Feb. 7, 1933. W. H. LESLIE 1,896,798

CENTRIFUGAL SWITCH

Filed Feb. 29, 1932

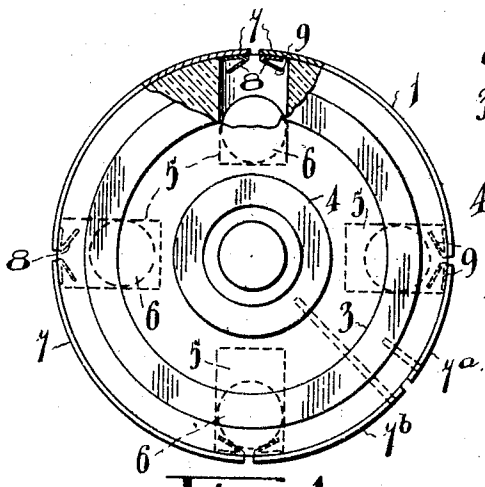


Fig. 1.

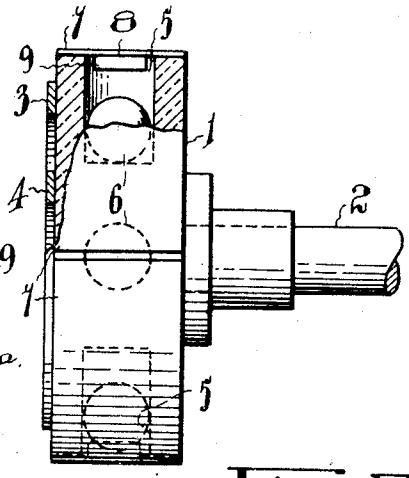


Fig. 2.

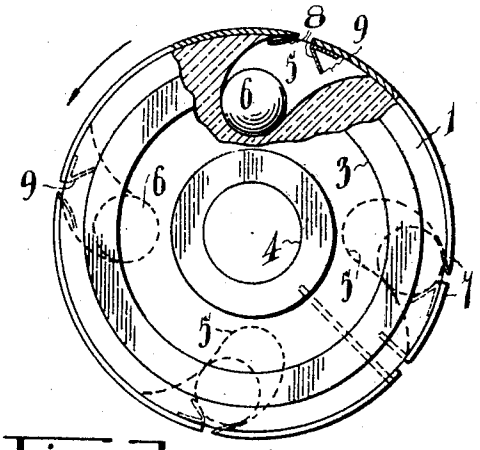


Fig. 3.

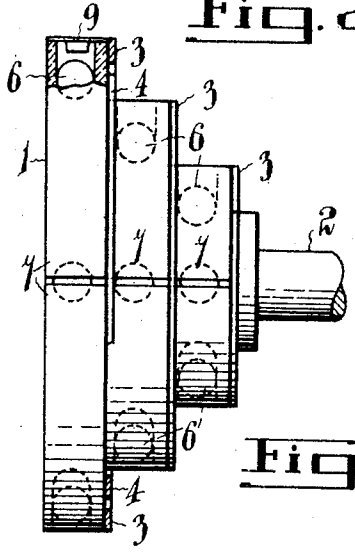


Fig. 6.

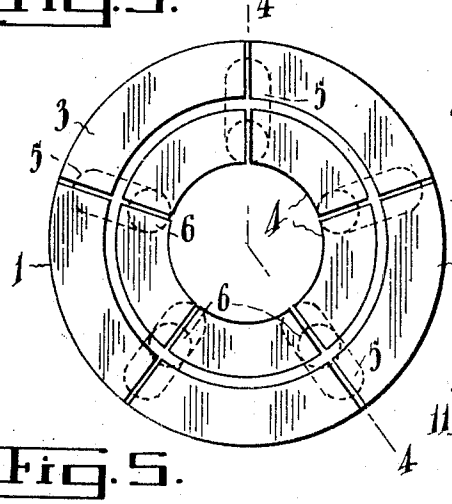


Fig. 5.

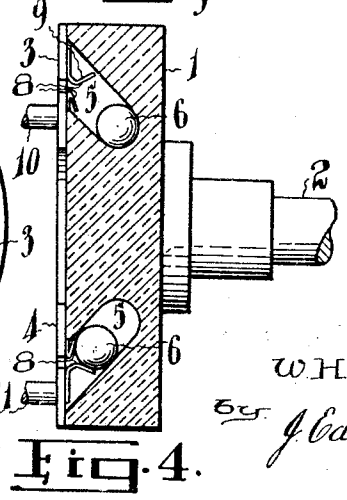


Fig. 4.

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UNITED STATES PATENT OFFICE

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CENTRIFUGAL SWITCH

Application filed February 29, 1932. Serial No. 595,798.

This invention relates to centrifugal switches, and my object is to design a switch which is particularly adapted to be used with alternating current controllers where dynamic breaking is desired for quick stopping, the function of the switch being to automatically disconnect the motor from the line by opening the circuit of the breaker clapper coil, but which may be used in connection with controller operating motors on steel rolling machines, belt conveyors and other machines requiring a rotary contactor.

I attain my object by providing a rotating member of insulating material having on its side spaced annular contacts. In the rotating member are formed a plurality of pockets in which are movable circuit closing balls, and around the periphery of the rotating member are mounted strips of conducting material, the ends of which project over the pockets and prevent the escape of balls. When the rotating member is rotating, the balls move outwardly and engage pairs of ends of the strips of conducting material. One of the strips is connected to one annular contact and another to the other annular contact and the balls make and break the circuit between the two contacts.

The construction is hereinafter more specifically described and illustrated in the accompanying drawing in which

Fig. 1 is a front elevation partly broken away of the improved switch;

Fig. 2 a side view of the same partly broken away;

Fig. 3 a front view partly broken away showing a modified form of switch;

Fig. 4 a side view partly broken away of another modification;

Fig. 5 a front view of the form shown in Fig. 4; and

Fig. 6 a side view showing a gang arrangement of switches.

In the drawing like numerals of reference indicate corresponding parts in the different figures.

In its simplest form, as shown in Figs. 1 and 2, the improved switch comprises a member 1 of insulating material mounted upon a suitable drive shaft 2, which shaft is supported and driven in any suitable manner by means not shown.

On the face of this member 1 are positioned two annular contacts 3 and 4.

Radially arranged in the member 1 are a series of pockets or recesses 5 in each of which is positioned a contact making ball 6. Secured to the periphery of the member 1 are strips 7 of conducting material. The end of one of these strips 7^a is in electrical connection with the annular contact 3, while the adjacent end of the adjacent strip 7^b is in electrical connection with the annular contact 4.

It will be noted that the other ends of the strips 7^a and 7^b and the ends of the intermediate strips 7 extend over the edges of the recesses a distance sufficient to prevent the escape of balls. These extending ends, are preferably formed as separate pieces 9 of light spring metal and are bent to form a good contact or seat 8 for the balls.

The operation of the apparatus is as follows. Upon the rotation of the member 1, the balls move outwardly under centrifugal force into the seats 8 at the outer ends of the recesses 5 and thus close the circuit betweeen the two annular contacts 3 and 4. As soon as the rotation of the member 1 slows down to a sufficient extent or stops altogether, the one or more of the balls then uppermost will move out of the seats 8 and thus break the circuit between the two annular contacts. The recesses or pockets are so arranged, that no matter in what position the member 1 stops, at least one ball will move out of its seat and thus break the circuit.

In Fig. 3 I show a modified form in which the ball pockets or recesses are curved or inclined relative to the radial line. In this arrangement, the balls will move outwardly to close the circuit when the member 1 is rotated in one direction as indicated by arrow, but will remain in the bottoms of the recesses when the member 1 is moved in the reverse direction. This arrangement is of particular value for certain purposes.

In Figs. 4 and 5 a still further modification is shown. In this form the pockets are formed in the face of the member 1 instead of in the

periphery, but are inclined towards the axis of the member 1. In this form I show the annular contacts 3 and 4 as sectional, but it will be evident that in some cases only the annular contact 3 may be sectional or only the contact 4 sectional. In this form as the member 1 rotates, the balls move outwardly and complete the annular contacts, while upon the member 1 slowing down sufficiently or ceasing to rotate, at least one of the balls will leave its seat and break the circuit. With this arrangement, however, to ensure proper breaking of the circuits it is advisable that at least one of the brushes 10 and 11 be arranged adjacent the top of the member 1 in view of the fact that if both were located near the bottom, a single ball would complete the circuit between the brushes.

In Fig. 6 I show a gang arrangement in which a plurality of centrifugal switches are arranged side by side. This form may be used for various purposes, such as timing or for an accelerating switch contactor. Any of the forms shown in the other views may be used in this gang construction, and any desired arrangement of contact rings may be employed.

While I have not shown such mechanism in the drawing, it will be understood that any suitable type of brush, spring, or other contacts may be used for engaging the annular contacts 3 and 4.

From the above description it will be seen that I have devised a centrifugal switch which will satisfactorily attain the object of my invention as set out in this specification.

What I claim as my invention is:

1. In a switch, the combination with a rotating member having a plurality of pockets therein; contact members movable in said pockets, said pockets being arranged to direct the contact members towards the outer end of said pockets when the member is rotated; and divided conducting means extending across the mouths of said pockets, the divisions being in front of the pockets, said pockets being arranged when the member is rotating to direct the balls towards the outer ends of said pockets to bridge the divisions in the conducting means, said conducting means forming the means for retaining the contact members in the pockets.

2. In a centrifugally operated switch, a rotating member having a plurality of pockets therein extending in a direction from the axis of said member towards its periphery, and divided conducting means extending across the mouths of said pockets, the divisions being in front of said pockets, and contact members movable outwardly in said pockets under centrifugal action adapted to bridge the divisions in the conducting means, said conducting means forming the means for retaining the contact members in the pockets.

3. In a centrifugally operated switch, a rotating member having a plurality of radially directed pockets therein, and divided conducting means extending across the mouths of said pockets, the divisions being in front of said pockets, and contact members movable outwardly in said pockets under centrifugal action adapted to bridge the divisions in the conducting means, said conducting means forming the means for retaining the contact members in the pockets.

4. In a centrifugally operated switch, a rotating member having a plurality of pockets therein each extending in a direction from the axis of said member towards its periphery, and inclined circumferentially relative to a radial line passing through the open end of said pocket, and divided conducting means extending across the mouths of said pockets, the divisions being in front of said pockets, and contact members movable outwardly in said pockets under centrifugal action adapted to bridge the divisions in the conducting means, said conducting means forming the means for retaining the contact members in the pockets.

Signed at the city of Toronto, Canada, this 18th day of February, 1932.

WILLIAM H. LESLIE.