April 28, 1936. J. J. DRABIN 2,038,552

STARTING DEVICE FOR AUTOMOTIVE VEHICLES

Filed May 13, 1935

Fig. 1.

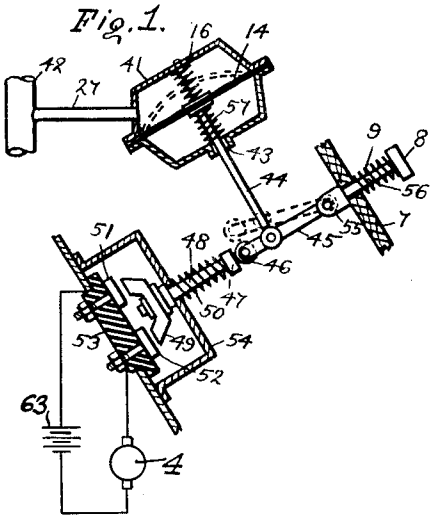


Fig. 2.

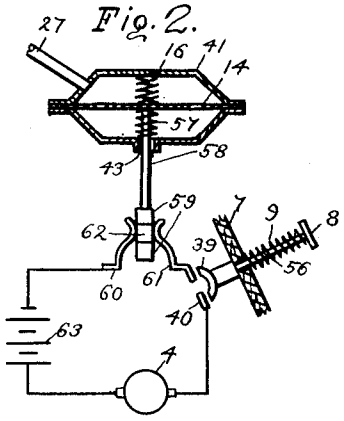
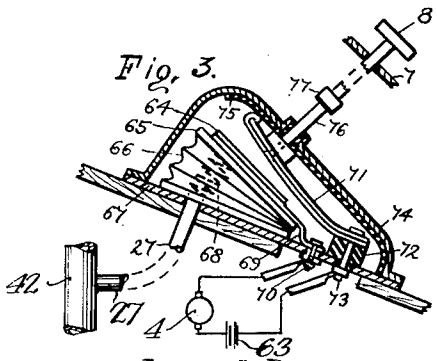


Fig. 3.



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Patented Apr. 28, 1936 2,038,552

UNITED STATES PATENT OFFICE

2,038,552

STARTING DEVICE FOR AUTOMOTIVE VEHICLES

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Application May 13, 1935, Serial No. 21,178

3 Claims. (Cl. 290—38)

My invention relates to starting devices and has particular reference to automatic control of switches for electric starting motors for gasoline engines.

The object of my invention is to provide a starting switch operated by a pedal, which will become automatically disconnected as soon as the engine begins to turn under its own power.

Another object of my invention is to provide an automatic device for disconnecting a starting switch not only when the engine of the vehicle begins to turn in its operative direction, but also under conditions of backfiring when the engine makes rapidly a few revolutions in the wrong direction.

Another object of my invention is to provide an air operated motor connected with the intake manifold of the engine and adapted to disconnect the starting switch mechanically or electrically when there is vacuum or pressure in the intake manifold, corresponding to the conditions of the normal running of the engine or its backfiring.

My invention is more fully described in the accompanying specification and drawing in which—

Fig. 1 is a sectional elevation of my device for disconnecting starting switch when there is vacuum or pressure in the engine manifold, Fig. 2 is a sectional elevation of another modification showing also diagrammatically the electric circuits, and Fig. 3 is a sectional elevation of a starting switch with my disconnecting attachment of a modified construction.

In my device I use an air motor, preferably a cylinder with a movable member inside, such as a plunger or diaphragm, connected with the intake manifold of an engine.

A typical embodiment of my invention is shown in Fig. 1. The air cylinder 41 is connected by a pipe 27 with the intake manifold 42 of the engine. The other side of a diaphragm 14 is exposed to the outside air through an aperture 43 around a rod 44 extending from the diaphragm to the switch. The other end of the rod 44 is pivotally connected to a push rod 45 having a roller 46 resting against a flat head 47 of a push rod 48 carrying a switch contact member 49. A spring 50 keeps the rod 48 in a raised position, away from the stationary contact members 51 and 52 mounted on an insulation block 53 in a housing 54. The other end of the rod 45 is pivotally connected to a clevis 55 on the end of a pedal rod 56 having a pedal 8 on the end. A spring 9 keeps the pedal in a raised position with the clevis 55 resting against the lower side of the board 7.

The diaphragm 14 is maintained in a neutral or middle position by compression springs 16 and 57. In this position the roller 46 rests against the head 47. As soon as the engine begins to turn under its own power, however, vacuum in the manifold will cause the atmospheric pressure to push the diaphragm into the cylinder thereby pulling the roller 46 off the head 47 and releasing the rod 48 and disconnecting the switch by the action of the spring 50.

Should the engine backfire and turn backwards, pressure will be created in the manifold, causing the diaphragm 14 to deflect outward. Such a movement of the diaphragm will also disconnect the starting switch by pushing the roller 46 off the other side of the head 47.

A modification is shown in Fig. 2. Here the diaphragm 14 is operating a rod 58 supporting an insulation block 59 on the other end. This block slides between resilient contact members 60 and 61. A conducting contact sleeve 62 is mounted on the middle portion of the block 59 and electrically connects the members 60 and 61 when the diaphragm 14 is in its neutral or middle position (which is shown in Fig. 3 of the drawing). In this position the circuit for the starting motor 4 is closed on a battery 63 through contact points 61 and 40 when the starting pedal 8 is depressed closing contact points 61 and 40. The circuit becomes disconnected as soon as the engine begins to turn under its own power, in which case the atmospheric pressure will cause the diaphragm 14 to deflect upwards due to vacuum in the manifold, shifting the sleeve 62 away from the contact points 60 and 61 and placing an insulated portion of the block 59 between them instead. In case of a backfire pressure in the manifold will cause the diaphragm to deflect outward, likewise pushing the sleeve 59 off the members 60 and 61 and disconnecting the starting circuit.

A simplified modification of a starting switch is shown in Fig. 3. Here a contact plate 64 is mounted on the upper or movable board 65 of bellows 66 supported on a base plate 67. The bellows is kept in an expanded or operative position by a spring 68 inside and is connected by a pipe 27 with the intake manifold of the engine.

The contact plate 64 is connected by a flexible strip 69 with a terminal 70. The flexible strip 69 may be made resilient in which case the spring 68 may be dispensed with. Another flexible resilient contact member 71 is supported at one end on an insulation block 72 by a terminal bolt 73. A housing 74 encloses the switch and is lined inside with an insulation layer 75. A rod 76 extends through a hole in the housing and through

the floor board 7 and is provided with a pedal 8 on the end. Resiliency of the contact member 71 keeps it in the upper position away from the plate 64. The contacts are closed by depressing the pedal 8 thereby bringing the plates 64 and 71 together. A collar 77 on the rod 76 rests against the edge of the hole in the housing limiting the movement of the rod.

The bellows becomes deflated by the pressure from the outside air as soon as vacuum is produced inside of it by the normal operation of the engine. With the bellows deflated the plate 64 moves away from the plate 71 thereby breaking the circuit for the starting motor. The collar 77 prevents the member 71 from following the plate 64 when the bellows is fully deflated.

My starting devices in all their modifications can easily be mounted on the frame of the starting motor, being small and compact and consisting of but a few parts.

Because of the automatic action of the device, the contacts may be closed by the clutch pedal so that the starting switch is closed whenever the clutch pedal is depressed.

I claim as my invention:

1. In a starting device for an automotive vehicle having an engine with an intake manifold and a starting motor, the combination of an electric switch for said motor, a retrieving spring for disconnecting said switch, a manually controlled means for closing said switch, a hinged link connecting said manual means with said switch, an air motor operatively connected with said link, and a pipe connecting said air motor with said intake manifold, said motor being adapted to disconnect said link from said switch when there is vacuum or pressure in said manifold.

2. In a starting device for an automotive vehicle having an engine with an intake manifold and a starting motor, the combination of an electric switch for said motor, a retrieving spring for disconnecting said switch, a manually controlled means for closing said switch, a disconnectible connection between the closing means and the switch, an air motor operatively connected with said disconnectible connection, and a pipe connecting the air motor with said intake manifold said motor being adapted to disconnect said connection when said engine begins to turn under its own power, in either direction, producing vacuum or pressure in said manifold.

3. In a starting device for an automotive vehicle having an engine with an intake manifold and a starting motor, the combination of an electric switch for said motor (a retrieving means for disconnecting the switch, a manually controlled means for closing the switch, an air motor, a pipe connecting the air motor with said manifold, and operative connections between the air motor and said closing means, the motor through said connections being adapted to render said closing means inoperative when there is vacuum or pressure in the manifold.

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