No. 860,360. PATENTED JULY 16, 1907.

E. C. ELDREDGE.

PLUG SWITCH.

APPLICATION FILED JULY 27, 1906.

Fig. 1.

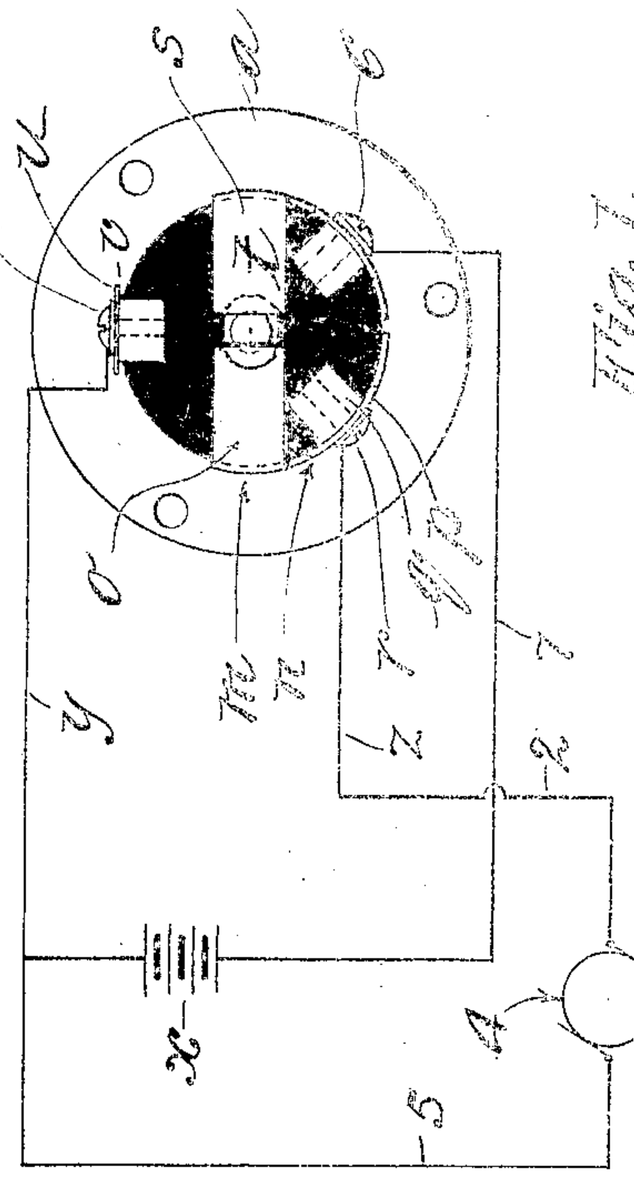


Fig. 4.

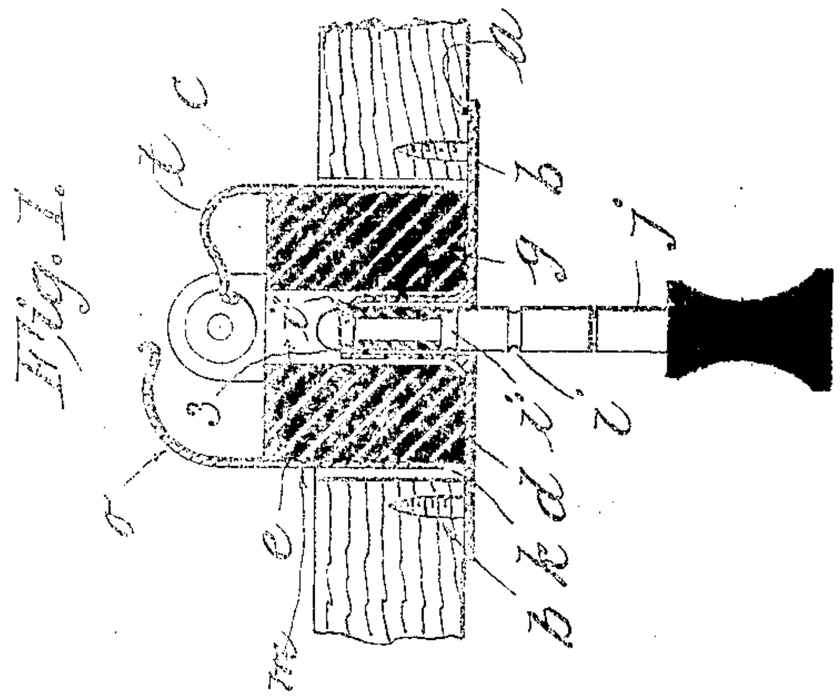


Fig. 6.

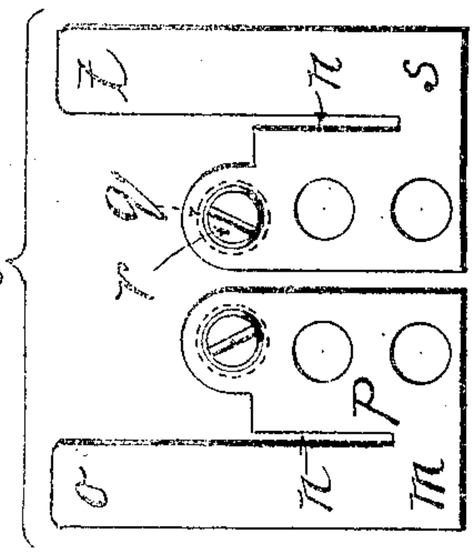


Fig. 2.

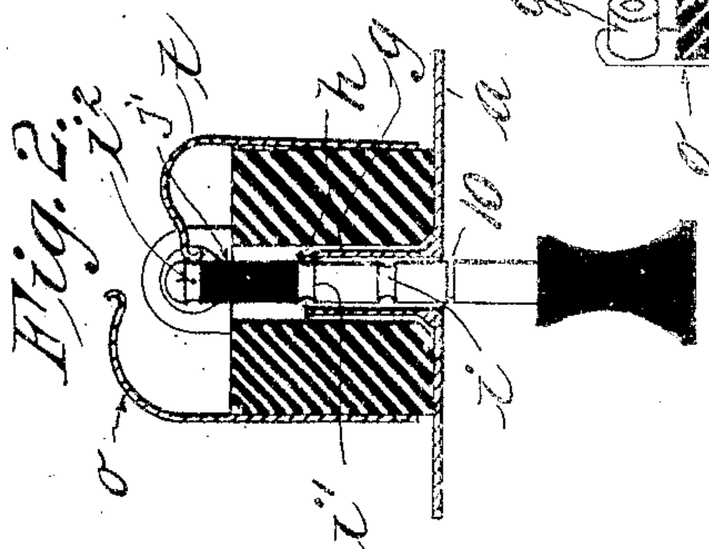


Fig. 5.

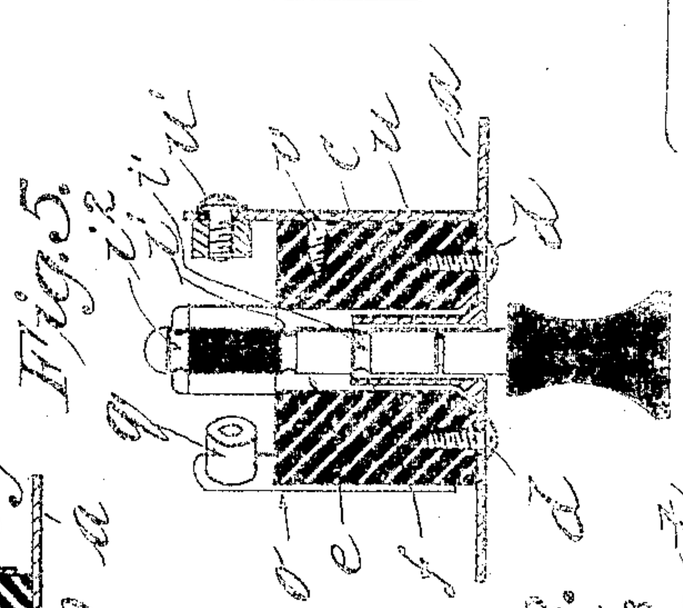
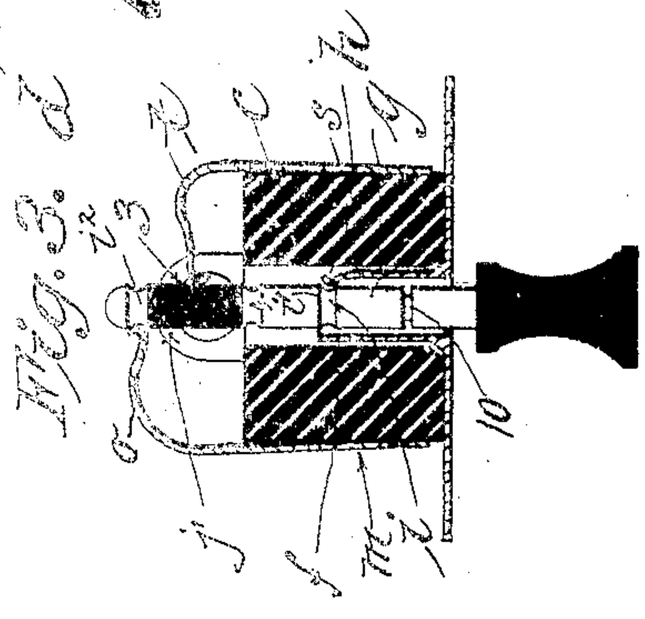


Fig. 3.



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UNITED STATES PATENT OFFICE.

EARL C. ELDREDGE, OF SPRINGFIELD, MASSACHUSETTS.

PLUG-SWITCH.

No. 860,360. Specification of Letters Patent. Patented July 16, 1907.

Application filed July 27, 1906. Serial No. 327,991.

To all whom it may concern:

Be it known that I, EARL C. ELDREDGE, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Plug-Switches, of which the following is a specification.

This invention relates to improvements in plug switches and particularly to that class which are used on automobiles that employ both a battery (either primary or secondary) and a magneto or dynamo for furnishing electrical energy for igniting the vaporous charge in the cylinders of internal combustion engines; the invention being adapted to connect the battery to the spark-coils, for instance, for starting the engine, and after the same is started to disconnect or cut out the battery and cut in or connect the magneto to the spark-coils, these two operations being carried out by means of a switch employing a single plug only. The position of the plug in the switch determines whether the battery, magneto, (or dynamo) is connected in the circuit of the spark-plugs.

In the drawing forming part of this application,—Figure 1 is a sectional view through the axis of the switch showing the plug normally retained therein without closing either circuit. Fig. 2 shows a view taken on the same sectional line as Fig. 1, but showing the plug so as to connect the battery to the spark-coils. Fig. 3 is also a vertical sectional view through the axis, but showing the plug thrust into the switch so as to disconnect the battery and connecting the dynamo or magneto in the spark-coil circuit. Fig. 4 is a diagrammatic view showing how my improved switch is connected with both the battery and magneto. Fig. 5 is a sectional view through the axis of the switch but in a plane at right angles to the plane on which Figs. 1, 2 and 3 are taken, and showing the common terminal. Fig. 6 is a view showing the conducting pieces of my switch removed and developed.

Referring to the drawings in detail, *a* designates a plate of any approved form of conducting material, preferably brass, having means, as the screws *b*, for securing the same to any suitable fixed position.

c designates a cylindrical piece of any insulating material, as hard rubber, that is secured to the plate *a* by means of the screws *d*. The cylindrical piece *c* is provided with an opening therethrough, designated at *e*.

Soldered or otherwise secured to the plate *a* is a tubular piece *f*, one side of which is slitted for the purpose of forming a resilient tongue *g* having a detent or offset portion *h* at its inner end, the purpose of which is for engaging the annular grooves *i* and i^1 and i^2 on the plug *j*, for holding the same securely in different positions in the switch.

Between the grooves i^1 and i^2 on the plug *j* is located a piece of insulation j^1 as rubber, and uniform in diameter with the plug. Secured to the outer surface of the cylindrical piece *c* by screws is a piece of conducting material *m*, and preferably spring brass. This part is slitted, as shown at *n*, so as to provide a resilient or spring finger *o* that extends over the axial or center line of the piece *c*, and in the path of movement of the plug *j* for permitting engagement of the same when pushed inward, as shown in the figures, thus closing the dynamo circuit as hereinafter described.

Integral with the part *m* is a portion *p* that has soldered thereto a short cylindrical post *q* that is threaded for receiving the binding screw *r* to which the dynamo terminal is secured.

Oppositely located to the part *m* is another piece of resilient material *s* that is provided with the overhanging finger portion *t* in the same manner as the portion *o* described, but located at a less distance from the end of the cylindrical piece *c* than the finger *o*, the purpose of which is to close the circuit through the battery when the plug is pushed inward so that the resilient detent *h* engages the groove i^1 (see Fig. 2) and the finger *t* the groove i^2. The piece *s* is also provided with a binding post construction, the same as described in connection with the piece *m*. It will be observed from Fig. 4 that the ends of the fingers *o* and *t* are substantially in alinement with the opening *e* of the cylindrical piece *c*.

Oppositely located to the two conducting pieces *m* and *s* is a strip of metallic material *u* that is secured at its upper end to the cylindrical piece of insulating material *c* by a screw *v* and at its lower end it is soldered or otherwise secured to the plate *a*, as shown in Fig. 5. This strip serves as a common terminal for both sources of electrical energy, the current passing from one of the sources of energy to the strip *u* and binding post u^1 to the plate *a*, tubular piece *f*, tongue *g*, plug *j*, and from thence to either one of the flexible fingers *o* or *t* according to whether the plug is pushed so as to engage either one or the other of these contact fingers, as shown in Figs. 2 or 3, thus closing the circuit through the spark-coils of the engine.

The normal position of the plug is shown in Fig. 1 where the groove i^2 is engaged by the spring-finger *h*, and indicated by a click. Upon pushing the plug *j* inward so as to engage the shorter contact finger *t*, shown in Fig. 2, the current passes from the battery *x* to the wire *y* that is secured to the common-terminal strip *u*, from thence to the plate *a*, tubular piece *f*, flexible strip *h*, plug *j*, to the contact finger *t*, plate *s*, binding screw 6, wire 7, to the other terminal of the battery *x*. After the engine is started in this way by current from the battery, the plug *j* is pushed inward to the position shown in Fig. 3, the finger *t* then engaging the insulated portion 3 of the plug cutting out the battery, while the contact finger *o* is brought into engagement with the groove i^2 on the end of the plug *j* as shown. The current then flows from one termi-

nal of the magneto 4 by the wire 5 to the wire *y*, common terminal *u*, plate *a*, tubular piece *f*, strip *h*, plug *j*, to the contact finger *o*, binding-post *r* on the part *m*, wire *z* back to the other terminal of the magneto 4.

It is thus seen that I have devised a simple and inexpensive plug-switch having only one plug for accomplishing the double purpose of connecting and disconnecting either the battery or magneto (or dynamo) for igniting the vaporous charge.

Although I have described the use of my switch in connection with an internal combustion engine, it is evident that its use is not to be limited to such purpose.

It is also to be understood that the diagrammatic view only shows in a general way how the switch is used to connect and disconnect different sources of electrical energy for ignition purposes, and I have not deemed it necessary to refer in detail to the necessary accessories as used in circuit with ignition systems, as spark-coils, condensers, and make and break devices.

In order to determine the position of the plug within the switch, I have placed an index circle or groove which, when the plug engages the shorter contact finger *t*, is flush with the outer surface of the plate *a*, as shown in Fig. 2 at 10. This index ring permits an accurate visual determination of the position of the plug at a glance without withdrawing the same from its socket, and also a click when the flexible strip *h* enters the groove *i*.

What I claim, is:—

1. In a switch of the class described in combination, a base plate, an insulating piece secured thereto, a terminal secured to the base-plate, a cylindrical portion secured to the plate, a plug for engaging the cylindrical portion, contact-fingers secured to the insulating piece, the free ends thereof lying in the path of the plug but at different distances from the end of the insulating piece whereby when the plug is inserted the contact-fingers will be engaged successively by the plug, a conducting element secured to the plug whereby the same may make electrical connection with either of the contact fingers which lie in its path of movement, as described.

2. A switch for connecting and disconnecting two sources of electrical energy in circuit having in combination, a plate, a cylindrical tubular portion secured thereto, an insulating piece secured to the plate, a terminal secured to the plate, contact fingers secured to the insulating piece, their free ends being in alinement with the bore of the insulating piece, a plug having peripheral grooves for engaging the bore, a portion of the same having an insulating surface, the contact fingers being provided with portions for engaging the peripheral grooves of the plug for holding the same in different locked positions, whereby when the plug is brought in contact in succession with the fingers the two sources of energy may be connected and disconnected in succession.

3. A switch of the class described, in combination, a base-plate having an opening therethrough, an insulating piece provided with a bore and secured to the base-plate so that the bore and opening are in register, a tubular piece secured to the base-plate and located within the bore of the insulated piece, a common terminal secured to the base-plate, a plurality of contact fingers secured to the insulating piece and having their free ends located at different distances from the insulating piece and substantially in alinement with the bore of the insulating piece, a plug having a series of grooves, a portion of the same being provided with an insulating surface, whereby when the contact fingers are engaged successively by the plug independent sources of electrical energy may be connected and disconnected to different circuits, as described.

4. An electrical switch, a base-plate, a plug having a series of peripheral and longitudinally spaced grooves, the outer surface between the last two grooves being composed of insulating material, means on the plate for detachably engaging the grooves, a series of contact fingers secured to the plate and in alinement with the travel of the plug, a common terminal on the plate whereby when the plug is locked in one position a source of energy is connected in circuit, and whereby when the plug is locked in a different position a different source of energy is connected in the same circuit, the contact-finger previously engaged by the plug being in engagement with the insulating material of the plug, and the first source of energy is cut out, as described.

5. An electrical switch, a base-plate of conducting material having a single perforation, a plug extending into said perforation, a flexible contact finger carried by the plate for detachably locking said plug in different positions to the plate, a common terminal secured to the plate, a series of contact fingers insulated from the plate and in the path of the plug for connecting different sources of energy, whereby when the plug is locked in one position one of the sources of energy is connected in circuit, and whereby when the plug is locked in a different position a different source of energy is connected in circuit, and the first source of energy is cut out, as described.

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