture or material through the nozzle device under pressure also aids, in this form of construction shown, to reduce the temperature of the central tubular member b^2 or prevent the same from becoming overheated.

In the construction shown in Fig. 4, the discharge end of the nozzle is flaring or conical in form as shown at d, but the cap or mouthpiece c is not employed, and in this form of construction the central tubular member b^2 is gradually enlarged from the receiving end thereof to the discharge end, and the operation of this form of construction, or the results produced by the use thereof will be approximately the same as with the construction shown in Fig. 3.

My invention is not limited to any particular method of, or means for, connecting the nozzle device with the front wall of a furnace or other apparatus, or appliance for using liquid hydrocarbon mixtures as fuel, nor is the invention limited to any particular form of bunrer head or other device or apparatus for supplying the mixture to the nozzle device, and any suitable device or apparatus of this class may be employed, and while I have shown the form of construction which I prefer for carrying my invention into effect, the invention is not limited to the details of construction herein shown and described, and changes therein and modifications thereof may be made, within the scope of the appended claims, without departing from the spirit of the invention or sacrificing its advantages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A hydrocarbon fuel nozzle for use in connection with hydrocarbon fuel furnaces or similar apparatus, said nozzle comprising a central tubular member having inlet and discharge ends, a metallic shell inclosing said tubular member, and a casing of asbestos or similar material between said member and said shell and extending approximately the full length thereof.

2. A device of the class described comprising a central tubular member having inlet and discharge ends and inclosed in a casing of non-heat conducting material and provided with a flaring mouth or discharge opening, having a metallic facing.

3. A hydrocarbon burner device for use in connection with furnaces or similar apparatus comprising a metallic shell adapted to be mounted in the furnace wall, a non-heat conducting lining in said shell and extending the full length thereof and a tubular member in said lining.

4. A device of the class described comprising a tubular member which tapers from the inlet to the discharge end thereof, a casing composed of non-heat conducting material inclosing said tube and provided with a flaring discharge, and a metallic shell inclosing said casing.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 11th day of August, 1919.

JOSEPH NEEDHAM.

Witnesses:
C. E. MULREANY,
H. E. THOMPSON.