April 18, 1950 G. H. EVEREST 2,504,670

FUEL SUPPLY SYSTEM FOR ENGINES

Filed Feb. 3, 1947

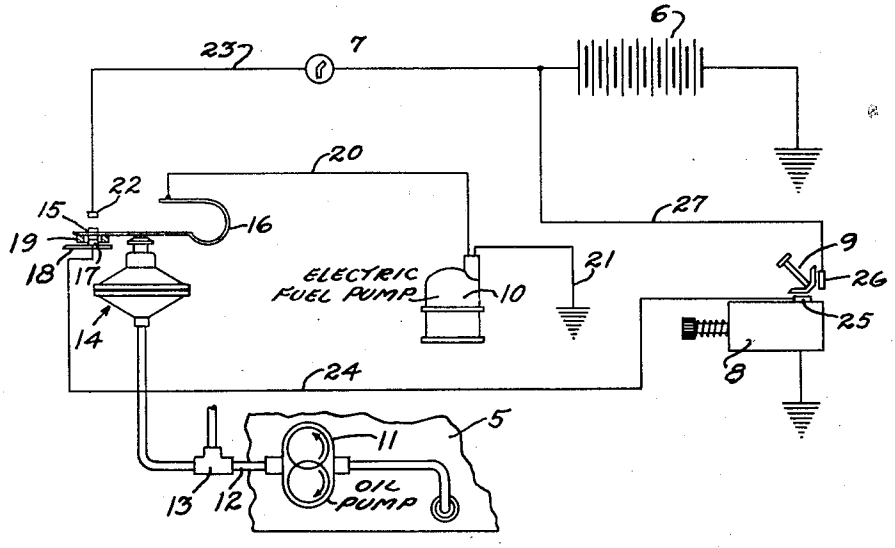


FIG. 1.

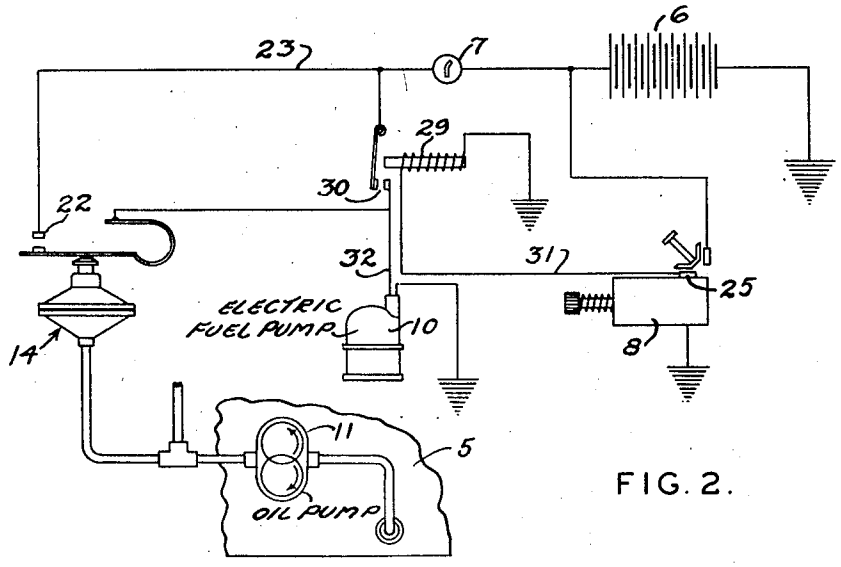


FIG. 2.

INVENTOR
GEORGE H. EVEREST

BY George R. Ericson

ATTORNEY

Patented Apr. 18, 1950 2,504,670

UNITED STATES PATENT OFFICE

2,504,670

FUEL SUPPLY SYSTEM FOR ENGINES

George H. Everest, Fresno, Calif., assignor to Carter Carburetor Corporation, St. Louis, Mo., a corporation of Delaware

Application February 3, 1947, Serial No. 726,058

6 Claims. (Cl. 123—179)

1

This invention relates to fuel supply systems for internal combustion engines and consists particularly of a novel circuit arrangement for energizing an electric fuel pump during starting and normal running operation while causing the pump to stop as a safety feature, in case of failure of the oil pressure or any other fluid necessarily supplied or circulated incidental to running of the engine.

Where fuel is supplied to the engine by an electric fuel pump of the type illustrated in Korte Patent No. 2,394,860, the continued running of the pump after the engine stops or in case of failure in the pressure lubricating system, for instance, may result in complications. Consequently, it has been suggested that the control circuit for the pump may be energized through a pressure switch which is responsive to pressures in the lubricating system. However, this arrangement requires a by-pass circuit for operating the pump during cranking of the engine. Such a by-pass circuit requires a special starting switch having an extra point or some other means preventing the grounding of the pump operating current through the starting motor during normal operation of the engine. In accordance with the present invention, the oil pressure switch is conveniently provided with an extra stationary point which remains normally closed when the engine is not in operation and less than normal pressure exists in the lubricating system. Since this point is open during normal running, it may be connected to one of the terminals of an ordinary starting switch.

It is the main object of the present invention to provide convenient and simple means for utilizing an ordinary starting switch in supplying current temporarily during cranking of the engine to the fuel pump.

This object and other more detailed objects hereafter appearing are attained by the arrangement illustrated in the accompanying drawing in which:

Fig. 1 is a diagrammatic view illustrating an internal combustion engine, in part, and various accessories and electrical connections.

Fig. 2 is a diagrammatic representation of another arrangement.

Fig. 1 illustrates a portion 5 of an internal combustion engine which is provided with the usual storage battery 6, ignition switch 7, starting motor 8 and starting switch 9. An electric fuel pump 10 is mounted in the fuel tank (not shown) and provided with tube connections to

2

the usual engine carburetor (not shown) for supplying liquid fuel under pressure thereto. An oil pump is indicated at 11 for supplying lubricant under pressure conduit 12 leading to the various engine points to be lubricated. Connected to oil conduit 12 by means of a T fitting 13 is an oil pressure switch, generally indicated at 14, which may be generally of the type disclosed and claimed in a copending application, Serial No. 715,558, filed December 11, 1946, in the names of Alfred C. Korte and Alex N. Szwargulski. This switch is of the double throw type and has a movable point 15 carried by a spring strap 16 so as to be normally maintained in contact with the lower stationary point 17. Adjacent point 17 there is provided a metallic armature element 18 which cooperates with a permanent magnet 19 carried by strap 16 to resist opening of point 17 by pressure and insure snap action of the movable contact. Strap 16 is connected by a wire 20 to the fuel pump which is grounded as at 21.

Upper, normally open point 22 of the pressure switch is connected by a wire 23 through ignition switch 7 to battery 6. Lower, normally closed contact 17 of the pressure switch is connected by a wire 24 to a contact 25 mounted on top of the starter motor and constituting part of starter switch 9. The other point 26 of the starter switch is connected in the usual manner by a wire 27 to the battery.

When starting switch 9 is closed to crank the engine, movable point 15 will be in contact with lower point 17 of the pressure switch closing a circuit for energizing the pump. When the engine starts to run under its own power, oil pressure will be built up so as to snap strap 16 and the movable point 15 upwardly into contact with point 22 closing circuit 23, 22, 15, and 20 for energizing the pump during normal running of the engine. The snap action of the movable switch point insures continued running of the pump during the transition between cranking and normal operation.

In Figure 2 the oil pressure switch is provided with a single, stationary contact 22 which is closed responsive to the existence of normal oil pressure in the lubricating system. In lieu of the lower point of the pressure switch, there is provided a relay having a primary coil 29 connected to switch point 25 on the starting motor. The points 30 of the relay, when closed, connect battery lead 23 directly to the fuel pump motor. The necessity of the extra switch point either in the relay, as in Fig. 2, or in the pressure

switch as in Fig. 1, will become clearly evident if it is imagined that lead 31 were directly connected to wire 32 leading to the pump. In such case, battery current supplied through wire 23 and the closed oil pressure switch point would ground through the starting motor.

In both of the forms shown, this is prevented. In Fig. 1, the means of solving the problem is especially simple and inexpensive in that it requires only the use of a double throw pressure switch while eliminating a relay as at 29 in Fig. 2, or a special three-point starter switch.

Broadly, normally open switch point 22 may be closed responsive to a pressure, other than oil pressure, which is necessarily incidental to normal running of the engine. Further, a source of fuel pressure other than the electric fuel pump may be controlled. The invention may be modified in various respects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

I claim:

1. In combination with an internal combustion engine, a battery, a starter switch, an electric fuel pump, a pressure lubricating system, a double throw switch with its movable point normally contacting one of its stationary points and arranged to be actuated responsive to pressures in said lubricating system, first circuit means including said battery, said movable point, said normally open point, and said fuel pump for energizing said pump when normal pressures exist in said lubricating system, and second circuit means including said battery, said movable point, said normally closed point, said starting switch, and said pump for energizing said pump during starting of the engine.

2. In combination with an internal combustion engine, a starter switch, an electric fuel pump, a conduit for supplying fluid to the engine necessarily incidental to operation thereof, a double throw switch arranged to be actuated by pressure variations in said conduit, a first control circuit for said fuel pump including said battery and the movable and normally open points of said pressure switch for energizing said pump during normal operation of the engine, and second control circuit means for said pump including said battery, said starter switch and the movable and normally closed points of said pressure switch

for energizing said pump during starting of the engine.

3. The combination described in claim 2 further including means producing snap action of said pressure switch.

4. In combination with an internal combustion engine, a battery, starter and ignition switches, an electric fuel pump, a pressure lubricating system, a double throw switch having a normally closed stationary point and arranged for actuation responsive to pressure variations in said lubricating system, first control circuit means for said pump including said battery and the movable and normally open points of said pressure switch for energizing said pump during normal operation of the engine, and second control circuit means for said pump including said battery, said starter switch and the movable and normally closed points of said pressure switch for energizing said pump during cranking of the engine.

5. The combination described in claim 4 further including means associated with said movable and normally closed points for producing snap action of said pressure switch and insuring continuous operation of the pump during the transition between starting and normal running thereof.

6. The combination described in claim 4 further including a magnet and armature mounted between the movable and normally closed points of said pressure switch for increasing the resistance to opening said normally closed point and insuring snap action of said movable point.

GEORGE H. EVEREST.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,834,977	Schweisthal	Dec. 8, 1931
1,920,694	Hancock	Aug. 1, 1933
2,162,174	Jones	June 13, 1939
2,210,044	Schirokauer	Aug. 6, 1940
2,337,838	Reavis	Dec. 28, 1943

FOREIGN PATENTS

Number	Country	Date
111,108	Australia	July 22, 1940