P. J. & C. D. BODINE.

SPEED RESPONSIVE SWITCH.

APPLICATION FILED NOV. 8, 1911.

1,046,953.

Patented Dec. 10, 1912.

Fig. 4.

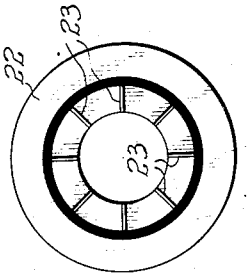



Fig. 2.

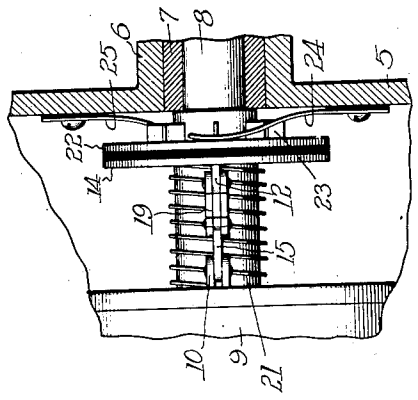



Fig. 3.

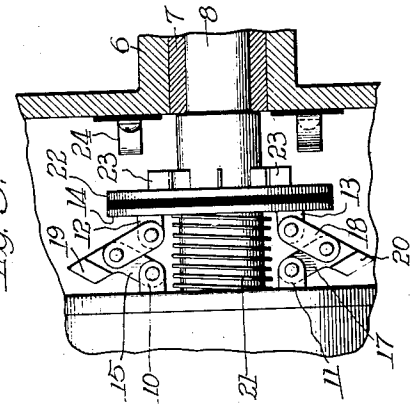
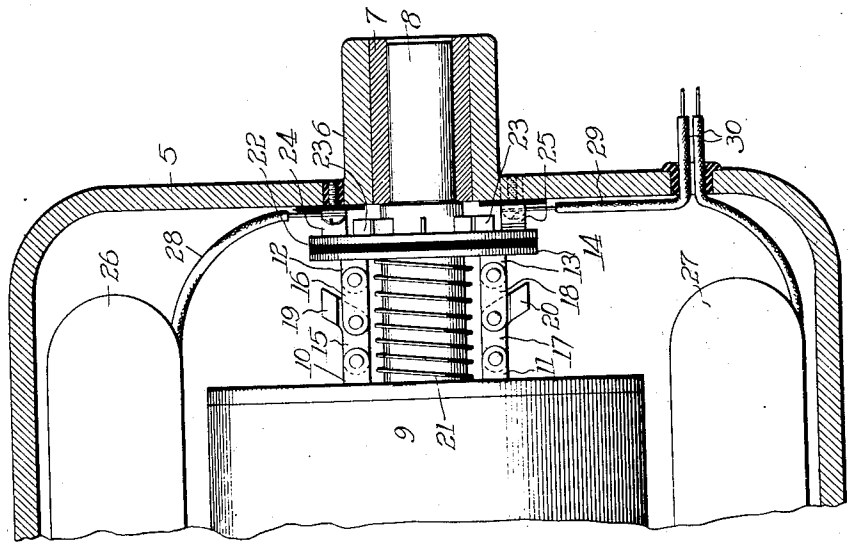



Fig. 1.

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# UNITED STATES PATENT OFFICE.

PAUL J. BODINE AND CARL D. BODINE, OF CHICAGO, ILLINOIS.

## SPEED-RESPONSIVE SWITCH.

1,046,953. Specification of Letters Patent. Patented Dec. 10, 1912.

Application filed November 8, 1911. Serial No. 659,133.

*To all whom it may concern:*

Be it known that we, PAUL J. BODINE and CARL D. BODINE, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Speed-Responsive Switches, of which the following is a specification.

Our invention relates to improvements in automatically operating, speed responsive switches.

One of the objects of our invention is to provide an electric switch associated with a revolving part, and so arranged as to automatically open a circuit when said revolving part has reached a predetermined velocity.

Another object of our invention is to provide means, connected with the revolving part, for communicating a current of air, which current of air is caused to sweep across or between the separating contacts and thereby blow out the spark, or arc, that may result from the separation of the contacts of the live circuit. And a specific object of our invention is to provide a switch of this character associated with a revolving armature of a dynamo electric machine, whereby the field magnet circuit may be opened after the armature has attained a certain velocity.

Other and further objects of our invention will become readily apparent to persons skilled in the art from a consideration of the specification, taken in conjunction with the drawing, wherein;

Figure 1 is a plan view of a dynamo electric machine, showing the switch closed; Fig. 2 is a fragmentary elevation of the device, showing the switch closed by the operation of the spring; Fig. 3 is a similar view to Fig. 2 showing the switch opened; and, Fig. 4 is an end view of the moving element of the switch, showing the contact springs and the fan-propelling blades.

In all the views the same reference characters indicate similar parts.

5 indicates the frame of a dynamo electric machine, having a bearing hub 6, which contains a bearing sleeve 7 of the shaft 8. The shaft 8 carries an armature 9, which may be rotated by any convenient means. To the armature 9 there are secured lugs 10 and 11 located equal distances from the axis of the shaft 8. Similar lugs 12 and 13 are provided on the sliding ring 14. The lugs 10 and 12 are connected together by pivoted links 15 and 16, and the lugs 11 and 13 are connected together by pivoted links 17 and 18. These links are pivoted together as shown. The links 15 and 17 carry weights 19 and 20, respectively. An open helical spring 21 surrounds the shaft 8 and abuts against the end of the armature 9, and against the inside surface of the ring 14, this tending to hold the link connection between the armature and the ring in straight relation, as shown in Fig. 1, with the ring 14 moved along the shaft to the right as far as permitted by the link connection. The ring 14 carries the insulated contact ring 22, and there are secured to the ring 14, at suitable intervals, radially disposed fan blades 23.

Resilient contact spring brushes 24 and 25 are insulated from the frame 5, and are located on either side of the axis of the shaft 8 and adapted to make electrical contact with the insulated ring 22, when the parts are in the positions shown in Figs. 1 and 2, and to break contact therewith when the parts are in the position shown in Fig. 3. The brushes 24 and 25 are electrically connected to the field windings 26 and 27 by wires 28, 29 and 30, as clearly shown in Fig. 1.

When the parts are in the positions shown in Fig. 1 the circuit through the field windings is closed by the spring 21 of the automatic switch, but when the parts have assumed the position shown in Fig. 3, as a result of the speed of the armature, the circuit is thereby broken. When the speed of the armature 9 has reached the predetermined velocity the weights 19 and 20 will be thrown outwardly by the effect of centrifugal motion until they have assumed the position shown in Fig. 3, whereby the ring 14, carrying the insulated contact ring 22, is bodily shifted on the shaft 8, to a position where contact brushes 24 and 25 will no longer make connection therewith. At the time when the circuit is thus opened between the contacting parts the fan blades 23 are propelling air radially in the plane of the contacting members, and any spark or arc that might be produced, as a result of the breaking of the contacts, is extinguished by the draft of air which is projected across the path of the arc by the effect of the fan construction. The weights 19 and 20 may be varied and the tension of the spring may be increased or decreased to determine the critical time at which the contacts will be

broken or the switch opened by the shifting ring 14 with reference to the speed of the armature 9.

In certain kinds of motors it is convenient to start them with the field magnet windings in circuit and after the armature has attained a predetermined speed it is also desirable that the windings shall be automatically removed from the circuit at that critical time, and we have, therefore, found the construction illustrated and described to be efficient in performing this desired function.

It is evident that our invention is not to be limited to this specific form or use, or for that matter to be limited in its association with the dynamo, as any revolving part with which our automatic switch is associated will serve to perform the same function as the armature of the dynamo.

One of the essential features of our construction is the production of a draft of air by the rotated parts simultaneously with the separation of the contacts, thereby to maintain the contacts cool and to prevent injurious burning of the contacts at the time of separation.

While we have herein described a specific embodiment of our invention for the purpose of complete disclosure, we wish it understood that we are not limited further than defined by the scope of the appended claims.

What we claim is;

1. In an automatic switch the combination of a rotatable disk spring-pressed to one position and movable toward another position upon rotation thereof at a predetermined speed, contacts carried by said disk, stationary contacts for coaction therewith when the disk is in said first mentioned position, and means carried by said disk within the radius of the contacts to cause a current of air to be projected outwardly past said coacting contacts.

2. In an automatic switch a rotatable contacting part carrying radially disposed air propelling blades, yielding, bodily stationary contacts for engagement with said rotatable part within the plane of said blades at the time of separation, and speed responsive means for separating said rotatable contacting part from said contacts at a predetermined speed of said rotatable part.

3. In an automatic switch the combination with a rotatable shaft, of an insulated contact ring movable longitudinally thereof, a spring surrounding said shaft to move said ring in one direction into contact with yielding brush contacts, a yielding brush contact on each side of the axis of said ring, a speed responsive means to move said ring in the opposite directions, and an air propelling means rotatable with said speed responsive means for effecting an arc extinguishing blast of air across the arc forming contacts of said switch.

In testimony whereof we hereunto set our hands.

PAUL J. BODINE.
CARL D. BODINE.

In the presence of—
FORÉE BAIN,
MARY F. ALLEN.