March 29, 1960 W. A. ENGSTROM 2,930,432

AUTOMATIC CARBURETOR ADJUSTMENT FOR BURNING OF DIFFERENT FUELS

Filed July 25, 1955

FIG.1.

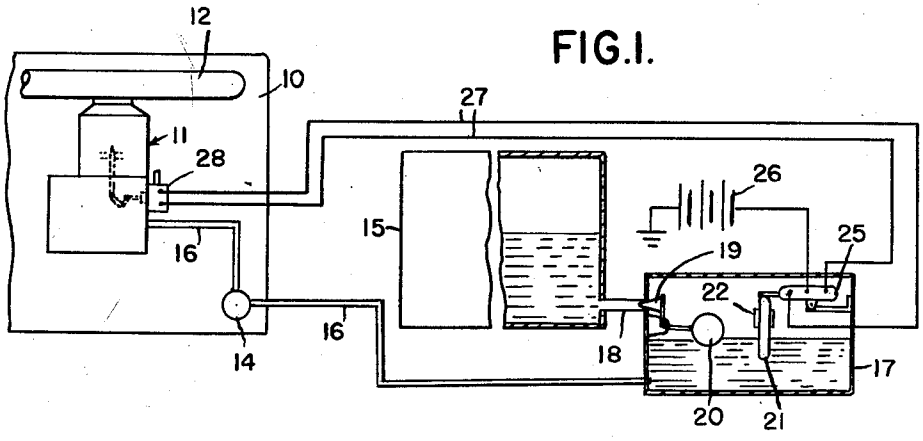


FIG.3.

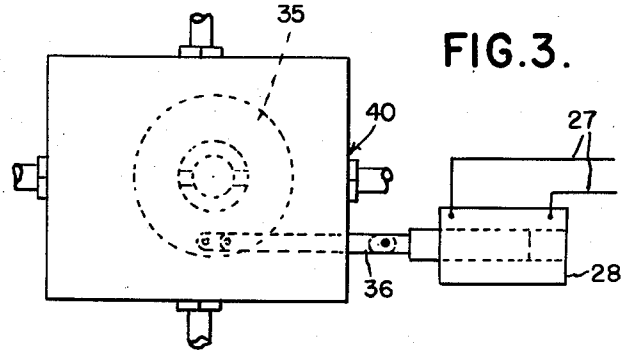
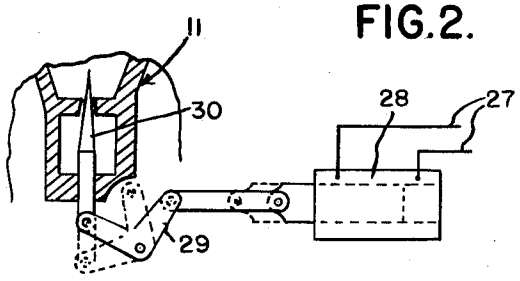


FIG.2.



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United States Patent Office 2,930,432 Patented Mar. 29, 1960

2,930,432

AUTOMATIC CARBURETOR ADJUSTMENT FOR BURNING OF DIFFERENT FUELS

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Application July 25, 1955, Serial No. 524,195

2 Claims. (Cl. 158—36)

My invention relates to internal combustion engines and more particularly to a fuel or fuel and air mixture control for such engines.

It is necessarily a requirement in engine design to now construct same for burning a wide variety of fuels, from diesel fuels to high octane gasoline, with the further requirement that same be burned without manual adjustments being required on the carburetor or fuel injector.

It is an object of my present invention to provide for the burning of a wide variety of fuels in carbureted engines, as well as in fuel injection engines, by constructing a control device responsive to the specific gravity of the fuel being used, which control device may be actuated to automatically adjust the jet of a carburetor or vary the fuel metering control of a fuel injection pump.

For a more detailed understanding of my invention, reference may be had to the accompanying drawing illustrating a preferred embodiment of my invention in which like characters refer to like parts throughout the several views, and in which—

Fig. 1 is a diagrammatic view illustrating the entire control system,

Fig. 2 is a fragmentary view showing how a nozzle jet of a carburetor may be thus automatically adjusted, and

Fig. 3 is a fragmentary view showing the control system associated with a fuel metering valve of a fuel injection apparatus.

I have chosen to show the control system when applied to a carbureted engine, and referring more particularly to Fig. 1 of the drawing, 10 designates an internal combustion engine, 11 the carburetor, 12 the conventional intake manifold, and 14 the conventional fuel pump.

A fuel supply tank 15 is provided for the storage of any one of a wide variety of fuels and suitable fuel lines 16 are employed to connect the fuel tank to the pump, and the pump outlet to the carburetor.

An auxiliary tank 17 is connected by the fuel line 18 to the supply tank 15, this connection being suitably controlled by a conventional float actuated valve 19, said float 20 located within the auxilitary tank and being operated to maintain a constant level of fuel in said auxiliary tank. A float hydrometer 21 of standard construction is slidably supported by guides 22, and as well known to those skilled in the art, this float hydrometer is constructed to have a variable disposition in the fuel depending on the specific gravity of the fuel in which it floats. It is known that a hydrometer type float will sink to various levels in fuels of various specific gravity, and for example it is noted that a standard float hydrometer will sink two inches deeper in gasoline than it does in jet fuel.

Therefore, the variable relationship of a float type hydrometer and the liquid in which it is floated is utilized to operate a mercury switch 25 controlling the supply of electric current from battery 26 through conductors 27 to a solenoid actuator 28.

Referring to Fig. 2 it will be observed that suitable mechanical connections 29 from the actuator 28 to the needle valve 30 of the carburetor 11 are employed to adjust the carburetor jet, whereby to provide the proper size jet for the fuel being used for operating hte engine. In a fuel injection engine, various types of fuel metering

devices may be employed to control the discharge of fuel to the engine, many of these fuel metering devices embodying an angularly adjustable metering valve 35 of fuel injection pump 40 as illustrated in Fig. 3. Connections 36 connect the solenoid actuator 28 to the angularly adjustable fuel metering valve to automatically effect the required adjustment for the fuel being used to operate the engine.

Any desired type of multiple contact mercury switch 25 may be employed to control the desired operation of the solenoid actuator 28, and it will be obvious that various degrees of adjustment may be had if so desired.

While I have illustrated but one embodiment of my invention, it will be apparent, however, to those skilled in the art to which my invention pertains that various changes and modifications may be made therein without departing from the spirit of my invention or from the scope of the appended claims.

I claim:

1. In an internal combustion engine, a fuel supply system operable to supply a combustible fuel charge to said engine and comprising a liquid fuel supply tank, a fuel pump having its inlet connected with said fuel supply tank, a regulable fuel metering means operable to meter fuel to said engine and connected with the fuel outlet of said fuel pump, said fuel pump supplying fuel under pressure to said fuel metering means, and control means for adjusting said fuel regulable means, said control means comprising an actuator operably connected with said fuel regulable means and a specific gravity sensing float hydrometer disposed in said fuel tank and remotely operably connected with said actuator to adjust same in response to a predetermined change of the specific gravity of the liquid fuel in said fuel tank to adjust said fuel metering means in accordance with said fuel specific gravity, and means maintaining a constant level of fuel in said fuel tank.

2. In an internal combustion engine, a fuel supply system operable to supply a combustible fuel charge to said engine and comprising a liquid fuel supply tank, a fuel pump having its inlet connected with said fuel supply tank, a regulable fuel metering means operable to meter fuel to said engine and connected with the fuel outlet of said fuel pump, said fuel pump supplying fuel under pressure to said fuel metering means, and control means for adjusting said fuel regulable means, said control means comprising an actuator operably connected with said fuel regulable means and a specific gravity sensing float hydrometer disposed in said fuel tank and remotely operably connected with said actuator to adjust same in response to a predetermined change of the specific gravity of the liquid fuel in said fuel tank to adjust said fuel metering means in accordance with said fuel specific gravity, said fuel supply tank having a main tank and an auxiliary tank connected with said main tank and provided with a float actuated valve means operable to maintain a substantially constant level of liquid fuel in said auxiliary tank, said actuator comprising a solenoid operable to adjust said fuel metering means, said float hydrometer being buoyantly floated in the auxiliary tank fuel supply and a switch operably connected with said hydrometer and with said solenoid and operable to actuate said solenoid in response to changes of buoyancy of said hydrometer effected by predetermined specific gravity changes of said fuel.

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