

Dec. 27, 1932.

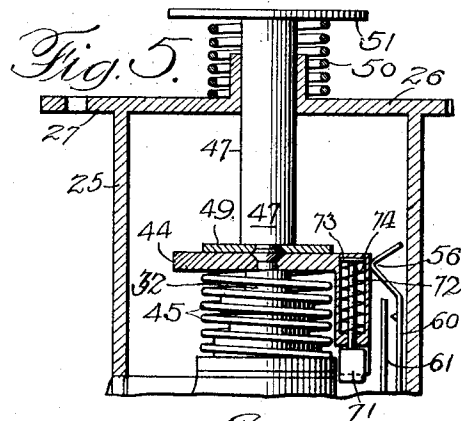
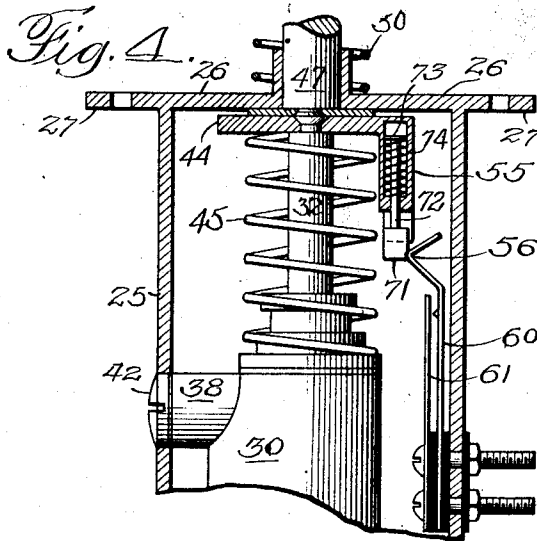
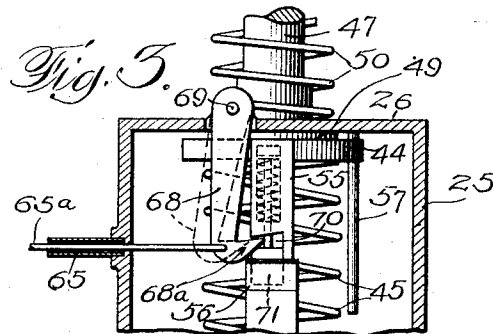
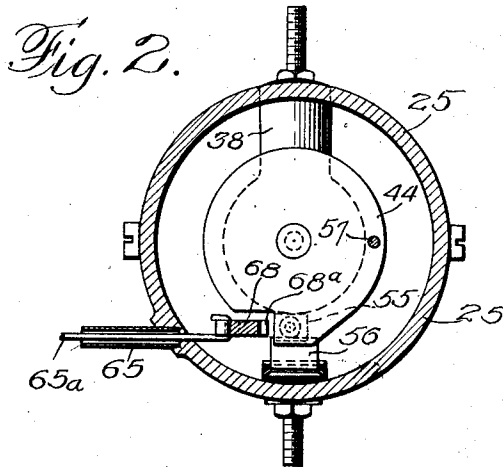
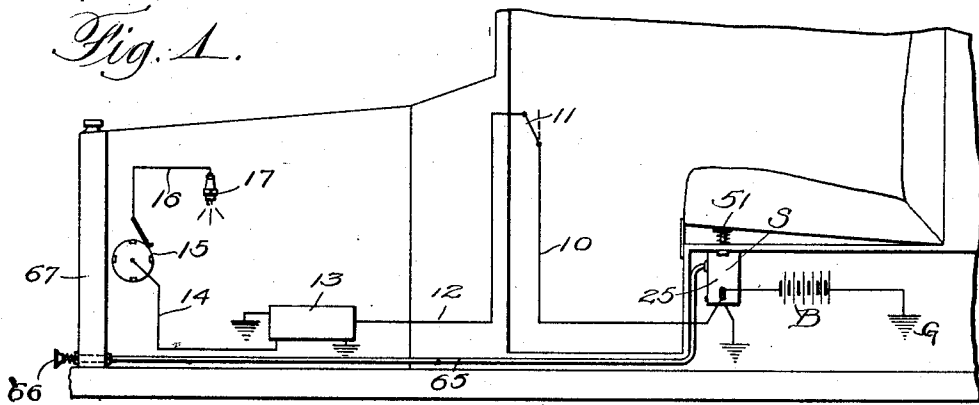
R. L. NAFZIGER

1,891,998

ELECTRIC SWITCH DEVICE

Filed Oct. 3, 1929

2 Sheets-Sheet 1



Inventor
Ralph L. Nafziger
By Luther Johns, Atty.

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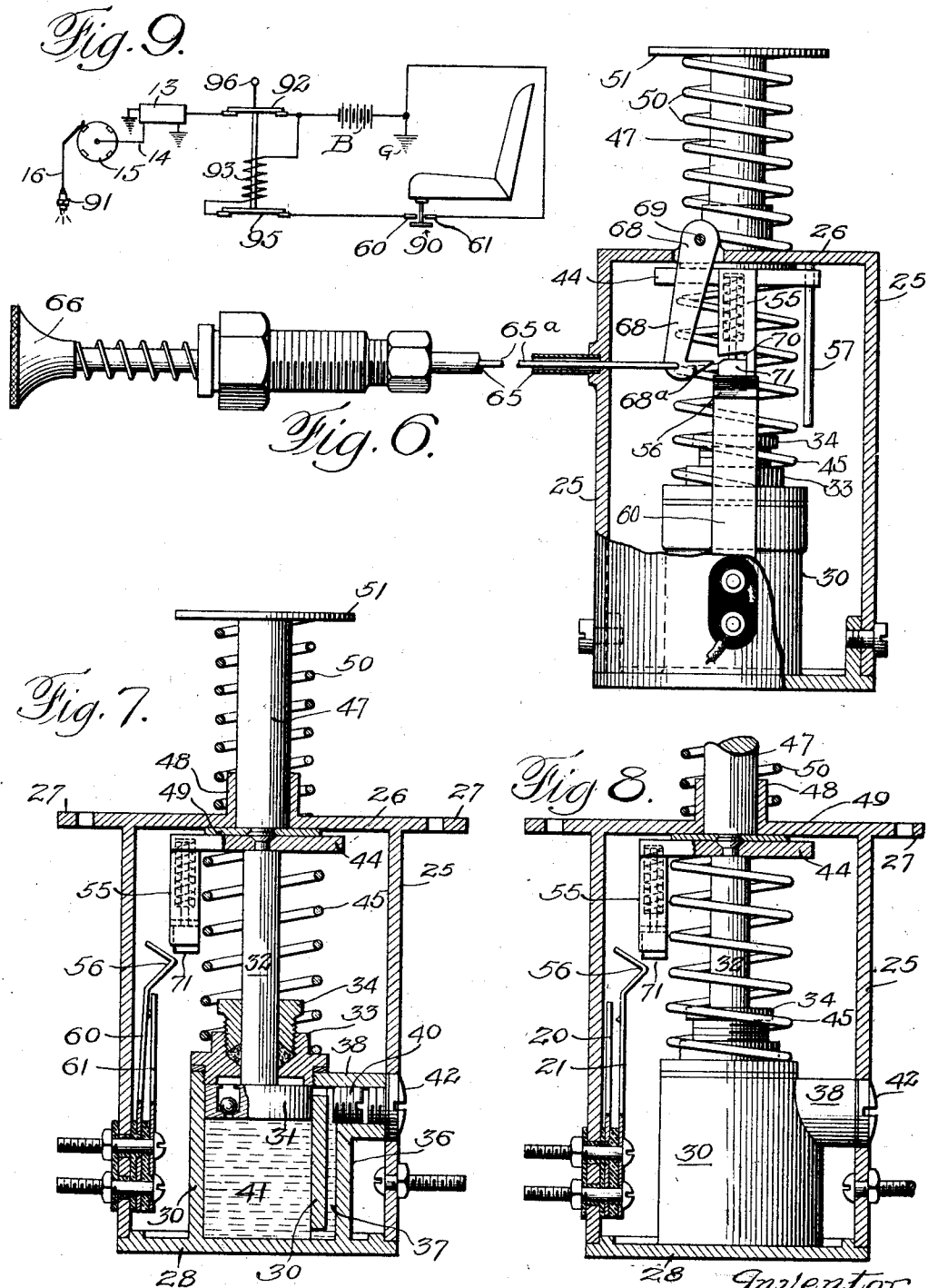
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ELECTRIC SWITCH DEVICE

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2 Sheets-Sheet 2



Inventor
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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH DEVICE

Application filed October 3, 1929. Serial No. 396,947.

These improvements relate to switch devices for controlling an electric current.

The chief objects are to provide a highly advantageous switch mechanism of the general kind shown in my copending application Serial No. 363,896, filed May 17, 1929 on controlling engines, etc. and a system or systems employing the switch mechanism in a vehicle having an internal combustion engine.

In Figure 1 of the drawings herewith I have shown the present device in the same engine circuit illustrated in said copending application;

Fig. 2 is a top plan of the switch device with the cover portion of the casing removed;

Fig. 3 is a fragmentary view, with the casing in section, showing the action of a hand-controlled device;

Fig. 4 is a similar fragmentary sectional view of the device turned ninety degrees on the vertical axis from the position of Fig. 3, and showing how the circuit is broken when the parts are in the relative positions of Fig. 3;

Fig. 5 is a fragmentary medial vertical section of the device oriented as in Fig. 4 and with the piston rod completely depressed;

Fig. 6 shows the device in side elevation, with the casing chiefly in section, in the orientation of Fig. 3 and with the hand-control element in retracted position;

Fig. 7 is a medial vertical sectional view showing the device turned on its axis one hundred eighty degrees from its position in Figs. 3, 4 and 5;

Fig. 8 shows a form of the device modified by merely reversing the contact members so as to provide a normally open circuit which is closed by the same operations which open the circuit in the other figures. Fig. 1 includes the device of Fig. 8; and

Fig. 9 is a diagrammatic circuit showing an application of the device of Fig. 7.

Referring to Fig. 1 the ignition circuit comprises a battery B, switch device S, conductor 10, dash-board switch 11, conductor 12, induction coil 13, conductor 14, timer 15,

conductor 16 and spark plug 17. The switch S is to be deemed in accordance with Fig. 8 of the drawings. The contact members 20 and 21 (Fig. 8) are therefore to be understood as becoming separated when the driver rises from his seat, thus breaking the circuit.

According to some of my inventions in engine-stopping systems and according to other applications which may be made of such a device the circuit will be broken instead of being completed when the piston rod of the switch device is pushed inward. In some of the figures I have illustrated the device as having a normally closed circuit, although by comparing Figs. 7 and 8 it will be clear that to change the device from a normally closed to a normally open circuit calls merely for the reversal of the contact members marked 20 and 21 in Fig. 8. Excepting these contact members therefore the same parts in the several figures will be given the same reference characters.

Turning to Fig. 7 there is a casing 25 having an integral top 26 with extending ears 27 for securing the device in a given position, with a screw-held removable bottom 28. The bottom 28 has an integral cylinder 30 in which is a piston 31 carried at the end of a piston rod 32, with a cap 33 screwed into the top of the piston and a packing gland 34 threaded into that cap, suitable packing material being between these elements 33 and 34 whereby a tight fit is provided for the piston rod where it leaves the cylinder.

At the side of cylinder 30 is an integral enlargement of the walls at 36 and through this enlargement there is a by-pass channel 37 opening into the cylinder at the top and at the bottom. The boss 38 extending laterally from the cylinder wall is interiorly threaded and is provided with a cylindrical screw 40 adapted to control the flow of liquid 41 through the by-pass in one direction. The outer screw 42 closes the opening whereby the screw or valve 40 is concealed.

The piston rod 32 terminates within the casing 25 and has rigidly secured at its top a plate 44 the shape of which is seen in Fig. 2. The coil spring 45 bearing against the plate 44 and against the cap 33 forces the piston

rod upward. The piston rod is forced downward by the plunger 47 passing through the boss 48 in the cover 26 and having at its lower end a plate 49 which serves as a stop to limit the outward movement of the plunger 47, the coil spring 50 bearing against the head 51 normally forcing the plunger 47 outward.

When the plunger 47 is forced inward the motion is communicated to the piston and the liquid below it is forced to some extent through the by-pass 37 but chiefly through the automatic one-way ball valve controlled duct 39, whereby the piston may move fairly easily and rapidly in the inward direction. At the end of that piston movement the liquid body is therefore above the piston. When the plunger 47 is then permitted to be retracted by its spring 57, as by the driver's getting off the seat in Fig. 1, the spring 45 on the piston rod forces the piston upward. The time required for the piston to make its upward stroke will depend upon the effective cross area of the by-pass 37, which is at the valve or screw 40. This time may be varied as desired within fairly wide limits. In connection with an engine control circuit as in Fig. 1 the driver will ordinarily be allowed some small number of minutes after leaving his seat before the engine will be stopped through the breaking of the circuit in the device of Fig. 8.

The plate 44 at the top of the piston rod carries rigidly, in downwardly extending position as the device is shown, a member 55 adapted to control the spring contact members 20 and 21 in Fig. 8 and 60 and 61 in some of the other figures. The V-shaped engagement part 56 of one of these contact members is in the downward path of movement of the control member 55. In order that this control member 55 may always move in a definite path there are guide means shown as a rod 57 secured to the top wall 26, the plate 44 sliding loosely on that rod. When the control member 55 is moved inward the part 56 is pushed aside. In Fig. 8 this lateral movement completes the circuit while in Fig. 7 it breaks the circuit. Fig. 5 shows how the circuit is maintained open at 60 and 61 at all stages of the downward movement of the piston rod. Fig. 7 shows how the circuit automatically closes when the piston has moved to the end of its outward stroke. In Fig. 8 that same movement automatically opens the circuit.

The construction thus far described would be sufficient if it were merely desired to operate the contact making members by moving the plunger 47 inward, with delayed-action means for restoring the contact makers to normal position. Since, however, the present device is intended, as one of its uses, to control the ignition circuit of automobiles and trucks, to prevent their idling unduly when the driver is absent from the vehicle, and

since many of such trucks are not equipped with electric starters but still depend upon a crank at the front of the engine, I have provided means for operating the contact makers from the front of the vehicle so that the driver may start the car from that position.

To this end I provide what is known as a Bowden control 65 having a spring retracted push button 66 extending outward beyond the radiator 67, the push rod 65a of the Bowden control being connected to a dog 68 pivoted at 69 to the top wall of the casing 25. This dog 68 has a pointed end portion 68a directed toward a gap 70 between the head 71 and the body of the control member 55, the head 71 being at the end of a rod 72 having at its upper end a plate 73, while the spring 74 operates to draw the head 71 upward.

It will be noted from the several figures that the head does not come out flush with the operative side surface of the control member 55, but it extends laterally far enough to push aside the V-shaped part 56 of the contact maker.

Looking at Fig. 6 it will be noted that the point 68a is ready to enter the gap 70. It may be caused to enter that gap by pushing upon the button 66. The pointed element 68a is wedge-shaped to such effect that when it is forced into the gap 70 the head 71 is forced downward. Fig. 4 shows it so forced downward and as having forced the V-shaped extension 56 of contact maker 60 away from contact maker 61, thus breaking the circuit in that arrangement. In Fig. 8 the same downward movement of the head 71 would make contact. The light-tension spring 74 tends to withdraw the head 71 upward, but a slight recess in the head 71 where the V-shaped element 56 engages it retains the head 71 frictionally in its position shown in Fig. 4.

Assuming the device of Fig. 8 to be shown in Fig. 1 the movement of the head 71 by the Bowden control causes the circuit to be completed, and therefore the car may be started by cranking. Thereupon the driver takes his seat in the car and this action pushes downward the plunger 47 and that pushes downward the control device 55. The device 55 now pushes the V-shaped spring element 56 farther aside than it was pushed by the head 71, and so the head 71 is released and its spring 74 retracts it to normal position. The spring 80 on the Bowden control retracts the dog 68 as soon as the operator's hand is removed from the push button.

In Fig. 9 I have shown a system in which the normally open seat switch 90 (shown diagrammatically) is to be assumed to be in accordance with Fig. 7. The ignition circuit, including the spark plug 91, is completed through conductor 92 of the double pole relay 93. The switch 90 is open when the driver is seated, but when the circuit through the seat

switch is closed, as when the driver rises from the seat, current passes through the relay 93, energizing it and breaking circuits at both the contact makers 92 and 95, and since contact maker 92 is in the ignition circuit while contact maker 95 is in the seat switch circuit, both of these circuits are opened. The handle 96 indicates means for operating the relay to close both circuits at that place.

with means for operating the switch device at a place remote from said seat to control the circuit when said seat is not occupied, together with means for rendering said last-mentioned means inoperative to control the circuit when the driver again occupies said seat.

RALPH L. NAFZIGER.

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

I claim:

1. In an automobile or the like having an internal combustion engine, an ignition circuit therefor and a driver's station, the combination therewith of a switch device under the control of the presence of a person in said station for controlling said circuit, with means for operating the switch device at a place remote from said station and independently of the presence of a person thereat.

2. In an automobile or the like having an internal combustion engine, an ignition circuit therefor, and a seat for the driver of the vehicle, the combination therewith of a switch device normally operated to control the circuit by the weight of a person on said seat, with means for operating the switch device at a place remote from said seat to control the circuit when said seat is not occupied.

3. In an automobile or the like having an internal combustion engine, an ignition circuit therefor, and a seat for the driver of the vehicle, the combination therewith of means normally dependent upon the presence of a person on said seat for rendering the circuit operative to run the engine, said means being normally operative to stop the engine when the person's weight is removed from the seat, with means for rendering the circuit operative to run the engine for a limited time when the person's weight is removed from the seat.

4. In an automobile or the like having an internal combustion engine, an ignition circuit therefor and a driver's station, the combination therewith of a switch device under the control of the presence of a person in said station for controlling said circuit, with means for operating the switch device at a place remote from said station and independently of the presence of a person thereat, together with means for rendering said last-mentioned means inoperative to control the circuit when the operator again resumes his station.

5. In an automobile or the like having an internal combustion engine, an ignition circuit therefor, and a seat for the driver of the vehicle, the combination therewith of a switch device normally operated to control the circuit by the weight of a person on said seat,

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