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AUTOMATIC OIL CHANGER

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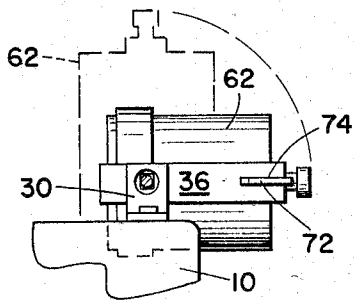
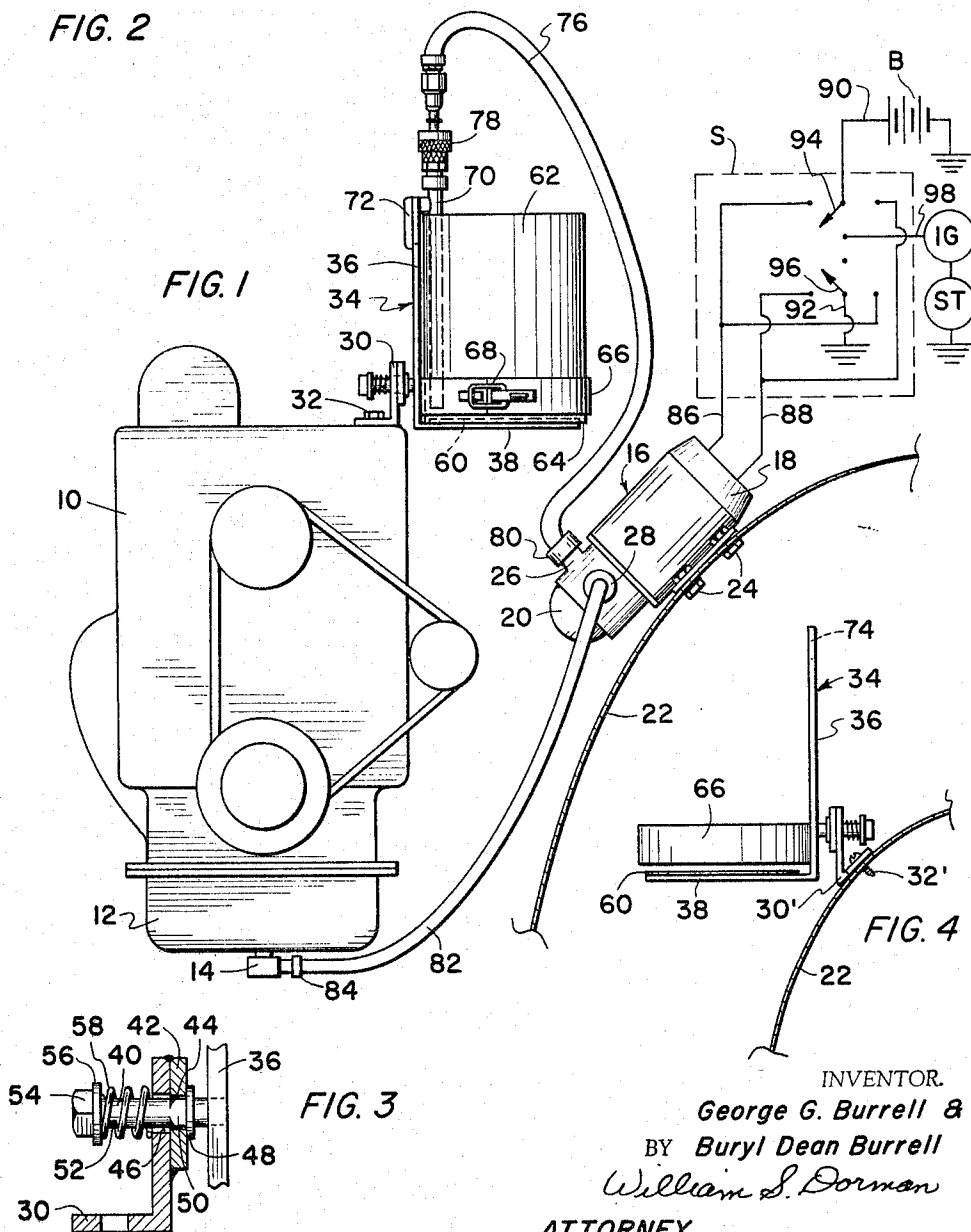


FIG. 2



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1

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AUTOMATIC OIL CHANGER

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The present invention relates to apparatus designed for changing oil automatically with respect to the vehicle motor of an automotive vehicle. More particularly, the present invention pertains to a changing apparatus which is simpler and more effective than any other similar apparatus heretofore known.

When the oil is changed in the combustion engine of an automotive vehicle in the well recognized and conventional manner, it is necessary to elevate the automobile so that the drain plug on the oil pan will be accessible to the station attendant or mechanic. The drain plug is then removed and the oil is allowed to drain out by gravity. After the vehicle has remained in this position for sufficient period of time to insure that all the oil has drained from the crank case, the drain plug is reinserted and tightened, the vehicle is lowered to the ground and fresh oil is introduced to the vehicle motor through the conventional tubular opening at the top of the motor. The aforementioned operation is relatively time consuming and somewhat inconvenient; furthermore, this operation ties up space and equipment which can not be used for other purposes until this operation is completed.

The problems involved in the above described operation are well recognized and certain proposals have been put forth to simplify or eliminate these problems. For example, Hock Patent No. 3,112,012 describes a system for removing oil without requiring that the automobile be elevated.

On the other hand, the present invention provides an apparatus whereby the entire operation involved in changing the oil can be completed within a few minutes time without elevating the automobile, without occupying premium station space, and without introducing additional difficulties.

Briefly stated, the present invention involves a plurality of attachments which can be installed under the hood of the automobile and which are readily accessible to, and easily controlled by, the operator of the vehicle or the service station attendant or mechanic. An oil container is mounted on a suitable pivoted bracket underneath the hood. When the hood is raised, the bracket can be pivoted to move the oil container to an upright position. A reversible pump and reversible D.C. motor are also mounted under the hood. A suitable switch is also provided for connecting the D.C. motor to the battery of the automobile for driving the motor and pump in both rotary directions. The pump connects with the drain opening in the crank case and with a tube leading into the oil container. In one direction of movement, the pump can completely drain the oil from the motor and place the oil in the oil container; in the reverse direction, the pump can remove the oil from the oil container and put it into the vehicle motor. The oil container in question is of the same size and shape as the oil container which contains the fresh oil normally purchased from the service station. As will hereinafter appear, it is an extremely simple matter to remove spent oil completely from the vehicle motor and to supply the motor with a fresh quantity of oil. As will also hereinafter appear, it is possible to remove all of the oil from the motor and to take the oil so removed to a warm location for overnight storage where the vehicle itself might be subjected to extremely cold conditions.

Therefore, it is a principal object of the present invention to provide an apparatus for changing the oil in an

2

automotive vehicle in a manner which is simpler and more effective than heretofore known.

It is a further object of the present invention to provide an apparatus of the type described above which is relatively inexpensive, easy to install and simple in operation.

It is a still further object of the present invention to provide an apparatus of the type described above which will encourage more frequent oil changes thereby preserving the life of the vehicle motor while, at the same time, leading to the increase sales of oil.

It is a further object of the present invention to provide a apparatus of the type described above which will facilitate the rapid starting of motors at low temperatures thereby increasing the life of the vehicle battery.

Other and further objects and advantageous features of the present invention will more clearly hereinafter appear in connection with a detailed description of the drawings in which:

FIGURE 1 is an elevation, partly diagrammatic and partly in section showing the manner in which the present invention is associated with the standard vehicle engine of an automotive vehicle;

FIGURE 2 is an elevation, partly in section and on a somewhat smaller scale than FIGURE 1, of the supporting means for the oil container and showing the bracket pivoted ninety degrees with respect to the position shown in FIGURE 1;

FIGURE 3 is a sectional detail, on an enlarged scale, of the pivotal connection between the supporting bracket for the oil container and the support to which the bracket is attached; and

FIGURE 4 is an alternate form of the present invention showing a somewhat modified support connected with the bracket which holds the oil container.

Referring to the drawings in detail, FIGURE 1 shows the outline form of a vehicle motor 10 which is mounted in a conventional manner on the frame (not shown) of an automotive vehicle. The crank case or oil pan 12 of the motor 10 has a lower opening (not shown) in which a drain plug (not shown) is normally received. For the purposes of the present invention, however, the drain plug is removed and an elbow fitting 14 is screwed into the drain outlet of the oil pan 12 so as to occupy the position shown in FIGURE 1. A pump unit 16 having an electric motor portion 18 and a hydraulic pump portion 20 is suitably connected to the inside of the fender 22 of the automotive vehicle by means of bolts and nuts 24 or by conventional sheet metal screws (not shown).

As shown in the drawings, the pump unit 16 contains both the electric motor 18 and the hydraulic pump 20 in the same unit; such units are readily available on the market which are designed to operate on the standard 12 volt source provided by the conventional battery used in automotive vehicles. The electric motor 18 is a D.C. motor whose direction of rotation can be reversed by reversing the leads to the battery. Pump 20 is provided with two ports 26 and 28. The pump is also reversible such that when the motor is driven in one direction to turn the pump in the same direction, the port 28, for example, becomes the inlet port and the port 26 becomes the outlet port; when the motor is driven in the opposite direction so as to drive the pump in the opposite direction, the port 26 becomes the inlet port and the port 28 becomes the outlet port.

The internal details of the electric motor 18 are now shown but it should be understood that this motor is of conventional design, it is reversible, and it can be powered by a 12 volt D.C. source; similarly, the internal details of the pump 20 are not shown, but it should be understood that this pump can be any one of several conventional types of hydraulic pumps which are reversible. Furthermore, although the motor 18 and pump 20 are shown as

3

connected together in a single pumping unit 16, in which manner this unit can be readily purchased on the market, it should be understood that the motor 18 and pump 20 might be purchased and mounted separately with a suitable driving interconnection (not shown) provided between the two devices.

Although the D.C. motor referred to above is described as a 12 volt type of motor (because most vehicle batteries provide a 12 volt source), it should be understood that this invention contemplates the use of a 6 volt D.C. motor (or differently rated motor) if the vehicle battery in question provides only 6 volts (or other voltage).

A small angle support 30 can be suitably mounted on the motor block 10 by means of the bolt 32. An L-shaped bracket 34 having a vertical leg 36 and a horizontal leg 38 is mounted on the support 30 as best shown in FIGURE 3. A bolt 40 is suitably connected at its right hand end, by welding or other convenient means, to the vertical leg 36 of the bracket 34. A flat vertical plate 42 is attached to the support 30, preferably by welding or the like, between the support and the leg 36. The plate 42 has a square hole 44 extending horizontally through this plate. A circular hole 46 of slightly larger size is located in the support 30 in registry with the square hole 44. A circular flange 48 integral with the bolt 40 prevents movement of the bolt 40 towards the left any further than that shown in FIGURE 3. Immediately to the left of the flange 48 is a square shank portion 50 having an external shape and size conforming exactly to that of the internal shape and size of the square hole 44. Thus, in the position shown in FIGURE 3, the bolt 40 cannot be rotated with respect to the support 30.

To the left of the square shank portion 50, the bolt 40 is provided with a reduced cylindrical portion 52; if the bolt 40 is moved to the right such that the square portion 50 is beyond the square hole 44, the portion 52 is of such size that the bolt 40 may be freely rotated in the square hole 44.

The left hand end of the bolt 40 is provided with a nut 54. A washer 56 is also received on the bolt 40 immediately to the right of the nut 54. A spring 58 is mounted on the bolt 40 between the washer 56 and the support 30. The spring 58 is of sufficient strength and compressibility that it normally holds the elements in the relative positions shown in FIGURE 3. However, if a longitudinal force is applied against the bolt 40 urging it towards the right, the spring will be compressed, the square shank portion 50 will be drawn out of the square hole 44 and the vertical leg 36 can be turned so as to rotate the bolt 40.

If, for example, the leg 36 is rotated ninety degrees, the force on the bolt 40 can then be released and the parts will be reengaged in the same manner as shown in FIGURE 3 except that the vertical leg 36 will now be horizontal.

A flat horizontal plate 60, preferably circular in shape, is secured to the horizontal leg 38 for supporting thereon a suitable oil container 62, generally of cylindrical configuration. Preferably the plate 60 is of such diameter as to fit snug against the bottom of the container 62 between the edges of the outer peripheral rim 64 of the container. A flexible metallic strap 66 is attached to the upright leg 36 of the bracket 34. A suitable clasp 68 connected across the free ends of the strap 66 is adapted, when closed, to securely engage the container 62.

A metallic tube 70 is removably secured adjacent its upper end to the vertical leg 36 by means of a tongue 72 which is received in a suitable slot 74 in the vertical leg 36. The tube 70 passes through a suitable hole (not shown) in the container 62 and has its lower end terminate adjacent the bottom interior of the container 62. A flexible conduit or tubing 76 connects between the port 26 on the pump 20 and the upper end of the tube 70 by means of any suitable connections. For example, a connector 78 of the so called quick-disconnect type can be

4

employed or a standard threaded coupling 80 can be utilized. Another flexible conduit or tubing 82 connects with the port 28 on the pump 20 and the open end of the fitting 14. A clamp 84 can be employed if desired to insure the retention of the end of the conduit 82 on the fitting 14.

Also shown in FIGURE 1 is a switch S of the double pole, three-position type. The switch S connects with the motor 18 by means of leads 86 and 88. This switch also connects to the standard 12 volt battery by means of lead 90. The switch S also connects to ground by means of lead 92. Leads 90 and 92 connect with movable ganged contactors 94 and 96, respectively. In the extreme left hand positions of the contactors 94 and 96, the battery B is connected to the motor 18 through the lead 86, and the lead 88 is grounded. In the extreme right hand position of the contactors 94 and 96, the reverse situation holds true; i.e., the battery is connected to the motor 18 through the lead 88 and the lead 86 is grounded.

In the center positions of the movable contactors 94 and 96, no power is supplied to the motor 18. However, if desired, the ignition system of the automobile itself may be connected to the battery through the center position of the switch S, thus providing a safety interlock to prevent operation of the vehicle motor when the electric motor 18 is operated in either direction. Thus, the "hot" lead 98 from the ignition can be connected to the upper central terminal of the switch S rather than directly to the battery B. Therefore, when the movable contactors 94 and 96 are in their central position, in which case the motor 18 is "off," the lead 98 from the ignition connects to the battery B through the movable contactor 94 and the lead 90 such that the automotive vehicle can be started in the conventional manner. The legends IG and ST diagrammatically represent the ignition switch and the starter motor, respectively.

Since it is well recognized that the hood (not shown) of the automotive vehicle normally is reasonably closely adjacent to the top of the motor 10, it would ordinarily be impossible to close the hood with the container 62, tube 70 and conduit 76 occupying the positions shown in FIGURE 1. Therefore, when the oil change has been completed, it is merely necessary to apply a small force towards the right (with respect to FIGURE 1) so as to compress the spring 40 after which it is relatively simple to turn the bracket 34 and container 62 to the position shown in FIGURE 2. Thereafter, it is then possible to close the hood of the automobile.

In some situations it may be necessary or desirable to mount the bracket 34 other than on the motor 10. FIGURE 4 shows an alternate form of the present invention where the supporting structure for the container 62 is mounted on the inside of the fender 22. In such case, it is necessary to employ a modified form of bracket 30' which can be attached to the inside of the fender 22 by means of sheet metal screws 32'.

Operation

It will now be assumed that the automotive vehicle has been operating in a conventional manner for such a period of time that it is now desirable to change the oil in the vehicle motor. First of all, the vehicle itself is parked in a convenient location and the motor is turned off. The hood is raised, the bracket 34 is urged towards the right (as it appears in FIGURE 1) and the bracket 34 and container 62 are pivoted to the upright position. At this time, the container 62 is, of course, empty. The switch S is turned to that position where the pump 20 drains the oil from the motor 10 to fill the container 62. After the container 62 is filled, the switch S is moved to turn off the motor 18. The tube 70 is withdrawn from the container 62, the clamp 68 is loosened, and the full container 62 is removed from the bracket 34.

At this point, a fresh container of oil is punched with a

5

hole at the top to provide an entrance for the tube 70. The fresh can of oil, thus punched, is placed on the bracket 34, the clasp 68 is re-engaged, and the tube 70 is inserted through the hole in the fresh can of oil, the tongue 72 engaging the slot 74 in the vertical leg 36. Now the switch is actuated so as to operate the motor 18 and pump 20 in a direction reverse from that previously described so that the fresh oil is pumped from the new can or container 62 into the motor 10. When the new container 62 is emptied the switch S is moved to that position where it turns off the motor 18. The bracket 34 is again urged towards the right and the bracket and container mounted thereon are pivoted ninety degrees after which the hood can be closed. The pump, oil container and switch can remain in the positions last described until it becomes necessary to change the oil again.

The operation described above in changing the oil for the vehicle motor can be completed in a few minutes time and in a manner which is convenient to the operator of the vehicle or station attendant.

In colder climates, the apparatus of the present invention provides a still further useful function. It will be assumed, first of all, that the vehicle is operated in an area which is then experiencing extremely cold temperatures; it will be assumed, secondly, that a heated garage or the like is not available for the overnight storage of the vehicle. Under the above circumstances, and after the vehicle has been suitably parked for the night, the operator of the vehicle will drain the oil from the vehicle motor in the manner described above so as to fill the container 62. Thereafter, the electric motor 18 is turned off and the coupling 78 is opened, or the tube 70 is withdrawn from the container 62. The clasp 68 is now opened and the container 62, with or without the tube 70, is removed from the bracket 32. The bracket 34 is pivoted to its horizontal position, the hood is closed, and the container 62, which is now filled with oil, can be taken inside the house (or apartment) where it can be kept warm overnight. In the morning the reverse operation can be followed and the warm oil returned to the motor. Thus, the vehicle motor can be readily started even on extremely cold mornings. It is well recognized that the principal reason why a motor is difficult to start on a cold morning is that the oil is also very cold and extremely viscous.

From the above, it should be apparent that the present invention is simple in operation and provides for a considerable savings in time for changing oil. Furthermore, because of its ease in operation, the present invention will lead to more frequent oil changes thereby preserving the life of the vehicle motor. This invention will also tend to increase the sales of oil but, at the same time, will be of benefit to the service stations as a result of the savings in man hours. In colder climates, the present invention will facilitate the starting of the vehicle motor on cold mornings thereby preserving the life of the vehicle battery.

Whereas the present invention has been described in particular relation to the drawings attached hereto, it should be understood that other and further modifications apart from those described or suggested herein, may be made within the spirit and scope of this invention.

What is claimed is:

1. Apparatus for changing the oil in the vehicle motor of an automotive vehicle through the drain outlet of the oil pan of said vehicle motor comprising an upright bracket mounted under the hood of said vehicle for supporting an oil container thereon in upright position, a reversible pump mounted under said hood, an electric motor mounted under said hood in driving relation with said pump, an electrical switch interconnected between said motor and a standard vehicle battery in said vehicle, an open fitting received in the drain outlet of the oil pan of said vehicle motor, a tube mounted on said bracket passing through a hole in said container, the lower end of said tube terminating adjacent the bottom of said con-

6

tainer, a first hydraulic conduit connecting from said fitting to a first port on said pump, a second hydraulic conduit connecting from a second port on said pump to the upper end of said tube, said switch being operable to connect the electric motor to the battery in such a manner as to rotate said electric motor and pump in one direction to pump oil from the vehicle motor into the oil container, said switch also being operable to connect the electric motor to said battery in such a manner as to rotate said electric motor and said pump in an opposite direction so as to pump oil from said oil container back into said vehicle motor, and means for pivoting said bracket from its upright position to a substantially horizontal position.

2. Apparatus as set forth in claim 1 wherein said switch is provided with an interlock to prevent the starting of said vehicle motor when said electric motor is connected to said battery.

3. Apparatus for changing the oil in the vehicle motor of an automotive vehicle through the drain outlet in the oil pan of said vehicle motor comprising a support mounted under the hood of said vehicle, said support having a square hole extending horizontally through a portion of said support, an L-shaped bracket having a vertically extending leg and an interconnecting horizontally extending leg, a horizontal bolt secured at one end of the vertical leg of said bracket, the other end of said bolt extending through and beyond said hole in said support, said bolt having a square portion adjacent said one end thereof adapted to be received in the square hole of said support whereby rotation of said bolt is prevented, said bolt having a reduced portion between said square portion and the other end of said bolt, spring means mounted on said bolt between said support and said other end of said bolt for resiliently urging the square portion of said bolt into the square hole of said support, said spring being sufficiently compressible when a longitudinal force is applied to said bolt to permit withdrawal of the square portion of said bolt from said square hole for rotation of said bolt relative to said support, a flat plate mounted on the horizontal leg of said bracket for supporting an oil container thereon in upright condition, means for holding said container securely on said bracket, a vertical tube removably secured to the vertical leg of said bracket and extending through a hole in said container into the interior of said container, said tube terminating at its lower end adjacent the bottom of said container, an open fitting received in the drain outlet of the oil pan of said vehicle motor, a pump mounted under said hood, an electric motor mounted under said hood in driving relation with said pump, a first hydraulic conduit connecting between said fitting and a first port on said pump, a second hydraulic conduit connecting between a second port on said pump and the upper end of said tube, switch means providing electrical connection between said electric motor and a vehicle battery mounted in said vehicle, said switch being operable to connect said electric motor to said battery in such a manner as to drive said electric motor and said pump in one direction to pump oil from said vehicle motor into said oil container, said switch also being operable to connect said electric motor to said battery in such a manner as to drive said motor and said pump in the opposite direction to pump oil from said oil container into said vehicle motor.

4. Apparatus for changing the oil in the vehicle motor of an automotive vehicle through the drain outlet in the oil pan of said vehicle motor comprising a support mounted under the hood of said vehicle, said support having a square hole extending horizontally through a portion of said support, an L-shaped bracket having a vertically extending leg and an interconnecting horizontally extending leg, a horizontal bolt secured at one end to the vertical leg of said bracket, the other end of said bolt extending through and beyond said hole in said support, said bolt having a square portion adjacent said one end thereof adapted to be received in the square hole of said

7

support whereby rotation of said bolt is prevented, said bolt having a reduced portion between said square portion and the other end of said bolt, spring means mounted on said bolt between said support and said other end of said bolt for resiliently urging the square portion of said bolt into the square hole of said support, said spring being sufficiently compressible when a longitudinal force is applied to said bolt to permit withdrawal of the square portion of said bolt from said square hole for rotation of said bolt relative to said support, a flat plate mounted on the horizontal leg of said bracket for supporting an oil container thereon in upright condition, a flexible band secured to said bracket for surrounding said container, clasp means on said band for tightening said band into gripping engagement with said container for holding said container securely on said bracket, a vertical tube removably secured to the vertical leg of said bracket and extending through a hole in said container into the interior of said container, said tube terminating at its lower end adjacent the bottom of said container, an open fitting received in the drain outlet of the oil pan of said vehicle motor, a pump mounted under said hood, an electric motor mounted under said hood in driving relation with said pump, a first hydraulic conduit connecting between said fitting and a first port on said pump, a second hydraulic conduit connecting between a second port on said pump and the upper end of said tube, switch means providing electrical connection between said electric motor and a vehicle battery mounted in said vehicle, said switch being of a multi-position type, one position of said switch maintaining said electric motor in an off position, a second position of said switch connecting said electric motor to said battery in a such manner as to drive said electric motor and said pump in one direction to pump oil from said vehicle motor into said oil container, and the third position of said switch connecting said electric motor to said battery in such a manner as to drive said motor and said pump in the opposite direction to pump oil from said oil container into said vehicle motor.

8

5. Apparatus for changing the oil in the vehicle motor of an automotive vehicle through the drain outlet of the oil pan of said motor comprising a bracket mounted under the hood of said vehicle for supporting an oil container thereon, a reversible pump mounted under said hood, an electric motor mounted under said hood in driving relation with said pump, an electrical switch interconnected between said motor and a standard vehicle battery in said vehicle, an open fitting received in the drain outlet of the oil pan of said vehicle motor, a tube mounted on said bracket passing through a hole in said container, the lower end of said tube terminating adjacent the bottom of said container, a first hydraulic conduit connecting from said fitting to a first port on said pump, and a second hydraulic conduit connecting from a second port on said pump to the upper end of said tube, said switch being of a multi-position type, one position of said switch maintaining the electric motor in an off position, a second position of said switch connecting the electric motor to the battery in such a manner as to rotate said electric motor and pump in one direction to pump oil from the vehicle motor into the oil container, a third position of said switch connecting the electric motor to said battery in such a manner as to rotate said electric motor and said pump in an opposite direction so as to pump oil from said oil container back into said vehicle motor.

6. Apparatus as set forth in claim 5 wherein said switch, in said second and third positions thereof, is adapted to prevent the starting of said vehicle motor.

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