June 13, 1944. P. S. DE BEAUMONT 2,351,408

INDICATING SYSTEM

Filed Oct. 15, 1941

Fig. 1.

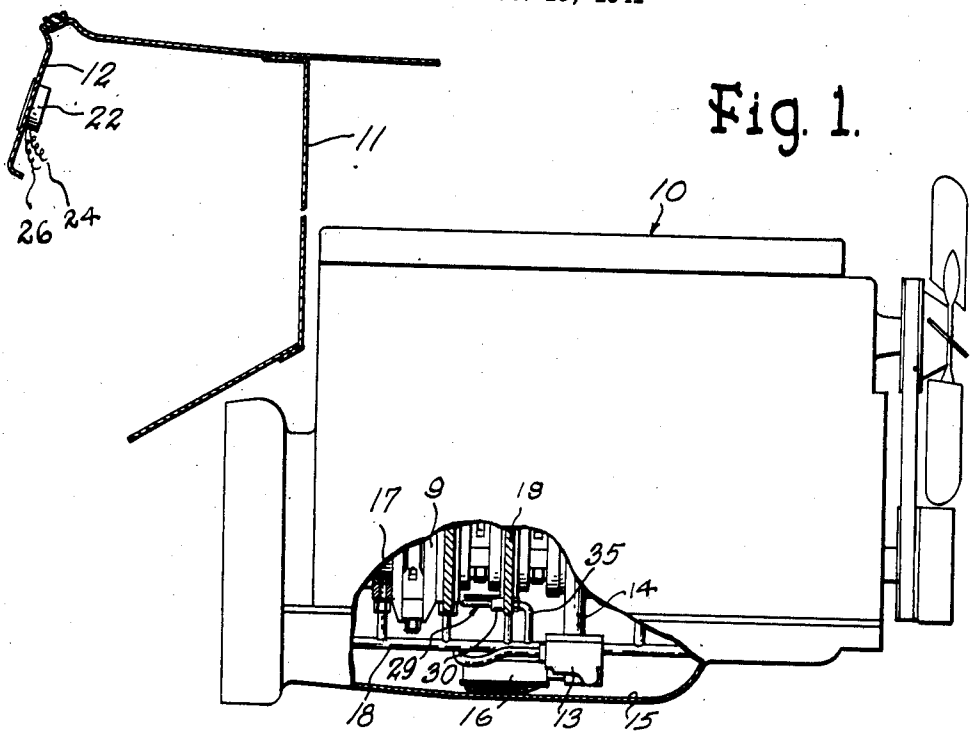
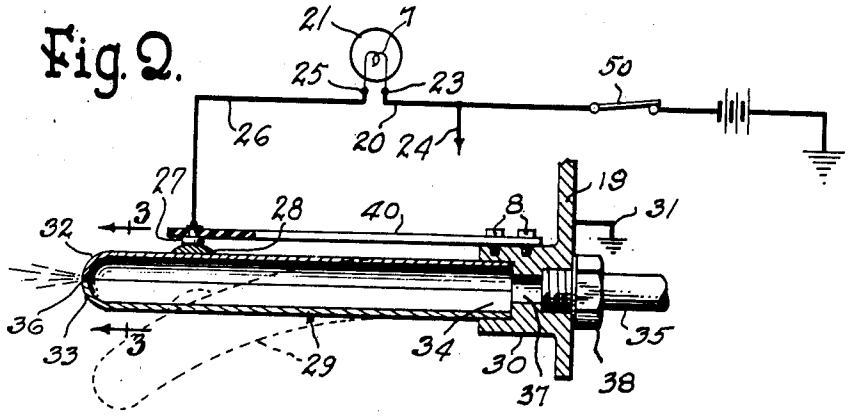


Fig. 2.



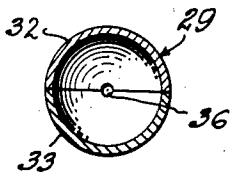


Fig. 3.

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INDICATING SYSTEM

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6 Claims. (Cl. 177—311)

This invention relates to indicator systems and more particularly to control means for such systems.

Systems to which this invention applies have many uses and can be of a visible, audible or other type wherein the condition or position of something is indicated. The invention can be utilized for controlling the circuit in an electric type of indicator system for visibly registering operating conditions of the oil in the lubricating system of an engine.

It is an object of the invention to provide a simple, inexpensive system for indicating operating conditions of an engine lubricating system.

Another object of the invention is to provide a control for an electric indicator system that is responsive to heat and temperature.

Another object of the invention is to provide a movable switch contact mounting that flexes automatically in response to temperature and pressure conditions.

Still another object of the invention is to provide a visible indicator system that responds to temperature and pressure conditions in an engine lubricating system.

Other objects of the invention will appear from the following description taken in connection with the drawing, which forms a part of this specification, in which;

Fig. 1 is a partly broken away and sectioned elevational view of the forward end of a motor vehicle having an indicator system incorporating the invention associated therewith;

Fig. 2 is a diagrammatic view of the indicator system;

Fig. 3 is a sectional view of the indicator system control structure taken on line 3—3 of Fig. 2.

In the drawing, an engine 10 is shown in advance of a motor vehicle dash 11 and instrument board 12. A conventional lubricating system supplies oil under pressure to the usual engine bearings and includes a gear pump 13 driven by the engine through shaft 14. The pump lies in the engine sump, formed by pan 15, and has a strainer 16 at the oil inlet end. The pump draws oil from the sump through the strainer and delivers it under pressure to a distributing manifold conduit 18 leading to engine bearings, such as bearings 17 for the crankshaft 9. Oil drains from the bearings into the sump and is recirculated by the pump.

Operating conditions of the engine and the lubricating system can be readily ascertained by the vehicle driver through means of an electric indicator system. The visible portion of the indicator system is illustrated as an electric light bulb 21 housed in a casing 22 fixed to the instrument board. One terminal 23 of the incandescent wire 7 in the light bulb is connected in parallel with the engine electric ignition system 24 by conductor 20 and the other terminal 25 of the bulb wire 7 is connected with a stationary contact 27 by conductor 26. This stationary contact 27 can be fixed to a dielectric bracket 40 anchored to a boss 30 formed on one of the interior walls 19 in the engine casing by securing bolts 8. The light circuit is grounded by conductor 31 that can be fastened to wall 19 and is controlled by means, in the form of a movable switch structure, that is responsive to temperature and pressure, preferably that of the oil in the pressure side of the lubricating system.

The control means for the light circuit consists of the ignition switch 50 and a Bourdon tube 29 anchored at one end to wall 19 and having a contact 28 carried by and movable with the other end which is free. The tube has an open inlet end 34 seated in a passage 37 in boss 30 and conduit 35 is attached to the boss, in communication with the passage, by fitting 38. Conduit 35 leads from the oil distributing manifold 18 on the pressure side of the lubricating system. The free end of the Bourdon tube is formed with a relatively small outlet opening 36 through which oil flows into the engine casing and drains back into the sump, the outlet opening being smaller than the opening in the inlet end of the tube. The tube is formed of two welded together, flexible metal sections 32 and 33 having different coefficients of expansion, such tube structure per se forming the subject matter of divisional application Ser. No. 509,417, filed November 8, 1943.

Oil from the pressure side of the lubricating system will flow through the flexible Bourdon tube and the free end of the tube carrying the contact 28 can flex in response to pressure and temperature of the oil to thus make and break the light circuit. The arrangement is such that, with the ignition switch 50 closed, the tube will be in circuit closing position under normal engine operating conditions. When the oil supply is low or other conditions occur in the engine operation that lower the pressure and/or raise the temperature of the oil, then the free end of the tube flexes in the direction shown by dotted lines in Fig. 2, and moves contact 28 away from contact 27. Under this condition the indicator light goes out so that the driver will be advised of an unfavorable engine operating condition and will

investigate. Under most unfavorable engine operating conditions the oil pressure will decrease while the oil temperature rises and both pressure and temperature will influence flexing of the free end of the circuit control tube.

Although the invention has been described in connection with a specific embodiment, the principles involved are susceptible of numerous other applications which will readily occur to persons skilled in the art. The invention is therefore to be limited only as indicated by the scope of the appended claims.

What I claim is:

1. In an indicating system for an engine lubricating system in which oil is delivered to bearings under pressure, a lamp circuit for visibly indicating operating conditions of the lubricating system, and a bimetallic open ended Bourdon tube through which oil from the lubricating system can flow, said tube controlling said lamp circuit through movement in response to temperature and pressure of the oil flowing therethrough.

2. In an indicating system for a lubricating system in which oil is delivered to bearings under pressure, an electrical system for visibly indicating operating conditions of the lubricating system, and a bimetallic open ended Bourdon tube connected in the lubricating system and flexible in response to pressure and temperature of the oil flowing therethrough to control said electrical system.

3. In an indicating system for a lubricating system in which oil is delivered to bearings under pressure, an electric system for visibly indicating operating conditions of the lubricating system, and a bimetallic Bourdon tube having open ends and flexible to control said electric system, one end of said tube being anchored and connected to receive oil flowing under pressure in the lubricating system and the other free end flexing in response to the pressure and temperature of the oil flowing therethrough.

4. In an indicating device for a lubricating system in which oil under pressure is delivered to bearings, visible indicator means, an electric system for actuating said indicator means, and a movable switch element controlling said electric system, said switch element including a Bourdon tube having open ends and formed of metal sections having different coefficients of expansion and connected in open communication at one end with the lubricating system, the tube flexing in response to the temperature and pressure of the oil flowing therethrough.

5. In an indicating device for a lubricating system in which oil under pressure is delivered to bearings, visible indicator means, an electric system for actuating said indicator means, a movable Bourdon tube switch element open at both ends and connected with the lubricating system for the flow of oil therethrough, said tube being formed of sections having different coefficients of expansion, and an anchor for one end of the tube.

6. In an indicating device for a lubricating system in which oil under pressure is delivered to bearings, visible indicator means, an electric circuit for actuating said indicator system, a bimetallic Bourdon tube having a free end and an anchored end connected in open communication with the lubricating system, means grounding the tube, and a contact fixed to the free end of the tube for controlling the circuit, the free end of the tube having a relatively small outlet orifice therein and flexing out of circuit forming position in response to predetermined pressure and temperature of oil passing through the tube.

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