No. 745,799. PATENTED DEC. 1, 1903.

J. R. DONNELLY.

OIL BURNER.

APPLICATION FILED APR. 12, 1899. RENEWED DEC. 24, 1901.

NO MODEL.

Fig. 1.

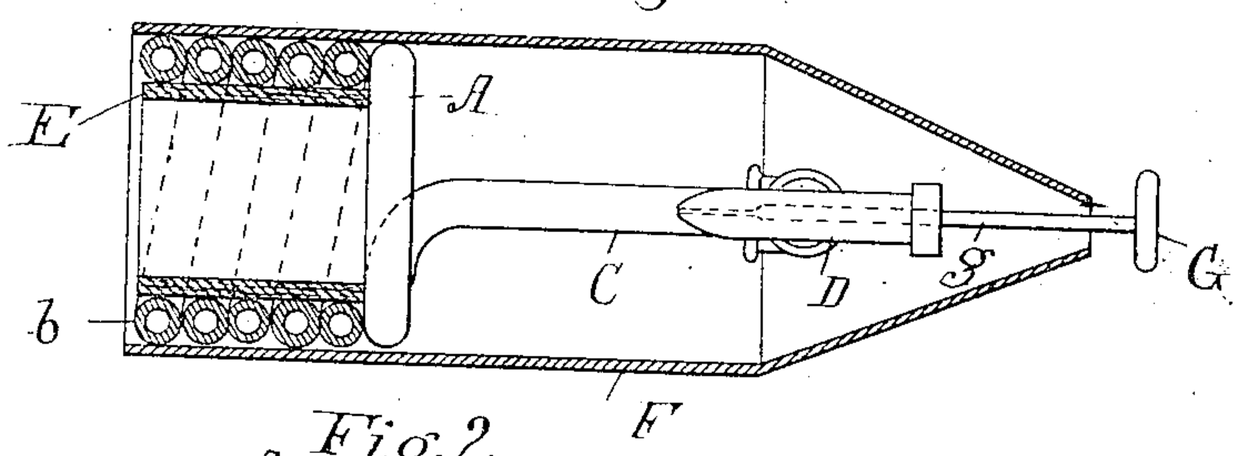
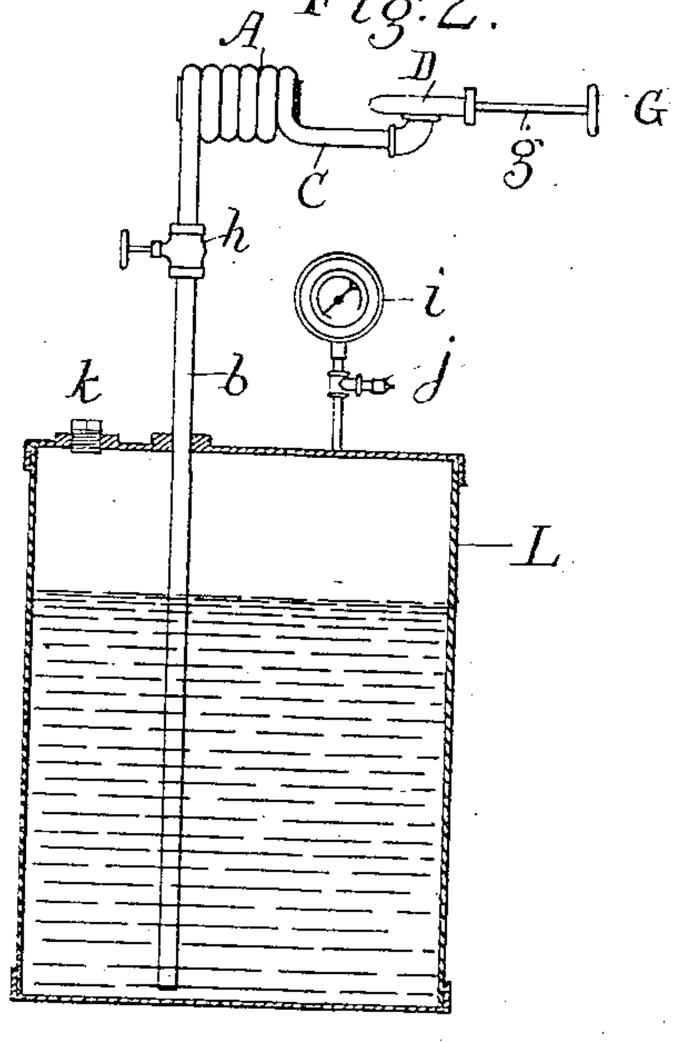


Fig. 2.



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No. 745,799. Patented December 1, 1903.

UNITED STATES PATENT OFFICE.

JOHN R. DONNELLY, OF FAIRFIELD, MAINE.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 745,799, dated December 1, 1903.

Application filed April 12, 1899. Renewed December 24, 1901. Serial No. 87,138. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. DONNELLY, a citizen of the United States of America, and a resident of Fairfield, Somerset county, State of Maine, have invented certain new and useful Improvements in Oil-Burners, of which the following is a specification.

My invention relates to vaporizing oil-burners, such as are used for burning liquid hydrocarbons, and it is particularly designed for burning kerosene, fuel-oil, and other heavy hydrocarbons rich in carbon without decomposing the oil-vapor and depositing carbon in the vaporizing-chamber.

A further object of the invention is to produce a reducing-flame of suitable form and having a sufficiently high degree of heat for brazing purposes and for other similar uses.

These burners consist of a vaporizing-chamber, which is generally in the form of a coil, connecting with an oil-supply under pressure, and the vapor generated in the coil is delivered through a vapor-discharge nozzle or burner of suitable form, producing a flame from the heat of which the vaporizing-coil becomes sufficiently heated to convert its contents into an unstable gas or vapor. Hitherto these coils or vaporizers have been so constructed that they were either wholly or partially in contact with the flame at all times, and the result was that when burning the heavy hydrocarbons a distillation or decomposition of the oil took place within the vaporizing-chamber, depositing carbon, clogging up the needle-valve, and filling up the vaporizing-chamber. Innumerable attempts have thus been made to burn heavy oils in this type of burners, but none have come into successful and general use.

My invention is founded on the idea of keeping the vaporizer down to a temperature as low as possible consistent with forming the necessary vapor by interposing between the flame and the vaporizer an insulating protecting-covering by which the vaporizor is protected at all points from coming within the sphere of combustion of the flame and so becoming overheated, and I have found from experience that when the coil is thus kept as cool as possible I not only prevent carbonization in the coil, but I add greatly to the heat-producing qualities of the vapor.

In the accompanying drawings I illustrate a burner which is well adapted to carry out my invention, the burner being specially designed for brazing and other similar work wherein a very hot highly-concentrated reducing-flame is necessary.

In the drawings, Figure 1 is a part-horizontal section through the burner, the casing being shown entirely in section; and Fig. 2 is a vertical elevation and section, showing the burner connected with the oil-tank.

A represents the vaporizing-chamber, which is here shown in the form of a cylindrical coil connecting at one end with the supply-pipe *b*, which leads from the bottom of the oil-tank L. The oil-tank L is a closed tank, and pressure is put on the oil by suitable means, so that it is under pressure when it reaches the coil. The coil connects with a vapor-discharging nozzle or burner D by means of the pipe *b*, and this nozzle is shown as being controlled by a suitable needle-valve having the valve-stem *g* and the handle G.

The coil A forms within itself a cylindrical combustion-chamber, and the nozzle D is so located as to direct a jet of flame longitudinally through said combustion-chamber.

For the purpose of preventing the coil from becoming overheated by the flame I interpose between the flame and the coil an insulating and protecting covering, by which the flame is protected from coming in contact with the coil at any point. In the burner here shown I line the combustion-chamber with a lining or bushing composed of fire-clay, asbestos, or other suitable refractory material which is a sufficiently good non-conductor of heat to protect the coil from becoming overheated.

A supply-valve *h* is provided in the pipe *b* for controlling the passage of the oil to the vaporizer, and the tank L is provided with a pressure-gage *i* and an air connection *j*, through which air may be pumped into the tank. A plug *k* is inserted in the tank for the purpose of introducing oil into the tank.

When the burner is to be used in exposed places, I inclose it in a suitable casing F. This casing keeps the wind from blowing out the flame and coil from becoming too cold, and it admits air to be mixed with the vapor either around the valve-stem, as here shown, or by other suitable openings.

In operating the burner the coil is first heated by some suitable external means, as by the application of an alcohol flame, and the needle-valve is opened, allowing the vapor mixed with air to pass into and through the combustion-chamber. The flame is forced through the combustion-chamber at a high velocity, heating the inner surface of the refractory bushing to an incandescent state and being projected into the atmosphere, forming a tongue of flame beyond the bushing which is intensely hot and is well adapted to brazing, heating, soldering coppers, and other like purposes. The refractory bushing allows sufficient heat to pass through to the coil to keep up the vaporization of the oil, but not enough to overheat the oil, and as the inner surface is at a red heat it regenerates and keeps up the heat of the flame to the combustion-point.

The thickness of the refractory bushing is regulated to produce just the proper temperature in the coil to vaporize without decomposing the oil. I find with a burner thus constructed that I am able to burn kerosene and even crude petroleum without any carbon whatever being deposited in the coil, the large surface exposed to the comparatively low temperature completely volatilizing all the elements of the oil.

The flame can be exactly regulated by means of the needle-valve and can be run wide open or turned down to small proportions.

It is evident that the form of the burner can be varied from the one here shown by way of illustration without departing from the spirit of my invention, which consists, broadly, in the complete insulation of the vaporizing-coil from the flame, so that it will not be in contact with the flame at any point, for I have found from experience that if the vaporizer is exposed to the flame at any point, be it ever so small, a deposit of carbon takes place at that point, which eventually fills up the coil and obstructs the flow of vapor through the needle-valve.

It is obvious that changes in the construction and specific arrangement can be made without departing from the nature and principle of the invention.

I claim—

1. In an oil-burner, the combination of a coil connected with a source of oil-supply under pressure, a lining for said coil composed of refractory and non-heat-conducting material forming a combustion-chamber and a vapor-discharge nozzle connected with said coil and adapted to discharge vapor into said combustion-chamber.

2. In an oil-burner, the combination of a coil connected with a source of oil-supply under pressure, a lining for said coil composed of asbestos and forming a combustion-chamber and a vapor-discharge nozzle connected with said coil and adapted to discharge vapor into said combustion-chamber.

3. In an oil-burner, the combination of a coil connected with a source of oil-supply under pressure, a lining for said coil composed of a refractory and non-heat-conducting material forming a combustion-chamber and a burner-head for discharging burning vapor into said combustion-chamber.

Signed by me at Fairfield, Maine, this 8th day of March, 1899.

JOHN R. DONNELLY.

Witnesses:
F. E. MCFADDEN,
H. O. BROWN.