S. F. BRIGGS.

SWITCH.

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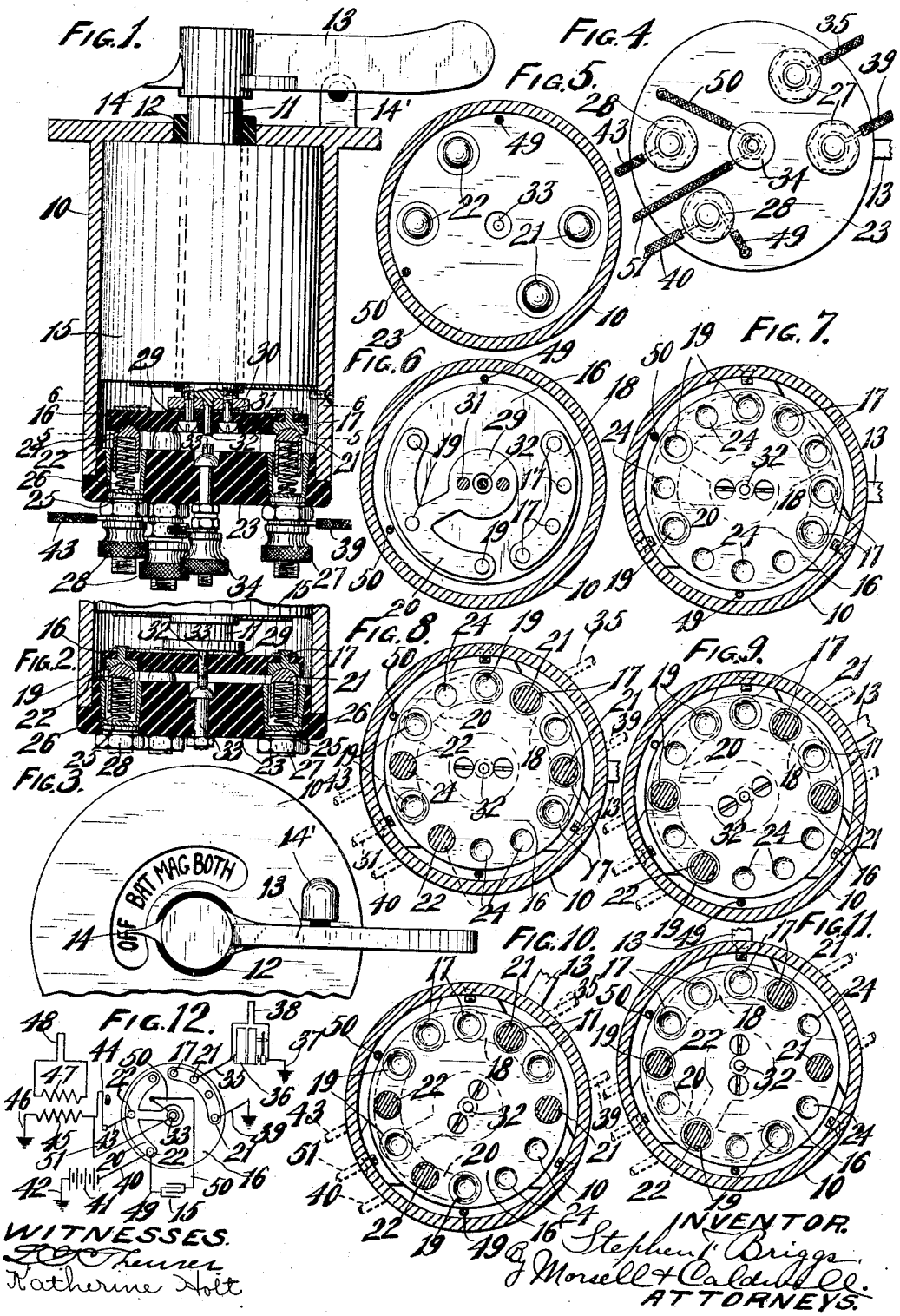
1,100,949. Patented June 23, 1914.



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SWITCH.

1,100,949. Specification of Letters Patent. Patented June 23, 1914.

Application filed April 27, 1911. Serial No. 623,754.

To all whom it may concern:

Be it known that I, STEPHEN F. BRIGGS, a citizen of the United States, residing in Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Switches, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention has for its object to provide an electrical switch for automobile ignition or lighting and for various other purposes wherein the switch is required to take a number of positions for effecting different electrical connections.

Another object of this invention is to provide such switch mechanism with spring-actuated contacts which serve as detents for holding the switch in its various positions against accidental movement.

Another object of this invention is to provide such a switch mechanism with an operating handle which is capable of an inward movement to operate as a push button for closing a circuit momentarily.

With the above and other objects in view the invention consists in the switch as herein claimed, its parts and combinations of parts and all equivalents.

Referring to the accompanying drawings in which like characters of reference indicate the same parts in the different views: Figure 1 is a central sectional view of a switch constructed in accordance with this invention, the parts being in their normal or "off" position; Fig. 2 is a similar view of a portion thereof showing the parts in the position in which the handle is depressed for engaging a pair of bush button contacts for momentarily closing a circuit; Fig. 3 is a plan view of the device, a part being broken away; Fig. 4 is a view of the bottom of the device showing the wiring connections therefor; Fig. 5 is a transverse sectional view on line 5—5 of Fig. 1, looking down on the bottom plate and showing the location of the spring-pressed contacts; Fig. 6 is a similar view on line 6—6 of Fig. 1, looking down on top of the contact disk; Fig. 7 is a sectional view showing the other side of the contact disk; Fig. 8 is a sectional view similar to Fig. 7, but showing the spring contacts in section to indicate their relative positions, the contact disk being in the "off" position and the connecting wires being shown in dotted lines; Fig. 9 is a similar view with the contact disk in the "battery" position; Fig. 10 is a similar view with the contact disk in the "magneto" position; Fig. 11 is a similar view with the contact disk in the "both" position; and Fig. 12 is a diagram showing the electrical connections for the switch when used for controlling a double ignition system for gas engines.

In these drawings, 10 indicates a casing which is preferably cylindrical, as shown, and 11 is a switch stem or shaft which is loosely mounted therein through an insulating bushing 12 so as to be capable of a turning movement as well as a sliding movement.

The stem 11 may be turned or depressed by means of a handle or lever 13 on the end thereof. An index finger 14 on the lever 13 serves to indicate the position of the switch by standing in front of index characters on the end of the cylinder, as shown in Fig. 3, and by engaging stops 14′ on the cylinder the movements of the switch are limited.

The switch stem 11 may be conveniently surrounded by a condenser 15 and at its lower end, beneath said condenser, the stem 11 has mounted on it a contact disk 16 of insulating material carrying a series of four contact buttons 17 connected on top of the contact disk by a metal strip 18 and also provided with a series of three contact buttons 19 spaced farther apart than the buttons 17 and connected on top of the disk 16 by a metal strip 20. The contact buttons 17 and 19 have their lower ends provided with rounded recesses to receive the rounded ends of a pair of spring-pressed contacts 21 and a pair of spring-pressed contacts 22 which are mounted in an insulating bottom plate 23 which closes the lower end of the casing. Besides the recesses in the ends of the contact buttons there are similar recesses 24 in the disk 16 between the contact buttons 19 and between the two series of contact buttons, the latter consisting of a group of three recesses between the last button 17, and the first button 19. The spring pressed contacts 21 and 22 may be of any suitable construction, but are prefer-

ably as here shown, consisting of a cup-shaped rounded contact member slidably fitting in the pocket of a recessed member 25 which passes through the insulating bottom plate 23, with a coil spring 26 confined between these members to force the contact member upwardly into the recesses of the contact buttons 17 and 19 and into the recesses 24 of the insulating contact disk. These recesses are regularly spaced on the contact disk, as shown in Fig. 7, so as to fit the spring-pressed contacts in the several positions of the disk in which the index finger 14 stands in front of the designations on the casing. The switch is thus releasably locked in its several positions by the engagement of the spring contacts with the recesses so that it may be determined by the resistance to the movement of the operating lever 13 whether the switch is in one of its operative positions or not. Each of the members 25 of the spring contacts 21 and 22 constitutes a binding post at the end thereof which projects from the bottom plate 23, the binding post for the spring contacts 21 being designated by the numeral 27 and the binding posts of the spring contacts 22 being designated by the numeral 28.

The metal strip 20 for the contact buttons 19 has a projection therefrom terminating in a disk-shaped piece 29 held in contact with a plate 30 by the screws 31 which clamp the contact disk 16 to the lower end of the switch stem 11. The plate 30 has a contact point 32 passing through the contact disk 16 so as to be capable of engagement with a corresponding contact point 33 passing through the insulating bottom plate 23 of the casing, such engagement being effected when the switch stem 11 is depressed against the spring pressure of the spring-pressed contacts 21 and 22. The end of the contact point 33 constitutes a binding post 34.

One method of wiring the switch for controlling the ignition of a gas engine for automobile and the like purposes is shown in the drawings and particularly in the diagram of Fig. 12, wherein one of the spring contacts 21 is connected by a wire 35 with one terminal of the magneto 36, the other terminal of which is grounded at 37. The magneto 36 also has its terminals connected with a spark plug 38 of the engine. The other spring contact 21 is connected by a wire 39 to the ground. One of the spring contacts 22 is connected by a wire 40 with one terminal of a battery 41, the other terminal of which is grounded at 42, while the other spring contact 22 is connected by a wire 43 with an engine operated make-and-break device 44 which connects with the primary winding 45 of an induction coil grounded at 46. The secondary winding 47 of the induction coil is connected as usual with a spark plug 48 of the engine. One terminal of the condenser 15 is connected by means of a wire 49 with the binding post of the spring contact 22 which is connected to the battery, while the other terminal of the condenser is connected by a wire 50 with the binding post 34 of the contact point 33.

When the switch is in the "off" position, the contact disk is in the position shown in Figs. 7 and 8, in which the spring contacts 21 are in engagement with two of the contacts 17, thus short circuiting the magneto 36 to render it ineffective for producing ignition. Also the battery-controlled ignition mechanism is ineffective, inasmuch as the spring contact 22 which has connection with the wire 40 from the battery is then in engagement with one of the recesses 24 of the insulating disk and not in electrical connection with one of the contact buttons 19.

When the switch lever 13 is moved to the next position, the "battery" position, as shown in Figs. 9 and 12, the magneto is still ineffective since both spring contacts 21 are in engagement with contact buttons 17, but now both of the spring contacts 22 are in engagement with contact buttons 19 so that the metal strip 20 completes a connection from the battery wire 40 to the igniter wire 43 and consequently the operation of the ignition device 44 by means of a cam on the engine or otherwise will effect the battery ignition in the usual manner. In such connection the condenser 15 is bridged across the contact maker of the igniter 44, its one terminal being in connection with the metal strip 20 through the spring contact 22 on one side of the contact maker and its other terminal being connected by the wire 50 with the contact point 33, there being a wire 51 connected with the binding post 34 of said contact point 33 and leading to the connection between the igniter 44 and the primary winding 45 of the induction coil to complete the connection with the other side of the contact maker of the igniter. For starting the engine on compression it is only necessary to depress the switch stem 11 until the contact points 32 and 33 engage, as shown in Fig. 2, thus closing a short circuit around the igniter 44 from the metal strip 20 through the engaged contacts 32 and 33 by way of the wire 51 to the primary winding 45 of the induction coil.

In the next position of the switch, the "magneto" position, as shown in Fig. 10, one of the spring contacts 21 engages with one of the recesses 24 of the insulating contact disk and therefore removes the short circuit around the magneto terminals so as to render the magneto effective for ignition, while the spring contacts 22 are both in engagement with recesses 24 of the insulating contact disk and the battery circuit is therefore broken.

In the next position of the switch, the

"both" position, as shown in Fig. 11, one of the spring contacts 21 is still in engagement with a recess 24 of the insulating contact disk so that the magneto remains effective, but the spring contacts 22 having passed into engagement with two of the contact buttons 19 close the battery circuit also, so that both ignition systems are effective.

While the invention is admirably suited for the purpose of engine ignition, as herein set forth, it is not limited to such application, for it is capable of various uses, such as the control of lighting systems for automobiles, for instance, the second position of the switch may close the taillight and sidelight circuits, the third position, the taillight and headlight circuits and the fourth position, all of said circuits, while the closing of the contact points 32 and 33 may be relied on to close the circuit for the speedometer light or a signal circuit. Further by substituting contact disks of various contact button connections, the switch may be adapted for a number of uses. Also the invention is not limited to the details of construction shown and described, for obviously the recesses in the contact disk may be omitted or the recesses may be formed in the spring pressed contacts, instead of in the contact buttons or the spring pressed contacts may be carried by the contact disk and such modifications do not depart from the spirit and scope of this invention.

In view of the above, I desire it to be understood that this invention is not limited to any specific form or arrangement of parts except in so far as such limitations are specific in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. A switch, comprising a stationary member and a movable member, a spring actuated contact on one member, a contact on the other member, one of the said contacts having a recess into which the other contact may fit to hold the contacts in engagement with each other for establishing an electrical circuit, and contact points carried by the two members to be engaged for closing an electrical circuit while the said contacts are engaged when the movable member is moved toward the stationary member against the pressure of the spring contact.

2. A switch, comprising a stationary insulating member and a rotary insulating member, two pairs of spring contacts mounted on one member, at the same distance from the center thereof and forming terminals of two different circuits, said contacts provided with convex ends, a circular series of contact buttons on the other member having concave recesses into which the convex ends of the contacts fit with pressure to hold the rotary member in various predetermined positions, there being similar recesses in the surface of the insulation of said member between some of the contact buttons and receiving the spring contacts in the same manner as the recesses in the contact buttons so that in each operative position of the switch all of the spring contacts fit in the recesses to resist turning of the rotary member, and metal plates on the button carrying member having the contact buttons connected therewith for effecting various circuit connections between the spring-pressed contacts in the different positions of the rotary member.

3. A switch, comprising a stationary member and a movable member, a series of spring contacts mounted on one member, a series of recessed contact buttons on the other member adapted to have the spring pressed contacts fit therein in different positions of the movable member, means connecting certain of the contact buttons together to effect various connections between the spring pressed contacts in the different positions of the movable member, and contact points on the two members adapted to be engaged for closing an electrical circuit when the movable member is moved toward the stationary member against the pressure of the spring pressed contacts.

4. A switch, comprising a casing, an insulating head mounted on the casing, spring pressed rounded contacts mounted in the insulating head, a shaft rotatably and slidably mounted in the casing, a handle for turning and depressing the shaft, an insulating disk carried by the shaft, recessed contact buttons on the insulating disk adapted to be engaged by the spring-pressed contacts, means connecting certain of the contact buttons together whereby they establish various connections between the spring-pressed contacts in the different positions of the disk, a contact point carried by the shaft and a contact point on the insulating head, said contact points being adapted to be engaged for establishing an electrical circuit when the shaft is depressed.

5. A switch, comprising a casing, an insulating head therefor, spring-pressed rounded contacts mounted in the insulating head, a shaft slidably and rotatably mounted in the casing, a handle for turning and sliding the shaft, an insulating disk mounted on the shaft, recessed contact buttons carried by the insulating disk, there being recesses in the insulating disk, the said disk at regular intervals being provided with either a contact button or one of the said recesses, one pair of the spring-pressed contacts being positioned a distance apart equal to two of the said intervals and another pair of spring-pressed contacts being similarly spaced, four of the contact buttons being arranged in succeeding intervals on the disk, a connector connecting said four contact

buttons together, the other three contact buttons being positioned on the disk to alternate with some of the said recesses in the disk, a connector connecting said three contact buttons together, a contact point at the center of the disk having connection with the last mentioned connector, a contact point on the insulating head adapted to be engaged with the other contact point when the shaft is slidably moved in the casing.

In testimony whereof, I affix my signature, in presence of two witnesses.

STEPHEN F. BRIGGS.

Witnesses:

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KATHERINE HOLT.