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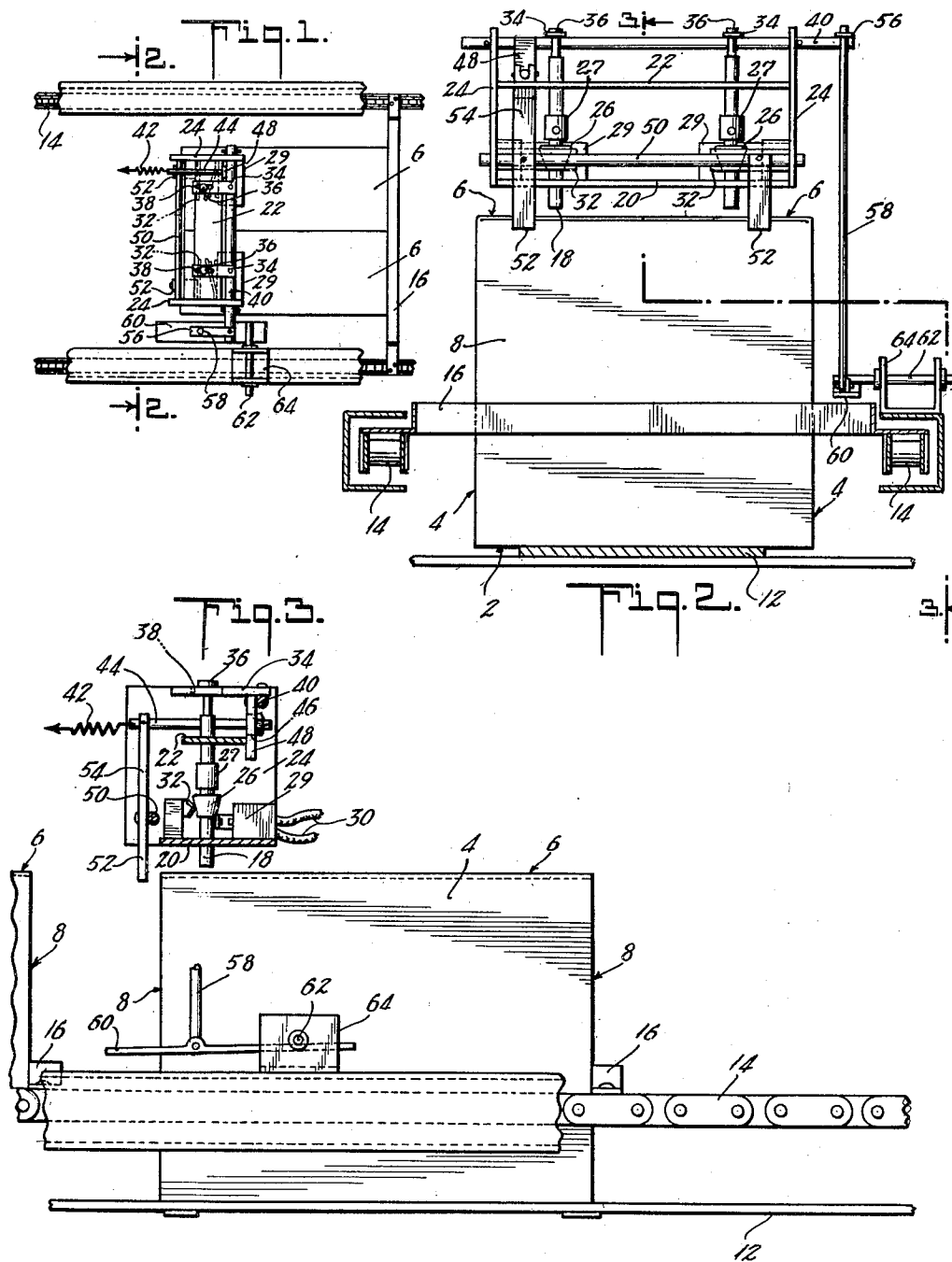
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DETECTOR FOR CARTON CLOSING MACHINES

Filed Dec. 13, 1945

2 Sheets-Sheet 1



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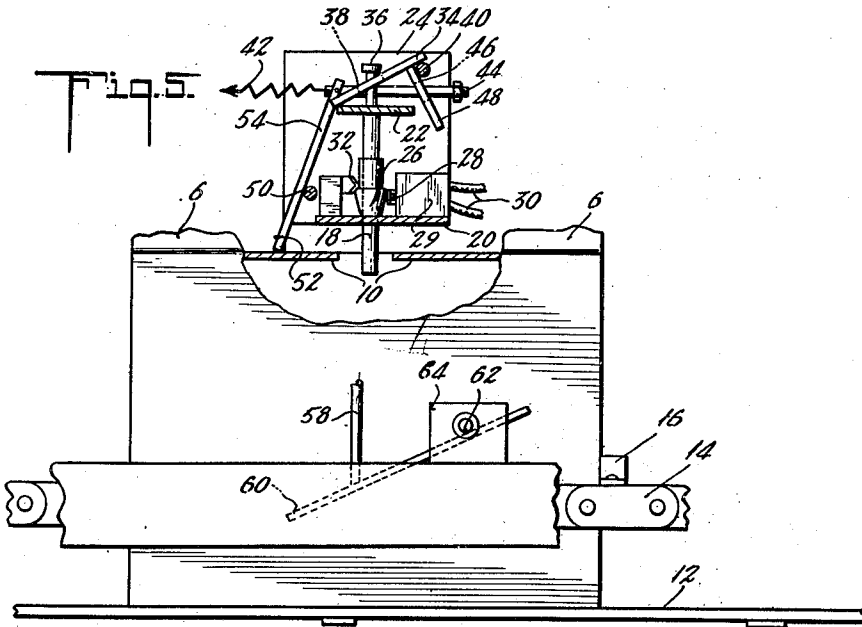
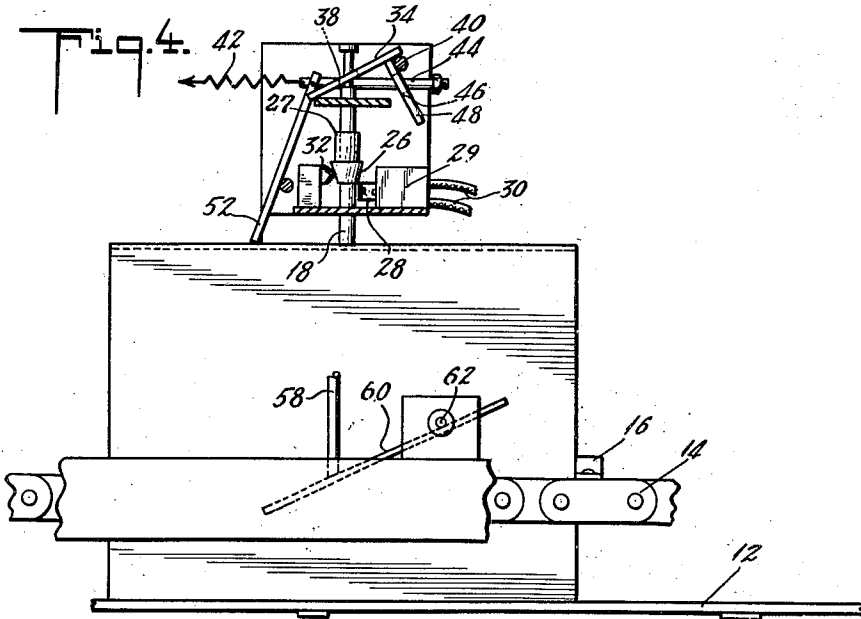
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DETECTOR FOR CARTON CLOSING
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The present invention relates to machines for use in closing and sealing filled boxes or cartons, and has special reference to devices for stopping the machine or the feeding of the cartons in case a carton has not been properly closed or sealed.

The machine is particularly adapted to operate on cartons of the type provided with end flaps that are hingedly connected to the upper ends of the end walls of the cartons, and side flaps which are hingedly connected to the upper edges of the side walls of the cartons. This type of carton when filled may be closed by first folding down the end flaps and then the side flaps, adhesive being applied to the undersides of the side flaps so as to secure the side flaps over the end flaps. In machines for closing and sealing such cartons considerable difficulty has heretofore been experienced in case the machine fails to properly close one of the cartons as it progresses therethrough.

The principal object of the present invention is to provide means which is simple in construction and efficient and reliable in operation for stopping the machine in case either one of the side flaps of the carton is not properly closed. Preferably when the machine is thus stopped, the carton which is improperly closed may either be removed from the machine or the carton properly closed by hand, before the machine is again thrown into operation.

The invention is illustrated, by way of example, in the accompanying drawings, in which:

Figure 1 is a plan view, partly diagrammatical, of a portion of a carton closing or sealing machine embodying the features of my invention in their preferred form;

Fig. 2 is a transverse sectional elevation, on an enlarged scale, taken on the line 2-2 of Fig. 1;

Fig. 3 is a longitudinal sectional elevation taken substantially on the line 3-3 of Fig. 2; and

Figs. 4 and 5 are views corresponding substantially to Fig. 3 but showing certain parts of the detecting and stop mechanism of the machine in different positions.

The box or carton closing or sealing machine illustrated in the drawings, is of the type of the one illustrated and described in the patent to Saylor et al. No. 1,471,924, dated October 23, 1923.

The machine is particularly adapted for closing and sealing boxes or cartons, such as shipping cartons made of corrugated cardboard. Such cartons are usually provided with a bottom wall 2, side walls 4, side flaps 6 which are hingedly connected by scoring or otherwise to the upper edges of the side walls, end walls 8, and end

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flaps 10 hingedly connected to the upper ends of the end walls.

As shown, the machine is provided with a longitudinally extending support 12 on which the cartons are mounted to slide longitudinally one behind the other and spaced apart. The cartons are adapted to be thus moved along the support by means of endless conveyor chains 14 that are connected by cross bars 16 which respectively engage the rear ends of the cartons.

In accordance with the present invention, during the continued progress of the cartons through the machine, after each carton has been closed and sealed, it is presented to detecting devices which in case the side flaps of the carton have not been properly closed serve to stop the machine. The defective carton may then be conveniently removed from the machine, or the proper closing thereof may be performed by hand before the machine is again thrown into operation.

As shown, these devices comprise feeler or detector rods or pins 18, the lower ends of which are adapted to ride respectively on the side flaps of each carton as the carton passes beneath the pins. These pins 18 are mounted to slide vertically in apertures in plates 20 and 22 which are secured to upright frame plates 24. Each detector pin 18 has a conical collar 26 mounted to slide freely thereon. The collar 27 is secured on each pin 18 and its lower end is adapted to abut the upper end of the associated conical collar 26. The downward movement of each pin 18 and collar 26 is limited by the engagement of the lower end of the collar 26 with the plate 20 (Fig. 5). When either pin 18 is in this position, its collar 26 has depressed the operating member 28 of a suitable micro-switch 29 which is in circuit with the motor circuit through wires 30. Such movement of the switch member 28 serves to break the motor circuit, thus stopping the machine. Each pin 18 is held in this position by means of a spring clip 32 which engages a shoulder on the upper end of the conical collar 26.

During the normal operation of the machine, each conical collar 26 is held elevated sufficiently to release the operating member 28 of the micro-switch.

As each carton approaches the detector pins 18 and as the forward end thereof passes beneath the lower ends of the pins, the pins are held in the elevated position shown in Fig. 3 by means of arms 34 which engage the undersides of flanges or heads 36 on the upper ends of the pins, the pins extending through elongated slots 38 in the arms. The arms 34 are secured to a rock shaft 40 which

is mounted to turn in apertures in the side frame plates 24. The rock shaft 40 is turned to hold the pins 18 in elevated position by means of a coiled spring 42 secured to the end of a rod 44 which extends through a slot 46 in an arm 48 secured to the rock shaft 40. The movement of the rod 44 to the left by the spring 42 is limited by the engagement of the arm 48 with one edge of the plate 22.

A rock shaft 50 is mounted to turn in apertures in the side frame plates 24 and has secured thereto two depending arms 52. One of the arms 52 has an upward extension 54 which has its upper end pivotally connected with the end of the rod 44.

The rock shaft 40 has secured to one end thereof (Figs. 1 and 2) an arm 56 to which is pivotally connected the upper end of a rod 58 which has its lower end pivotally connected with an arm or shoe 60. This arm or shoe is secured on a rock shaft 62 that is mounted to turn in apertures in the sides of a channel member 64 secured to the machine frame.

With this construction, when the detecting device is set in operative position as shown in Fig. 3, as a closed and sealed carton is being conveyed over the support 12 by means of one of the cross bars 16 of the conveyor chain 14, the upper edge of the front end wall of the carton engages the depending arms 52 and during the continued movement of the carton, the arms are turned so as to ride over the top of the carton. This movement of the arms 52 turns the rock shaft 50 and through the arm extension 54, moves the rod 44 forwardly against the tension of the spring 42. This movement of the rod 44 releases the arm 48 and rock shaft 40 so as to permit the arms 34 to be swung downwardly by gravity and thus release the detector pins 18. The detector pins then drop by gravity into engagement with the top surfaces of the side flaps of the carton, the collars 26 being retained in elevated position by the leaf springs 32.

In case the carton has been properly closed, during its continued movement, the detector pins 18 and the arms 52 merely ride over the top of the carton as the carton continues to be fed beneath them. As the front end of the carton approaches the detector pins 18, the associated conveyor cross bar 16 engages the underside of the arm or shoe 60, and swings the shoe in a direction to move the rod 58 upwardly which, as the arms 52 ride off of the rear end of the carton, acts through the arm 56 to turn the rock shaft 40 to restore the arms 34 and 48, the detector pins 18, and the arms 52 to their initial operative position as shown in Fig. 3, the parts being held in this reset position by means of the spring 42 ready to act on the next carton presented thereto.

In case one or the other of the side flaps of a carton has not been properly closed, as the space between the end flaps 10 of the carton reaches a position beneath the detector pin on that side of the carton, the pin drops into the position shown in Fig. 5, thus acting through the fixed collar 27 thereon to force the conical collar 26 downwardly to operate the switch member 28 to break the motor circuit and stop the machine.

When the machine is thus stopped, the detector pins and conical collars 26 may be raised by hand so as to permit removal of the carton or proper closing thereof by hand, the circuit connections (not shown) enabling this to be done without starting the machine. With the detector

pins and the conical collars 26 thus elevated to the position shown in Fig. 3, the main starting switch (not shown) of the machine may be operated to again throw the machine into operation. After the defective carton is removed and the machine is again thrown into operation, the succeeding cross bar 16 by engagement with the shoe 60 resets the detecting device (Fig. 3) as the next carton is presented thereto.

As will be evident to those skilled in the art, my invention permits various modifications without departing from the spirit thereof or the scope of the appended claims.

What I claim is:

1. In a machine for use in closing cartons having side flaps hingedly connected to the side walls thereof, the combination of means for feeding cartons longitudinally, detecting members beneath which the cartons pass as they are thus being fed, the detecting members being adapted to respectively bear on the top surfaces of the side flaps of each carton when the side flaps are closed and in case one of the side flaps is not closed the adjacent detecting member is free to drop a distance below its surface engaging position, an electric switching device associated with each detecting member whereby when the detecting member thus drops below its said surface engaging position the switching device is operated, means for retaining said detecting members a distance above the top surface of the carton as the front end portion of each carton passes beneath said members, and means operated by engagement of the front end of the carton therewith for releasing said retaining means when the front end of the carton has passed a predetermined distance beneath said members.

2. In a machine of the class described, the combination of means for feeding cartons longitudinally, a detecting member beneath which the cartons pass as they are thus being fed, the detecting member being adapted to bear on the top surface of each carton when the top of the carton is closed and in case the carton is not closed to drop a distance below its said surface engaging position, an electric switching device associated with the detecting member whereby when the detecting member thus drops below its said surface engaging position the switching device is operated, means for retaining said detecting member a distance above the top of the carton as the front end portion of each carton passes beneath said member, and means operated by engagement of the front end of the carton therewith for releasing said retaining means when the front end of the carton has passed a predetermined distance beneath said member.

3. In a machine of the class described, the combination of means for feeding cartons longitudinally, a detecting member beneath which the cartons pass as they are being fed, the detecting member being adapted to bear on the top surface of each carton when the top of the carton is closed and in case the carton is not closed to drop a distance below its said surface engaging position, an electric switching device associated with the detecting member whereby when the detecting member thus drops below its said surface engaging position the switching device is operated, means for retaining said detecting member a distance above the top of each carton as the front end portion of the carton passes beneath said member, a pivotally mounted arm having its lower end arranged in the path of the upper portion of each

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carton and a spring tending to turn said arm in one direction whereby as the carton is conveyed beneath the said arm, the arm is first swung rearwardly against the tension of said spring and then bears on the top surface of the carton, and connections between said arm and said retaining means for releasing said retaining means when the front end of the carton thus passes beneath said arm.

4. In a machine of the class described, the combination of means for feeding cartons longitudinally, a detecting member beneath which the cartons pass as they are thus being fed, the detecting member being normally held above the top of each carton and when released adapted to drop into engagement with the top surface of the carton when the top of the carton is closed and in case the carton is not closed to drop a distance below its said surface engaging position, means for retaining said detecting member in its said normal position, means actuating said retaining means to release the detecting member when the front end of the carton has passed a predetermined distance beneath said member, and means acting automatically to reset said retaining means after the carton has passed said detecting member and before the succeeding carton is presented to said detecting member.

5. In a machine of the class described, the combination of means for feeding a carton longitudinally one behind the other, a detecting member beneath which the cartons pass as they are thus being fed, the detecting member being normally held above the top of each carton and when released adapted to drop into engagement with the top surface of the carton when the top of the carton is closed and in case the carton is not closed

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to drop a distance below its surface engaging position, a rock shaft, an arm carried by the rock shaft and engaging said detecting member to retain it in said normal position, means for turning the rock shaft in one direction to release said detecting member to permit it to drop into engagement with the top surface of the carton when the front end of the carton has passed a predetermined distance beneath the detecting member, and means for turning said rock shaft in the opposite direction to return the detecting member to its normal position when the carton has passed the detecting member and before the succeeding carton is presented to said member.

6. A structure according to claim 5 in which the means for turning said rock shaft in a direction to return the detecting member to its said normal position comprises a pivotally mounted shoe, connections between the shoe and said rock shaft, and a member carried by said carton-feeding means for turning said shoe in one direction to act through said connection with the rock shaft to turn said rock shaft in said direction.

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