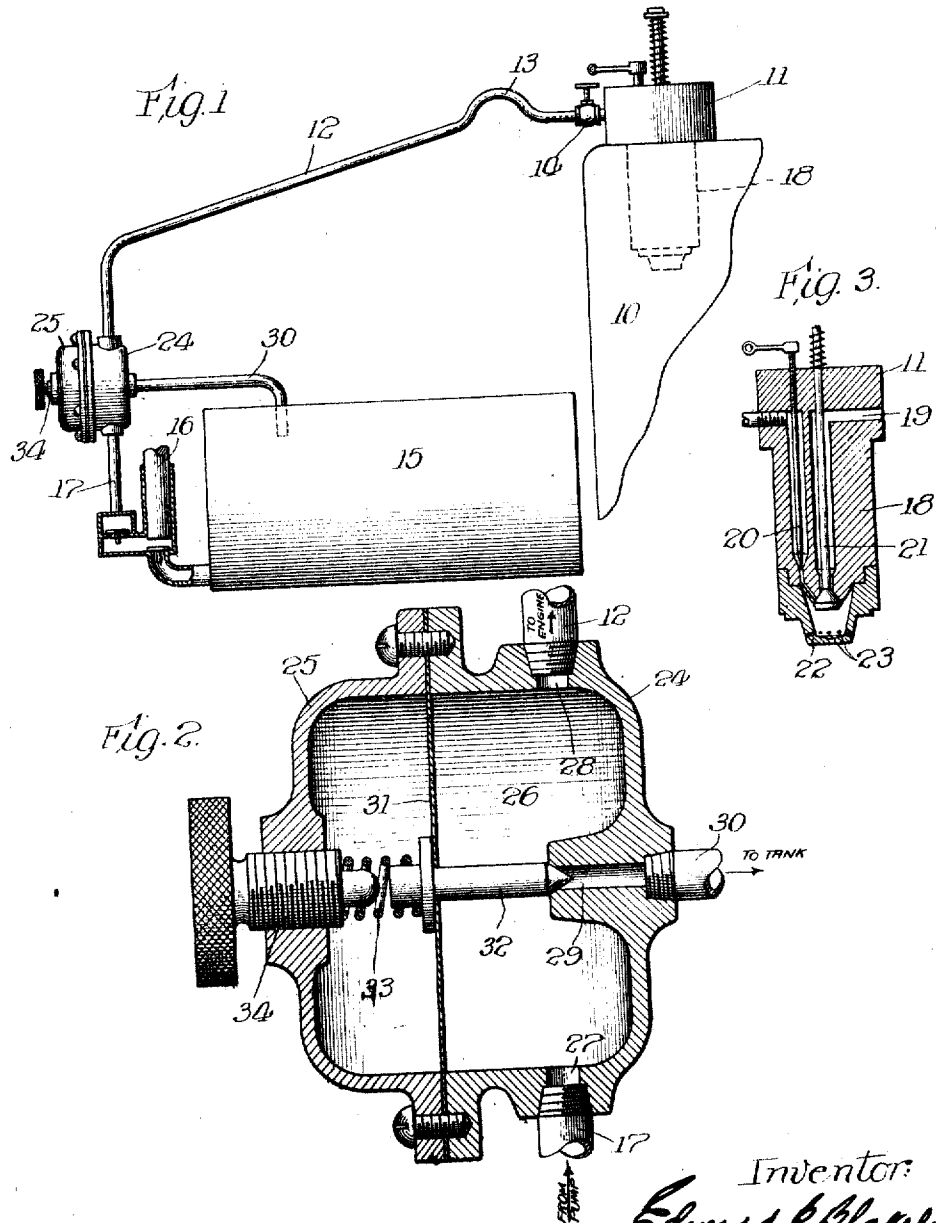


E. B. BLAKELY.
LIQUID FUEL FEED.
APPLICATION FILED JUNE 13, 1919.

Patented Feb. 15, 1921.

1,368,475.



Witness:
A. J. Sauer.

Inventor:
Edwards & Blakely
By Geo. T. Murray atty.

UNITED STATES PATENT OFFICE.

EDWARD B. BLAKELY, OF CHICAGO, ILLINOIS, ASSIGNOR TO R. M. HVID COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF MICHIGAN.

LIQUID-FUEL FEED.

1,368,475.

Specification of Letters Patent.

Patented Feb. 15, 1921.

Application filed June 13, 1919. Serial No. 303,838.

To all whom it may concern:

Be it known that I, EDWARD B. BLAKELY, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Liquid-Fuel Feeds, of which the following is a specification.

My invention relates to fuel feeding devices for hydro-carbon engines and particularly to means adapted to be associated with oil engines of the type in which liquid fuel is fed directly to the cylinders.

In engines of the type described and particularly those of the Hvid type, such as shown in Patents Nos. 1,245,312, of Nov. 6, 1919, to Blakely, and 1,283,197, of Oct. 29, 1919, to Hvid, the fuel in liquid form is delivered by gravity to the igniting device where it is suitably disposed of in order to secure the highest efficiency. In engines of this type the entrance of the liquid fuel to the ignition cup is controlled primarily by a needle valve and secondarily, by a puppet valve, the latter valve being opened in consonance with the main intake valve. It sometimes happens that an engine stops at a point where the puppet valve is open, with the result that the auxiliary supply of oil which is maintained in an elevated container, escapes past the needle valve into the cup and finally into the cylinder with the result that upon attempting to start the engine considerable damage is likely to be incurred.

To obviate this I have provided means whereby a constant supply of fuel is provided, and yet in which there is no reserve amount of oil which may escape in the manner described. Particularly in multi-cylinder engines, a pump is commonly provided for elevating the oil to the gravity tank, the over-flow returning to the main tank. This pump is utilized in the present design but no elevated tank is employed. A casing is provided having inlet, outlet and over-flow openings, the over-flow being controlled by a valve carried by a diaphragm, the arrangement being such that whenever pressure is exerted by the liquid within the casing the diaphragm is moved and the over-flow valve opened, with the result that a constant supply of oil is maintained within the casing. If, however, the engine should stop, the pressure is immediately reduced in

the casing to a point at which the over-flow valve is closed and the casing is kept full of oil. Immediately on the starting of the engine the operation continues as before.

The invention will be more readily understood by reference to the accompanying drawings, wherein,

Figure 1 is an elevation somewhat diagrammatic in form, showing a preferred arrangement of my controlling device;

Fig. 2 is an enlarged vertical sectional view through the controlling device, and,

Fig. 3 is a longitudinal sectional view through an igniting device of the Hvid type.

In the drawings it will be seen that the engine indicated at 10, is provided with an igniting device 11, a sectional view of which is shown in Fig. 3. Fuel is supplied to the device by means of a tube 12, having a bend or goose-neck 13, therein and which may or may not be provided with a valve 14. The main supply of fuel is carried in a tank 15, and is withdrawn therefrom by means of a pump 16, and discharged through the pipe 17 into the lower or inlet opening of the controlling device which forms the subject matter of this invention.

The igniting device, as shown in Fig. 3, is in the form of a plug 18, and is provided with a small air inlet opening 19, a needle valve 20, which primarily controls the amount of liquid fuel, a puppet valve 21, adapted to be opened on the suction stroke of the engine by a suitable means not shown, and an igniting cup 22, having small escape apertures 23, all for the purpose fully set forth in the patents heretofore referred to. It will be seen that if the engine is stopped in such condition that the puppet valve 21, is in open position, any liquid fuel contained in an elevated tank will drain into the cylinders with the objectionable features heretofore noted.

In order to obviate this difficulty I provide the device best shown in Fig. 2, which is in the form of a casing composed of two halves 24, 25, suitably joined by means of flanges and screws, thereby providing a space 26, having an inlet 27, an outlet 28, to the pipe 12, and an over-flow outlet 29, which connects to the pipe 30, and serves to discharge excess oil into the tank 15. The space 26, is divided by means of a diaphragm 31, clamped between the two halves of the cas-

ing and supporting a valve 32, which controls the over-flow outlet 29. A spring 33, bears against the diaphragm, the pressure exerted being controlled by means of an adjusting thumb-screw 34. The adjusting device is provided in order to suitably control the delivery of different fuel oils. The Hvid engines are adapted to burn heavy oils such as crude petroleum as well as the lighter hydrocarbons and as these oils have different degrees of viscosity, a greater or less degree of pressure is required in order to elevate the same and overcome the surface tension developed in the passages to the point of use.

15 The device operates as follows: Assuming the engine in operation, the pump will deliver a constant supply of liquid into the chamber 26. Such quantity as is necessary for combustion will be delivered through the pipe 12, to the igniting device. However, as any material pressure develops within the chamber, the diaphragm 31, will be deflected and the over-flow outlet 29 opened, thus permitting the excess of oil to return to the tank. Should the engine be stopped, the pressure will immediately be reduced and the over-flow outlet closed, thus trapping the oil contained within the chamber 26. Upon resumption of operations the first stroke of the pump will again serve to deliver fuel to the igniting device. I provide the bend in the pipe 13, in order that there may be a small quantity of oil retained in the pipe and connections, an amount being provided at least sufficient to carry the engine over several cycles. This is a safety feature and is not essential in practice.

Obviously the exact form and arrangement of the parts is not essential to secure desirable results and modifications may be made in the construction shown without departure from the spirit of my invention.

I claim:

1. In a device for feeding liquid fuel to hydrocarbon engines, the combination of a liquid fuel igniting device, a tank located below the level of the igniting device, a pump for elevating liquid fuel, a controlling device connected to the pump and igniting device and located at a point below the latter, said controlling device including a casing having a spring-pressed, valve-controlled over-flow outlet, and means for trapping liquid fuel within the casing when the pump is stopped, substantially as described.

2. In a liquid fuel feeding device for hydrocarbon engines, the combination with the engine of a liquid fuel igniting device, a tank, a pipe connecting the tank and the igniting device, a pump, and a controlling device located in said pipe, the tank and controlling device being located below the level of the igniting device, said controlling device including means for maintaining a constant pressure within the pipe and for trapping liquid fuel within the pipe between the engine and controlling device when the engine is stopped, substantially as described.

3. In a fuel controlling device for hydrocarbon engines, the combination with the engine of an igniting device, an oil supply tank located at a point below the igniting device, a pump for elevating oil, and means in the form of a pressure reducing device for maintaining a constant low pressure within the pipe during the operation of the engine and for trapping liquid fuel in the pipe when the engine is stopped, substantially as described.

Signed at Chicago, Ill., this 9th day of 80 June, 1919.

EDWARD B. BLAKELY.

Witness:

T. D. BUTLER.