

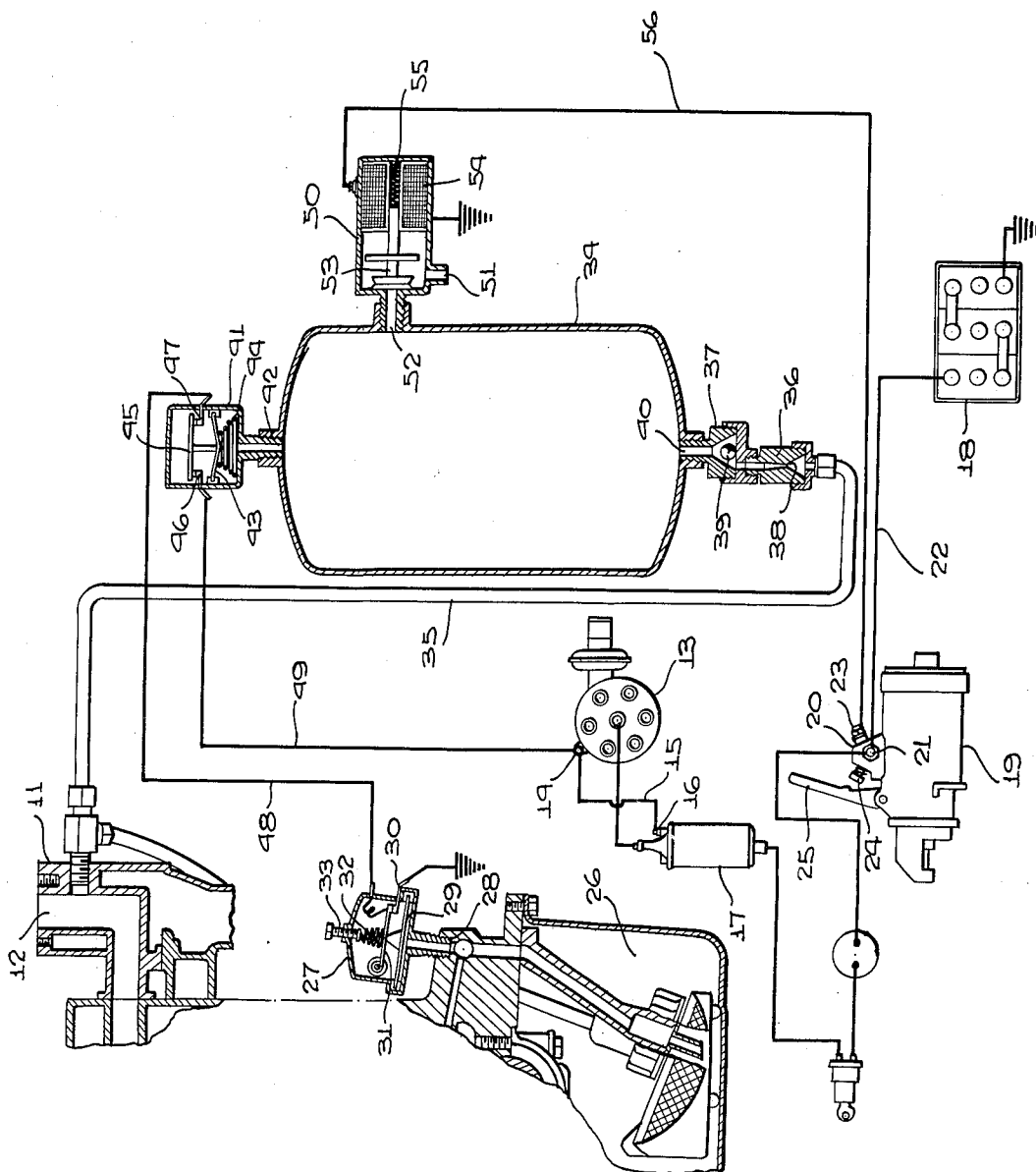
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OIL PRESSURE LOSS MOTOR PROTECTOR

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OIL PRESSURE LOSS MOTOR PROTECTOR

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2 Claims. (Cl. 123—198)

This invention relates to protective devices for internal combustion engines, and more particularly to a device for automatically terminating the operation of the internal combustion engine of a motor vehicle or the like when the oil pressure drops below a safe value.

The main object of the invention is to provide a novel and improved system for protecting an internal combustion engine against operation when the oil pressure of the engine is below a safe value, the improved system involving relatively simple parts, being reliable in operation, and being arranged so that it does not interfere with starting of the engine.

A further object of the invention is to provide an improved system for protecting the internal combustion engine of a motor vehicle from damage due to insufficient oil pressure, the improved system being easy to install, involving inexpensive components, and being arranged so that the ignition system of the internal combustion engine is automatically deenergized whenever the oil pressure drops below a predetermined safe minimum value.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein the single figure is a schematic diagram of an improved safety system for protecting an internal combustion engine against insufficient oil pressure, in accordance with the present invention.

Referring to the drawings, 11 designated a fragmentary portion of the internal combustion engine of a motor vehicle, said fragmentary portion including the intake manifold 12. Designated at 13 is the distributor of the engine, and designated at 14 is the breaker point contact terminal of the distributor which is connected by a wire 15 to the ungrounded terminal 16 of the low voltage winding of the ignition coil 17. The vehicle battery is designated at 18 and the vehicle starting motor is designated at 19. Designated at 20 is the starter switch, said switch being provided with a first terminal 21 connected by a wire 22 to the underground terminal of the battery 18, and with a second terminal 23 connected to the underground terminal of the starting motor 19, the starting motor 19 becoming energized when the switch button 24 is pushed inwardly by the operation of the starter pedal lever 25.

The engine crankcase is shown at 26. Designated at 27 is a normally closed, pressure-responsive switch which is connected to the crankcase 26 at 28 and which is provided with the pressure-responsive diaphragm 29. The switch 27 has a first terminal 30 which is grounded and has a movable contact 31 biased toward engagement with the terminal contact 30 by a coiled spring 32 which is urged inwardly by an adjustable screw 33 threadedly engaged in the outer wall of the switch. By adjusting the screw 33, the movable contact 31 will be rotated away from the contact terminal 30 when the oil pressure in the crankcase 26 exceeds a predetermined minimum value. When the oil pressure drops below said minimum value, the movable contact 31 rotates into engagement with the grounded terminal contact 30.

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Designated at 34 is a vacuum tank which is mounted adjacent the internal combustion engine 11 and which has one end thereof connected to the engine intake manifold 12 by a conduit 35 through a metering jet member 36 and a ball check valve 37, as shown. The metering jet member 36 contains a constricted metering passage 38 which prevents the vacuum in the tank 34 from dropping too rapidly when the vacuum in the intake manifold 12 diminishes momentarily, as during periods of sudden acceleration of the motor vehicle or when a heavy load is suddenly placed on the engine, as when the vehicle encounters a steep grade. The ball check valve 37 also serves to prevent the vacuum in the tank 34 from dropping under such conditions, since the ball 39 will seat in the valve and close the valve passage 40 when an unbalance of pressure occurs, as under conditions of sudden acceleration, as above described, wherein the vacuum in the intake manifold 12 drops.

Designated at 41 is a normally open, vacuum-responsive switch which is connected at 42 to the end of the vacuum tank 34 and which is provided with the vacuum-responsive diaphragm 43 and the biasing spring 44. Secured to the diaphragm 43 is the switch armature 45 which bridges the stationary contacts 46 and 47 when vacuum is present in the vacuum tank 34. When the tank 34 is vented, the loss of vacuum therein causes the spring 44 to flex the diaphragm 43 outwardly, namely, upwardly, as viewed in the figure, causing the armature 45 to disengage from the contacts 46 and 47, opening the switch. The contact 47 is connected by a wire 48 to the movable contact 31 of the oil pressure-responsive switch 27 and the contact 46 is connected by a wire 49 to the breaker contact terminal 14 of the distributor 13. Thus, with the vehicle in normal operation, vacuum is present in the tank 34 and the switch 41 is closed. However, with normal oil pressure in the engine, the switch 27 is open. However, when the oil pressure in the engine drops below the predetermined safe minimum value, the contact 31 engages the contact 30, causing the breaker point terminal 14 to be grounded through a circuit comprising the wire 49, contact 46, switch armature 45, contact 47, wire 48, the contact 31 of switch 27, and the stationary contact 30 of said switch, which is grounded, as shown. Thus, the ignition system is automatically deenergized when the pressure of oil in the crankcase 26 drops below a predetermined safe value.

In order to enable the engine to be started, means are provided for venting the vacuum tank 34 simultaneously with the energization of the starting motor 19. Said means comprises a solenoid valve 50 mounted on the tank and having a vent port 51 which is placed in communication with the vent passage 52 when the solenoid plunger 53 is elevated responsive to the energization of the solenoid winding 54. Plunger 53 is normally biased toward closing position over the passage 52 by the solenoid spring 55. One terminal of the solenoid winding 54 is grounded and the other terminal is connected by a wire 56 to the starter switch terminal 23, whereby the solenoid winding 54 becomes energized simultaneously with the closure of the starting switch 20, said solenoid 54 becoming energized in parallel with the starting motor 19. The energization of the solenoid valve 50 allows the vacuum tank 34 to be vented to atmosphere, thereby causing the vacuum-responsive switch 41 to open, whereby the ignition system is allowed to function normally during the starting of the engine. As the engine is started, the metering member 36 prevents vacuum from being built up too rapidly in the tank 34, and thus produces a substantial time delay in the closing of the vacuum-responsive switch 41 when the engine is being started. Thus, the protective circuit cannot interfere with normal starting of the automobile engine. However, after the engine

has been started and is in its operating condition, vacuum develops in the tank 34 and causes the switch 41 to be closed, thereby preparing the protective circuit for response in the event that the oil pressure in the crankcase 26 drops below the desired minimum value.

While a specific embodiment of an improved oil pressure loss protective system for an internal combustion engine has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In an internal combustion engine having an intake manifold, an oil crank case associated with said engine, and an ignition system associated with said engine, said ignition system having a low voltage winding, the improvement comprising a normally closed switch operatively associated with said crank case and arranged to open responsive to a predetermined oil pressure in said crank case, a normally opened switch, a vacuum tank connected to the intake manifold of the engine, means formed and arranged to close said second-named switch when a predetermined vacuum exists in said tank, means formed and arranged to vent said tank for a short time when the engine is started, whereby to allow said second-named switch to open during starting of the engine, and a circuit including said switches and connected between the terminals of the low voltage winding of said ignition 30

system and being arranged to de-energize the ignition system when both switches are closed.

2. In an internal combustion engine having an intake manifold and a starter, an oil crank case associated with said engine, and an ignition system associated with said engine, said ignition system having a low voltage winding, the improvement comprising a normally closed switch operatively associated with said crank case and arranged to open responsive to a predetermined oil pressure in said crank case, a normally opened switch, a vacuum tank connected to the intake manifold of the engine, means formed and arranged to close said second-named switch when a predetermined vacuum exists in said tank, an electromagnetic vent valve on said tank, means formed and arranged to open said vent valve simultaneously with the operation of the starter, whereby to allow said second-named switch to open during starting of the engine, and a circuit including said switches and connected between the terminals of said low voltage winding of said ignition system and being arranged to de-energize the ignition system when both switches are closed.

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