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2,402,284

PRESSURE CONTROL

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Fig. 1.

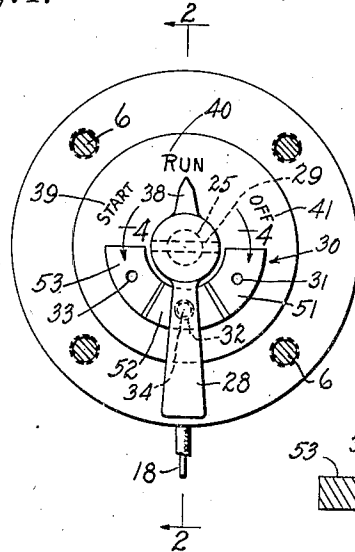


Fig. 4

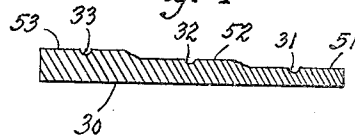


Fig. 2.

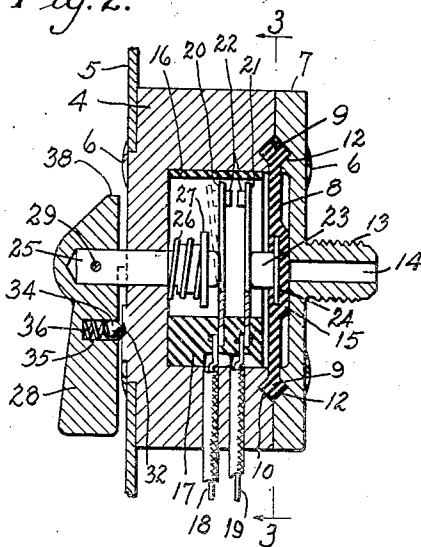
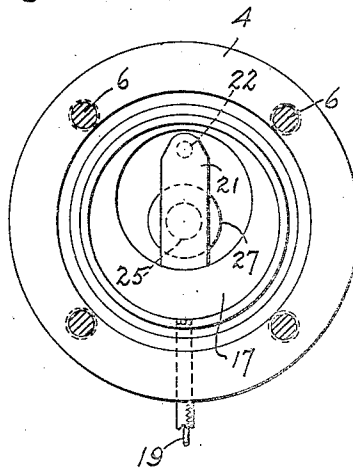


Fig. 3.



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PRESSURE CONTROL

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4 Claims. (Cl. 200—81.5)

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My invention relates to a pressure control, and more particularly to a control for an electric switch that is dependent upon continued fluid pressure.

An object of the invention is to provide an automatic control that is subject to the pressure in an oiling system, whereby an electric circuit may be broken in case the pressure in the oiling system falls below a given point.

Another object of the invention is to provide automatic means to break the ignition of an internal combustion engine in case the oiling system fails because of lack of oil, although it is to be understood that the present control is adaptable for other types of mechanism than internal combustion engines.

A further object of the invention is to provide manual means for initially closing the circuit of an apparatus of the character hereinbefore mentioned, in order to be able to start the apparatus even though there is no pressure in the oiling system, and then to be able to switch the control over to its automatic position in which the circuit is automatically broken in case the pressure in the oiling system becomes reduced to a predetermined point.

My invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawing merely shows and the following description merely describes one embodiment of the present invention, which is given by way of illustration or example only.

In the drawing, like reference characters designate similar parts in the several views.

Fig. 1 is a face view of an embodiment of the foregoing objects, with a face plate shown in Fig. 2 removed.

Fig. 2 is a vertical section taken along the line 2—2 of Fig. 1.

Fig. 3 is a transverse section taken along the line 3—3 of Fig. 2, looking in the direction of the arrows.

Fig. 4 is a curved section taken along the semi-circular line 4—4 of Fig. 1.

Referring more in detail to the drawing, the reference number 4 generally designates a housing mounted upon a face plate 5. It is the face

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plate 5 that has been removed from Fig. 1. Normally bolts 6 hold the housing 4 and face plate 5 together. The bolts 6 also extend through a back plate 7 and hold a diaphragm 8 clamped between the body of the housing 4 and the back plate 7.

The diaphragm 8 has an enlarged, angular rim 9 that fits in complementary recesses 10 and 12 in the opposed faces of the housing 4 and back plate 7. The back plate 7 has a threaded nipple 13 for connection with a line from an oiling system, to convey pressure through passage 14 in the nipple against the back of the diaphragm 8. The diaphragm 8 has a pad 15 on its rear face which at rest (as shown in the drawing), closes the passage 14.

Insulation 16 extends around the inner face of the housing 4. The insulation 16 is thickened at the bottom, as shown at 17, in which is imbedded inner ends of wires 18 and 19, in an electric circuit. Contact fingers 20 and 21 are respectively connected with the wires 18 and 19. Contacts 22 are mounted on opposed faces of the fingers 20 and 21.

An abutment member 23 engaging the back of the finger 21 has a flange 24 imbedded in the pad 15 of the diaphragm 8.

Journalled in the housing 4 is a pivot pin 25. Coil spring 26 around the enlarged inner end of the pin 25 abuts against a collar 27 on the stem, and against the opposed inner face of the housing 4, to draw the pin 25 inward with respect to the housing 4. The normal position of the finger 20 is as shown by the broken lines in Fig. 2. The pressure of the spring 26 moves the finger 20 to its full line position in Fig. 2, when permitted by the adjustment hereinafter described.

A manual switch lever 28 is fastened on the pin 25, as suggested at 29. The front face of the housing 4 has a three-step adjusting arc 30 provided with recesses 31, 32 and 33. A ball 34 in a recess 35 in the back of the switch lever 28 is urged by a coil spring 36 into one of the recesses 31, 32 or 33 or rolls along the three-step arc 30 between the recesses.

The arc 30 preferably has three steps or three elevations 51, 52 and 53, as best shown in Fig. 4. When the lever 28 is in engagement with the highest elevation 53, the pin 25 is drawn outward from the housing 4 sufficiently for the finger 20 to resiliently spring back to its normal broken line position in Fig. 2, which is the inoperative position. The second highest elevation 52 permits the lever 28 to be moved inwardly toward the housing 4 by the spring 26, until the pin

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25 is in the position shown in Fig. 2 and thereby the finger 20 is moved to the full line position shown in Fig. 2, which is the normal running position. The lowest elevation 51 permits the lever 28 to be moved even farther inward, under the influence of the spring 26 until the contacts 22 are in engagement with each other by reason of bending the finger 20 toward the finger 21, which is the starting position.

A pointer 38 may be mounted on the lever 28 to register with the words "Start," "Run" and "Off," as shown at 39, 40 and 41 on the face of the housing 4. This indicates the different positions of the lever 28 just described. The spring-urged detent 34 provides a means for indicating to the operator the different positions.

In the operation of my present device, by switching the lever 28 to a position in which the ball 34 is in the recess 33 on the highest elevation 53, the lever 28 is moved to the left in Fig. 2, against the action of the spring 26. This permits the finger 20 to swing to the left in Fig. 2, as shown in broken lines, so that the circuit is effectively broken irrespective of what pressure exists in the passage 14.

When the switch lever 28 is moved to a position in which the ball 34 is in engagement with the recess 31, the lever 28 moves to its closest position with respect to the housing 4. In this position the spring 26 causes the finger 20 to move to a position in which the contacts 22 are in engagement with each other, so that the circuit is closed irrespective of what pressure exists in the passage 14.

The inbetween position of the lever 28, as shown in the drawing, illustrates the ball 34 as being in the recess 32. This is the normal running position, in which the contacts 22 are in engagement with each other if the pressure in the passage 14 rises sufficiently to flex the elastic diaphragm to a point where the finger 21 is bent to the left in Fig. 2, until the contacts 22 are in engagement. If the pressure in the passage 14 falls below that point, the contacts are separated by the inherent resilience of the finger 21. The fall in the fluid pressure in the passage 14 indicates trouble. This decline in the pressure breaks the circuit containing the wires 18 and 19.

If my control is connected with an internal combustion engine, the circuit would be the ignition circuit. Thus, if the oil pressure fell below a certain point, the ignition circuit would be automatically broken, thus stopping the engine, so that the trouble could be corrected.

While I have illustrated and described what I now regard as the preferred embodiment of my invention, the construction is, of course, subject to modifications without departing from the spirit and scope of my invention. I, therefore, do not wish to restrict myself to the particular form of construction illustrated and described, but desire to avail myself of all modifications that may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A control device, comprising a housing, electrical contacts in the housing movable toward and away from each other, diaphragm means arranged to seal off the contacts in a particular space in the housing, means to supply fluid under pressure to the housing at the opposite side of the diaphragm from the contacts, and means opening the contacts to a point where the diaphragm cannot close same though actuated by

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fluid pressure, whereby to break the circuit despite the fluid pressure, said means including a pin journaled in said housing, tension means to cause said pin to oppose the resilient movement of one of said contacts relative to the other, a lever connected to said pin, and a graduated body on said housing and cooperating with said lever to control manually the position of one of said contacts relative to and independently of the other contact.

2. In a machine having an electric circuit and having means for maintaining a supply of lubricating oil under pressure, a housing, a flexible diaphragm in the housing sealing the interior thereof into separate compartments against the passage of fluid from one compartment to the other, the housing having a connection with said means to supply oil under pressure to the compartment at one side of the diaphragm, electrical contact means in said circuit disposed in the other compartment, the contact means being movable to closed and open positions, resilient contact-support means mounted to move by their inherent resilience to circuit-breaking positions, the diaphragm tending to move one contact-support means to a circuit closing position by said oil pressure, a pin journaled in said housing, spring means urging the other contact-support means to a circuit closing position against its inherent resilience, the latter spring means being stronger than the contact support that it actuates, means to operate said pin, including a lever, a body graduated in different planes secured to said housing and having indentations, said lever manually movable on said body and having spring-pressed means to engage said indentations and hold said lever in any one of three positions, to-wit: to move one of the contact supports to a circuit closing position, regardless of the oil pressure; to maintain the one contact in position to be engaged by the other contact when under the influence of the oil pressure; and to move one of said contacts out of reach of the other contact.

3. A control device comprising a housing, resilient electrical contacts in the housing movable toward and away from each other, diaphragm means to seal off the contacts in the housing, means to supply fluid pressure to the housing at the opposite side of the diaphragm from the contacts, and means to control the position of one of said contacts relative to the other, to move the same to a circuit closing position regardless of pressure, to maintain said contact in position to be engaged by the other contact when under pressure and to cause said contact to move out of reach of the other contact, said means including a pin, tension means to oppose the resilient movement of one of said contacts relative to the other, a lever connected to said pin, and means on said housing and co-operating with said lever to control manually the position of said one contact relative to and independently of the other contact.

4. In a machine having an electric circuit and having means for maintaining a supply of lubricating oil under pressure, a housing, a flexible diaphragm in the housing sealing the interior thereof into separate compartments against the passage of fluid from one compartment to the other, the housing having a connection with said means to supply oil under pressure to the compartment at one side of the diaphragm, electrical contact means in said circuit disposed in the other compartment, the contact means being

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movable to closed and open positions and comprising resilient contact support means mounted to move by its inherent resilience to a predetermined position, a pin journaled in said housing, spring means influencing said pin to oppose the resilient tendency of one of said contacts to move away from the other contact, and means to control the inward and outward movement of

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said pin and the relative movement of said contacts, comprising a lever secured to said pin, a body graduated to different planes mounted on said housing, and the planes provided with indentations, and a spring-pressed member carried by said lever and engageable in said indentations.

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