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AUTOMATIC STARTING SWITCHES

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4 Claims. (Cl. 200—81.5)

My invention has relation to improvements in starting switches for automobile engines and it consists in the novel details of construction more fully set forth in the specification and pointed out in the claims.

The object of the invention is to provide a starting switch that will operate automatically on the closing of the ignition switch to close the electric circuit of the engine whereupon the starting motor is immediately set in motion. This new automatic starting switch will operate independently of the usual manually operated starting switch but may be associated with it if desired as a matter of precaution.

The advantage of the automatic starting switch is that in case of engine failure while the automobile is in motion the starter will be automatically actuated without any act on the part of the driver. This is a great advantage while driving under difficult traffic conditions, and to inexperienced drivers. The invention makes for safety and helps to avoid traffic congestions.

These advantages as well as others inherent in the invention will be better apparent from a detailed description of the invention in connection with the accompanying drawings, in which—

Fig. 1 is a diagrammatic view of the electrical system of an automobile engine embodying my new automatic starting switch; Fig. 2 is a front elevation of my invention comprising the automatic switch and actuating mechanism therefor; Fig. 3 is a side elevation of the invention; Fig. 4 is a side elevation of the automatic switch and actuating vane therefor; Fig. 5 is an end view of the actuating switch; and Fig. 6 is a combined side elevation and section of the vacuum actuated diaphragm which also serves as an actuating device for the automatic switch.

Referring to the drawings, for the present to Fig. 1 only, B represents the battery, one side of which is grounded at G and the other side of which is connected by a conductor 1 to contact 2 of ignition switch 3. The contact 4 of switch 3 is connected by a conductor 5 to the ignition, comprising coil, distributor and spark plugs (not shown), and contact 4 is also connected by conductor 6 to electric terminal 7 of a mercury switch 8. The terminal 9 of switch 8 is connected by a conductor 10 to coil 11 of relay 12 associated with starting motor 13. The other side of coil 11 is grounded at G'. One side of the starting motor is grounded at G'' and the other side connected to contact 14 of the relay 12 by conductor 15. Contact 16 of relay 12 is connected to conductor 1 by conductor 17. The usual starting switch 18 is connected between conductors 1 and 10 by conductors 19 and 20 respectively so that it may be used to actuate the starting motor 13 if desirable, or necessary.

From the foregoing it is obvious that on closing the switch 18 current will flow through the relay 12 to actuate the starting motor 13. The action of the automatic switch 8 will be described after the description of the mechanism thereof which is as follows:

A bracket 21 is mounted at any suitable point adja-

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cent to the engine fan (not shown), said bracket having a crank shaft 22 mounted in it on which shaft 22 a blade 23 is loosely mounted. The blade 23 is supported by ears 24, 25 on the latter of which is a spring clamp 26 for holding mercury tube switch 8. There are a pair of contacts 7 and 9 in tube 8 adapted to be short-circuited by the mercury 28 when the vane 23 hangs freely under the force of gravity (Figs. 3 and 4). An insulated bracket 29 is mounted on bracket 21 and carries contacts 30 and 31, the former being connected by conductor a to contact 7 and the latter by conductor b to contact 9.

By referring to the wiring diagram (Fig. 1) it will be seen that contact 7 is connected by conductor 6 to both the ignition switch 3 and the ignition (not shown). Contact 9 is connected by conductor 10 to relay coil 11.

It should be apparent that when the vane 23 is forced by the air blast of the fan to the dotted position (Fig. 4) the tube of switch 8 is tilted so as to cause the mercury 28 to flow away from contacts 7 and 9, thus opening the switch to the starting motor. When the motor is killed and the fan slows or comes to a stop the vane 23 drops (full lines Fig. 4) and the contacts 7 and 9 are connected to automatically connect the starter and start the motor.

As a matter of precaution against the breaking of the fan belt a second actuating device is provided for the automatic starting switch 8. This second actuating device comprises a vacuum operated flexible diaphragm 32 mounted within a case 33. The chamber 34 above the diaphragm has a hollow boss 35 connected by suitable fittings 36 to a tube 37 which is also connected to the vacuum side of the motor (intake manifold, for example). The diaphragm 32 carries an arm 38 which depends through a slot 39 in the bottom of case 33 and said arm has an opening 40 through which extends a crank 41 on the end of crank shaft 22. There is a depending lever arm 42 on the opposite end of crank shaft 22 which impinges on vane 23 when shaft 22 is rotated by the upward movement of arm 38. A spring 43 holds the diaphragm 32 in its lower position except when the motor is running, at which time the vacuum created in chamber 34 raises the diaphragm 32 to rotate crank shaft 22 and cause lever arm to impinge on vane 23 and raise the same (dotted position, Fig. 4) unless the vane is held up by the blast of the motor fan.

From the foregoing it is apparent that every contingency is provided for to insure the automatic starting of the motor in the event the same should accidentally fail.

Having described my invention, I claim:

1. An automatic electric switch comprising a movable vane, a tube mounted on said vane, a pair of contacts at one end of said tube, a liquid conductor in said tube connecting said contacts when the vane is at rest, and a vacuum actuated diaphragm associated with the vane to break the connection between the contacts and the liquid conductor.

2. An automatic control for an electric circuit comprising a support, a vane member pivotally suspended therefrom and adapted to be swung by gravity to a predetermined position and to be swung from said position by an air stream, a mercury switch mounted on and movable with said member and contributing by its weight to the gravity-induced swinging of the member, said switch closing a circuit when in said predetermined position and opening the circuit when moved substantially therefrom, and a vacuum operated device including a diaphragm having an operative connection to said vane member to move the latter away from said predetermined position as the vacuum in the device is increased.

3. An automatic control for an electric circuit comprising a support member, a horizontal shaft journaled thereon and provided with offset crank elements, a vane

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member pivoted on said shaft and depending therefrom, a mercury switch mounted on said vane member and movable therewith, independently of movement of said shaft, from a circuit closing position to a circuit opening position, a suction device including a diaphragm and an arm actuated thereby and operatively connected to one of said crank elements, and one of said crank elements being disposed to engage said vane member and move it with said shaft irrespective of air pressure on said vane members.

4. In an automatic control for an electric circuit, a relatively stationary support, a vane member having a pivot-mounting on said support and depending therefrom so as to be swung on its pivot by a stream of air, a mercury switch mounted on said vane member with its center of gravity adjacent to said pivot support, a vacuum pressure device having an element actuated by the pressure in the device and operatively associated with said vane at a point on the latter spaced substantially from said pivoted mounting, whereby variations in the flow of air past said vane and variations in the pressure in said device operating independently of each other

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swing said vane and switch on said pivoted mounting from a circuit closing to a circuit opening position.

References Cited in the file of this patent

UNITED STATES PATENTS

5	1,241,284	Rhoades	Sept. 25, 1917
	1,269,637	Olmsted	June 18, 1918
	1,352,212	Newcomb et al.	Sept. 7, 1920
	1,456,663	Willis	May 29, 1923
10	1,635,078	Gilbert	July 5, 1927
	1,644,935	McCabe	Oct. 11, 1927
	1,791,614	Danner	Feb. 10, 1931
	2,060,955	Swennes	Nov. 17, 1936
15	2,135,620	Loehr et al.	Nov. 8, 1938
	2,180,796	Claytor	Nov. 21, 1939
	2,226,785	Soucy	Dec. 31, 1940
	2,296,528	Lacoe	Sept. 22, 1942
	2,318,671	Claytor	May 11, 1943
20	2,475,850	Moore et al.	July 12, 1949
	2,577,653	Dysart	Dec. 4, 1951
	2,582,483	Hallerberg	Jan. 15, 1952