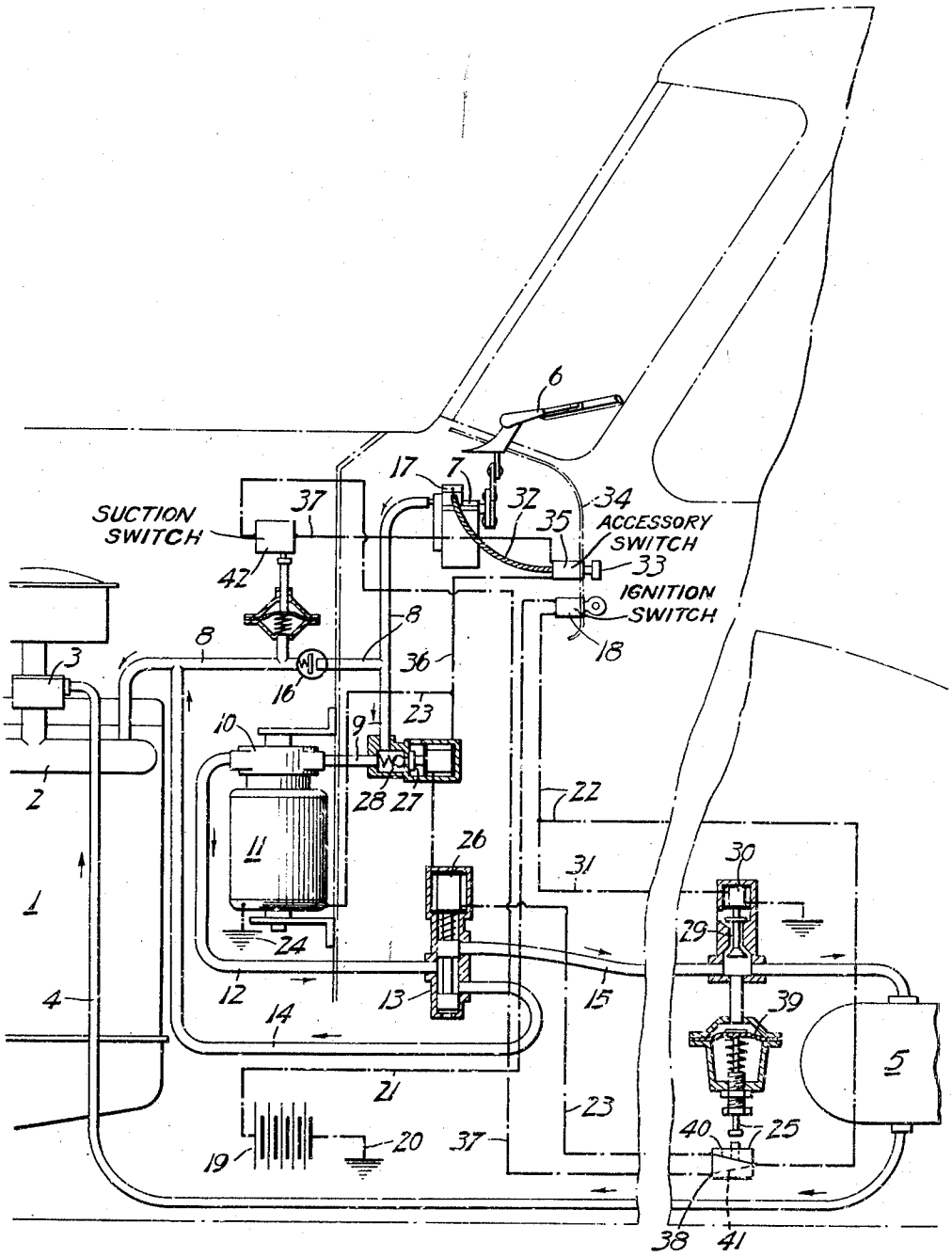
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PUMP FOR OPERATING SUCTION ACCESSORIES AND PRESSURIZING FUEL TANKS OF MOTOR VEHICLES

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PUMP FOR OPERATING SUCTION ACCESSORIES AND PRESSURIZING FUEL TANKS OF MOTOR VEHICLES

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This invention relates to the motor vehicle accessory field and more particularly to a system utilizing air pressure singly or in association with the negative pressure of the intake manifold, the primary object of the invention being to provide a combined fuel feeding and accessory system which is practical and efficient in operation and one in which a common source of operating pressure serves to supply subatmospheric pressure for the operation of the accessory and superatmospheric pressure for the feeding of fuel.

A further object of the invention is to provide an accessory system of this character in which the fuel supply system is given preference over the other accessories or adjuncts in order to insure continuous and efficient engine performance. Again, the invention aims to provide a system of this nature in which the fuel system is brought into functioning immediately upon the conditioning of the ignition system for engine starting.

A still further object of the invention is to provide a fuel system in which superatmospheric pressure is utilized for compelling fuel flow from the supply tank to the carburetor while providing a factor of safety against fire hazard when the vehicle is parked.

The foregoing and other objects will manifest themselves as the following description progresses, reference being made therein to the accompanying drawing, wherein the illustrated embodiment depicts diagrammatically the improved system.

Referring more particularly to the drawing, the numeral 1 designates a motor vehicle power plant having an intake manifold 2 and a carburetor 3 the latter being supplied through a conduit 4 with fuel from a supply tank 5 located in the back of the vehicle. The accessory, herein illustrated by way of example as a windshield cleaner 6, has its motor 7 connected through a conduit 8 to the intake manifold and by a conduit 9 to a suction generating pump 10 that is electrically driven by a motor 11. The discharge or exhaust from the pump flows through a conduit 12 to a distributing valve 13 which normally directs the pump exhaust to the atmosphere, as through the intake manifold by a branch passage 14 leading to the suction line 8, but is adapted to direct the exhaust through a branch conduit 15 into the fuel tank 5 for providing a fuel feeding pressure on the liquid therein.

The suction line 8 supplies the accessory motor 7 with subatmospheric pressure when the manifold supply is ample. When not, the pump will

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function, an interposed check valve 16 closing to preclude the pump 10 drawing gas from the manifold. A control valve 17 is arranged to connect the accessory motor 7 to the source of suction.

The key controlled ignition switch 18 of the motor vehicle power plant connects the source of electricity 19 to the self-starter system, not shown. The battery 19 is grounded at 20 and connected by a circuit wire 21 to the ignition switch, the circuit being completed through wires 22 and 23 and the motor 11 to the ground 24. Also interposed in this circuit is a normally closed switch 25, the electro-magnet 26 of the exhausted directing valve 13, and an electro-magnetic bleed valve 27, the switch 25 being responsive to the tank pressure in the branch conduit 15.

When the ignition switch is closed, and assuming that the carburetor is in need of replenishment, the electrically driven pump will function as a compressor to build up the pressure in the fuel tank. Concurrently, the valve 13 will close off the manifold branch 14 and open the fuel tank branch 15 so that the now operating pump will deliver air to the fuel tank for raising the pressure on the fuel therein. At the same time the bleed valve 27 will unseat to permit air flow into the inlet side of the pump against the action of a spring closed ball check valve 28. This check valve will function to admit the air necessary for the fuel tank when the accessory motor 7 is inoperative. It will also function to admit a supplementing supply of air to the pump for fuel feeding purposes when the accessory motor is in operation. By reason of the spring seated check valve sufficient vacuum will be maintained for efficient windshield cleaner performance. Obviously, two or more accessory motors may be connected to the pump inlet conduit 9.

Should the accessory system alone be operating, the electromagnet valve 27 will close the bleed opening to condition the system for accessory operation alone in enhancing the suction influence of the pump when the latter is called upon.

Means are provided to vent the fuel tank whenever the ignition switch is turned off and thereby minimize the fire hazard from possible fuel leakage. To this end a normally open venting valve 29 is designed for being closed by an electromagnet 30 which is also connected in circuit with the battery 19 and the ignition switch by means of a branch circuit wire 31.

The control valve 17 for the accessory motor 7 may be operated by a flexible push-pull wire 32 leading to a knob 33 on the instrument panel 34. This knob also constitutes an actuator for a

switch 35 which is connected by a branch wire 36 from the electric motor wire 23 and also by a wire 37 to a switch contact 38 in the switch 25. The switch 25 normally closes the motor circuit for supplying the fuel tank with fuel feeding pressure but when the tank pressure is sufficient and the pressure responsive member 39 is functioning, it will interrupt the motor circuit through the wire 23 and connect the wire 22 to the wire 37. This has been schematically depicted by the arm 40 which is adapted to be shifted to the dotted line position 41 for continuing the motor operation should the accessory be in use at the time when the member 39 responds to a sufficient pressure in the fuel tank.

A suction responsive switch 42 is interposed in the circuit wire 37 and breaks the motor circuit, as far as the accessory is affected when the manifold suction influence is ample for accessory operation, at which time the accessory motor 7 will operate on the manifold influence alone.

From the foregoing, it will be observed that the suction actuated accessory system will always have a reliable source of negative pressure. Likewise, the fuel feeding system will always have a reliable supply of superatmospheric pressure, and that under normal conditions of vehicle travel the suction producing pump for the accessory system will supply the fuel feeding system with the desired fuel feeding pressure, the pump inlet being supplied with the required additional air by means which function only when the fuel feeding system requires additional air.

The combined fuel feeding and accessory system is efficient and practical. Upon replenishing the fuel supply in the tank 5, the required pressure will be immediately restored upon closing the ignition switch.

The foregoing description has been given in detail for clearness and not by way of limitation since the inventive principles are capable of assuming other physical embodiments without departing from the spirit of the invention and the scope of the appended claims.

What is claimed is:

1. A combined fuel feeding and accessory system for a motor vehicle having a power plant, comprising a suction actuated accessory, a pump having fluid connection with the accessory for so actuating the same, a fuel tank for supplying the power plant of the motor vehicle with fuel, a pressure supply conduit connecting the pump exhaust to the tank, electrical means for actuating the pump including the ignition switch of the power plant in an energizing circuit therefor, a distributing valve under the control of the ignition switch to connect the pump exhaust to the fuel tank when the switch is turned on and to open the pump exhaust to the atmosphere when the ignition switch is opened, and means responsive to the tank pressure for opening the circuit.

2. A combined fuel feeding and accessory system for a motor vehicle having a power plant, comprising a suction actuated accessory, a pump having fluid connection with the accessory and taking air therefrom for so actuating the same, a fuel tank for supplying the power plant of the motor vehicle with fuel, a pressure supply conduit connecting the pump exhaust to the tank, electrical means for actuating the pump including the ignition switch of the power plant in an energizing circuit therefor, means for admitting additional air into the pump intake for building up the tank pressure, means responsive to the tank pressure for opening the circuit, and means under the control of said tank pressure responsive means for precluding the admission of additional air to the pump inlet when the fuel tank pressure is ample.

3. A combined fuel feeding and accessory system for motor vehicles, comprising, in combination with a source of fluctuating pressure, a suction operated accessory connected to the source, a control operable to connect the source to the accessory, an air pump having its inlet connected to the accessory, a fuel tank connected to the pump outlet for providing a fuel feeding pressure therein, electrical means connected for operating the pump and including a pump driving electric motor and a circuit closing switch operable by the control, means responsive to the source pressure for opening the switch, and a second circuit including the electric motor and a circuit closing switch therefor.

4. A combined fuel feeding and accessory system for motor vehicles, comprising, in combination with a source of fluctuating pressure, a suction operated accessory connected to the source, a control operable to connect the source to the accessory, an air pump having its inlet connected to the accessory, a fuel tank connected to the pump outlet for providing a fuel feeding pressure therein, electrical means connected for operating the pump and including a pump driving electric motor and a circuit closing switch operable by the control, means responsive to the source pressure for opening the switch, a second circuit including the electric motor and a circuit closing switch therefor, and means for venting the tank when the second circuit is opened.

5. A combined fuel feeding and accessory system for motor vehicles, comprising, in combination with a source of fluctuating pressure, a suction operated accessory connected to the source, a control operable to connect the source to the accessory, an air pump having its inlet connected to the accessory, a fuel tank connected to the pump outlet for providing a fuel feeding pressure therein, electrical means connected for operating the pump and including a pump driving electric motor and a circuit closing switch operable by the control, means responsive to the source pressure for opening the switch, a second circuit including the electric motor and a circuit closing switch therefor, and a distributing valve acting to divert the pump discharge from the tank to the atmosphere when the second circuit is opened and the first circuit is closed.

6. A combined fuel feeding and accessory system for motor vehicles, comprising, in combination with a source of fluctuating pressure, a suction operated accessory connected to the source, a control operable to connect the source to the accessory, an air pump having its inlet connected to the accessory, a fuel tank connected to the pump outlet for providing a fuel feeding pressure therein, electrical means connected for operating the pump and including a pump driving electric motor and a circuit closing switch operable by the control, means responsive to the source pressure for opening the switch, a second circuit including the electric motor and a circuit closing switch therefor, and means under the control of the second circuit for admitting additional air to the pump inlet for compression in the tank.

7. A combined fuel feeding and accessory system for motor vehicles, comprising, in com-

bination with a source of fluctuating pressure, a suction operated accessory connected to the source, a control operable to connect the source to the accessory, an air pump having its inlet connected to the accessory, a fuel tank connected to the pump outlet for providing a fuel feeding pressure therein, electrical means connected for operating the pump and including a pump driving electric motor and a circuit closing switch operable by the control, means responsive to the source pressure for opening the switch, a second circuit including the electric motor and a circuit closing switch therefor, means under the control of the second circuit for admitting additional air to the pump inlet for compression in the tank, and a distributing valve acting when the second circuit is opened and the first circuit closed to divert the pump exhaust into the suction communication between the source and the accessory.

8. A combined fuel feeding and accessory system for motor vehicles, comprising, in combination with a source of fluctuating pressure, a suction operated accessory connected to the source, a control operable to connect the source to the accessory, an air pump having its inlet connected to the accessory, a fuel tank connected to the pump outlet for providing a fuel feeding pressure therein, electrical means connected for operating the pump and including a pump driving electric motor and a circuit closing switch operable by the control, means responsive to the source pressure for opening the switch, a second circuit including the electric motor and a circuit closing switch therefor, means under the control of the second circuit for admitting additional air to the pump inlet for compression in the tank, a distributing valve acting when the second circuit is opened and the first circuit closed to divert the pump exhaust into the suction communication between the source and the accessory, and a check valve in the suction communication between the points of connection with the inlet and outlet of the pump.

9. A combined fuel feeding and accessory system for motor vehicles, comprising, in combination with a source of fluctuating pressure, a suction operated accessory connected to the source, a control operable to connect the source to the accessory, an air pump having its inlet connected to the accessory, a fuel tank connected to the pump outlet for providing a fuel feeding pressure therein, electrical means connected for operating the pump and including a pump driving electric motor and a circuit closing switch operable by the control, means responsive to the source pressure for opening the switch, a second circuit including the electric motor and a circuit closing switch therefor, means under the control of the second circuit for admitting additional air to the pump inlet for compression in the tank, a distributing valve acting when the second circuit is opened and the first circuit closed to divert the pump exhaust into the suction communication between the source and the accessory, a check valve in the suction communication between the points of connection with the inlet and outlet of the pump, and means operating to vent the tank when the second circuit is opened, said second switch constituting the ignition switch for vehicle power plant.

10. A combined fuel feeding and accessory system for motor vehicles, comprising, in combination with a source of fluctuating pressure, a suction operated accessory connected to the source, a control operable to connect the source to the accessory, an air pump having its inlet connected to the accessory, a fuel tank connected to the pump outlet for providing a fuel feeding pressure therein, electrical means connected for operating the pump and including a pump driving electric motor and a circuit closing switch operable by the control, means responsive to the source pressure for opening the switch, a second circuit including the electric motor and a circuit closing switch therefor, means under the control of the second circuit for admitting additional air to the pump inlet for compression in the tank, a distributing valve acting when the second circuit is opened and the first circuit closed to divert the pump exhaust into the suction communication between the source and the accessory, and means operating to vent the tank when the second circuit is opened, said second switch constituting the ignition switch for vehicle power plant.

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