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[54] CENTRAL OIL FEEDING AUTOMATIC CONTROL DEVICE FOR VEHICLES

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[51] **Int. Cl.**.....**F01m 1/00**

[58] **Field of Search** .....123/32 EA, 32 AE; 307/9, 10

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[57] **ABSTRACT**

A central oil-feeding automatic control device, which can automatically operate every certain distance of running of vehicle, comprising an electric circuit including a switch opening and closing by a cam rotatable with a drive shaft, normally open and closed fixed contacts, a movable contact, electromagnetic coils of a valve and said relay, a bimetal coil, a hydraulic pressure responsive switch and a bimetal switch.

1 Claims, 2 Drawing Figures

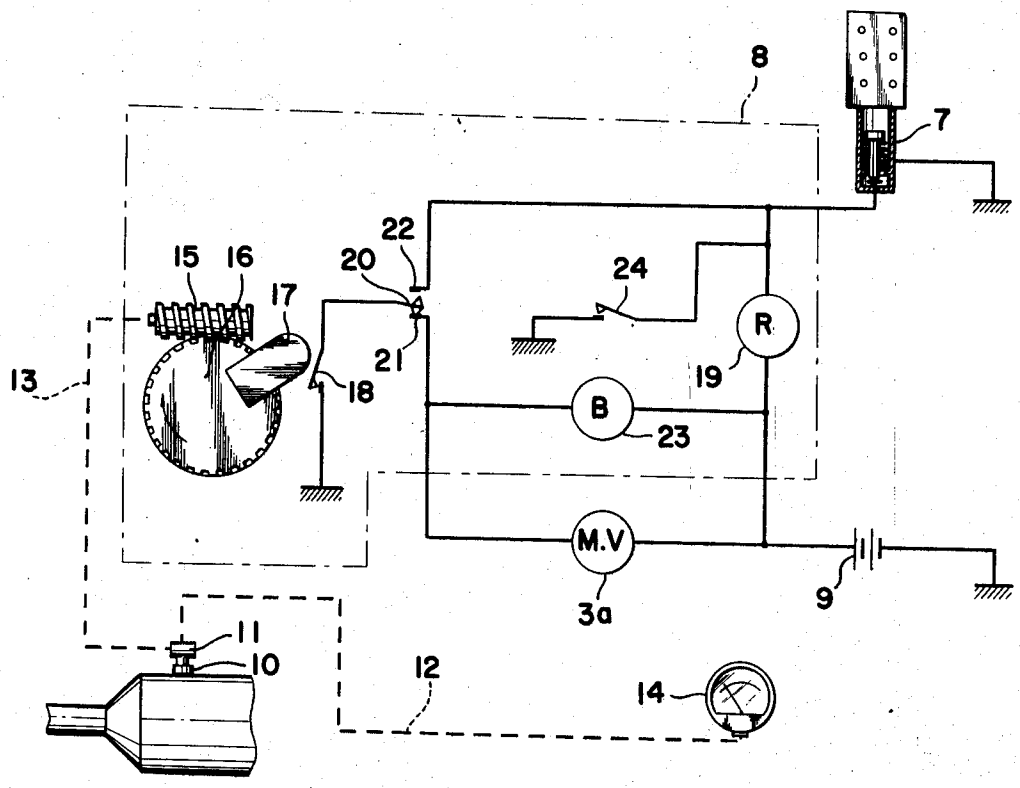


FIG. 1

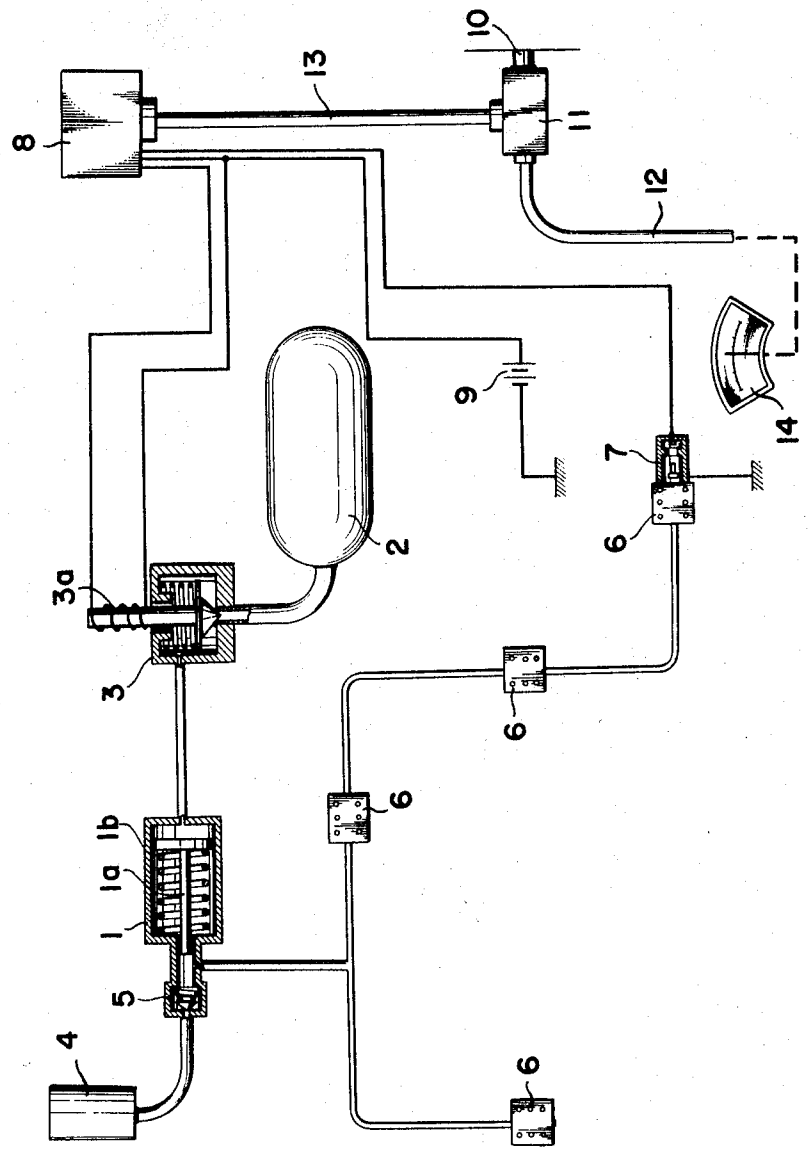
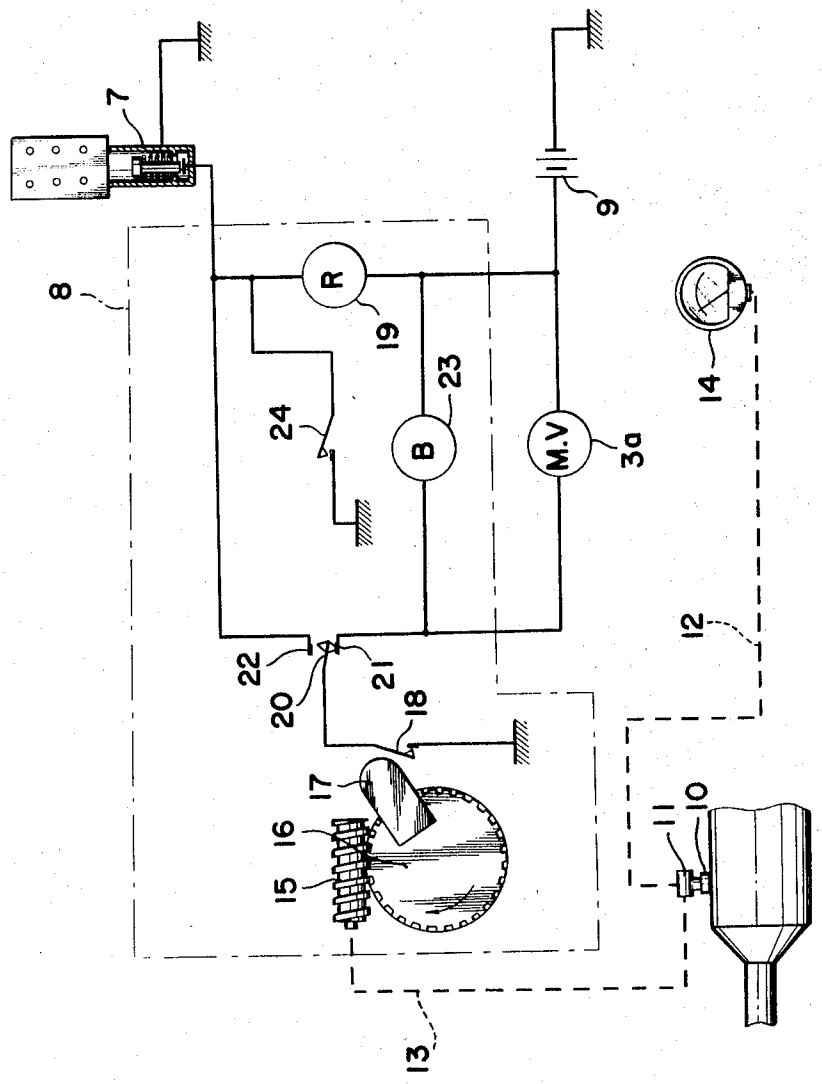


FIG. 2



CENTRAL OIL FEEDING AUTOMATIC CONTROL DEVICE FOR VEHICLES

This invention relates to a central oil-feeding automatic control device for vehicles such as automobiles and the like.

A control device of the type which has hitherto been known in the art generally includes mechanical components and is complicated in construction.

The present invention has for its objects to provide a central oil-feeding automatic control device which can automatically operate every certain distance of running of vehicle in order to avoid trouble of frequent oil supply and ensure a complete oil supply operation, and which is simple in construction, sure in operation and low in cost.

In order that this invention may be more readily understood, reference will now be made, by way of example, to the accompanying drawings, in which:

FIG. 1 shows an operation diagram of an automatic controlling device according to this invention combined with a conventional central oil-feeding device for vehicle, and

FIG. 2 shows an electric connection diagram thereof.

In FIG. 1, numeral 1 denotes an oil supply pump operative by compressed air pressure passing from an air tank 2 through an electromagnetic valve 3. Numeral 4 denotes a lubricating oil tank supplying a lubricating oil to an oil supply pump 1 through a check valve 5. Numeral 6 denotes a distributor receiving the lubricating oil from the oil supply pump 1 and feeding the oil to lubricating places in the vehicle. Numeral 7 denotes an oil pressure responsive switch which receives the oil supply pressure from the oil supply pump 1 through one of the distributors 6, detects the oil pressure upon completion of supply oil to a desired oil supplying place and closes the contact. Numeral 8 denotes a cycle timer automatically connected to the electromagnetic valve 3 every certain distance of running of a vehicle, as later described in detail, so as to stop electric supply to the electromagnetic valve 3 when said switch 7 is closed. Numeral 9 denotes a battery of a vehicle for electric source. Numeral 10 denotes a rotation-receiving part from a transmission of a vehicle; 11 a rotation transmitting device; and 12 and 13 flexible shafts for transmitting, rotation from the rotation transmitting device 11 respectively to a vehicle speed meter 14 and a cycle timer 8.

Operation of the device having the above construction will now be illustrated. By operation of the cycle timer 8, the electromagnetic valve 3 is energized to open every certain distance of running for a vehicle. Thus, the passage of pipings connecting the air tank 2 and the oil supply pump 1 are in communication. Therefore, the compressed air pressure in the air tank 2 actuates the oil supply pump 1. The lubricating oil suctioned in the oil supply pump 1 is fed in compression to respective distributors 6 by the oil supply pump piston 1*a* to feed oil to the lubrication parts of the vehicle. Upon completion of the oil supply, the switch 7 is closed. The cycle timer 8 then cuts off current to the electromagnetic valve 3 which is then closed. The oil supply pump 1 suctions the lubricating oil from the tank 4 by spring 1*b* through the check valve 5 and returns to its initial position. At this instant, the operating oil pressure to the switch 7 is opened so that the contact returns to the initial position to be opened.

Now, the cycle timer 8 will be described in detail with reference to FIG. 2. Numeral 15 denotes a worm rotated through transmission of a vehicle from the rotation transmitting device 11 through the flexible shaft 13; 16 a worm gear meshing therewith; and 17 a cam fixed to the worm gear 16 to open and close the switch 18. Numeral 19 denotes a relay coil provided between the switch 7 and the electric source 9, the movable contact member 20 of which is grounded or earthed through the switch 18, closing a normally open fixed contact 22 when energizes the relay coil 19 and closing the normally closed fixed contact 21 when it is energized. Numeral 23 denotes a bimetal coil provided between the relay fixed contact 21 and the electric source 9 in parallel with the electromagnetic coil 3*a* of the electromagnetic valve 3. When a current is on some period of time and the temperature rises to a certain value, the bimetal switch 24 to be closed is connected to the fixed contact 22 of the relay. The contact of the hydraulic pressure responsive switch 7 is also connected to the relay fixed contact 22. Both are earthed.

The operation of the device of the above construction is now illustrated. The worm 15 is rotated through the transmission so that the worm gear 16 is rotated in the arrow direction very slightly in association with the distance of running of a vehicle. When the cam 17 closes the switch 18, current flows in the electromagnetic coil 3*a* and the bimetal coil 23, since the relay movable contact 20 and the relay fixed contact 21 are closed. As the electromagnetic coil 3*a* is energized, the oil supply pump 1 is actuated in the way as described above and the oil is supplied in the desired parts in the vehicle. When the oil supply is accomplished, the switch 7 is closed so that a current is on in the relay coil 19 to move the movable contact 20 to the relay fixed contact 22. The currents to the electromagnetic coil 3*a* and the bimetal coil 23 are cut off. The oil supply pump 1 stops oil supply operation and returns to its initial position to be prepared for subsequent operation. Therefore, the switch 7 also returns and opens its electric circuit. As the movable contact 20 and the fixed contact 22 are closed the relay coil 19 is energized while the switch 18 is closed. As far as the vehicle continues its running, the cam 17 continues rotation. After running a predetermined distance the switch 18 is opened. At this instant, current to the relay coil 19 is cut off. The relay movable contact 20 is detached from the fixed contact 22 and contacts to the fixed contact 21 to be prepared for subsequent operation. After oil supply has been accomplished, energizing of a current is continued to the electromagnetic coil 3*a* so that the electromagnetic coil may be damaged by heat. Simultaneously a bimetal 23 is energized for the safety purpose.

By energizing it for a certain period of time, the bimetal switch 24 is closed by heating action of the bimetal coil 23. The relay coil 19 is energized as in case the switch 7 is closed. The currents of the electromagnetic coil 3*a* and the bimetal coil 23 are cut off and then the electromagnetic coil 3*a* is prevented from burning. Through the heating of the bimetal 23 is stopped and the temperature falls to open the bimetal switch 24, the closing of the contact member 20 and the contact 22 continued as far as the switch 18 is closed. Therefore, the electromagnetic coil 3*a* is not energized again. As this electric circuit controls the central oil feeding device, the vehicle stops to move at the instant the switch 18 is closed. Even though the rotation of the cam 17 will stop, the central oil feeding device accomplishes its operation without troubles. Then a current continues to flow to the relay coil 19. The operative current of the relay coil 19 is usually small in the amount and will not cause damages such as overheating in the coil. However, said current may become to zero by providing an electric source switch to open it.

What is claimed is:

1. A central automatic control device for supplying oil to a vehicle comprising an oil supply pump; an electromagnetically controlled valve for controlling the output of said pump; and an electrical control circuit comprising a cam-operated switch opened and closed responsive to the movement of a cam which rotates with the drive shaft of the vehicle, a further switch including a normally closed, fixed contact, a normally open, fixed contact and a relay-controlled, movable contact for opening and closing said normally open contact and said normally closed contact, means for connecting said movable contact to ground through said cam-operated switch, an electromagnetic relay coil for controlling movement of said movable contact, a further electromagnetic coil for controlling actuation of said valve, a bimetal coil, means for connecting said further electromagnetic coil and said bimetal coil in parallel and for connecting one side of the parallel-connected coils to said normally closed contact of said further switch, a DC source, means for connecting the other side of said parallel-connected coils to the nongrounded side of said source, means for connecting the first mentioned electromagnetic relay coil

between the said normally open contact of said further switch and said nongrounded side of said source, a hydraulic pressure responsive switch actuated responsive to the pressure output of said oil supply pump, and a bimetal switch actuated responsive to said bimetal coil and connected between said normally open contact of said further switch and ground for, when actuated, limiting current flow through said further electromagnetic coil.

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