Oct. 11, 1932. J. J. COUGHLIN, JR 1,882,275

AUTOMATIC CUT-OUT

Filed May 20, 1929

Fig. 1.

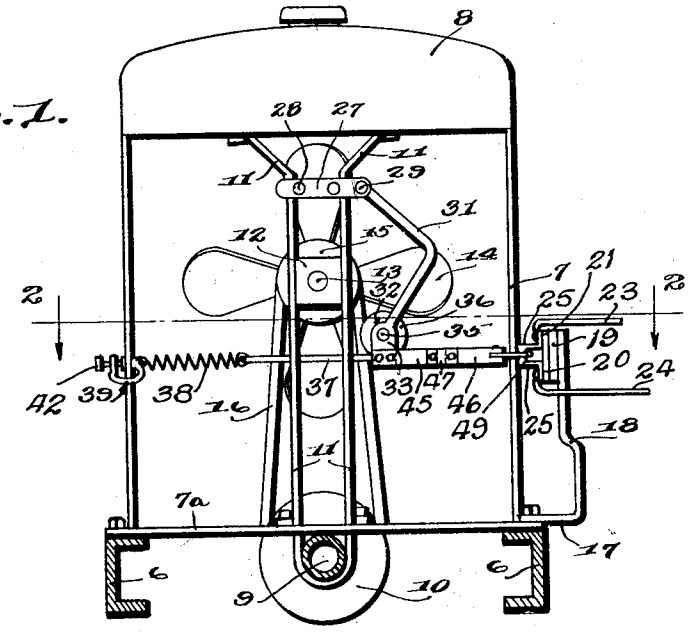


Fig. 2.

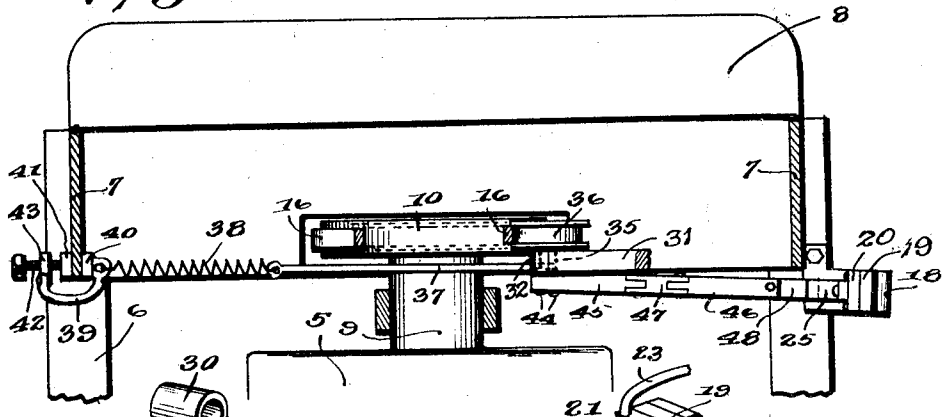


Fig. 3.

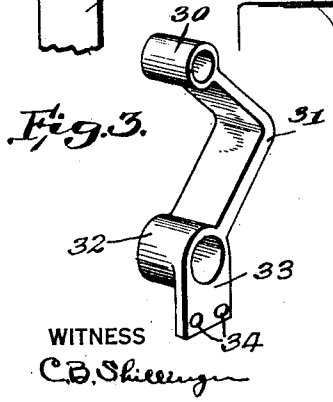
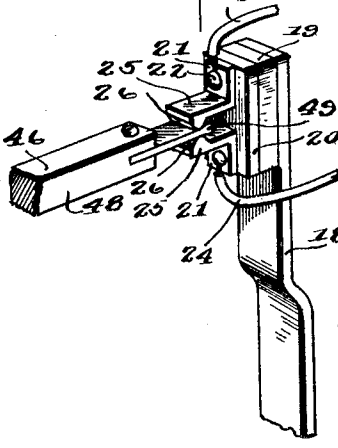


Fig. 4.



WITNESS
C. B. Shillington

INVENTOR
John J. Coughlin Jr.
BY
Munn & Co
ATTORNEY

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UNITED STATES PATENT OFFICE

JOHN J. COUGHLIN, JR., OF HACHITA, NEW MEXICO

AUTOMATIC CUT-OUT

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This invention relates to circuit breakers or cut outs interposed in the energizing electric circuit of a driving motor and automatically operated by the breaking of a belt or other wrapping connector interposed between a driving rotor of said motor and a driven rotor operating other mechanism.

The invention is more particularly concerned with and is exemplified by its application and adaptation to internal combustion motors for the purpose of opening the energizing electric circuit thereof upon the breaking of a belt or other wrapping connector driven by the motor and driving a second rotor, such for example, as that operating the fan of the motor.

The invention consists in the construction, arrangement and combination of elements as hereinafter described and pointed out in the appended claim, and is illustrated, in a preferable form, in the accompanying drawing, forming part hereof and in which:

Figure 1 is a vertical section taken forwardly of the motor of a generator driving motor of the Kohler type equipped with the control of the present invention, the section being taken on line 1—1 of Figure 2.

Figure 2 is a horizontal section on an enlarged scale, taken on line 2—2 of Figure 1 with the top tank of the radiator appearing in plan view.

Figure 3 is a detail perspective of the swinging arm which mounts the abutment roller engaging the fan belt.

Figure 4 is a fragmentary perspective detail of the movable switch arm interposed in the energizing electric circuit of the driving motor.

The invention is shown and will be described herein as applied to an internal combustion motor such as used in the Kohler current generating equipment for home electric light current supply.

The motor, shown generically at 5, in Figure 2, is carried on the frame 6. A radiator frame 7 upstands from the frame forwardly of the motor with the radiator (not shown) mounted therein at its forward end. In the drawing, Figures 1 and 2, the top tank 8 of the radiator is shown. The crank shaft 9 of the motor extends forwardly therefrom and carries a driving pulley 10 at its forward end and within the radiator frame 7 rearwardly of the body of the radiator as shown in Figure 2.

A pair of spaced parallel straps or bars 11 extend vertically of the frame 7 and above the crank shaft 9 support a bearing block 12 therebetween in which is journaled the shaft 13 of the motor fan 14 whose pulley 15 is connected to and driven from the motor shaft pulley 10 by means of a belt 16 or other suitable wrapping connector. The parts so far described represent standard equipment of a generator driving motor of the type referred to and per se form no part of the present invention.

In accordance with my invention, I have provided means cooperating with the fan belt 16 or similar wrapping connector and actuated by breakage or displacement thereof to break or open the energizing circuit of the motor, thereby stopping the operation of the motor until the fan belt has been replaced or a new belt applied. Since, in the use of motor driven equipment for generating light current, the motor is usually left to operate without supervision, the damage to the motor which would result from overheating through breakage or slippage of the fan belt and continued operation of the motor thereafter, is avoided by such provision.

Accordingly to the base flange of the radiator frame 7 is secured the flanged lower end 17 of an upstanding bracket 18. To the inner face of this bracket at its upper end is secured as by screws or other means an insulating block 19 overlaid by a second insulating block 20 fixed thereto without contact with its screws. Mounted over the inner face of the second insulating block by means of their flanged bases 21 and contact screws 22 to which the ends of wires 23 and 24 forming part of the energizing electric circuit of the motor 5 are attached, are a pair of spring contact arms 25 in spaced relation having at their inner ends and upon their confronting upper and lower faces respectively contact ribs 26 extending in parallel and slightly spaced relation.

The spaced bars 11 adjacent their upper ends are embraced from their front and rear faces by a pair of plates 27 clamped to the arms 11 and rigidly connected by bolts 28 inserted between the confronting faces of the arms 11. The plates 27 extend outwardly beyond the arms 11 and are bored in alinement at the side adjacent the spring contacts 25 to receive the opposite ends of a pin 29 upon which is journaled the bearing hub 30 formed at the upper end of an angular arm 31 depending therefrom and having its lower end formed with a bearing hub 32 and with an ear 33 depending from the hub at its rear side and provided with threaded bores 34 therein adjacent to its lower edge. This hub forms a bearing for the shaft 35 of a belt engaging pulley 36 best seen in Figure 2 and normally held tensioned inwardly against the belt 16 by a link 37 having one end fixed to the rear face of the ear 33 and its other end hooked to one end of a tensioned spring 38. The opposite end of the spring is anchored to a clamp engaging the side of the radiator frame 7 opposite to the spring contacts 25. This clamp as shown comprises a U-shaped bracket 39 embracing the rear edge of the radiator frame through an integral end block 40 through an eye of which the end of the spring 38 is inserted and through a second and movable block 41 carried upon the inner end of a threaded adjusting stud 42 inserted through a threaded bore in the other end block 43 of the U-shaped clamping member 39.

To the front face of the ear 33 is secured, as by screws 44 extending therethrough into the threaded bores 34, a link 45. A second link 46 joined thereto by an interposed block 47 of insulating material extends toward the spaced spring contacts 25 and carries in its slotted outer end a switch plate 48 which extends between the contact ribs 26 and has its inner end slightly enlarged at 49 to form a contact abutment engaging the inner faces of the abutments formed by the ribs 26 and normally retained thereby in contact against the tension of the spring 38 so long as the pulley 36 engages the belt 16. This engagement will, of course, be effective as long as the belt 16 remains on the pulleys 10 and 15 and transmits power from the motor shaft 9 to the fan shaft 13. This belt, therefore, is effective to restrain the spring 38 and permit the switch arm plate 48 to remain in contact with the ribs 26 and thus maintain the energizing electric circuit of the motor 5 closed. In the event the belt 16 through breakage or slippage is no longer interposed between the pulley 36 of the arm 31 and the tensioned spring 38, the tension of the latter will be effective to swing the arm 31 with its pulley 36 and ear 33 in a direction away from the spring contacts 25 pulling the links 45, 46 and 47 and the switch arm toward the left as viewed in Figures 1 and 2 and out of contact with the headed or ribbed ends of the spring contact members 25 so that the energizing circuit of the motor will be opened and the operation of the motor will cease until the belt has been replaced or removed and the pulley 35 re-positioned in contact therewith, the switch arm 48, of course, being again inserted between the spaced spring contacts 25 to again close the energizing circuit. While an automatic circuit breaker or cut out of this particular character is particularly useful in connection with motors operating without supervision such as the motors driving generators for small electric light plants, etc., it will be obvious that it may be used upon motors generally including those of motor vehicles.

The specific construction described as representing a preferred form of the invention is intended as illustrative rather than restrictive of the invention and is subject to modification and adaptation to different conditions of manufacture and use in consonance with the spirit of the invention and the scope of the appended claim.

What I claim, therefore, and desire to secure by Letters Patent is:

A circuit breaker for energizing electric circuits comprising spaced outwardly yielding contact members included in an energizing electric circuit a movable switch blade insertible between said contacts and normally closing the circuit therethrough, said blade having a circuit closing abutment engageable with said contacts to close the circuit therethrough and normally restraining said switch blade from withdrawal from between said contacts to break the circuit, a pivotally suspended carrier mounting a belt-engaging roller, pivoted links connecting said roller suspension with said switch blade, a spring attached to said roller suspension and normally holding the roller tensioned against the belt with the switch blade abutment in circuit closing contact with said spaced contacts, but effective through breakage or displacement of the belt by slippage, to swing the suspended roll, links and switch blade in a direction to withdraw the blade from between the links and break the energizing circuit therethrough, said contacts yielding outwardly in response to the spring pull on the switch blade abutment there against.

JOHN J. COUGHLIN, JR.