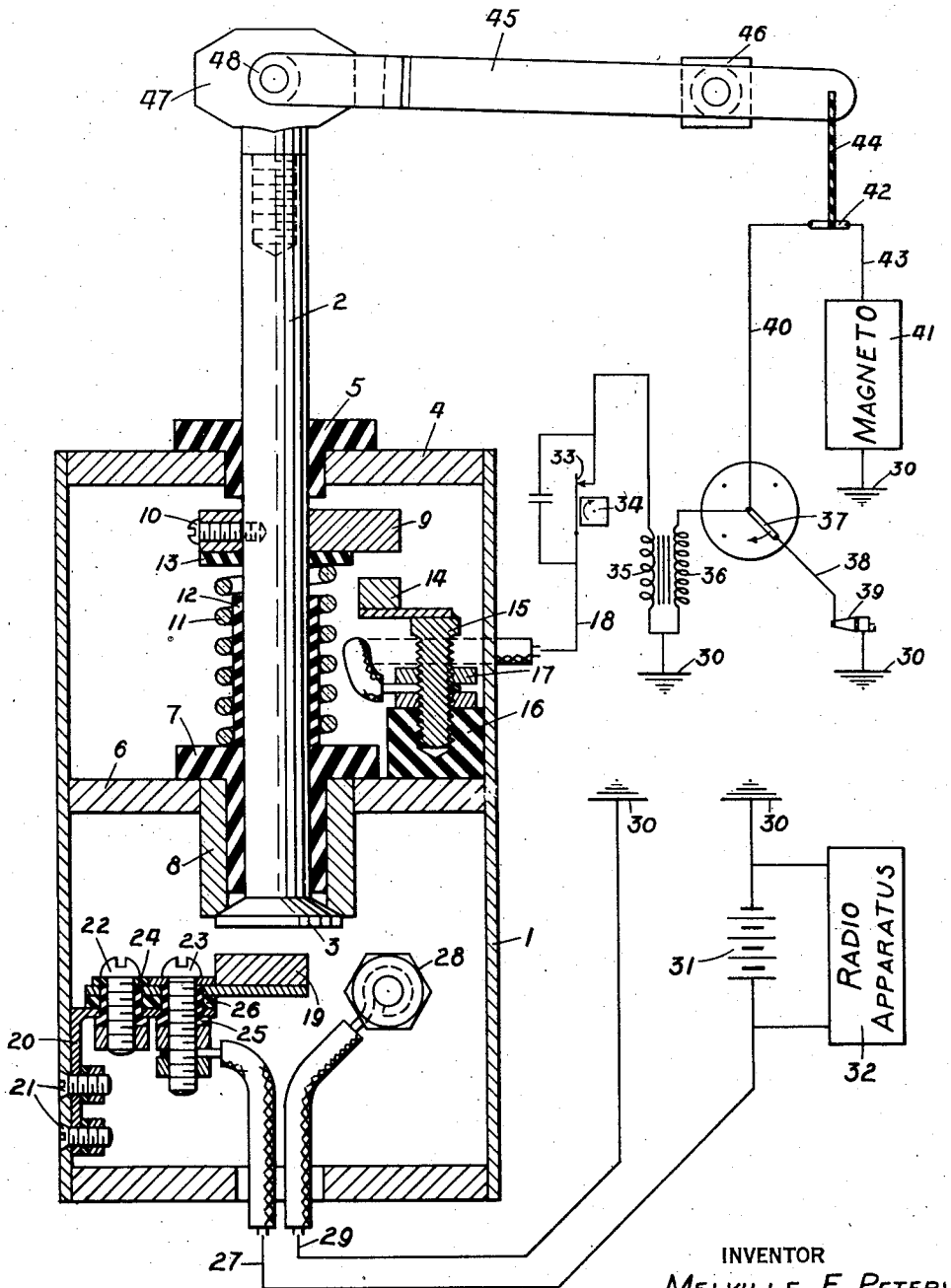


March 8, 1938.

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BOOSTER SWITCH SYSTEM
Filed Jan. 7, 1936

2,110,171



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2,110,171

BOOSTER SWITCH SYSTEM

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Application January 7, 1936, Serial No. 57,919

6 Claims. (Cl. 200—16)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This invention relates to an electrical system and, more particularly, to a switch adapted to connect a storage battery or other source of potential to an internal combustion motor booster coil or other apparatus giving rise to the generation of oscillation.

In aircraft and other types of movable craft propelled by internal combustion motors it is often desirable or necessary to carry radio receiving apparatus or other apparatus that might be adversely affected by electrical oscillations set up in the ignition system where these oscillations are permitted to be impressed upon the battery supplying the radio receiving or other apparatus.

To facilitate the starting of an internal combustion motor carried by a movable craft, a booster coil fed from a storage battery has been employed with good results in so far as starting the motor was concerned. However, after a motor has been started and the high tension ignition voltages are supplied by a magneto the booster coil is no longer needed. When the primary circuit of the coil is opened by means of a conventional switch, high frequency oscillations set up in the ignition circuit by the magneto will work back from the booster coil, by way of the capacity across the open switch, to the battery and thus cause interference in a radio receiving set connected to said battery.

The principal object of this invention is to provide a system wherein electrical oscillations generated in an internal combustion motor ignition system or the like are prevented from passing into a storage battery by way of the coupling due to the capacity across an open switch connected to a booster coil or the like.

Another object of this invention is to provide a switch mechanism wherein the switch contacts, when open, are electrostatically and electromagnetically shielded from one another by a member maintained at a fixed potential.

Other and further objects will be apparent to one skilled in the art to which this invention appertains by reference to the following specification and the accompanying drawing, wherein the single figure shows partially in section and partially diagrammatically one embodiment of the invention.

In the drawing, 1 is a metallic casing and 2 is a conductive rod having a frusto-conical switch contact affixed to one end thereof. The rod 2 is mounted for axial movement in insulating bushings 5 and 7. The bushing 5 is mounted in an opening in the end wall 4 of the casing, while the bushing 7 is mounted in the sleeve 8 carried by

the shielding partition 6 which divides the casing 1 into two compartments. The movable switch contact 9 is affixed to the rod 2 by means of a set screw 10. A helical spring 11 is interposed between the shielding bushing 7 and the movable switch contact 9. The spring 11 is prevented from contacting with the rod 2 by means of an insulating sleeve 12. The spring is also prevented from bearing directly upon the switch contact 9 by means of the annular insulating member 13 surrounding the rod 2. Opposed to the movable switch contact 9 and in line therewith is a fixed contact 14 mounted on the screw support member 15 which in turn is mounted in insulating member 16 carried jointly by the casing 1 and the partition 6. Nut 17 on screw 15 holds the conductor 18 in firm contact therewith. Opposed to the movable contact 9 carried by connecting rod 2 and in line therewith is a second fixed contact 19 which is carried by bracket 20 mounted on the casing 1 by screws 21. The contact 19 is fastened to the bracket 20 by means of screws 22 and 23 but is insulated from the bracket 20 by means of the insulating bushings and washers 24, 25 and 26, respectively. The conductor 27 is effectively connected to the switch contact 19 by means of the screw 23 and its associated holding nut. The switch casing 1 may be grounded at 28 by means of the conductor 29 which is grounded at 30, or the case itself may be grounded. The conductor 27 connected with switch contact 19 is connected to one terminal of a battery 31, the other terminal of which is grounded at 30. The battery 31 is shown connected to radio or other precision apparatus at 32. The conductor 18 connected to switch contact 14 is connected by way of the breaker points 33 to one terminal of the primary 35 of the booster coil, the other terminal of the primary of which is connected to ground at 30. The breaker cam 34 is associated with the breaker points 33 in such a manner as to periodically break the primary circuit of the booster coil when the cam is rotated. The secondary 36 of the booster coil has one terminal thereof grounded, while the other terminal is connected to a distributor arm 37 which rotates synchronously with breaker cam 34. The distributor arm 37 upon being rotated alternately connects the secondary 36 of the booster coil to spark plug leads 38 leading to spark plugs 39. A conductor 40 is connected to the distributor arm 37 and also to a switch 42 adapted to connect conductor 40 to conductor 43 leading to a magneto or other source of spark plug potential 41. The switch 42 is mechanically

connected to link 44 which in turn is connected to lever 45 which is pivoted on a fixed pivot 46. The rod 2 has mounted thereon an operating handle 47 which is pivotally connected to lever 45 by means of a pin 48.

5 The operation of the device is as follows: When it is desired to start the motor, the rod 2 is slid axially downward to bring movable switch contact 9 against fixed contact 14 and to bring
10 contact 3 against fixed contact 19. This effectively completes a circuit through the primary 35 of the booster coil by way of the following circuit: ground 30, battery 31, conductor 27, screw
15 23, fixed contact 19, movable contact 3, conducting rod 2, contacts 9 and 14, screw 15, conductor 18, breaker points 33, to primary 35, and thence to ground 30. Upon the rotation of the motor in being cranked, the breaker cam 34 periodically breaks this circuit at breaker points
20 33 and causes high voltages to be set up in secondary 36. The high voltages in the secondary 36 cause a spark at the electrodes of spark plug 39 by way of the distributor arm 37, conductor 38, and ground. During this phase of the starting
25 the switch 42 is opened and the magneto 41 is not effectively connected with the distributor or spark plugs.

When the motor has started and it is no longer necessary or desirable to supply ignition potentials
30 by means of the booster coils, the spring 11 is permitted to drive the conducting rod 2 upwardly and open the circuit to the primary of the booster coil at two points; namely, between contacts 3 and 19 and contacts 9 and 14. As the booster
35 coil switch opens, the magneto switch 42 is closed by the rocking of the lever 45 about its pivot 46. Sparking potentials are thereafter supplied from the magneto by way of conductor 43, switch 42, conductor 40, distributor arm 37, lead 38, to spark
40 plug 39, and thence to ground. Heretofore in the art, when the motor has been started and the booster coil circuit is open, it is found that certain oscillations generated in the magneto-spark plug circuit have worked themselves back
45 to the battery circuit by way of the electrostatic capacity existing across the terminals of the booster coil circuit switch. It is to prevent this undesired operation that applicant's switch disclosed herein was developed. When the rod 2
50 is moved by spring 11 to its uppermost position, such as is shown in the drawing, the booster coil circuit is not only opened but the contacts 14 and 19 are effectively shielded from one another by the conductive partition 6, the conductive contact 3, and sleeve 8. With this type of structure,
55 it is possible to so completely isolate the ignition system from the battery 31 as to render the battery 31 available for the energization of radio receiving apparatus, such as that shown at 32, or other precision apparatus.

60 In the drawing and specification above, applicant has disclosed a booster coil system employing a single distributor for distributing sparking potentials to each of a plurality of spark plugs in turn from a single booster coil or magneto, but
65 is to be understood that other and equivalent systems may be devised. Applicant's switch is intended for use whenever and wherever it is desirable to electrostatically shield open switch contacts one from the other.

70 The invention described and claimed herein may be manufactured or used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.
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I claim:

1. A switch mechanism comprising a metallic casing having two separate compartments, a fixed contact insulatingly mounted in each compartment, a pair of electrically and mechanically interconnected movable contacts simultaneously movable to engage each contact or said pair with a respective one of said fixed contacts when the switch is in the closed position, one of said movable contacts being in each compartment, and means including one of said movable contacts for electromagnetically shielding said fixed contacts from each other when the switch is in the open position, said one movable contact completing the closure between said compartments when in open position.

2. A switch mechanism comprising a metallic casing, a metallic shield provided with an opening therein interposed in said casing and dividing said casing into two compartments, a pair of fixed contacts insulatingly mounted within said casing, one in each of said compartments, a conducting member extending through the opening in said metallic shield and insulated therefrom, a pair of movable switch contacts mounted on said conducting member, one in each of said compartments, for engaging with respective ones of said fixed contacts when the switch is in closed position, means for moving said conducting member to open said contacts, and means comprising one of said movable contacts for closing the opening in said shield and grounding said movable contacts when said switch is in an open position.

3. A switch mechanism comprising a metallic casing, a pair of fixed contacts mounted in said casing and insulated therefrom, a pair of interconnected movable contacts for completing a circuit between said fixed contacts when said movable contacts are moved into juxtaposition with said fixed contacts, continuously acting means tending to move said movable contacts to the open position, and means comprising at least one of said movable contacts for electrostatically shielding said fixed contacts from each other when the movable contacts are moved away from the fixed contacts.

4. A switch mechanism comprising a metallic casing, a metallic shield provided with an opening therein interposed in said casing and dividing said casing into two compartments, a pair of fixed contacts insulatingly mounted within said casing, one in each of said compartments, a conducting member extending through the opening in said metallic shield and insulated therefrom, a pair of movable switch contacts mounted on said conducting member, one in each of said compartments, for engaging with respective ones of said fixed contacts when the switch is in closed position, means for moving said conducting member to open said contacts, and means comprising a frusto-conical plug member carried by said conducting member for closing the opening in said shield and electrostatically shielding the fixed contact in one compartment from the fixed contact in the other compartment.

5. A switch mechanism comprising a metallic casing, a metallic partition dividing the casing into two compartments, said partition being provided with an opening therethrough, an insulating bushing having an annular section interposed in the opening in said partition, a pair of fixed contacts mounted within said casing, one in each compartment insulated therefrom, a conducting member mounted in said insulating bushing and extending into both of said compart-

ments, movable switch contacts mounted on said conducting member, one in each of said compartments, for engaging with respective ones of said fixed contacts when the switch is in closed position, and means for moving said conducting member and the contacts mounted thereon for opening said switch and moving one of said movable contacts to cover said opening.

6. A switch mechanism comprising a metallic casing, a metallic partition dividing the casing into two compartments, said partition being provided with an opening therethrough, an insulating bushing having an annular section interposed in the opening in said partition, a pair of fixed contacts mounted within said casing, one

in each compartment insulated therefrom, a conducting member mounted in said insulating bushing and extending into both of said compartments, movable switch contacts mounted on said conducting member, one in each of said compartments, for engaging with respective ones of said fixed contacts when the switch is in closed position, and means for moving said conducting member and the contacts mounted thereon for opening said switch and moving one of said movable contacts to cover said opening, and means acting on said conducting member normally tending to move said member to the open position.

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