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ELECTRIC CONTROL MECHANISM FOR BREAD WRAPPING MACHINES

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FIG. 1

FIG. 2

FIG. 3

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FIG. 4

FIG. 5

FIG. 6

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This invention relates to a machine for wrapping articles of the nature of sliced loaves of bread, especially a mechanism in which the loaves are delivered from the slicing machine to a conveyor, running at substantially right angles to the path of delivery, so that the forward movement of the loaves in one sense, in parallelism with the slicing planes, is translated abruptly into a movement perpendicular to the slices, that is, the sliced loaves are customarily discharged sidewise from the slicing mechanism and are eventually delivered endwise to the wrapping mechanism.

Machines for such operation of wrappers in conjunction with slicers are known, and include mechanism for effecting the realignment of the above described differences in path movements, but the efficiency of these existing machines is not altogether satisfactory, particularly with respect to the mechanism intervening between the slicer discharge and the infeed delivery conveyor to the wrapping machine.

Under such conditions, an object of the present invention is to provide an improved electric control mechanism for bread wrapping machines, with especial reference to efficient automatic control of the machine by the loaf at the above-named transfer point, the general organization of the cooperating mechanisms being desirably similar to that disclosed in the Letters Patent to Farmer, granted October 30, 1928, No. 1,689,428, for purposes of illustration, with certain modifications in structure and operation by way of improvement thereof.

In pursuance of the above general object of the invention, the latter includes the provision of two general controls for stopping the machine whenever necessary. In the first place, an overload safety control device is provided comprising a series of pins, spring-biased to a coupling position and adapted to be resistingly yieldable lengthwise of their respective axes to uncouple the loaf delivery mechanism from the main drive of the machine, at the same time acting, by virtue of said axial movement, to open a normally closed switch included in the electric motor circuit by which the machine is operated, thus deenergizing or incapacitating the circuit and so stopping the machine.

The invention includes also provision of a detector switch for the infeed conveyor to the wrapper mechanism which comprises a pivoted plate device spring-mounted adjacent to the infeed conveyor and exteriorly of the wrapping machine, so constructed and arranged that whenever a loaf is positioned incorrectly on the infeed conveyor it will bear against the plate, which consequently operates a normally closed switch in the motor energizing circuit, thereby incapacitating the machine by opening said circuit and stopping the motor.

Other objects and features of the invention will appear as the description of the particular physical embodiment of the invention selected for illustration progresses.

In the accompanying drawings, like characters of reference have been applied to corresponding parts throughout the several views which make up the drawings, in which:

Fig. 1 is a schematic view in vertical section elevation of part of an electrical control mechanism for a wrapper machine for sliced loaves, in the construction of which the present invention has been embodied;

Fig. 2 is a partial view in plan of the structure shown in Fig. 1, taken on the broken line 2—2;

Fig. 3 is a fragmentary detail view on an enlarged scale of the safety mechanism shown in Fig. 2;

Fig. 4 is a fragmentary detail view in plan, on a larger scale, of the control unit at the infeed point of the conveyor to the wrapper mechanism;

Fig. 5 is a view of the same in side elevation illustrating the safety control lever and associated contact devices.

In the now-preferred embodiment of the invention selected for illustration and description, the part designated by the reference character 18 is constituted by a portion of the bottom plate of a bread slicing machine (not shown in further detail along which sliced loaves of bread S are advanced or discharged, by suitable pushers, indicated schematically at 11 as taking the form of flights impelled in known manner by conveyor chains (not shown). The loaves are guided in their travel by adjustable side walls 12 and 13 suspended from bars or other suitable structural parts of the slicing machine (not shown).

The bottom plate 10 is illustrated as substantially level, but this is not intended to exclude the use of an inclined feed chute for the loaves, such as that disclosed in the aforesaid Farmer Patent No. 1,689,428. Such inclined chutes are used generally where unsliced loaves and similar articles are to be fed to a wrapping mechanism.

With either a gravity feed, or a positive feed,
as by the pushers 11 already referred to, or a combination of such feeds, the sliced loaves are preferably discharged past a swinging detector section 14—which will be described hereinafter—
to a conveyor mechanism disposed substantially at right angles to the bottom plate 10, and which, in the instance illustrated, includes a table or plate 20 (Figs. 1 and 2) having a slot 120 through which extend upwardly spaced flights 3 which engage the sliced loaves S received from the slicing machine and advance them toward a wrapping station, at which, as indicated in Fig. 1, the logo S, the plate 20, and wrapper web W, all associated as herein indicated, occupy a position considerably in advance of that occupied by the foremost loaf S in Fig. 2, but in alignment therewith.

Before proceeding to describe the distinctive features which characterize the present invention, it is noted that in a machine of the type herein illustrated by way of example, a plate 41 is provided, adapted to be swung upon a pivot 48 (Fig. 1), down to a position illustrated in dotted lines in Fig. 1, opposite to the plunger 24, so that when the lever 44 is suitably actuated—by suitable means not shown—the plunger 40 will push the loaf S from its full line position in Fig. 1, against a pendant lap L of the wrapper W, suitably disposed, by known or other suitable means, (which need not be described in detail) to effect a partial enfolding by the wrapper W around three sides of the loaf S.

The member 41 is eventually swung up by a lever 49, operated by a cam (not shown) on the wrapping machine, and each loaf in turn is then advanced by a pusher 60 (one of a series on a conveyor chain not shown) across a bridge piece B to a travelway 69 and into the range of action of the wrapping machine (not shown), where the ends of the wrapper are folded in conventional or other suitable fashion.

The above order of events presupposes the anticipated progress of each loaf duly from the plate 10 to the plate 20 and its advancement to the wrapping station without displacement or maldistribution of the loaf at any stage of its transfer. To aid such progress, the plate 20 is preferably inclined, as shown in Fig. 1, so that the loaves are gravity-biased into aligned position along a rear wall 32, this wall and the plate 20 being supported by the plate section 42 which, by suitable connections, (not shown) receives notion from a cam 43 mounted on a cam shaft 44 journalled in the supporting structure of the machine. The shaft 44 also carries a gear 45 in mesh with a pinion 46 fixed on the main drive shaft 47. As already noted, the lifting table 4 is fulcrumed on a pivot 45 which, by suitable connections (not shown) receives motion from a cam 43 mounted on a cam shaft 44 journalled in the supporting structure of the machine, and the pinion 46 also carries a gear 45 in mesh with a pinion 45 fixed on the main drive shaft 47. As already noted, the lifting table 41 is fulcrumed on a pivot 15 on which the inside guide wall section 14 swings, is supported in spaced end loops 16 of a brace 17 secured to a frame 18 mounted slidingly within a housing 19 extending away from the wall 12 and formed with a slot 190 through which a threaded stud 180 protrudes to receive a thumb screw 181 by which the frame 18 and plate section 42 may be operated to open or close, section 14, may be secured in adjusted position longwise of the housing 19.

The frame 18 carries a normally closed electric switch 25 mounted on the brace 17, through which extends a push button or trigger 24 by which lever 44 and plunger 40 may be operated to operate an electrical control circuit which includes conductors 37 leading to the electric motor by which the machine is driven, and the trigger 24 is adapted to be operated by an actuator arm 23 mounted within the housing 19 and which in turn is engaged by a plunger 22 mounted angularly within a recess 21 of the swinging section 14, the plunger being spring-pressed against the arm 23 with a tension which is normally insufficient to operate the trigger 24 when the parts occupy the position illustrated in Fig. 1. The actuator arm 23 is maintained normally by the action of a coil tension spring 28, connected between studs 120 on the section 14 and a wall portion 26 which is pivoted at 27 on the member 14, and is held normally against a stop pin 29 on the member 14, thus being kept at 50 right angles to the member 14, as shown in Fig. 4, but capable of permitting a knee action at the pivot 27 yieldingly if pressure is exerted against the member 14 by a load.

At a higher level, and each loaf in turn is then advanced by a pusher 60 (one of a series on a conveyor chain not shown) across a bridge piece B to a travelway 69 and into the range of action of the wrapping machine (not shown), where the ends of the wrapper are folded in conventional or other suitable fashion.

The above order of events presupposes the anticipated progress of each loaf duly from the plate 10 to the plate 20 and its advancement to the wrapping station without displacement or maldistribution of the loaf at any stage of its transfer. To aid such progress, the plate 20 is preferably inclined, as shown in Fig. 1, so that the loaves are gravity-biased into aligned position along a rear wall 32, this wall and the plate 20 being supported by the plate section 42 which, by suitable connections (not shown) receives notion from a cam 43 mounted on a cam shaft 44 journalled in the supporting structure of the machine. The shaft 44 also carries a gear 45 in mesh with a pinion 46 fixed on the main drive shaft 47. As already noted, the lifting table 4 is fulcrumed on a pivot 45 which, by suitable connections (not shown) receives motion from a cam 43 mounted on a cam shaft 44 journalled in the supporting structure of the machine, and the pinion 46 also carries a gear 45 in mesh with a pinion 45 fixed on the main drive shaft 47. As already noted, the lifting table 41 is fulcrumed on a pivot 15 on which the inside guide wall section 14 swings, is supported in spaced end loops 16 of a brace 17 secured to a frame 18 mounted slidingly within a housing 19 extending away from the wall 12 and formed with a slot 190 through which a threaded stud 180 protrudes to receive a thumb screw 181 by which the frame 18 and plate section 42 may be operated to open or close, section 14, may be secured in adjusted position longwise of the housing 19.
shaft 48 and is operated by a rod 49 controlled by a cam (not shown), which may be mounted on the shaft 44, and so all of the moving parts of the machine hereinafter described may be synchronized and their various operations performed in a suitable timed relation to each other.

As a safety means to prevent injury to any of the aforesaid moving parts, or to other parts associated therewith, in the event of overload of any part actuated by the cam 43, the latter is connected with its actuating gear 45 by an overload release which includes a series of plungers 52 having tapered heads 51 biased lengthwise by coil springs 55 in spaced bosses 50 upon the spokes of the gear 45 and thus adapted to enter similarly to countersunk recesses 53 in the web 54 of the cam 43.

Figure 3 is an enlarged view of one of these plungers in its operative position. The springs 55 are held in adjusted position against shoulders on the plungers by threaded sleeves 56, which permit axial movement of the plunger stems 52. By screwing the threaded sleeves in or out the springs 55 can be tensioned to obtain the desired gripping pressure of the plungers 52 against the walls of the recesses 53.

This clutch type connection as between gear 45 and cam 54 eliminates the possibility of breaking or damaging any of the working parts of the machine, when overload or "jam" occurs, particularly to parts which derive motion from members mounted on shaft 44, such an overload or strain on the shaft will overcome the pressure of springs 55, allowing the plungers to retreat from the recesses 53 and stopping the rotation of the cam 54.

As a further precaution, the invention provides means whereby the release of the plungers lengthwise operates to stop the machine by opening the energizing circuit of the electric driving motor.

The ends 58 of the plungers, as shown in their dotted line position in Fig. 3, project beyond the heads of the threaded sleeves 56, and upon continued rotation of the gear 45, engagement is caused, after less than one-third of a turn, between the head 59 of a plunger and the head 60 of a trip lever 60 which is mounted, as at 60, pivotally upon a relatively fixed portion of the frame, as indicated in Fig. 2, adjacent to the annular orbit of the plungers 51.

Such an engagement causes the arm or lever 60 to swing about its pivotal axis 60, and in so doing it swings its complemental arm 61 (Fig. 6) and depresses a pushbutton 62, acting thus to open a normally closed electrical switch 63 included in a control circuit with the electrical driving motor of the machine, the pushbutton moving its bridge piece 64 from contacts 65, thus stopping the flow of current through the conductors 66, and effecting the de-energization of the motor and the consequent incapacitation of the machine.

When the motor is thus stopped, the machine will remain inoperative until the cause of the disengagement shall have been corrected and the shaft 47 turned to include the fingers 51 again enter the recesses 53 as shown in Fig. 3 whereupon the control circuit will be rehabilitated and the machine can be set in motion after the usual starting switch shall have been closed by the operator.

The arm 60 is held in its normal position by a spring 61 in the switch 63.

As already noted briefly, each loaf in being transferred in a crosswise direction onto the table 41 encounters the downhanging free end L of the wrapper web W, (Fig. 1) which is thereby folded about a portion of the loaf as the latter arrives on the table 41. The downfolding of the ends of the wrapper is performed while the table 41 carries the loaf to its upper position, from which the pusher 68, depending from endless chains (not shown), transfers the loaf onto a runway 69.

Upon entering the runway the tail end of the wrapper, which has been severed from the web by a cam-actuated knife 68, in a suitable manner, is folded under the loaf. While carried along the runway 69, the remaining end and bottom flaps of the wrapper are folded against the loaf and the wrapper is sealed by suitable means incorporated in the runway, but not illustrated, as such mechanism is well-known to those skilled in the art.

What is claimed is:

1. In an article feed for a wrapping machine of the class described having an articleway, mechanism to advance sliced loaves in said articleway, and a prime mover to actuate said mechanism, an electrical control circuit provided with means to incapacitate said prime mover, and an electrical switch included in said control circuit, said switch including a switch operator device responsive to an overload upon said mechanism initiated by the movement of an unwrapped sliced loaf in misplaced position in the articleway, said operator device being adapted upon occurrence of such an overload to operate the switch and incapacitate said prime mover.

2. An article feed having the features claimed in claim 1, in which said operator device is constructed and arranged to hold the switch in said position to incapacitate the prime mover, with the machine stopped, until removal of the obstructed condition in the articleway, and means acting automatically to reset said switch and said operator device when the obstructed condition no longer obtains, so that operation of the machine under normal control is permitted by virtue of said removal of the obstructed condition.

3. An article feed for a wrapping machine of the class described having an articleway with guide walls, mechanism to advance unwrapped sliced loaves therein, and a prime mover to actuate said mechanism, an electrical control circuit provided with means to incapacitate said prime mover, and an electrical switch included in said control circuit, said switch including a switch operator device forming a yielding section of one of said guide walls and adapted to be actuated automatically exclusively by a defective or misplaced article, such switch operation constituting the sole function of said yielding section.

4. An article feed for a wrapping machine of the class described, having the features claimed in claim 2, wherein provision is made of electrical switches each included in such a control circuit, said switches each having a switch operator device, one of said operator devices being responsive exclusively to an engagement of the mechanism and another operator being responsive exclusively to the presence of a misplaced or defective article in said articleway, said overload device being arranged to permit cyclical rehabilitation by the prime mover upon removal of the overload condition, while said mechanism responsive to displacement remains unaffected, and means acting to reset said last-named op-
erator device and its switch automatically to permit operation of the machine immediately upon removal of the obstructed condition without manual intervention other than that involved in the normal control of the machine.

5. In an article feed of the class described having an article way, mechanism to advance articles in said article way, a feedway adapted to receive a supply of said articles and mechanism to feed said articles from the feedway to the article way in a direction substantially at right angles to the path of said articles in the article way, an electrical control circuit provided with means to incapacitate said mechanism, a control switch included in said circuit, and a switch operator device actuated automatically exclusively by a defective or misplaced article passing from said feedway to said article way; said switch operator device comprising a housing fixed in adjusted position along a wall of said article way, and a swinging wall section pivoted in said housing and spring-biased to a normal inactive position, and said control switch comprising a normally closed electric switch mounted within said housing and provided with a control button or trigger by which said control switch may be operated to open said control circuit, an actuator arm disposed within said housing, and a plunger mounted in said swinging wall section, whereby swinging movement of said section operates said plunger to move said actuator arm, actuate said control button or trigger and open said control circuit.

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