June 27, 1933. F. R. SCHMITT 1,915,550

BROKEN-WEB MOTOR CUT-OUT FOR WRAPPING MACHINES

Filed Feb. 16, 1932

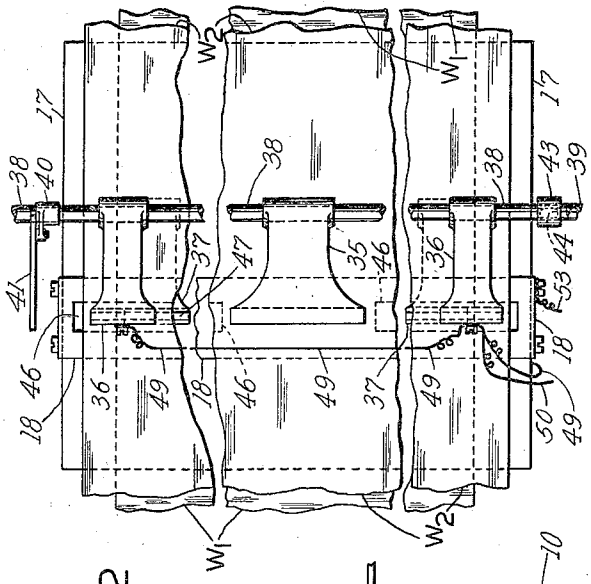


FIG. 2

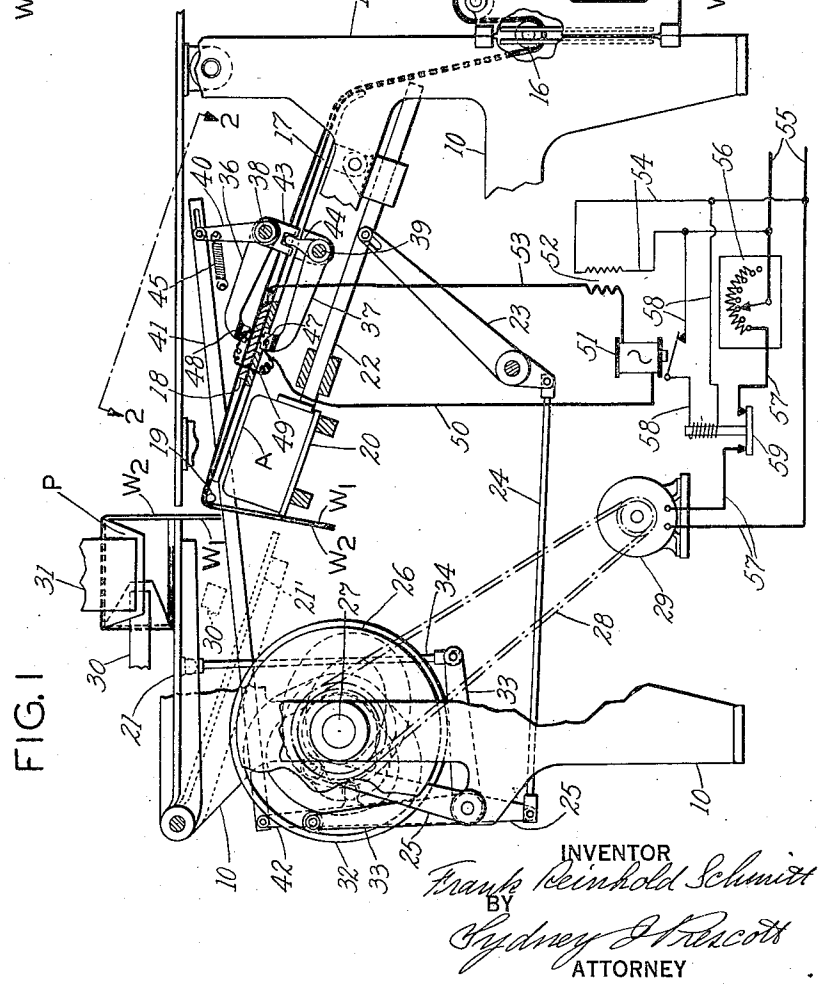


FIG. 1

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Patented June 27, 1933 1,915,550

UNITED STATES PATENT OFFICE

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BROKEN-WEB MOTOR CUT-OUT FOR WRAPPING MACHINES

Application filed February 16, 1932. Serial No. 593,390.

This invention relates to a motor cut-out device for wrapping machines, its main object being to automatically stop the driving motor of a wrapping machine employing wrapping material in the form of one or more continuous webs fed from reels in the machine, in case of breakage or tearing of one or more of these webs during the operation of the machine.

In the present invention, this object is achieved using the web itself to control an electric circuit which actuates a relay for starting and stopping the drive motor of the wrapping machine, either as an insulating part, if the web is of an electrically non-conductive material such as plain or waxed paper, cellophane, etc., or as a conducting part, if the web is of a conductive material, such as tin or other foil, metalized paper, etc. In the former case, the web holds the relay circuit open as long as it is intact but the circuit immediately closes when the web becomes discontinuous; in the latter case, the presence of the web is necessary to complete the circuit which thus is immediately open when a break in the web occurs. With this and other objects not specifically mentioned in view the invention consists in certain constructions and combinations hereinafter fully described and then specifically set forth in the claims hereunto appended.

In the following description, a bread wrapping machine with two webs of non-conductive material, such as ordinary or waxed paper, is taken as an example to illustrate the arrangement and operation of one form of the improved device. To the support plate which guides the wrapping webs into packaging position, a contact plate extending across the said support plate is so attached that one of the wrapping webs passes under the contact plate while the other passes over the same. One set of insulated contact fingers, suitably spaced, is placed a small distance above the upper web on this contact plate and another set a small distance below the lower web on the same, in openings provided for this purpose in the support plate. These contact fingers are mounted on shafts suitably inter-connected by means of interlocking levers or gear segments so that a cam operated lever on one shaft will impart to all the contact fingers a timed simultaneous opening or closing motion. Both sets of contact fingers are connected to one terminal of a low-voltage relay circuit and the contact plate to the other terminal so that the circuit is completed through either or both sets of contact fingers if one or more of the latter make contact with the contact plate. While the wrapping webs are being cut to size for a package, the webs are pressed against the contact plate by the cam-actuated contact fingers and form an insulating layer on each side of the contact plate. Thus when, at the time of a closing motion, both webs are intact, no current can therefore flow in the relay circuit in which case the latter does not disturb a make-and-break contact placed for this purpose in the motor supply circuit. But when either of the webs has been torn and contact between the fingers and plate is thereby established at the point of discontinuity, the aforesaid make-and-break contact will be opened, thus immediately stopping the driving motor of the wrapping machine.

In the accompanying drawing, which forms a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a portion of the side elevation of the wrapping machine equipped with a broken-web motor cutout device; and

Fig. 2 is a top view of the cutout device taken on line 2—2 of Fig. 1.

In carrying the invention into effect there is provided an electrically conductive member adapted to separate a pair of webs of wrapping material, electrically conductive contact fingers for pressing the webs against the sides of the member, means for pressing said fingers against said webs, and electrical means connecting said motor and fingers to stop the motor when one of said fingers engages a bare side of said member. In the best forms of construction contemplated, the electrical means connecting the motor and fingers includes an alternating current supply circuit connected to said motor, a step-down transformer having its primary terminals

connected to said supply circuit and its secondary terminals connected to the contact fingers through a relay, a make-and-break contact in the supply circuit adapted to be opened when the relay circuit is closed by contact of said fingers with the contact plate due to breaking of either or both webs. In the best forms of constructions contemplated, also, the means for pressing the fingers against the webs includes a pair of shafts on which said fingers are mounted, a rounded finger on one of said shafts, a fork on the other shaft engaging said rounded finger, an arm on one of said shafts, a cam, a cam lever engaging said cam, and a link connecting said lever and arm. These various means and parts may be widely varied in construction within the scope of the claims, for the particular machine selected to illustrate the invention is but one of many possible concrete embodiments of the same. The invention, therefore, is not to be restricted to the construction shown and described.

Referring to the drawing, the side frames 10 of the wrapping machine of the type shown in the patent to H. Y. Armstrong, No. 1,626,379, granted April 26, 1927, carry brackets 11 which support cross-shafts 12 and 13. The shafts 12 and 13 serve as supports for reels R1 and R2 which supply the wrapping webs W1 and W2 for producing a double wrapped package P, the width of the web W′ being equal to the length of the article to be wrapped and the width of the web W² being greater than the length of the article to provide end flaps which are folded over the ends of the article. The use of an inner wrapper or tube such as formed from the web W′ is highly desirable with articles such as sliced bread.

The inner wrapping web W1 is threaded over rollers 14, 15, and 16, and the outer web W2 over the rollers 14*a*, 15, and 16, both webs then passing over a support plate 17. The plate 17 carries a contact plate 18 formed of an electrically conductive material such as copper and mounted on it in such a manner as to allow the web W1 to pass under and the web W2 to pass over the same, the webs then passing over a roller 19 from which they hang over the end of the feed runway 20 delivering the article A to be wrapped.

As the article A is advanced from runway 20 to a lifter table 21, when the latter is in its down position 21′ shown in dotted lines, the down-hanging wrapper webs W1 and W2 are carried along by the article, thereby partly folding the webs around the same. The advance of the article is effected by a pusher 22 operated by lever 23 connected by a rod 24 to an arm 25 actuated by a cam 26 carried by a shaft 27 driven by a chain 28 from the drive motor 29 of the wrapping machine.

Upon article A entering into position on lifter table 21′, side tuckers 30 are caused to close upon the article, thereby tucking the forward side laps of the wrappers and holding them in position while the table 21′ ascends to its up-position 21. In approaching the latter position, the laps of the top fold encounter stationary folding plates 31, thereby causing the top flaps of the wrappers to be folded against the article, forming a partly finished package P. The swinging table 21 is operated by a double-faced cam 32 mounted on the drive shaft 27 actuating a bell-crank lever 33 connected to the platform 21 by a rod 34.

While the lifter table 21 dwells in its upper position, a cam-actuated paper pull-off rod, not shown, swings down and unwinds from each of the reels R1 and R2 a sufficient length of wrapping material for the next package. Upon the completion of the downward swing of the pull-off rod, a knife, not shown, cuts the webs W1 and W2.

During the cutting operation, a clamping arm 35 mounted on cross-shaft 38, Fig. 2, and contact fingers 36 and 37 mounted on the cross-shafts 38 and 39, respectively, actuated through an arm 40 by a link 41 connected to an arm 42 operated by the cam 32, press the webs W1 and W2 against the contact plate 18. The contact fingers 36 are spaced on shaft 38 to be near the edges of wrapper web W2, and the fingers 37 are mounted on shaft 39 near the edges of wrapper web W1. The shaft 38 carries a fork 43 engaging with a rounded finger 44 on shaft 39 thus moving the shaft 39 in the opposite direction of shaft 38 when the rod 41 is operated against the tension of a spring 45. The plate 17 is provided with slots 46 to allow the contact fingers 37 to engage web W2.

The fingers 36 and 37 have contact tips 47 insulated from the fingers by insulating blocks 48, the tips 47 being connected together by a wire 49, and the contact tip on one finger 36 being connected by a wire 50 to one terminal of the primary circuit a relay 51 fed by the secondary or low-voltage side of a step-down transformer 52, the other terminal of the transformer being connected by a wire 53 to the contact plate 18. The primary or high-voltage side of transformer 52 is fed through wires 54 from the line wires 55 which in the diagram are shown as a single-phase A. C. supply circuit which are connected through the motor starting switch 56 to drive the motor 29 of the machine by the wires 57. With this arrangement of a step-down transformer the operator cannot be shocked by stray currents of high voltage in the frame of the machine. The secondary circuit 58 of the relay 51 receives current from the line 55 through the wires 54 and is connected to a solenoid controlling a make-and-break contact 59 for the flow of the

motor current in circuit 57, this secondary circuit is arranged to be opened by means of a control contact underlying the core of the relay 51 when the latter is energized, thereby causing the make-and-break contact to open the motor circuit. When during the operation of the machine, with the starting switch 56 closed, a break in one or both of the webs W1 and W2 occurs, contact between the fingers 36 and 37 and the plate 18 will be established when the contact fingers are pressed against the contact plate 18, permitting the current induced in the secondary 52 of the transformer to flow through the primary circuit of relay 51 formed by wires 50, 53, and the contact plate and fingers. By this action, the secondary circuit 58 of the relay is broken when the relay 51 is energized, thereby opening make-and-break contact 59 and discontinuing the current flow in wires 57 and stopping the drive motor 29.

When webs of electrically conductive material are employed for wrapping, the wire 50 may be connected to one set of contact fingers 36 and the wire 53 to the other set 37 while the plate 18 then is made of insulating material. With the webs intact, the relay current will then flow from wires 50 to 53 through the contact fingers to the two webs which are in contact on rollers 15, 16, and 19. But when one of the webs is broken, the fingers at the break will rest on the insulating plate 18, thereby breaking the primary relay circuit and energizing the make-and-break contact 59 in the secondary circuit 58, the contact 59 in this case being arranged to open the motor circuit 57 when energized, by placing the contacts of the latter below the cross-bar of contact magnet 59 instead of above as shown in the drawing.

What is claimed is:

1. In a wrapping machine, the combination with an electrically conductive member adapted to separate a pair of webs of wrapping material, of electrically conductive contact fingers adapted to press the webs against the sides of said member, a motor for driving the machine, means for pressing said fingers against the webs, and electrical means connecting said motor and fingers to stop the motor when one of said fingers engages a bare side of said member.

2. In a wrapping machine, the combination with an electrically conductive member adapted to separate a pair of webs of wrapping material, of electrically conductive contact fingers adapted to press the webs against the sides of said member, a motor for driving the machine, means for pressing said fingers against the webs, and electrical means connecting said motor and fingers to stop the motor when one of said fingers engages a bare side of said member, said electrical means including an alternating current supply circuit connected to said motor, a step-down transformer having its primary terminals connected to said supply circuit, a solenoid, a make-and-break contact in said supply circuit carried by the core of said solenoid and adapted to open the supply circuit and stop the motor when said solenoid is de-energized, a relay, a secondary circuit connected to said supply circuit and said solenoid to energize the latter, and a control contact in the secondary circuit arranged to be opened when said relay is energized, said fingers being electrically connected to said relay and the secondary terminals of said transformer, whereby contact of one of said fingers with a bare side of said member due to breaking of either or both webs stops said motor.

3. In a wrapping machine, the combination with an electrically conductive member adapted to separate a pair of webs of wrapping material, of electrically conductive clamping fingers adapted to press the webs to the sides of said member, a motor for driving the machine, means for pressing said fingers against the webs, electrical means connecting said fingers and motor to stop said motor when either of said fingers engages a bare side of said member, means for guiding a web of wrapping material on either side of said member, and means for pushing an article against the leading ends of said webs to draw the webs between said member and the clamping fingers and partially enwrap the article.

4. In a wrapping machine, the combination with an electrically conductive member adapted to separate a pair of webs of wrapping material, of electrically conductive clamping fingers adapted to press the webs to the sides of said member, a motor for driving the machine, means for pressing said fingers against the webs, electrical means connecting said fingers and motor to stop said motor when either of said fingers engages a bare side of said member, means for guiding a web of wrapping material on either side of said member, and means for pushing an article against the leading ends of said webs to draw the webs between said member and the clamping fingers and partially enwrap the article, said means for pressing the fingers against the sides of said member including a pair of shafts on which said fingers are mounted, a rounded finger on one of said shafts, a fork on the other shaft engaging with said rounded finger, an arm on one of said shafts, a cam, a cam lever having a roller engaging said cam, and a link connecting said lever and arm.

5. In a bread wrapping machine, the combination with two rotatable supports for a pair of reels of wrapping material, of an oscillating lifting table, mechanism for oscillating said table, means for pushing loaves of bread onto said table in timed relation to the

oscillations thereof, means for guiding the webs of wrapping material into position to be engaged by a loaf of bread as it is advanced by said pushing means onto said lifting table, whereby the loaf is partially enwrapped in the webs of wrapping material, and single means for clamping both webs intermittently to hold them stationary, stopping said mechanism and loaf pushing means when either of said webs is broken while it is guided into position to be engaged by said loaf pushing means.

6. In a bread wrapping machine, the combination with two rotatable supports for a pair of reels of wrapping material, of means for advancing a loaf of bread, means for guiding the webs of wrapping material into position to be engaged by the advancing loaf, and single means for clamping both webs intermittently to hold them stationary, stopping said loaf advancing means when either of said webs is broken while it is being guided into position to be engaged by the advancing loaf.

7. In a wrapping machine, the combination with a member adapted to separate a pair of webs of wrapping material guided over its sides, of electrically conductive contact fingers for pressing the webs against the sides of said member, a motor for driving the machine, and electrical means connecting said motor and fingers to stop the motor when one of said fingers engages a bare side of said member.

In testimony whereof, I have signed my name to this specification.

FRANK REINHOLD SCHMITT.