Feb. 23, 1932. L. JOHNS 1,846,873

ENGINE CONTROL MEANS

Filed Oct. 14, 1929

Fig. 1.

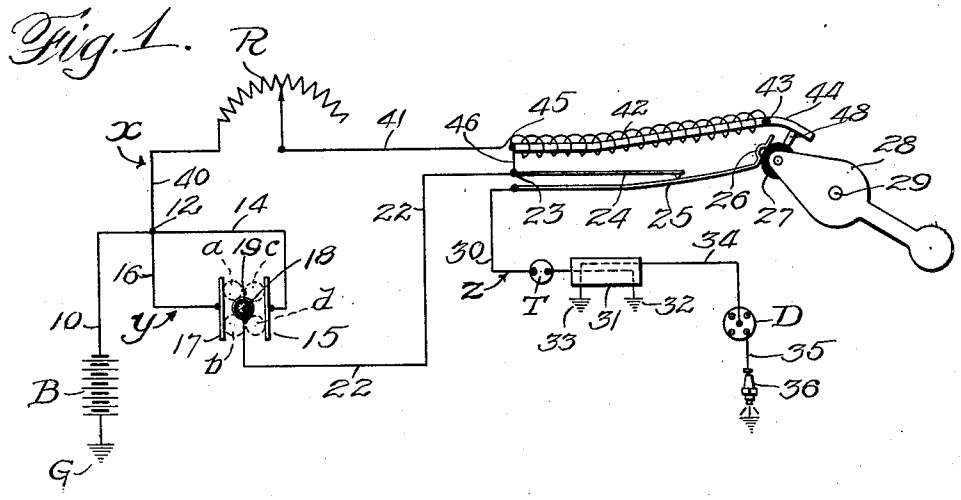


Fig. 2.

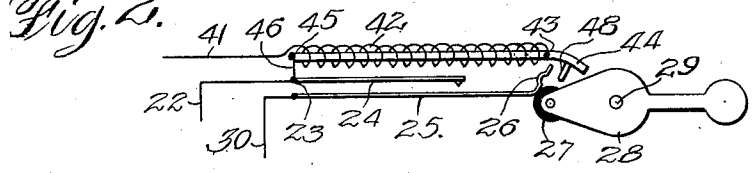
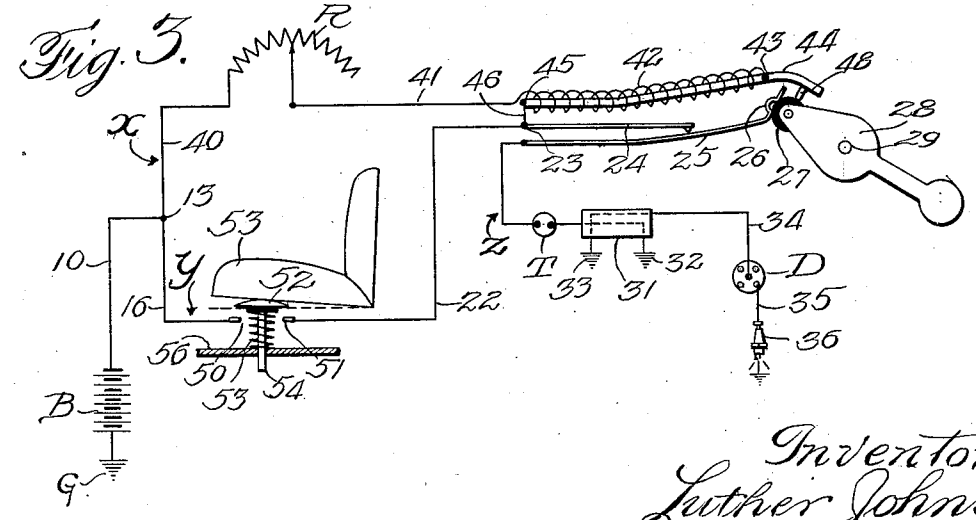


Fig. 3.



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UNITED STATES PATENT OFFICE

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ENGINE CONTROL MEANS

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These improvements relate to means for automatically stopping an engine, with particular view to the prevention of undue engine idling in automobiles and the like.

The chief object of the invention is to provide a simple and efficient circuit or system whereby such idling will be prevented beyond some predetermined and usually short interval of time.

In the drawings Figure 1 is a largely diagrammatic view of the system as including a switch controlled by relative movements of the usual gear shift lever of the automobile;

Fig. 2 is a detail showing the thermostat device and its manual control in their respective off or circuit-breaking positions.

Fig. 3 shows the system as including a switch controlled by relative movements of the seat constituting the driver's operating station; and

Referring to Fig. 1 the battery B grounded at G passes current through conductor 10 to the connection 12, at which place the circuit divides into what may be termed the delay-action branch, the thermostat branch or the auxiliary branch, marked X, and what may be termed the main branch, marked Y.

In the main branch current may pass from connection 12 through conductor 14 to one side of a switch mechanism shown as a plate 15, and it may also pass from connection 12 through conductor 16 to the other side of the switch mechanism shown as a plate 17, both plates thus being charged.

The gear shift lever 18 of the automobile is to be understood as being of the usual type having two lateral or operative positions on each side and a central, inoperative or neutral position, in which neutral position it is shown. This lever 18 is illustrated as carrying, in insulated relation to the lever, so as not to be grounded, a contact maker 19 adapted to make electrical contact with plate 17 when the gear shift lever is in either of the lateral or operative positions marked *a* and *b* on one side, and also with the plate 15 in either of the lateral positions *c* or *d* on the other side.

The conductor 22, connected to the contact-maker 19, leads to a connection at 23 with a conductor shown as a flat bar or plate 24 adapted at its free end to make contact with leaf-spring 25 having its free end formed with a recess or seat 26 adapted to be engaged and moved by an insulating roller 27 on the manual control lever 28 pivoted at 29. When the hand lever 28 is moved into its operative position as shown by Fig. 1 the spring 25 is flexed and held by the springiness of the strip 25 operating slightly beyond the dead center of the lever 28 with respect to pivot 29 whereby contact is made and maintained with the conductor 24. Current therefore passes to the spring 25 and thence through conductor 30 to the timer or interrupter T and thence to the spark coil 31, the primary of which is grounded at 32 and the secondary of which is grounded at 33, the secondary having a conductor 34 leading to the distributor D and thence to the conductor 35 to the spark plug 36, only one of such plugs being shown.

It thus appears that when the gear shift lever is moved into any of its operative positions indicated at *a*, *b*, *c* and *d*, a circuit will be completed through the device 31 and an induced current supplied to the spark plug. A part of the ignition circuit thus described has been denominated Y and I shall call that part of it which includes conductor 30, and thence on to the spark plug, section Z.

There is another open path for current to the spark plug while the engine is in operation, namely through the auxiliary branch X. From connection 12 conductor 40 leads to the preferably adjustable resistance R, and the current thence passes through conductor 41 and through the heating coil 42 of a current controlled delay-action device shown as a thermostat. The heating coil 42 is connected at 43 with the bi-metal thermostat element 44 and the current passes through element 44 to a connection at 45 from which the conductor 46 leads to connection 23, thus completing the auxiliary branch circuit to the switch elements 24 and 25. These switch elements are common to branches X and Y and are between X and Y on one side and section Z on the other side.

Circuit parts X, Y and Z will be considered to be the ignition circuit, the same

having a primary side and a secondary side.

The winding 42 and the resistance provided by the element R are so proportioned that when the engine is normally running to drive the vehicle there will not be sufficient current passing through the thermostat winding 42 to heat it sufficiently to flex the bi-metal strip 44, downward as the device is illustrated.

Such downward flexing, due to sufficient heat, causes the pin 48 to push upon the roller 27 and to dislodge it from the small bend 26 in the spring 25, the spring 25 being thereby enabled to straighten out under its own spring tension and to assume its position in Fig. 3 and to break the contact between switch elements 24 and 25.

The foregoing description of the operation contemplated the movement of the gear shift lever to one side or the other, so as to energize both branches X and Y, and we have observed that the current flows chiefly through branch Y during the running of the vehicle. Let us now consider the gear shift lever as being moved into its central, neutral or inoperative position as shown by Fig. 1. Contact is therefore broken between the contact-maker 19 and both of the plates 15 and 17, and the more direct or substantially resistance-free line to the spark-producing mechanism is thereby broken. That throws a greater amount of current through conductor 40, resistance R and the heating coil 42, and this increase of current causes the coil 42 to become heated, and to such effect as to flex the strip 44 so as to operate the manual switch lever 28 as described.

The resistance R and the thermostat winding 42 may be of such various values severally and combined as to provide a longer or shorter delayed action for cutting off the sparks as may be desired within the effective limits indicated by practice. In some cases the engine will be permitted to idle for say one minute while in others it may be preferable to allow several minutes or more to intervene before the ignition circuit is broken.

The occasion for such a device is largely in connection with the operation of trucks, although it is equally applicable to passenger vehicles. Truck drivers have a habit of permitting the engine to idle for long periods, as while making deliveries, getting their luncheons, etc. The present device will automatically prevent such undue idling, with a great saving of engine wear and tear, oil and fuel, and the prevention of much noxious gas discharge in the streets. I am not the first, however, to suggest means for accomplishing these desirable results.

In Fig. 3 the system is in all respects the same as that shown in Fig. 1 with the exception of the switch device in branch Y operating to break the more direct line and thus to throw sufficient current through the heating coil. The parts and operation of the system of Fig. 3 which have already been discussed in connection with Fig. 1 will be given the same reference characters, and without repeating much of what has been described.

Referring then to Fig. 3, the conductor 16 leads to a terminal 50 opposite which is a terminal 51 and these two terminals are bridged by a conductor 52 movable downward by seat 53 when the operator seats himself thereon. This insulated plate 52 is guided by a stem 54 surrounded by a coil spring 55 resting against a support 56 and operating to raise the bridging plate 52 as well as the seat whereby contact is broken at 50, 52 and 51 when the operator rises from the seat. Conductor 22 in Fig. 3 leads from the contact 51 to connection 23 as in Fig. 1.

According to Fig. 3 when the operator seats himself the circuit is completed from battery through contact makers 50, 52 and 51 and thence through the elements already described and to the same effects. Then when the driver gets off of his seat, to unload the truck or to make a delivery consuming considerable time, the contact at 50 and 51 is broken and an increase of current passes through the thermostat, with the effects already described, and as is shown by Fig. 2.

When the operator wishes to start the engine according to either embodiment shown the lever 28 is moved by the driver into contact-making position. This operation is equivalent to turning the ordinary ignition switch on the automobile dashboard.

The particular thermostat switch device and the seat switch illustrated are severally not of my invention. This invention is in a circuit or system which may employ other forms of delay-action means and other forms of thermostat devices. With respect to the seat switch, of which various forms have been devised by another than myself, the present invention is in a system peculiarly appropriate to such a control device. What I deem to be the chief merits of the present system are its notable simplicity and freedom from parts likely to get out of order, its possibilities of convenient embodiment in units or devices readily applicable to cars now in use, and all whereby the desired results are attained of preventing undue idling, and without interference with the operation of the engine or the vehicle when in actual service. There is an advantage in the divided circuit in that both branches X and Y supply current to the coil 31.

I contemplate as being included in these improvements all such changes, variations and departures from what is thus specifically illustrated and described as fall within the scope of the appended claims.

I claim:

1. The combination with the gear-shift

lever having an operative position and an inoperative position and the internal combustion engine of an automobile, of a divided ignition circuit for the engine comprising a main branch and an auxiliary branch, switch means common to both said branches, a make-and-break device in the main branch and under the control of the gear-shift lever to make the circuit in the main branch when the gear-shift lever is in its operative position and to break the same circuit when the gear-shift lever is in its inoperative position, a current-operated delayed-action device in the auxiliary branch and adapted to operate said switch means to break the circuit in both of said branches when the gear-shift lever is moved into its inoperative position.

2. The combination with the gear-shift lever having an operative position and an inoperative position and the internal combustion engine of an automobile, of a divided ignition circuit for the engine comprising a main branch and an auxiliary branch, a switch common to both said branches, a make-and-break device in the main branch and under the control of the gear-shift lever to make the circuit in the main branch when the gear-shift lever is in its operative position and to break the same circuit when the gear-shift lever is in its inoperative position, a current-operated thermostat device in the auxiliary branch and adapted to operate said switch means to break the circuit of both said branches when the device having said circuit-making-and-breaking means is in one of its positions.

3. In an automobile having an engine depending for its operation upon an ignition circuit, having also a hand-operable lever device for connecting the vehicle to the engine, and having also a driver's seat device, each of said devices being movable into different positions, one of said devices having operatively associated with it means for making and breaking a circuit, the combination therewith of a divided ignition circuit for the engine comprising a main branch and an auxiliary branch, switch means common to both of said branches, said circuit-making-and-breaking means being operatively in the main branch and being adapted to make the circuit therein when the one of said devices associated with said circuit-making-and-breaking means is in one of its positions and to break same circuit when the same device is in another one of its positions, a current-operated delayed-action mechanism in the auxiliary branch and adapted to operate said switch means to break the circuit of both said branches when the device having said circuit-making-and-breaking means is in one of its positions.

4. The combination of claim 1 hereof in which there are also means for operating said switch means by hand to complete the circuit through both said branches.

5. The combination of claim 2 hereof in which there are also means for operating said switch means by hand to complete the circuit through both said branches.

6. The combination of claim 3 hereof in which there are also means for operating said switch means by hand to complete the circuit through both said branches.

7. In an automobile having a driver's seat adapted to move up and down and thereby having two positions. and having an internal combustion engine, the combination therewith of a divided ignition circuit for the engine comprising a main branch and an auxiliary branch, switch means common to both of said branches, a make-and-break device in the main branch and under the control of the driver's seat and being adapted to make the circuit in the main branch when said seat is in one of its positions and to break the same circuit when the seat is in another one of its positions, a current-operated thermostat device in the auxiliary branch and adapted to operate said switch means to break the circuit of both branches when the seat is in one of its positions.

8. The combination of claim 7 hereof in which there are also means for operating said switch means by hand to complete the circuit through both said branches.

LUTHER JOHNS.