Sept. 18, 1956 C. D. SPRACHER 2,763,747

AUTOMATIC PRESSURE CONTROLLED SWITCH

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FIG. 1.

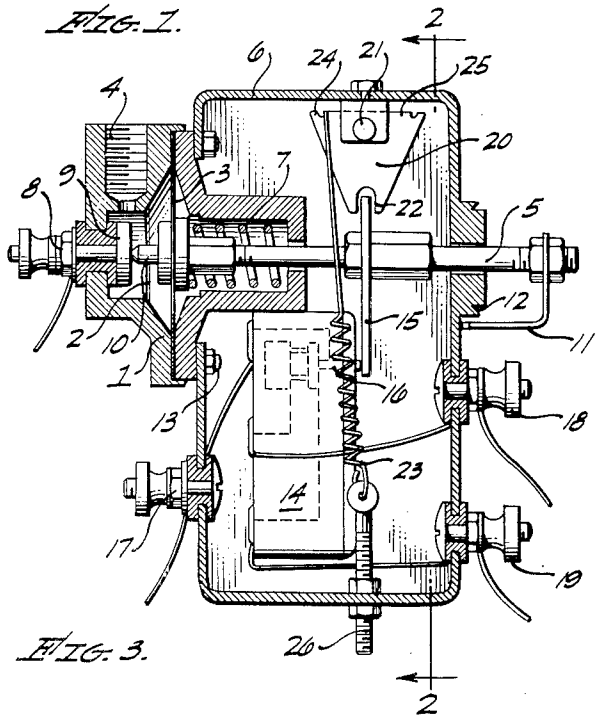


FIG. 3.

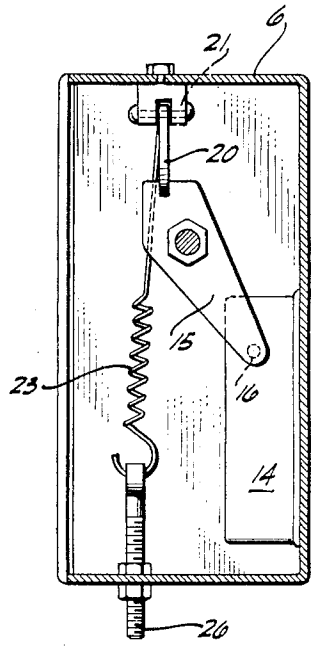
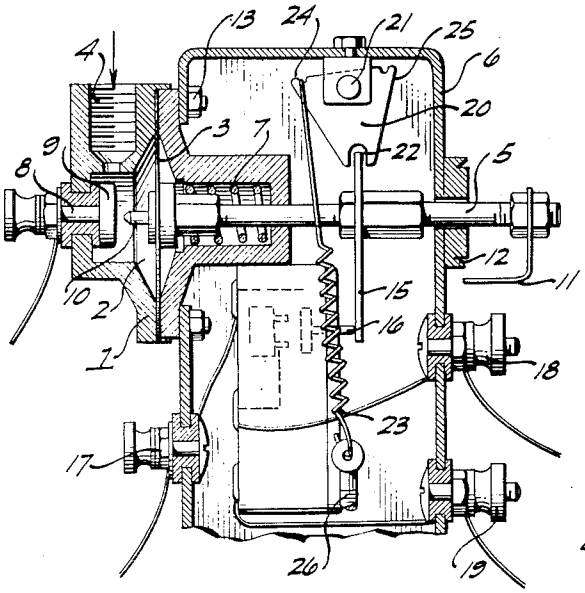


FIG. 2.



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AUTOMATIC PRESSURE CONTROLLED SWITCH

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2 Claims. (Cl. 200—83)

This invention relates to a novel automatic pressure controlled switch, particularly one which is used in connection with an internal combustion engine, this engine having a pressure oil system. The pressure of the oil system of the engine actuates the diaphragm of the switch so as to shut off the engine whenever the pressure of the oil system is reduced to a certain minimum.

An object of my invention is to provide a novel automatic pressure controlled switch which is applicable to engines having either magneto or a battery type ignition system.

Another object of my invention is to provide a novel automatic pressure controlled switch including a sensitive switch commonly termed a micro-switch, this switch being actuated by the rise or fall of the pressure of the oil system of the engine.

A feature of my invention is to provide a novel automatic pressure controlled switch which can be varied as to its sensitivity by adjustment of a spring within the switch.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

Figure 1 is a longitudinal sectional view of my switch showing the switch in closed position.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is a fragmentary longitudinal sectional view similar to Figure 1 but showing the switch in open position.

Referring more particularly to the drawing, the numeral 1 indicates a pressure housing which includes a chamber 2. A diaphragm 3 extends transversely across the chamber 2 and is mounted within the housing 1, substantially as shown. An intake port 4 extends into the chamber 2 and this port is connected to the pressure oil system of the engine so that pressure may be exerted by the oil of the engine on one side of the diaphragm 3. A rod 5 is secured at one end to the diaphragm 3 and this rod extends through a box 6 and is journalled in one wall of the box.

A spring 7 within the housing 1 bears against the diaphragm 3, tending to flex the diaphragm towards the left, as viewed in Figure 1. A ground terminal 8 extends into the housing 1 and includes a ground button 9 which is engaged by the terminal 10 in one position of the rod 5. If the engine is provided with a magneto, the ground wire from that magneto can be attached to the end of the rod 5, and also the terminal 8 can be grounded through an appropriate wire. When the contact 10 engages the button 9, the magneto of the engine would, therefore, be grounded and the engine would be stopped. This would occur when the oil pressure of the engine would drop to permit the spring 7 to press the contact 10 against the button 9. A spring finger 11 is attached to the outer end of the rod 5 and can be placed in the notch 12, thus pulling the contact 10 away from the button 9, which is necessary

when the engine is being started. As soon as the engine starts the oil pressure will flex the diaphragm 3 to the right, as shown in Figure 3, and will thus hold the contacts 9 and 10 apart.

The box 6 is attached to the housing 1 in a suitable manner, such as by means of the bolts 13. A sensitive switch (termed a micro-switch) 14 is fixedly mounted within the box 6. A finger 15 is fixedly secured to the rod 5 and this finger extends over and engages the actuating pin 16 of the sensitive switch. It will thus be evident that as the rod 5 moves under the urge of the diaphragm 3 that the switch 14 will be opened and closed, depending upon the position of the finger 15. A binding post 17 on the box 6 is connected to the switch 14 and this binding post serves as the common electrical terminal. An electrical lead is attached to the post 17 as shown. A second binding post 18 is also mounted on the box 6 and this binding post is so connected to the sensitive switch 14 that current will be transmitted to this binding post in the normally open position of the switch. A third binding post 19 on the box 6 is connected to the switch 14 so as to conduct current thereto in the normally closed position of the switch. Thus it will be evident that when the switch is open, current will be fed to the binding post 18, and when the switch is closed, current will be fed to the binding post 19.

When the oil pressure of the engine drops, the diaphragm 3 will flex to the left, as shown in Figure 1, and the finger 15 will then close the switch 14 by engaging the pin 16. In this position of the parts, current is fed to the binding post 19 and an alarm or a light may be attached to this binding post to indicate that the engine has stopped. Similarly, when the engine is running, oil pressure flexes the diaphragm 3 to the right, as shown in Figure 3.

The switch 14 is now open since the finger 15 moves away from the pin 16. Therefore, current is fed to the binding post 18 and again suitable equipment can be attached to this binding post, or the ignition system of the engine may be attached to this post if a battery ignition system is used. It is sometimes necessary that the rod 5 shall move quickly with respect to any change in the oil pressure of the engine. To aid and assist the spring 7 in controlling the movement of the rod 5, I provide a toggle plate 20 which is pivotally mounted at 21 in the box 6. The toggle plate 20 is formed with a notch 22 into which one end of the finger 15 extends.

A spring 23 is hooked at one end to a horn 24 of the toggle plate 20. The spring 23 may also be hooked over the opposite horn 25 of the toggle plate, depending on whether it is desired to oppose or aid the spring 7. The lower end of the spring 23 is attached to a bolt 26 which threads through the box 6, and by adjusting the length of this bolt within the box 6 it is possible to vary the tension of the spring 23. When the spring 23 is hooked to the horn 24, it opposes the spring 7, tending to open the terminals 9 and 10. When the spring 23 is hooked over the horn 25 it aids the spring 7 and tending to close the contacts 9 and 10.

In operation and starting first with the parts arranged as in Figure 1, the spring 7 is flexing the diaphragm 3 so as to press the contact 10 against the button 9, and this makes contact to the ground wire from the binding post 8, thus grounding the engine magneto, the ground wire of which is attached to the rod 5. This is the position of parts when the oil pressure of the engine is either zero or very low. As soon as the engine starts, the oil pressure entering the port 4 will flex the diaphragm 3 to the right, as shown in Figure 3. This breaks the contacts 9 and 10 and the engine (if it has a magneto) can operate. The sensitive switch 14 is being simultaneously operated and in the position of the parts shown in Fig-

ure 1 the switch 14 is closed, since the finger 15 is depressing the pin 16. The binding post 19 has current flowing to it in this position and suitable equipment can be attached to this binding post. When the engine is operating and the parts are as shown in Figure 3 the switch 14 is open and current flows to the binding post 18, which again can be used to control electrical apparatus or the ignition system of the engine itself, if a battery system is used. The tension spring 23 can be moved from one side of the toggle plate to the other, depending on whether it is desired to increase or decrease the action of the spring 7. Also the tension of the spring 23 can be adjusted by rotating the bolt 26.

Having described my invention, I claim:

1. An automatic pressure controlled switch comprising a housing, a flexible diaphragm extending transversely across the housing, said housing having a fluid pressure intake port therein, said port extending to one side of the diaphragm, an electrical terminal extending into the housing, a rod, one end of said rod being fixedly secured to the diaphragm, said rod projecting through the diaphragm, and the projecting end thereof being engageable with said terminal, a finger mounted on the rod, a box mounted on the housing, a sensitive switch mounted in the box, an actuating pin rising from the switch, said finger engaging the pin to actuate the switch on movement of the rod, and a spring in the housing bearing against said diaphragm to urge said diaphragm in a direction to contact the rod with said terminal, a toggle plate pivotally mounted in the box, said toggle plate having a notch therein, one end of said finger projecting into the notch, and a spring in the box, one end of said spring being attached to the toggle plate.

2. An automatic pressure controlled switch comprising a housing, a flexible diaphragm extending transversely across the housing, said housing having a fluid pressure intake port therein, said port extending to one side of the diaphragm, an electrical terminal extending into the

housing, a rod, one end of said rod being fixedly secured to the diaphragm, said rod projecting through the diaphragm, and the projecting end thereof being engageable with said terminal, a finger mounted on the rod, a box mounted on the housing, a sensitive switch mounted in the box, an actuating pin rising from the switch, said finger engaging the pin to actuate the switch on movement of the rod, and a spring in the housing bearing against said diaphragm to urge said diaphragm in a direction to contact the rod with said terminal, a toggle plate pivotally mounted in the box, said toggle plate having a notch therein, one end of said finger projecting into the notch, and a spring in the box, one end of said spring being attached to the toggle plate, a bolt threaded through the wall of the box, said spring being secured to the bolt at one end thereof, binding posts mounted in the box, and electrical leads extending from the binding posts to the sensitive switch.

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