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OIL PRESSURE CONTROL AND WARNING DEVICE

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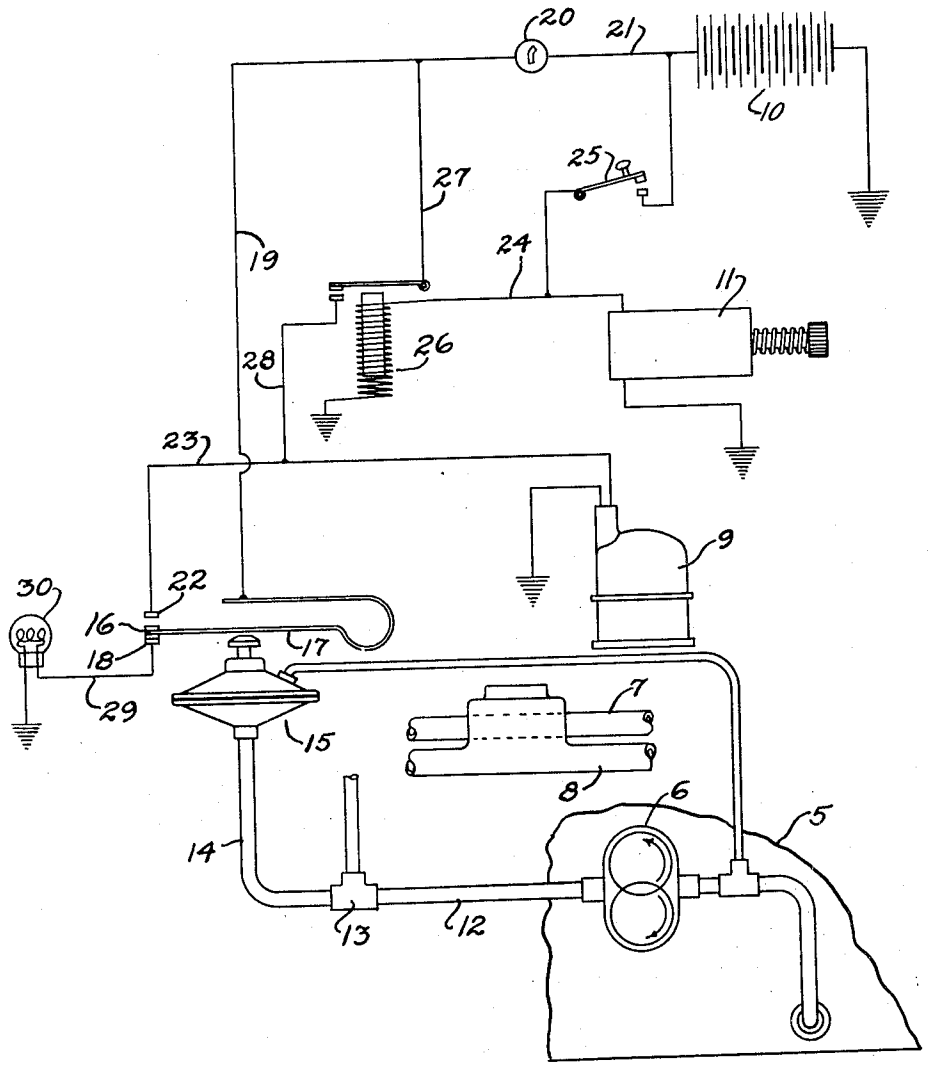

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OIL PRESSURE CONTROL AND WARNING DEVICE

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4 Claims. (Cl. 177—311)

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This invention relates to pressure controlled accessories of internal combustion engines and consists, particularly, in a novel unitary pressure control and safety device for the engine fuel pump and, alternatively, an oil pressure warning device.

Where the fuel is supplied to an internal combustion engine by an electric fuel pump, it is advisable to insure the cessation of the fuel supply promptly when the engine stops operating. Means must be provided also for supplying fuel temporarily during cranking of the engine. In the present invention, the electric fuel pump is controlled for normal operation by a switch which is closed responsive to a fluid pressure necessarily incident to engine operation, such, for instance, as in lubricating oil system. An electrical by-pass is provided for supplying current, temporarily, during cranking and the pressure switch is of the double throw type, the normally closed contacts thereof being utilized to operate a warning device indicating sub-normal pressure in the system which also cuts out the fuel pump.

The main object is to provide such a unitary pressure device which alternatively controls or energizes the fuel pump and a warning device.

A more detailed object is to provide such an alternatively operating pressure control device together with an auxiliary energizing control for the fuel pump operated temporarily during cranking.

These objects and other more detailed objects hereafter appearing are attained by the devices and circuits illustrated in the accompanying drawing in which the figure is a diagrammatic view of a portion of an internal combustion engine with various accessories and electrical circuits.

The engine 5 is provided with the usual oil pump 6 and intake and exhaust manifolds 7 and 8. An electric fuel pump 9 of the type disclosed and claimed in Korte Patent No. 2,394,860 is mounted in the fuel tank (not shown) at the rear of the vehicle and a storage battery 10 and electric starter motor 11 are conveniently mounted with respect to the engine. A conduit 12 connects oil pump 6 with various engine points requiring lubrication.

Connect to conduit 12 by means of a T fitting 13 and pipe 14 is a double throw oil pressure switch device, generally indicated at 15, and of the type disclosed and claimed in greater detail in a co-pending application, Serial No. 715,558, filed December 11, 1946 in the names of the present inventors. This pressure switch includes

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a movable contact or pole 16 supported by a resilient strap 17 so as to be normally closed against lower contact 18. Strap 17 is connected by a lead 19 to ignition switch 20 and thence by lead 21 to storage battery 10.

The upper or normally open stationary contact 22 of the pressure switch is connected by a lead 23 to fuel pump 9 for supplying operating current thereto when normal pressure exists in oil line 12, 14 so as to move switch contact 16 against contact 22. Pump circuit 23 will be open when subnormal pressure exists in conduit 14. However, the pump is operated during starting by means of a lead 24 extending from starter switch 25 to the primary of a relay 26. The points of the relay control a lead 27, 28, 23 from battery to the fuel pump so that when the starter switch is closed to energize starter motor 11, relay 26 will be picked up so as to supply current temporarily to the fuel pump.

The lower or normally closed point 18 of the pressure switch is connected by a lead 29 to a light bulb 30 so that when subnormal flow or pressure exists within conduit 12, 14, bulb 30 will be lit to indicate this condition and, accordingly, provide a warning of trouble in the oil pressure system.

The invention therefore, makes ingenious use of the pressure control switch as a part of the electrical fuel pump circuit as well as a warning device, thus, eliminating a separate or special device for the latter purpose.

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.

We claim:

1. In combination with an internal combustion engine having a conduit for supplying a fluid necessary to engine operation, a battery, an electrical fuel pump, a starting switch, a relay, and a warning device, a double throw pressure switch with its movable point actuable responsive to normal fluid pressure in said conduit and connected to said battery, the movable point and one of the stationary contacts of said pressure switch being normally closed, first pump energizing circuit means including said relay and said fuel pump, a circuit including said starting switch for energizing said relay, second pump energizing circuit means including the normally open contact of said pressure switch and said fuel pump, and a circuit including the normally closed contact of said pressure switch and said warning device.

2. In combination with an internal combustion engine having a pressure lubricating system, a battery, an electrical circuit including a relay, for controlling a fuel pump, a self-starter control circuit, and a warning device, a double throw switch having its movable contact connected to said battery and arranged for actuation responsive to variations of pressure in said lubricating system, a connection between said starter control circuit and said relay of the fuel pump circuit for energizing the latter circuit when the former is closed, a connection between said fuel pump circuit and one stationary contact of said switch for energizing said pump circuit responsive to the existence of normal oil pressure in said lubricating system, and an electrical connection between the other stationary contact of said switch and said warning device for energizing said device responsive to the existence of sub-normal pressure in said lubricating system.

3. In combination with an internal combustion engine, a pressure lubricating system, a battery, a self-starter switch, an electric fuel pump, a relay, a warning device, a double throw switch with its movable contact connected to said battery, a device responsive to pressure variations in said lubricating system for actuating said movable contact, a circuit including said battery, said relay, and said fuel pump, a relay control circuit including said battery and said starter switch, another circuit including said battery, one stationary contact of said double throw switch, and said fuel pump, and a last circuit including said battery, the other stationary contact of said double throw switch, and said warning device.

4. In combination with an internal combustion engine having a battery, an electric fuel pump, a pressure lubricating system, and a warning device, a double throw switch having its movable contact connected to said battery and operatively associated with said lubricating system, a circuit including said battery, said fuel pump, and one contact of said switch for energizing said pump responsive to the existence of normal pressure in said lubricating system, a pump control circuit in parallel with said circuit, effective during engine cranking for energizing said pump, and a circuit including the other contact of said switch for operating said warning device responsive to the existence of subnormal pressure in said lubricating system.

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