Jan. 24, 1956 P. STANCHEFF 2,732,203

MEANS FOR PREVENTING ERRORS IN THE PACKAGING OF ARTICLES OF MANUFACTURE

Filed May 29, 1953 2 Sheets-Sheet 1

Fig. 1

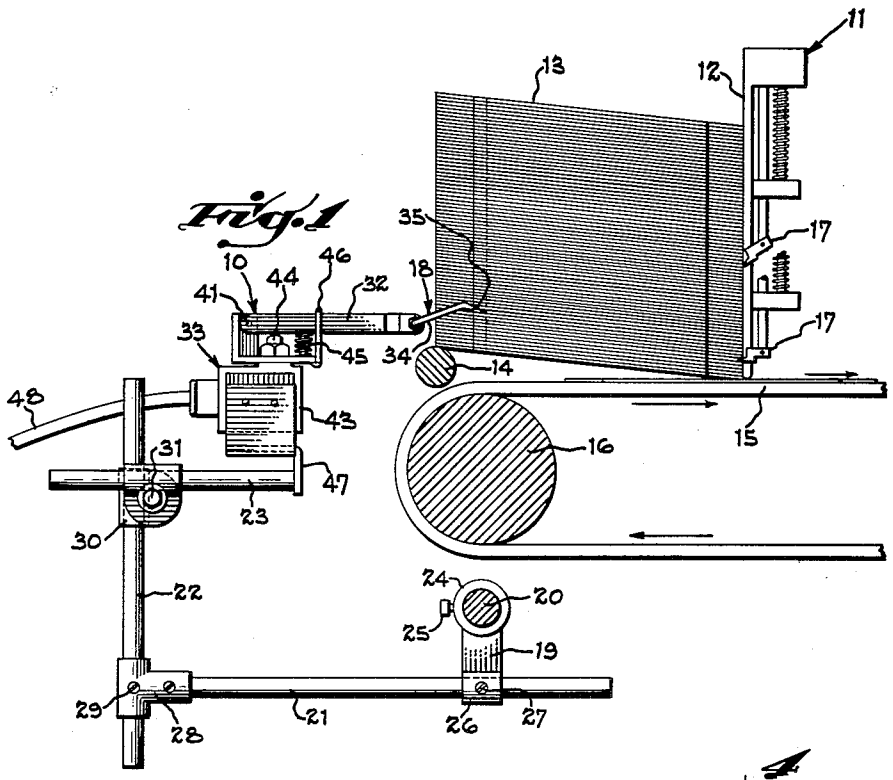


Fig. 2

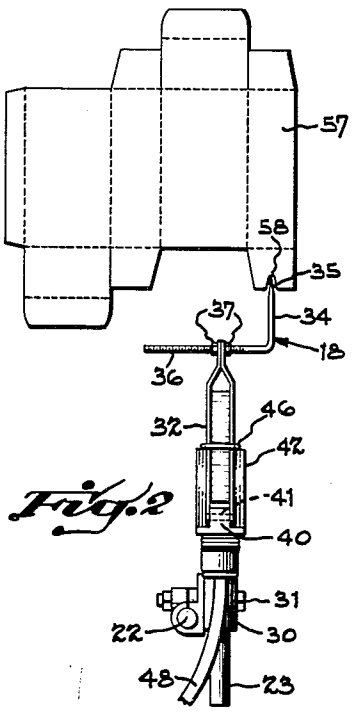
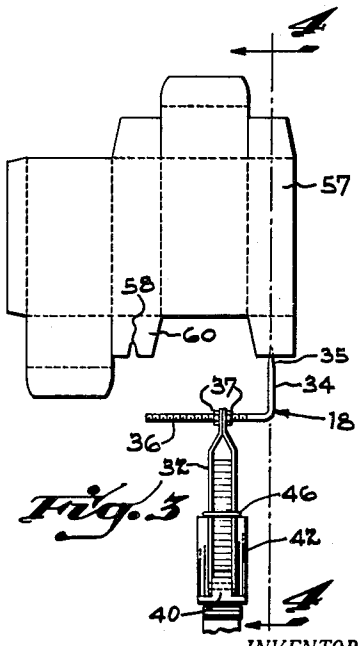


Fig. 3



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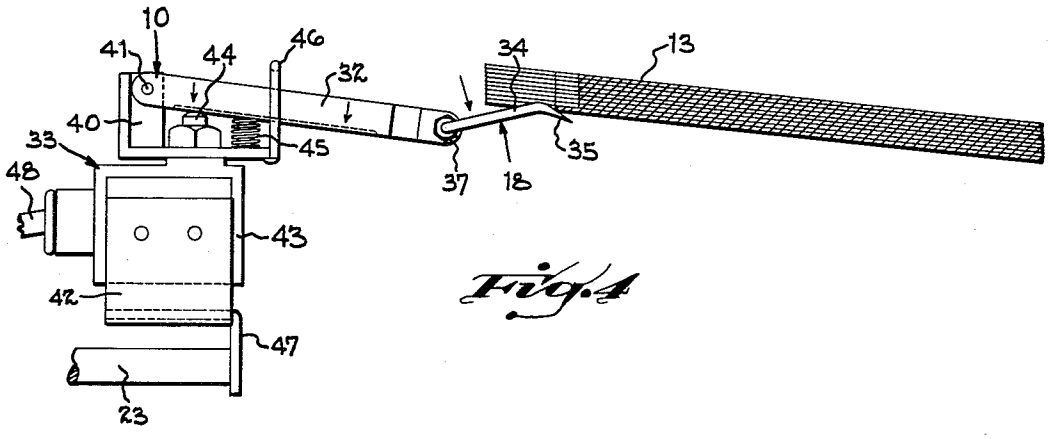


Fig. 4

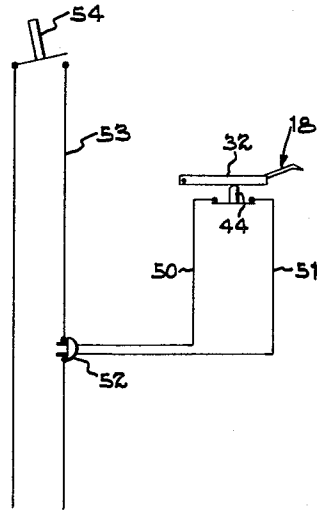


Fig. 5

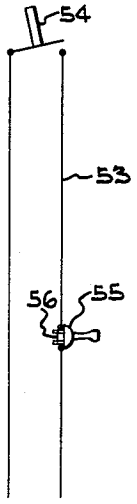


Fig. 6

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2,732,203

MEANS FOR PREVENTING ERRORS IN THE PACKAGING OF ARTICLES OF MANUFACTURE

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4 Claims. (Cl. 271—57)

This invention relates to the packaging of food, drug, and similar products within printed paperboard cartons, by means of automatic machinery. It is directed particularly to a method and means for preventing inadvertent commingling of cartons during fabrication or use, through which a given product might automatically but erroneously be packaged in a carton printed and intended for a different product.

Modern packaging techniques utilize high speed presses for the printing and die cutting of carton blanks from large sheets of paperboard, and high speed forming and gluing machinery to fold the blanks, fasten tabs thereof, and produce a finished carton in a flattened or "knockdown" form. Similarly, automatic packaging machinery at the point of use erects the flattened cartons from their knockdown form, inserts merchandise therein, and closes the cartons.

Throughout these operations, the printed sheets, the die cut blanks, and the flattened knockdown cartons are arranged in tall stacks to facilitate handling and feeding of the pieces to the automatic machinery. That carton or blank which is exposed at the top of a satck is necessarily accepted as an indication of the identity of all the cartons or blanks in that stack, and only random inspection of individual pieces can be achieved because of the great number of cartons produced.

Particularly in the food and drug businesses, many instances occur wherein products or articles differing only slightly as to composition, quality or content are to be packaged in cartons which are of identical size, shape and overall indicia, and which differ only in respect to some small detail in the printed matter. For example, a pharmaceutical manufacturer producing bottles of, say, Mercurochrome, in 5% and 2% concentration may wish to package the bottles in cartons which are identical in size, color and every other respect except as to the indicia stating "2%" concentration in one case, and "5%" in the other. Despite the most careful segregation of blanks for such cartons during fabrication, and despite the most careful handling of the stacks of finished flattened cartons at the point of use, it frequently occurs that some of the "2%" blanks will, by mistake, become stacked upon or sandwiched in a pile of blanks marked "5%," or vice versa. Since the top carton or blank of a stack is accepted as an indication of the contents of the entire stack, such an error immediately becomes hidden and may not be noticed during further processing or during actual filling of the cartons at the packaging machine. The result, in the case of the selected example, may be that Mercurochrome of 5% concentration is packed within a carton marked 2%. It is apparent that severe damage or personal injury may result if the user of the product does not notice the discrepancy. Even if the confusion of the different types of cartons in a pile is discovered at the time of packaging, many packages filled in the machine preceding the discovery of the error must be reopened, for piece by piece inspection, in order to cull out the improperly packed merchandise. The reopened cartons are necessarily scrapped if the closure flaps thereof have been sealed by glue.

Errors of this type are a constant nuisance and hazard in the fabrication of cartons and in the packaging of many different types of products in them. The opportunity for errors of this type to occur is, in fact, greatly increased by the practice of printing the indicia for different cartons of the same blank size upon different portions of the large feed sheets of paperboard. Yet this practice is requisite for reasons of economy when the total quantity of cartons to be produced in a given run is too small to justify the cost of preparing printing plates of full sheet size for the printing of one type of carton only in the run.

The principal objective of this invention is to provide a method and means for mechanically inspecting each carton blank prior to the time that an operation is going to be performed upon it, or prior to the time of use, such that any carton blank which does not conform identically in every respect with the other blanks with which it may be associated in a stack will readily be detected. A further objective has been to provide for correction of a mistake as soon as it is discovered, either by signal to the operator of the machine or by decommissioning the machine from further operation.

Briefly, in accordance with the principles of this invention, each family of carton blanks which is apt to be confused with a different family of cartons of similar size or shape is given a small identifying notch or recess in a flap tab, or other part thereof which preferably will be hidden when the box is closed. The notch or configuration, by reason of its position, size or shape identifies that particular type of carton. Cartons of similar size and shape but intended for another product, or differing from the first in any way as to the printed matter thereon, are given an identification notch in a different position of the blank. When all of the blanks or cartons of the first family are placed in a stack, the respective notches thereof fall into alignment from top to bottom of the stack, forming an open groove or channelway. Similarly, the cartons of the second family when stacked, define a notch or channelway but it is in a different location from the first. Accordingly, should blanks of the second family be placed inadvertently in a stack of the first, the notches thereof will be out of registry with the others and the channelway will, in effect, be obstructed by the first of the odd cartons which has gotten into the stack by mistake. Utilizing this principle, the present invention contemplates a detector finger past which the alinged notches in a stack of cartons may be moved, but against which the first odd carton in the stack will come into engagement, and trip a switch in association with the finger to energize a signal circuit or to effect the shutdown of the machine whenever the finger is engaged by an odd box.

Other objectives of the invention will be readily apparent to those skilled in the art from the following detailed description of the drawings in which:

Figure 1 is a side elevational view of an automatic pressure feeding mechanism adapted to feed box blanks into an automatic folding and gluing machine having the detector means of the present invention associated therewith.

Figure 2 is a top plan view showing the detector means and a box blank having a notch in position to pass the detector means.

Figure 3 is a view similar to Figure 2 showing a blank box having a notch which is placed in a different position from the one shown in Figure 2 so that it will trip the detector means.

Figure 4 is a side elevational view illustrating the manner in which the detector means is tripped by a blank

which does not conform to the others in a stack of blanks.

Figure 5 is a diagrammatic view illustrating how the detector means may be connected with the electrical control circuit of an automatic machine.

Figure 6 is a view similar to Figure 5 showing a way of closing the electrical circuit of an automatic machine when the detector is out of operation.

Detector means embodying the principles of the present invention is indicated generally by the numeral **10**, the entire assembly being shown in the left hand portion of Figure 1. An automatic feeding mechanism which is indicated generally at **11** is shown in the right hand portion of this figure. The figure shows a fragment only of the feed apron of an automatic folding and gluing machine. The feeding mechanism shown is one known in the trade as "The International Automatic Pressure Feed" manufactured by the International Paper Box Machine Co. of Nashua, New Hampshire. The particular feed mechanism shown is intended to be representative only.

The feed mechanism includes a gate **12** against which a stack of carton blanks, such as that shown at **13**, is placed. The stack is canted with respect to the gate by means of a support roller **14** upon which the side of the stack away from the gate rests. The canted relationship presents the leading edge only of the lowermost blank in the stack to the opening beneath the gate. The side of the stack adjacent the gate rests upon a feed belt **15** which passes around a drive drum **16** and underneath gate **12**. In the instant shown, a blank is passing the gate on the feed belt. Constant downward pressure is maintained on the stack by a pair of reciprocating pressure fingers **17** which alternately engage the stack and retract so that at all times one of them is pressing downwardly upon it. The stack of blanks is replenished from above and in moving toward the gate, they must pass a finger **18** which is part of the detector means of the present invention.

The detector mechanism is secured to the machine in the instance shown by a bracket **19** which is mounted upon a cross rod **20**. The rod **20** is intended to represent any machine part adjacent the feed apron which will offer support for the detector. The detector mechanism is mounted upon adjustable means so that its position may be shifted readily to accommodate cartons of different size and shape. The mounting means shown consists of three rods **21**, **22** and **23** which are joined to one another by adjustable fittings. Specifically, the bracket **19** includes a collar **24** which is slidably engaged upon the cross rod **20** so that the whole indicator assembly may be shifted laterally of the machine. The collar **24** is locked in position on cross rod **20** by a set screw **25**. A second collar **26** is provided on bracket **19**, the latter collar being below the first and turned at right angles with respect to it. Collar **26** journals rod **21**, and includes set screw **27** so that rod **21** will be locked in various positions of adjustment longitudinally of the machine. Rod **21** is joined to rod **22** at a T-shaped fitting **28**. Rod **22** is diposed vertically and may be locked in various positions of adjustment relative to fitting **28** by a set screw **29**. The third rod **23** is joined to the vertically disposed rod **22** by means of a universally adjustable fitting **30**, which includes a pair of sleeves secured to one another by a bolt **31**. Each of the sleeves is split and one may be turned with respect to the other about the axis of bolt **31**. Thus, upon loosening of the bolt, bracket **30** may be moved vertically upon rod **22**, and rod **23** may be adjusted by sliding it relative to the bracket and by swinging it up or down or sideways. Tightening bolt **31** locks both of the split sleeves to one another. The arrangement of fittings and rods shown affords a wide latitude of adjustment for positioning finger **18** relative to stack **13**, however, other mounting means may be employed if desired.

Finger **18** is secured to the outer end of a switch arm **32** which is a part of a switch assembly indicated generally at **33**. In the instance shown, finger **18** is L-shaped consisting of an arm **34** which has a tip **35** turned downwardly at a slight angle at the outer end thereof, and an arm **36**. The latter arm is threaded and is engaged in an aperture adjacent the outer end of switch arm **32**. A pair of nuts **37** which may be tightened on the threaded arm against the opposite sides of the switch arm permits tip **35** to be adjusted relative to the arm. The switch arm in the embodiment shown is formed from a length of channel stock. The web of the channel at both ends thereof is removed. At the outer end, the two side walls of the channel are bent in toward one another to receive finger **18**. At the opposite end the web is cut out to accommodate a journal block **40** which is part of the switch assembly. A pin **41** is rotatably journalled in block **40** and secured to the sides of the channel at the opposite sides of the block to provide a pivotal mount for the outer end of the switch arm. Block **40** is secured to a right angular bracket **42** which is, in turn, secured to a micro-switch **43**. The micro-switch is plunger operated, the plunger being indicated at **44** extends upwardly through bracket **42** and into engagement with the web portion of the channel member comprising the switch arm **32**. A nut threaded onto a bushing, not shown, surrounding plunger **44** secures bracket **42** to the housing of micro-switch **43**. A coil spring **45** is disposed between bracket **42** and the switch arm and serves to urge the arm upwardly. The upper movement of the switch arm **32** is limited by an inverted, U-shaped stop element **46** which straddles the switch arm and which has its lower ends welded, or otherwise secured, to bracket **42**. As will be seen from Figure 1, the plunger **44** of micro-switch **43** is depressed when the outer end of the arm **32** is depressed. Such movement opens the micro-switch. The switch is closed when the arm is in its up position against stop **46** under the action of spring **45**. The micro-switch is secured to the inner end of rod **23** by means of bracket mounting **47**.

Wiring to the switch, which is indicated at **48** in Figure 1, as shown diagrammatically in the circuit layout of Figure 5. The latter figure shows the switch arm **32** and the plunger **44** only of the micro-switch. A pair of leads **50** and **51** are taken from the respective contacts of the switch and are connected to a conventional, two pronged male plug **52**. This plug is arranged to be connected into the main control circuit of the machine with which the detector means is associated. The control circuit is shown diagrammatically only being indicated by the numeral **53**. A switch **54** represents the main off-on switch of the machine. As will be noted from the diagram of Figure 5, the circuit of the machine is broken when switch arm **32** is depressed. Figure 6 shows a means of closing the main circuit when the detector is not being used. The means consists of a male plug **55** having a handle thereon. The two prongs of the male plug are joined or shorted by a shunt piece **56**. The plug-in method of connecting the switch assembly to the main circuit of the machine is preferred over other means because it permits the detector to be removed as an assembly when it is not being used on the machine.

Reference is now made to Figures 2 and 3. A blank for a tuck end box **57** is shown in each of these figures. The blanks are conventional except for the provision of a notch **58**. In the carton blank shown in Figure 2, the notch is formed in the edge of a flap **59** at the right side of the blank. In Figure 3, the notch is on a different flap, indicated at **60**, near the center of the blank. When a number of blanks of the type shown in Figure 2, for example, are stacked one on top of the other in the condition in which they are received by the feeding mechanism **11** the aligned notches define a vertical groove or channel at the side of the stack. The same is true when a number of the blanks of the type shown in Figure 3 are

stacked one on top of the other. However, should one or more of the blanks of Figure 2 be stacked by mistake with those shown in Figure 3, or vice versa, the channel will be closed where the odd blanks are disposed in the stack. Without such notches, the two different kinds of box blanks would be indistinguishable when mixed in a stack.

The finger **18** of the detector means is adjusted at the infeed end of the machine so that it resides within the vertical groove provided by the aligned notches. Therefore, if during the course of a feeding operation an odd blank engages the finger, the finger will be depressed to open the main electrical circuit for the machine and thereby shut it down. The operator can then remove the odd blank or blanks before they are acted upon by the machine.

It will be obvious that the notches **58** may be placed anywhere along at least three of the edges of a blank of the type shown, and also that the notches themselves may be of any suitable shape or configuration. In this respect, notches or edge indentations are preferred to projections from the blank edge since the latter would increase overall blank size. Preferably, the notches are located in end flaps or other portions of the carton which are hidden when the carton is closed, and may be cut into the cartons at the time they are died out but, of course, this can be done in a separate cutting operation if desired. In addition, it will be appreciated that the invention is not limited to operations using blanks of a particular size and shape, and that the detector means is adapted to be associated with feed mechanisms other than the specific one selected to illustrate the principles of the present invention.

Having described my invention, I claim:

1. Means to prevent errors in automatic machine packaging operations wherein at least two different kinds of boxes which are visually similar and which are formed from identical box blanks are used, and in which an identifying notch is provided at a different place in one of the edges of each kind of box blanks, and in which the box blanks of each kind are stacked so that the notches in the respective edges of the blanks within the stack form a vertical channel in the side thereof, said means comprising a switch member associated with feed mechanism of a machine to which said stack is presented, said switch means effective upon being tripped to shut down said machine, a finger adapted upon being contacted to trip said switch, said finger arranged to reside within said channel at a place where the notches of the respective box blanks of the stack must pass in order to be fed into said machine wherein said finger is positioned to be contacted by the edge of a box blank having a notch located at a place different from the notches in the box blanks of the stack intended to be fed into said machine.

2. Means to prevent errors in automatic machine packaging operations wherein at least two different kinds of boxes which are visually similar and which are formed from identical box blanks are being used, and in which a notch is provided at the same place in one of the edges of all box blanks of one kind, and in which a notch is provided at a different place in one of the edges of the respective box blanks of each of the other kinds, and in which the box blanks are stacked and presented to the feed mechanism of a machine to operate upon them, said means comprising switch means effective upon being tripped to stop said feed mechanism, a finger adapted upon being contacted to trip said switch, said finger arranged to reside at a place where the notches of the respective box blanks of the kind intended to be fed into said machine must pass in order to be fed into said machine, whereby said finger is positioned to be contacted by the edge of a box blank having a notch located at a place different from the notches in the box blanks intended to be fed into said machine.

3. Means to prevent errors in automatic machine packaging operations wherein at least two different kinds of boxes which are visually similar and which are formed from identical blanks are being used, and in which each of the different kinds of box blanks has a differently positioned identifying notch in an edge thereof, and in which the box blanks are stacked and presented to the feed mechanism of a machine to operate upon them, said means comprising a finger positioned at a place where the notches of the respective box blanks of a kind intended to be fed into said machine must pass in order to enter said machine, a switch effective upon being tripped to stop said feed mechanism, said finger adapted upon being contacted by an odd box blank not having a notch therein corresponding to the notches in the box blanks intended to be fed into said machine to trip said switch and thereby stop said feed mechanism before said odd box blank is fed into said machine.

4. Means to prevent errors in automatic machine packaging operations wherein at least two different kinds of boxes which are formed from identical blanks are being used, and in which each of the different kinds of box blanks has a differently positioned identifying notch in an edge thereof, and in which the box blanks are stacked and presented to the feed mechanism of a machine to operate upon them, said means comprising a switch adapted upon being tripped to stop said feed mechanism, means to adjustably mount said switch adjacent said feed mechanism, a finger adapted upon being contacted to trip said switch, and said finger positioned at a place where the notches of the respective box blanks of a kind intended to be fed into said machine must pass in order to enter said machine.

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