

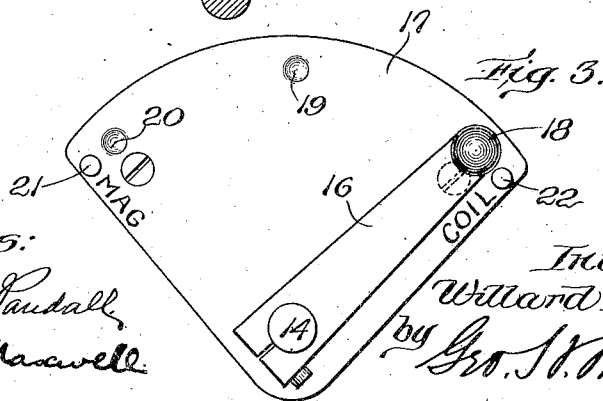
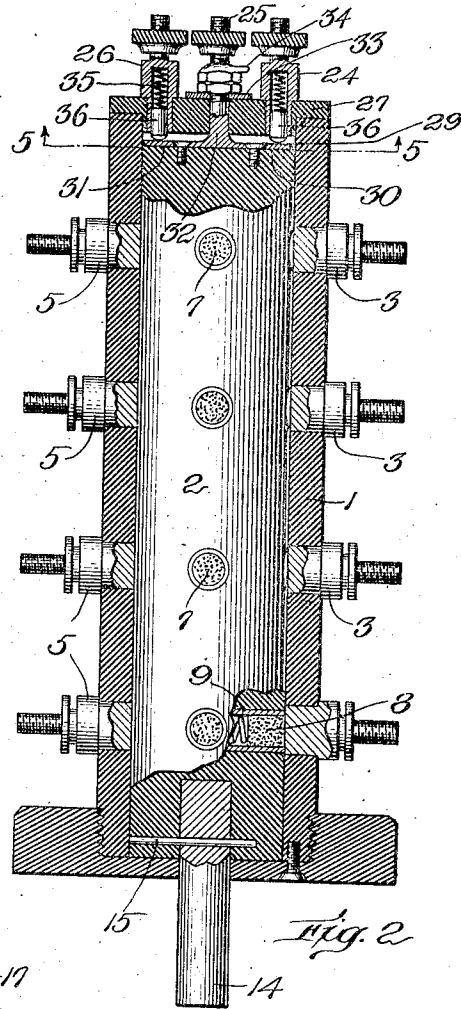
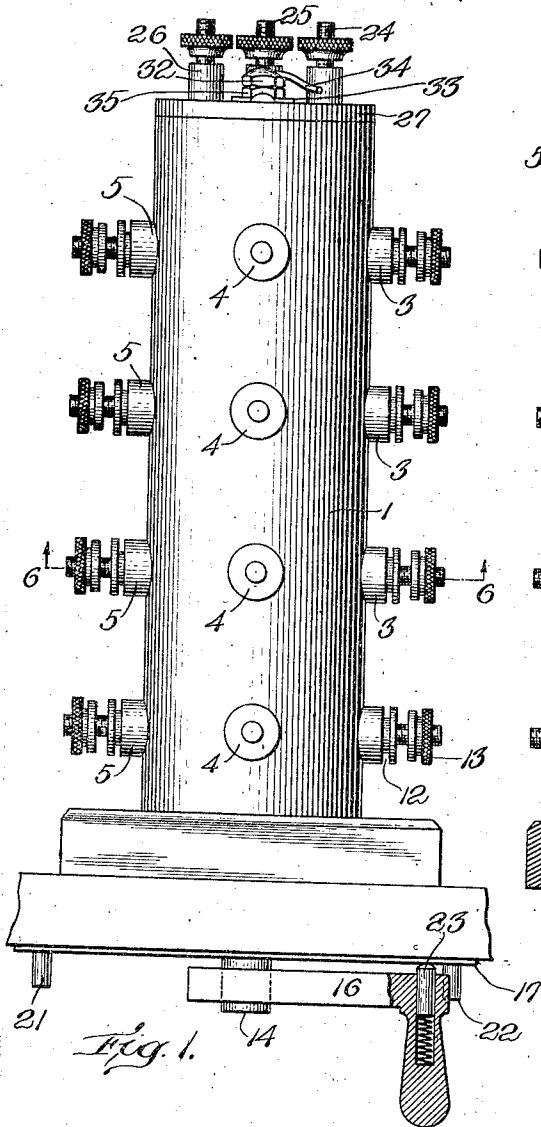
W. E. DOW.  
ROTARY SWITCH.

APPLICATION FILED JULY 29, 1910.

995,774.

Patented June 20, 1911.

2 SHEETS—SHEET 1.



Witnesses:

Arthur T. Randall,  
Edward Maxwell.

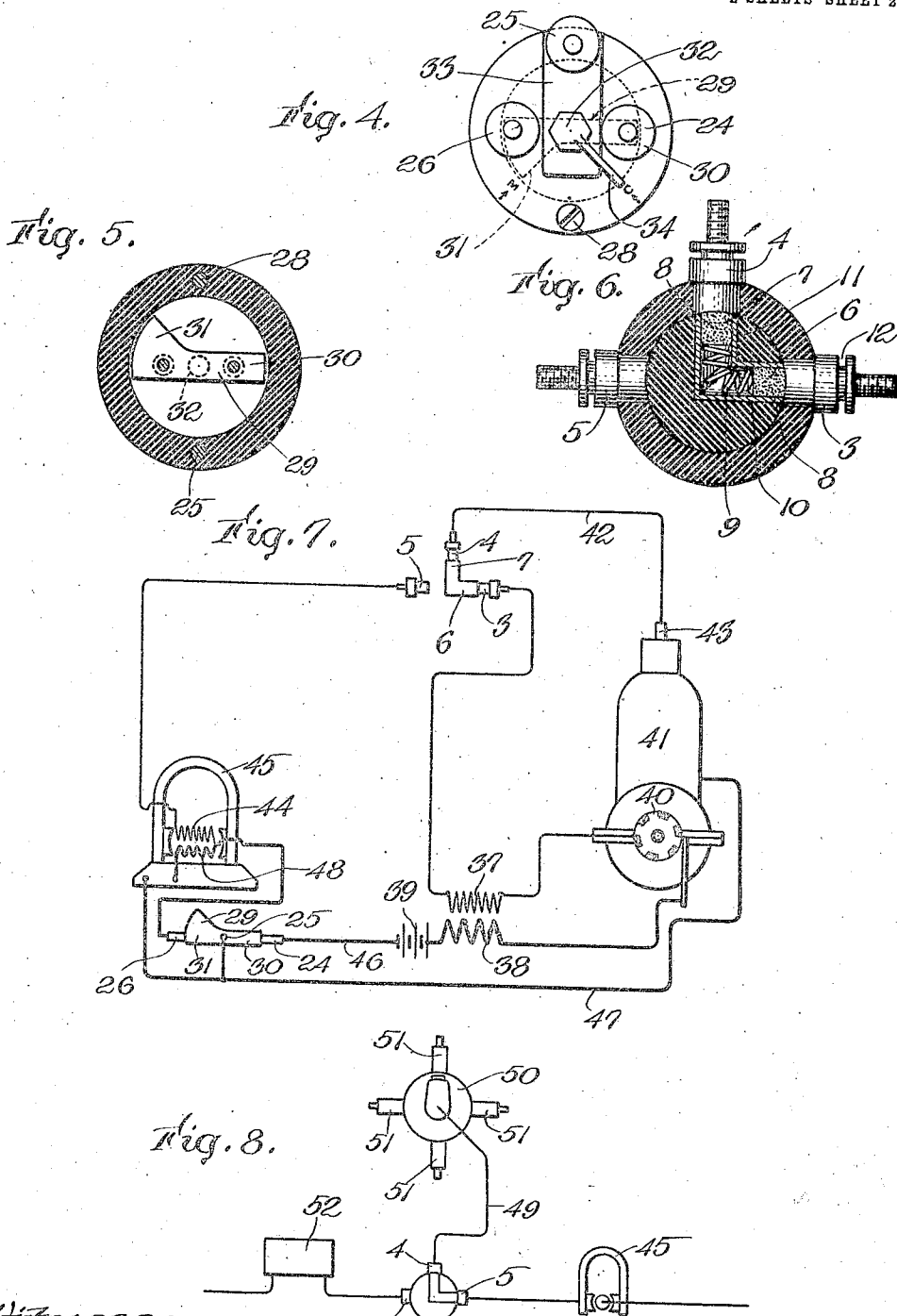
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att'y.

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# UNITED STATES PATENT OFFICE

WILLARD E. DOW, OF BRAINTREE, MASSACHUSETTS.

## ROTARY SWITCH.

995,774.

Specification of Letters Patent. Patented June 20, 1911.

Original application filed September 13, 1907, Serial No. 392,797. Divided and this application filed July 29, 1910. Serial No. 574,465.

### *To all whom it may concern:*

Be it known that I, WILLARD E. Dow, a citizen of the United States, residing at Braintree, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Rotary Switches, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My present application is a division of my application Ser. No. 392,797 filed Sept. 13, 1907, and relates especially to a rotary switch for operating at will an explosion engine either in connection with a battery and spark coil or in connection with a battery neto, whichever may be desired, without stopping the engine. In other words, by my invention the operator can start the engine by actuating the spark plug or plugs at the start in connection with the induction coil and battery circuit, and then, after the engine is started, he can, by a simple rotation of the same starting switch, cut out the spark coil and its battery circuit and cut in the magneto and its circuit, continuing the running of the engine thereafter in connection with the latter. This greatly simplifies the usual mechanism, saves battery consumption, and renders special skill less necessary.

While my invention is especially intended for use with automobiles, it is not confined thereto.

In the drawings, in which I have illustrated a preferred embodiment of the invention, Figure 1 is a lengthwise view of the switch looking down thereon; Fig. 2 is a broken longitudinal sectional view; Fig. 3 is an end view showing the operating handle and switch plate, and parts visible externally of the apparatus; Fig. 4 is an end view of the apparatus viewed from its inner end opposite Fig. 3; Figs. 5 and 6 are cross-sectional views taken respectively on the lines 5-5 Fig. 2 and 6-6 Fig. 1; Fig. 7 is a diagrammatic view illustrating the connections; and Fig. 8 is a diagrammatic view showing the further use of the invention.

The simplicity and compactness of the switch are among its important advantages.

In a barrel or insulating tube 1 is mounted an insulating turnable member 2, said barrel or cylinder being provided with stationary contact posts 3, 4, 5. The switch is preferably long and provided with a plu-

rality of these groups of posts to cooperate respectively with a corresponding plurality of spark plugs of a multi-cylinder engine, the construction of the switch being such that it can be practically any length so as to accommodate practically any number of groups or sets of these posts according to the requirements of any given engine or use. Coöperating with the external posts 3, 4, 5, are contacts 6, 7 in the turnable member 2, arranged at right angles to each other as shown best in Fig. 6. In order that the external and internal contacts may make close perfect contact, they are made relatively yielding, the internal contacts being herein shown as composed of carbon plugs 8 held outwardly by a spring or springs 9 in tubes 10, 11. The carbon plugs are exceedingly durable, and the construction shown also has the merit of being inexpensive and simple to make and to put together. The posts are preferably provided with a groove 12 and thumb nut 13 to accommodate the switch to different kinds of terminal clips.

At its front end the turnable member 2 is provided with a projecting axle 14 held immovably in the turnable member 2 by a pin 15, and provided at its outer end with a handle 16 which swings over a face plate 17 into the three positions 18, 19, 20, Fig. 3. Posts 21, 22 limit its throw and a spring-held plunger 23 Fig. 1 tends to hold the lever in whichever of the three positions it may occupy. At its opposite end or inner end the switch has three stationary positions 24, 25, 26, corresponding to the three posts of the handle, said posts being mounted in an insulating block or cap 27 secured in position by any suitable means as by the post 25 and a screw 28, which connect endwise into the barrel or cylinder 1. On the adjacent end of the turnable member 2 is fast a contact plate 29 having a narrow end 30 and a wide sector shaped end 31, and provided centrally with a post-like projection 32 which extends through and bears in constant engagement with a contact plate or strap 33 extending from the stationary post 25. At its free end the projection 32 carries a pointer 34, being also preferably provided with a nut 35 for pressing down on the contact plate or strap 33 for maintaining good contact at all times. The posts 24 and 26 are internally hollow and provided with spring pressed beveled plungers 36 for maintaining perfect contact

with the contact plate 29, being beveled to enable them to ride onto the plate conveniently when the turnable members turn.

In Fig. 7 I have illustrated the manner of use of my apparatus in connection with one spark plug of an engine. Referring to the wiring and other parts shown diagrammatically, the contact 3 connects with the secondary 37 of an induction coil or spark coil, whose primary 38 connects with a battery 39 at one end and an interrupter 40 at the other end on an engine 41. The contact 4 connects by wire 42 with a spark plug 43 for operating in usual manner a cylinder of said engine. The contact 5 connects with the secondary winding 44 of the armature of a magneto 45. The contact 24 connects by a wire 46 with the battery 39, the contact 25 by a wire 47 with any suitable ground, as on the engine, and the contact 26 connects to the primary winding 48 of said magneto armature, the armature windings on the magneto being suitably grounded in usual manner. Thus, by turning the handle 16 to the right, into the position shown in the drawings, the spark plug of each cylinder will be operated in connection with the induction coil and battery circuit, at which time the magneto remains inoperative, remaining short circuited through the ground wire 47, so that no damage can be done because of its necessary continuous rotation. After the engine has been started properly through the energizing of the spark plugs of its various cylinders by the induction or spark coil or coils, the operator turns the handle to the extreme left to the position 20 Fig. 3, thereby cutting out the battery and simultaneously connecting the contacts 4 and 5 of each group of contacts, the result being that the charge continues to be properly exploded by the energizing of its spark coils from the magneto. By the same turning movement of the switch the circuit of the spark coil is opened, rendering the coil inoperative by the breaking of the circuit between contacts 3 and 4. In other words, the switch cuts in the coil and cuts out the magneto by one movement and cuts in the magneto and cuts out the coil by a reverse movement. When the switch is moved to the middle point 19 Fig. 3 both the magneto and coil are cut out, as the end 30 of the contact 29 is thrown out of connection with the contact 24 but the sector end 31 of said contact 29 continues to short circuit the primary of the magneto, so that the latter is rendered inoperative.

It will be understood that I have omitted various usual details as to the timing of the circuit, etc., as my invention does not reside in the particular arrangement of engine or circuit closer or magneto or coil. It will also be understood that I have not attempted in the diagram, Fig. 7, to show the winding for

a multi-cylinder engine but only for one cylinder of an engine, it being understood that for operating a multi-cylinder engine the current from the magneto will usually be distributed to the different posts 5 by a suitable commutator or distributor, the same provision being preferably made in connection with the induction coil or spark coil, although preferably a separate coil is used for each spark plug. By my construction of switch, it will readily be seen that any number of spark plugs may readily be accommodated, inasmuch as the switch may be made as long or as short as desired, with as many groups of contacts as may be necessary. Also it is equally satisfactory when operated with a single coil and a single magneto, as illustrated in Fig. 8, in which a wire 49 is shown leading to a distributor 50 for operating successively the spark contacts 51 from either the magneto 45 or the induction apparatus 52 (as already described).

Having described my invention, what I claim as new and desire to secure by Letters Patent is,

1. In an apparatus of the kind described, a switch, comprising a stationary member and a movable member, three related terminals in fixed relation to said stationary member, connecting means carried by the movable member for closing the circuit between two of said contacts or between all three as desired or breaking said circuit, and independent contacts and connecting means also carried by said movable and stationary members for connecting the independent contacts for a given circuit when said first mentioned two contacts are in circuit closing relation and for connecting the independent contacts for a different circuit when said connecting means is in circuit breaking position.

2. In an apparatus of the kind described, a switch, comprising a turnable member, contacts movable therewith, and cooperating stationary terminals, said movable contacts including means for cooperating with three of said terminals to connect two thereof upon turning into one position and all three thereof upon turning into another position and to disconnect them when in a third position, and said movable contacts also including means insulated from the first mentioned means and from said three terminals for connecting others of the stationary terminals for two separate circuits respectively when the turnable member is moved to the second and third of said three respective positions.

3. In an apparatus of the kind described, a switch, comprising a tubular member, a turnable member axially movable therein, three stationary terminals at one end of said tubular member, a transverse contact at the end of the turnable member capable of con-

necting in circuit two of said stationary terminals in one position and all three thereof in another position and of disconnecting them in a third position, three radially arranged contacts in said stationary member insulated from the previously mentioned contacts for two independent circuits, and circuit closing means mounted on said turnable member for connecting two of said radial contacts for one of said circuits when the turnable member is in one of said positions and for connecting another two of said radial contacts for the other of said circuits when the turnable member is in another of said positions.

4. In an apparatus of the kind described, a switch, having a tube, a turnable member fitting snugly therein, radial terminals in said tube, and spring projected connected contacts in said rotary member for making contact with said radial terminals on rotation of the turnable member.

5. In an apparatus of the kind described, a switch, having a tube, a turnable member fitting snugly therein, radial terminals in said tube, and spring projected connected contacts in said turnable member for making contact with said radial terminals on rotation of the turnable member, each of said contacts consisting of a radial tube, a coiled spring therein, and a carbon plug supported in the outer end of the tube on said spring.

6. In an apparatus of the kind described, a switch, having a tube, a turnable member

fitting snugly within said tube, a plurality of longitudinal series of radial terminals similarly spaced lengthwise and circumferentially about said tube, and spring actuated contacts mounted in pairs in said turnable member to connect simultaneously corresponding terminals of two of said series in pairs throughout the length of the series, turning of the turnable member automatically cutting out the contacts of one series and cutting in the contacts of another series.

7. In an apparatus of the kind described, a switch, having a cylindrical member closed at its end, a turnable member fitting therein, three terminals mounted in said closed end, a bridging contact mounted across the end of the turnable member, one of said terminals being in continuous contact with said bridging contact and the other two of said terminals having spring projected ends to ride up on the opposite ends of the bridging contact when the turnable member is turned, said two terminals and the bridge contact having such shape and position as to connect one or both of said terminals with the third according to the position of the turnable member.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WILLARD E. DOW.

Witnesses:

GEO. H. MAXWELL,  
W. J. SPALDING.