

May 31, 1932.

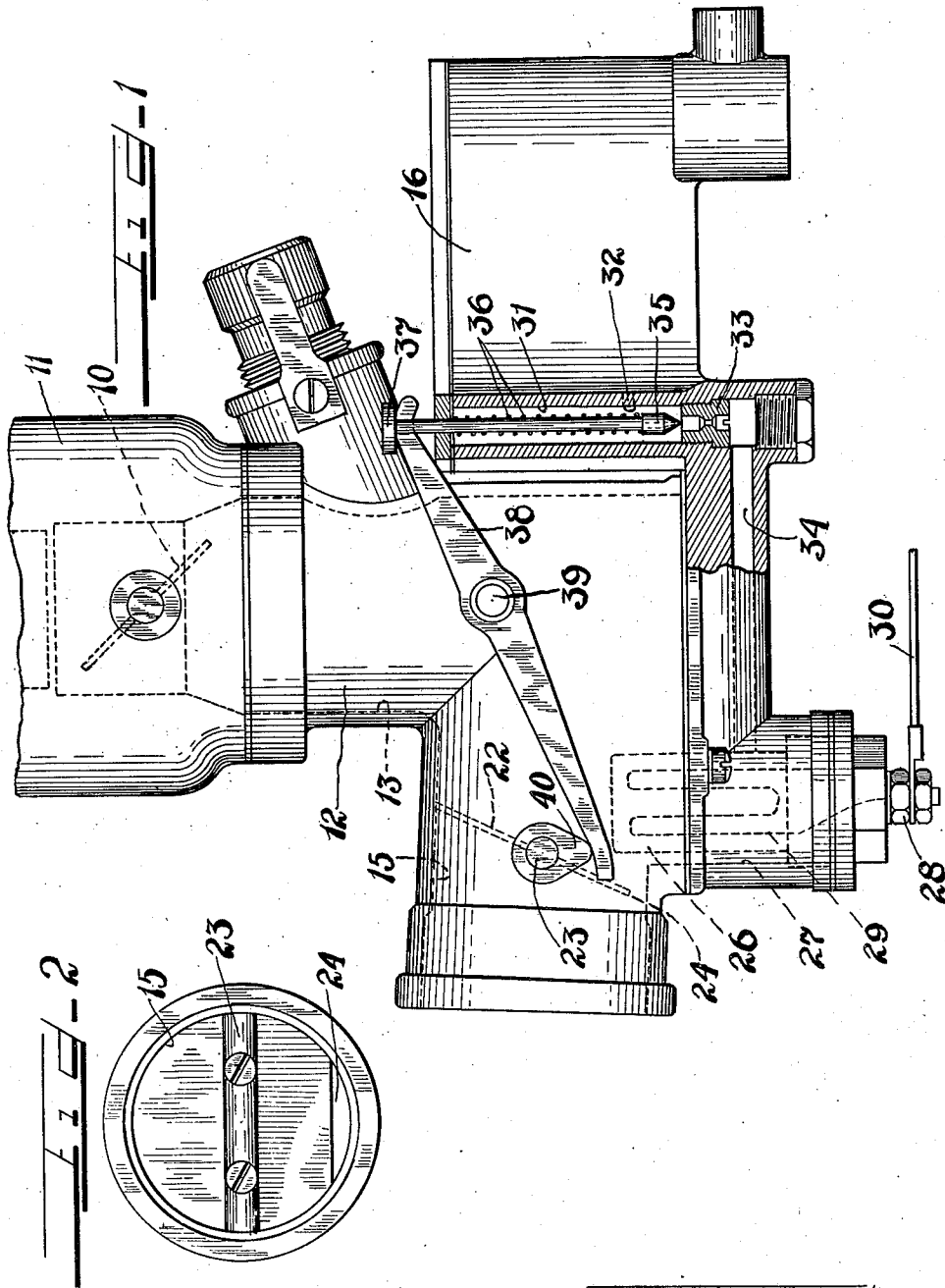
D. FIRTH

1,860,356

STARTING SYSTEM

Filed June 7, 1929

2 Sheets-Sheet 1



INVENTOR
David Firth
By Charles H. Kelly ATTORNEY

May 31, 1932.

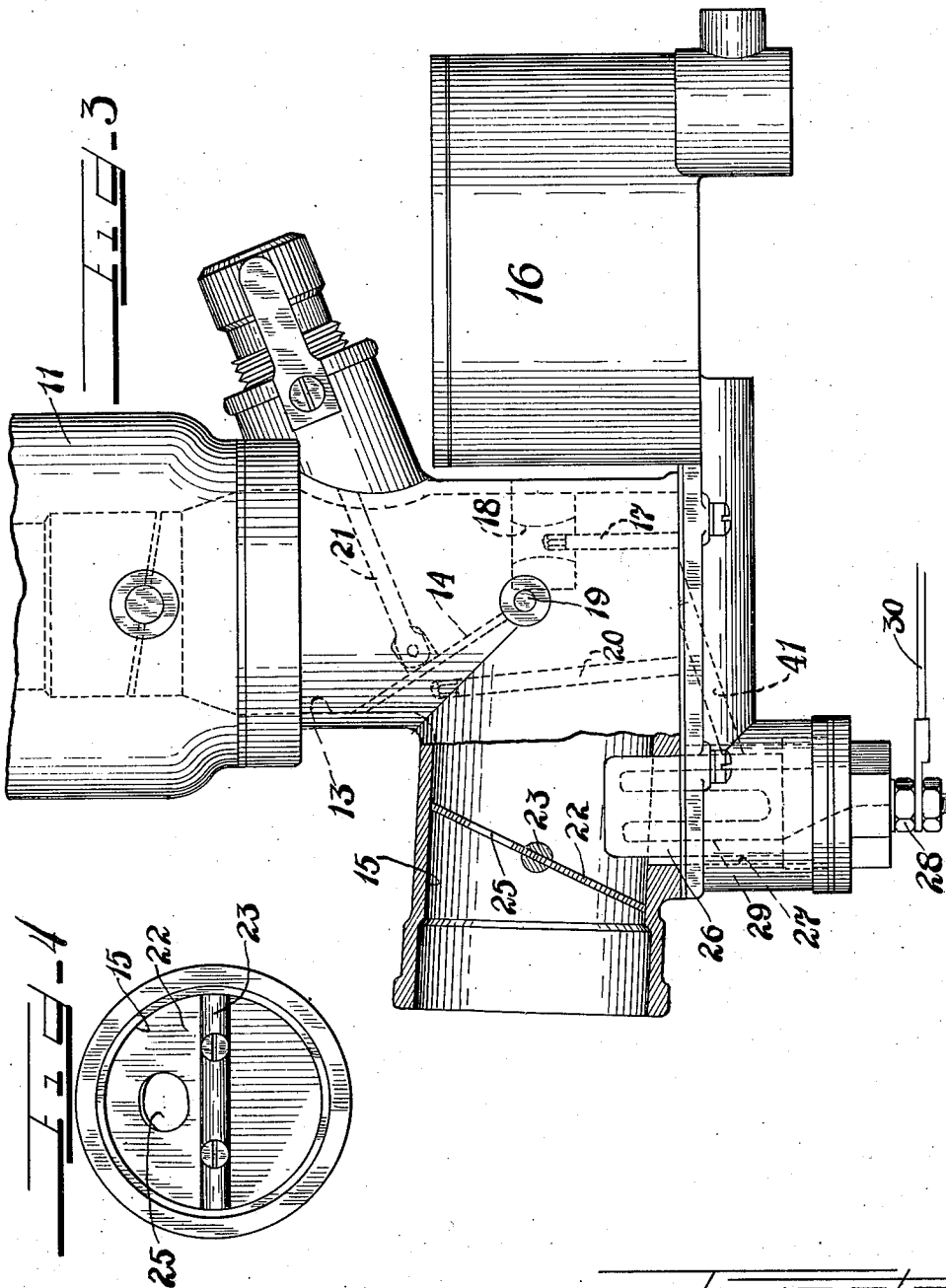
D. FIRTH

1,860,356

STARTING SYSTEM

Filed June 7, 1929

2 Sheets-Sheet 2



Inventor
David Firth
Charles M. Kelly
Attys

UNITED STATES PATENT OFFICE

DAVID FIRTH, OF FLINT, MICHIGAN, ASSIGNOR TO MARVEL CARBURETER COMPANY,
OF FLINT, MICHIGAN, A CORPORATION OF ILLINOIS

STARTING SYSTEM

Application filed June 7, 1929. Serial No. 369,029.

This invention relates to carburetion devices adapted to assist in starting a cold engine, and more particularly relates to the installation of a fuel vaporizer in association with a carbureter together with means for supplying fuel to said vaporizer when operating conditions are such as to render starting materially easier when the fuel vaporizer is in operation.

The principal object of my invention is to provide a simple, and improved installation of a fuel vaporizer or heated primer in association with the customary forms of carbureters, the fuel vaporizer being provided to render starting easier under cold conditions by providing a dry mixture of air with fuel vapors driven off of fuel by the aid of heating devices controllable at the will of the operator.

A further object of this invention is to provide a fuel vaporizer in association with the usual carbureters together with means to supply fuel to said vaporizer under extreme starting conditions which necessitate the full use of a choke valve such as is commonly used to increase the suction within the carbureter, to assist in the delivery of fuel therefrom.

It is also an object of this invention to provide a fuel vaporizer mounted in a carbureter embodying a fuel supply therefor which is controlled by the usual choke valve to admit a small supply of air for mixing with the fuel vapor to assure a combustible mixture.

Other and further important objects of this invention will be apparent from the disclosures in the specification and accompanying drawings.

The invention (in a preferred form) is illustrated on the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a side elevation of a carbureter partly broken away to disclose an embodiment of the present invention.

Figure 2 is a side view of the air inlet to the carbureter of Figure 1.

Figure 3 is another embodiment disclosing a modified form of this invention.

Figure 4 is a side view of the air inlet of Figure 3 which is interchangeable with Figure 2.

As shown on the drawings:

The carbureter chosen to illustrate the present invention is conventionally shown on Figures 1 and 3 wherein a throttle valve 10 is mounted in a jacketed portion of the intake manifold 11, a carbureter body 12 being mounted therebeneath and essentially comprising a mixture passage 13, controlled by a flap air inlet passage 15, and a fuel supply chamber 16.

Further details of the carbureter, shown in dotted lines in Figure 3, comprise a low speed fuel jet 17 discharging at the throat of a primary venturi 18, which forms a bypass to one side of the hinge 19 of the flap valve. A high speed nozzle 20 is also shown, so positioned as to be subjected to the air flow past the tip of the air valve 14 when the latter is opened by manifold suction acting against the push of a link 21. This structure may be briefly referred to as a somewhat conventionalized showing of a well known commercial form of air valve carbureter.

The air inlet passage 15 contains a butterfly choke valve 22 mounted on a shaft 23. In order to supply a limited amount of air when the choke valve is closed, a segment 24 of the valve is shown as cut away in Figure 2 while the same object is obtained in Figure 4 by an orifice 25. This air supply is necessary to form a combustible mixture with the vaporized fuel given off by a fuel vaporizer 26 shown as mounted in a well or sump 27 in the floor of the air inlet passage to the right of the choke valve in Figures 1 and 3. This vaporizer, as shown is of the electric resistance type having an insulated terminal 28 to which one end of a resistance or heating element 29 is attached, the other end of the element being grounded. Electric current for the heating element is supplied by a wire 30. It is not to be understood that the heating element is in constant use, details of the electrical control therefor being omitted, as a number of arrangements are already known, such as a combination with the choker or starter control or a separate control switch adjacent the

operator, as a vaporizer of this general type is provided primarily to assist in starting a cold engine.

In Figure 1 fuel from the fuel chamber flows into a well 31 through a port 32, the well having an orifice plug 33 limiting the flow of fuel from the well into a passage 34 leading to the vaporizer well or sump. A valve 35 is seated in the plug 33 by a spring 36 to shut off the fuel, the upper end of the valve stem carrying a head 37 under which one end of a lever 38 engages. This lever is pivoted at 39 and its other end is engaged by a cam 40 on the choke valve shaft 23, the cam being so positioned as to depress the contacting end of the lever 38 when the choke valve is in its fully closed position, thus unseating the valve 35.

In Figure 2 fuel is supplied to the vaporizer through a passage 41 which serves to drain fuel from the floor of the air inlet and mixture passage. In this modification the orifice in the choke valve is so proportioned as to lower the suction in the carbureter, at low cranking speeds, to a degree that is too low to raise fuel from the fuel jets into the intake manifold; however the suction in the carbureter below the throttle is sufficient to raise fuel out of the low speed jet or nozzle, which fuel drips back to the floor of the mixture passage and through the drain passage 41 into the well or sump in which the heating element or vaporizer is located.

Both embodiments of the invention operate in the same manner except for the supply of fuel to the vaporizer. When the choke valve is closed and the heating element is energized the small amount of air entering through the choke valve aperture is mixed with the fumes or vapors driven off by the heated vaporizer and the result is a rich and dry combustible mixture which materially assists in starting a cold engine because the dry mixture is stable and hence readily and evenly distributed to the various cylinders.

In the modification of the invention shown in Figures 1 and 2, the restricted orifice plug 33 limits the flow of fuel to the vaporizer to prevent flooding of the vaporizer. With the fuel flow limited to the vapor generating capacity of the vaporizer the action will be much more rapid as the cooling effect of a surplus supply of fuel is eliminated. The fuel supply to the vaporizer is also entirely cut off except when the choke valve is fully closed, so that when starting a warm engine, or under other conditions wherein a full choking effect is not required, the vaporizer will remain inoperative and no flooding or overflow of fuel will occur.

It will thus be seen that I have provided an improved and simplified starting system including a simple and reliable fuel vaporizer installation adapted to assist in starting a cold engine.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted, otherwise than necessitated by the prior art.

I claim as my invention:

1. In a carbureter, an electric fuel vaporizer, a choke valve, means for supplying fuel to said vaporizer when said valve is closed, and a port in said valve for supplying a limited amount of air to mix with the vapor given off by said vaporizer.
2. In a carbureter, a fuel vaporizer adapted to supply vaporized fuel to assist in starting a cold engine, a choke valve having a port therein to admit air to mix with said vaporized fuel when said valve is closed, and fuel supply means for said fuel vaporizer adapted to be controlled by said choke valve.
3. The combination with a carbureter of a fuel vaporizing device comprising means for heating and delivering fuel vapor to the carbureter, an air inlet formed in the usual carbureter choke valve for supplying air to be mixed with said fuel vapor, and means actuated by said choke valve for supplying fuel to said vaporizing device when said choke valve is closed.
4. In combination with a carbureter, a fuel vaporizer, a choke valve adapted to admit a limited supply of air to said vaporizer when the valve is closed, and means actuated by the closing of said valve for supplying fuel to said vaporizer.
5. The combination of a carbureter having an air inlet controlled by a choke valve, of a fuel vaporizer comprising a fuel reservoir provided with a heating coil, and means operated by the closing of said choke valve for supplying fuel to the reservoir of said vaporizer.
6. In combination with a carbureter, means for restricting the supply of air thereto for starting purposes, a fuel vaporizer associated with said carbureter and means for supplying fuel thereto when said air restricting means is in operative position.
7. In a carbureter, including an air inlet and a choke valve therefor, a fuel vaporizer in said carbureter, a fuel passage supplying fuel to said vaporizer, a valve in said passage, and means actuated by the closing of said choke valve for opening the valve in said passage.

In testimony whereof I have hereunto subscribed my name at Flint, Genesee County, Michigan.

DAVID FIRTH.