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AUTOMOTIVE OIL PRESSURE SAFETY SWITCH

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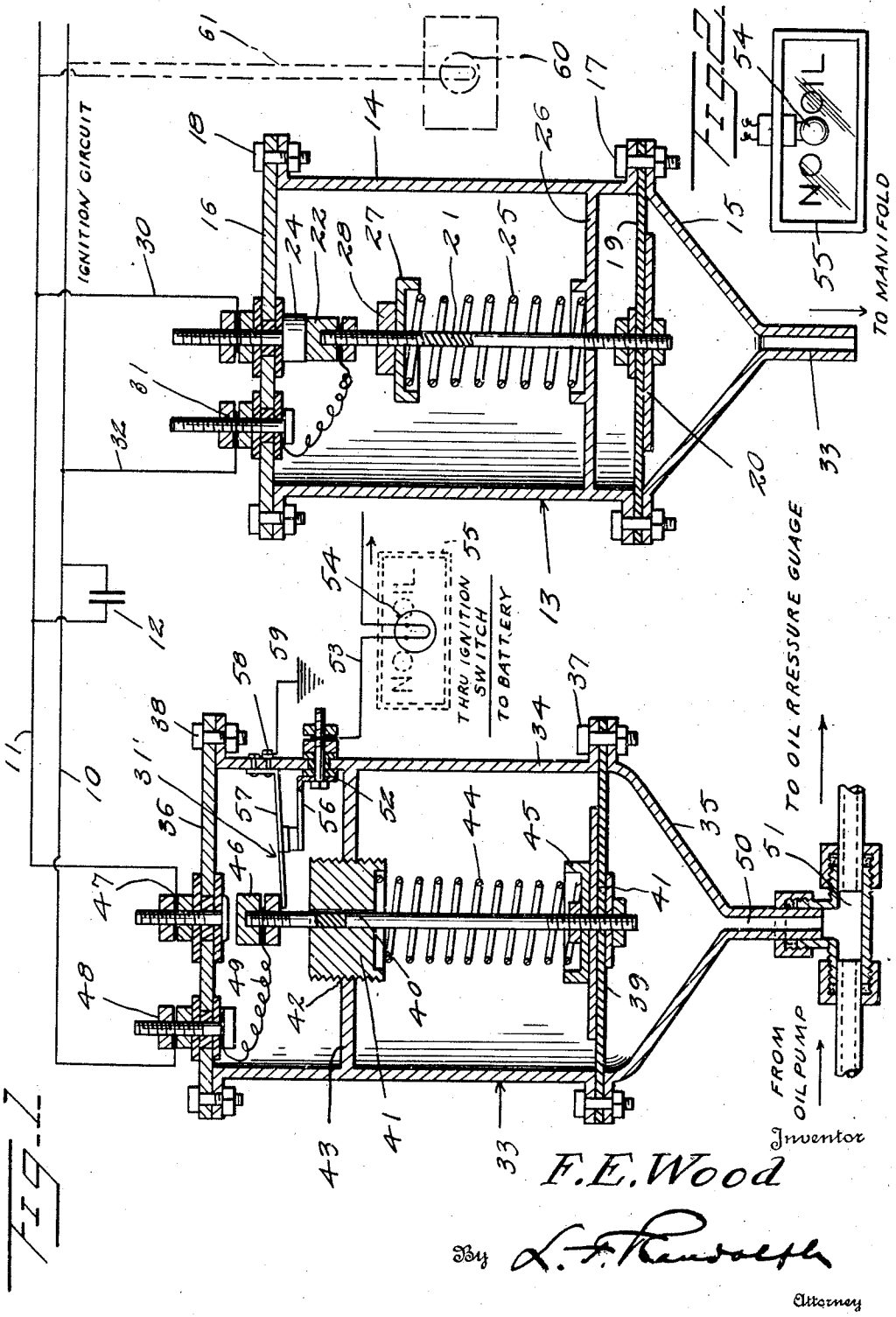

FIG. 1

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AUTOMOTIVE OIL PRESSURE SAFETY SWITCH

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1 Claim. (Cl. 200—83)

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My invention relates to means which will prevent engines of automotive types, as used on automobiles, trucks, tractors, or industrial power, from operating in the absence of sufficient lubricating oil.

I particularly attain the object in view by means associated with the ignition circuit of the engine through the combination of a switch operable by suction of the engine and a switch operable by pressure from the oil pump or line, and optionally with a signal operable to indicate the absence of oil in the crank case or lubricating system of the engine.

The more specific objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawings illustrating an operative embodiment.

In said drawings:

Figure 1 is a view showing my improvements approximately in central vertical section, in electrical diagram, and in connection with the oil line of the engine; and

Figure 2 is a front elevation of one form of indicator or signal which may be used.

Referring specifically to the drawings wherein like reference characters designate like or similar parts, an ignition circuit for an engine of the automotive type is partly and diagrammatically illustrated in Figure 1 by conductors 10 and 11, preferably having associated therewith a condenser as at 12.

A suction-operable switch is generally shown at 13 consisting of a suitably mounted casing having a cylinder section 14, a base section 15, and a cover section 16, the adjacent sections being suitably detachab'y connected together as by means of bolts at 17 and 18. Connected airtight across the switch 13 is a flexible diaphragm 19, marginally clamped in place by the bolts 17. Rising from and attached to the diaphragm 19 in a suitably reinforced manner at 20 is a rod 21 of suitable insulation equipped with a contact 22 of metal at its top, which has a conductor 23 connected to it.

Contact 22 normally is urged into engagement with a contact 24 by an expansive spring 25, which surrounds the rod 21 and is supported on a web 26 of the cylinder section 14. Said spring 25 at its upper end bears against an inverted cap 27, in turn abutting a nut 28 which is screw threaded and adjustable and to the rod 21 to vary the tension of the spring 25.

Contact 24 may be of any suitable conventional type, as for instance consisting of a bolt and nuts

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as shown and having a conductor 30 connected thereto and leading from the ignition conductor 11. Said contact 24 is mounted on and insulated from the cover section 16, and another contact or terminal 31 is mounted on and insulated from said cover section 16, the same also preferably being of the bolt-and-nut type, although any equivalent may be used. The previously mentioned conductor 23 is connected to the terminal 31, and also connected to that terminal is a conductor 32 which leads from the ignition circuit conductor 10. Spring 25 normally maintains contacts 22 and 24 in engagement. The base section 15 is hollow and has a central tube 33 which is connected to the intake manifold of the engine in order to subject the diaphragm 19 to the suction incidental to operation of the engine to control the opening and closing of the contacts 22 and 24.

An oil-pressure-operated switch is generally designated 33'. It may consist of detachable sections such as the cylinder 34, base 35, and top 36, the adjacent parts being connected together in any suitable manner, as by means of bolts 37 and 38.

A flexible diaphragm 39 bridges the interior of the pressure switch and is fastened in place marginally airtight as by means of the bolts 37. Rising from the diaphragm 39 is a rod 40 of suitably insulating material, having any desired reinforced connection at 41 with the diaphragm. Rod 40 is guided for vertical movement in a vertically adjustable plug 41 screw threaded at 42 in a wall or web 43, the screw threads permitting adjustment so that the tension of a coil spring 44 which surrounds the rod 40 may be varied, such spring abutting the plug 41 and also an inverted cap 45 adjacent the diaphragm.

At the upper end rod 40 carries a contact 46 which is urged away from engagement with a contact and binding post 47 by said spring 44. This contact and binding post 47 may be of any suitable type, but preferably is a bolt-and-nut insulated from the top section 36. Ignition circuit conductor 11 leads to the contact 47 while the ignition circuit conductor 10 leads to a binding post or contact 48, also preferably of the bolt-and-nut type and mounted on but insulated from the cover section 36. A short flexible conductor 49 extends from the contact 46 to the contact 48.

Base section 35 of the pressure switch has an outlet tube at 50, and the same is detachably connected in any suitable manner to a pipe line

51 leading from the oil pump to the pressure gauge (not shown).

In the operation of the engine the ignition switch will be closed in order to close the ignition circuit 10—11, enabling starting of the engine. The suction-controlled diaphragm switch 13 is used during only the starting period. A moment after the engine has been in operation the normal suction of the intake manifold will open the ignition circuit and, unless the circuit has been closed by the pressure-controlled diaphragm switch 33', the engine will stop. When the engine is not in operation no pressure is upon the diaphragm 39 and therefore the spring 44 will cause the ignition circuit to open by lowering contact 46 out of engagement with contact 47. However, during the period of time required by the suction to open the suction-controlled switch 13, the oil pump will generate enough pressure to close the contact at 46—47, thus maintaining a closed ignition circuit. If no oil pressure is generated by the pump, the contacts will remain open and the engine will stop. This also will be true if the engine is in operation and the oil pressure fails.

I also preferably provide a suitable signal to indicate the absence of oil pressure. For instance, a terminal 52 is attached to but insulated from the cylinder 34 and is connected to a conductor 53 which passes through the ignition switch to the battery and includes an electric lamp 54. This lamp may be located behind a suitably disposed transparent or translucent sign or panel 55, having the words "No oil" or the equivalent delineated thereon. A contact 56 is connected to the terminal 52 engageable by a contact 57 when contact 46 is in lowered position to maintain the contacts 56 and 57 engaged and the circuit closed through the lamp 54. However, when contact 46 is raised the inherent resiliency of contact 57 spaces it above the contact 56. Said contact 57 is bolted or otherwise secured at 58 to the cylinder 34 and the same is grounded at 59.

In lieu of the signal at 54 and its connections, I may employ the signal suggested at 60, still using the panel 55, and connecting the signal or lamp 60 by conductors 61 to the ignition circuit wires 10 and 11 as shown. The bulb, 54 or 60, whichever is used, is energized through the ignition circuit and switch and, only when both the oil pressure and suction-operated diaphragm switches are open but not before the starting period. This lamp or bulb would be connected as a shunt, and when either or both diaphragm switches were closed the bulb or lamp would not be lighted due to its high resistance and to the fact that the current would flow through the diaphragm switch contacts which offer very little resistance. On the other hand, when both diaphragm switches are open and the lamp or bulb lighted across the line, it will offer so much resistance that the ignition coil will not function on the current which will flow through it; therefore, the motor will stop. In the event that there is no oil pressure the operator's attention is attracted by the lighted sign indicating "No oil." Such lamp or bulb 54 or 60 of course would be lighted during the interval when the ignition switch was turned on and before sufficient oil pressure was developed during each starting period.

Various changes may be resorted to provided that they fall within the spirit and scope of the invention.

I claim as my invention:

A switch of the character described comprising a casing provided with a removable endwall, said endwall being provided with an internal contact and a binding post, a cross partition in the casing having an opening therein, a rod slidable through the opening and provided with a contact at one end engageable with the first mentioned contact, a flexible connection between the rod contact and the binding post, an outwardly constricted closure for the other end of the casing and provided with a nipple, a flexible diaphragm interposed between the outwardly constricted closure in the adjacent end of the casing, clamp means between the last mentioned closure in the casing for clamping the diaphragm in place, a connection between the other end of the rod and the diaphragm, said partition having a well structure thereon, a coil compression spring on the rod having one end disposed in the well, a well cap on the rod for receiving the other end of the spring and being slideable on the rod and a nut adjustable on the rod and against the well cap for regulating the said spring.

FREMONT E. WOOD.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,769,673	Blaschke	July 1, 1930
1,431,914	Dashner et al.	Oct. 10, 1922
1,711,001	Summers	Apr. 30, 1929
1,573,371	Bloch	Feb. 16, 1926
1,460,500	Rall	July 3, 1923
2,131,264	Benjamin	Sept. 27, 1938
2,208,909	Miller	July 23, 1940