

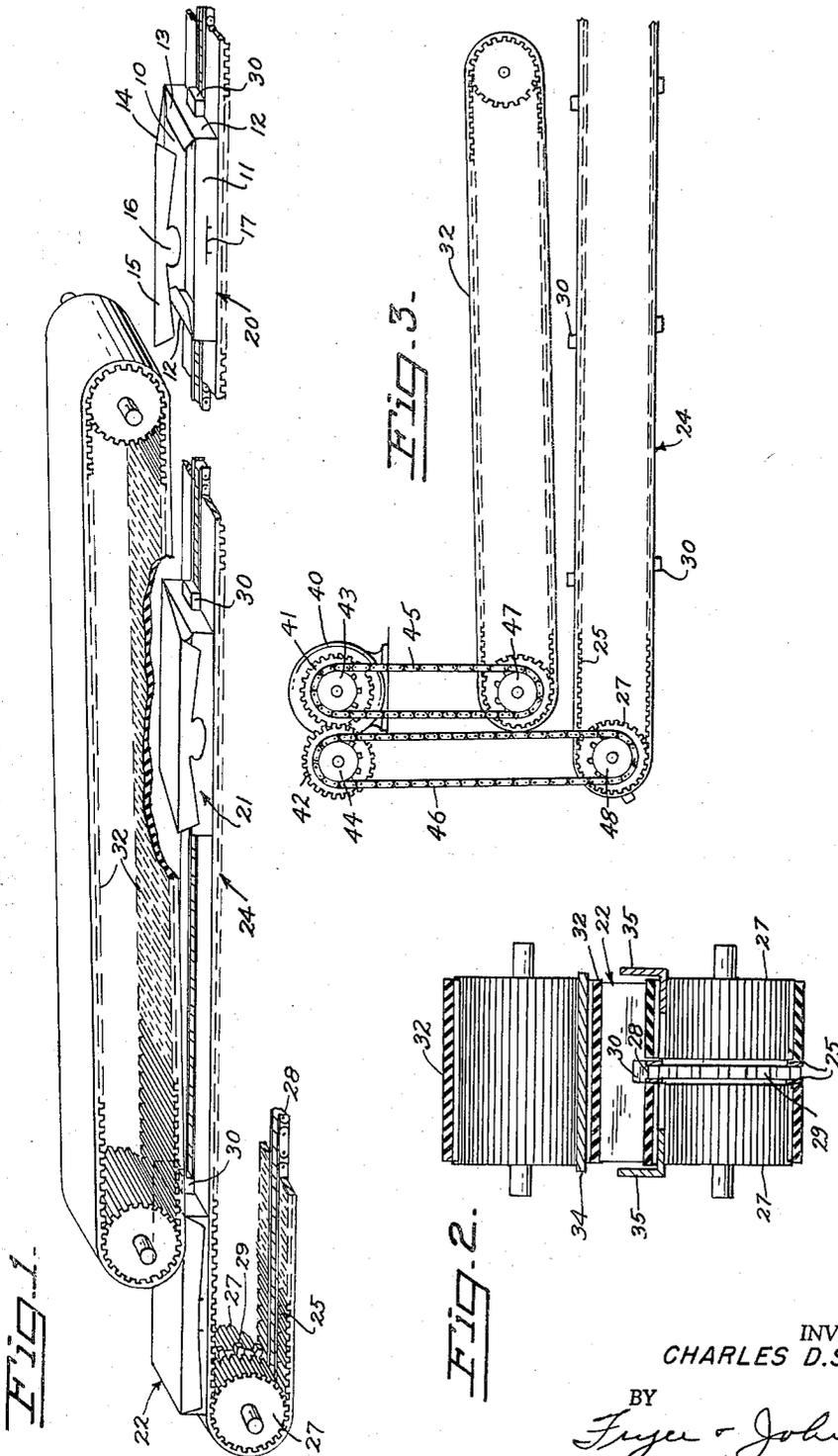
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MACHINE FOR CLOSING CARTON LIDS

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MACHINE FOR CLOSING CARTON LIDS

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2 Claims. (Cl. 93—36)

This invention relates to the closing of carton lids after the cartons have been set up and filled and it pertains particularly to means for accomplishing closing of the carton lid straight upon the carton rather than in a slightly twisted or skewed position. A common type of carton for packaging food products and the like comprises a rectangular tray with a cover formed integrally with one edge of the carton and closed by being bent downwardly toward the opposite edge where it is secured in its closed position.

For the purpose of the present description, the edge to which the cover is hinged is at the top of what will be referred to as the back wall of the carton while the edge toward which it is closed is on the front wall, the ends of the carton being those two walls between the front and back wall. Many, if not most machines designed for setting up and filling cartons move the cartons in an endwise direction because of mechanical expedience in performing the several steps of the setting up and filling operations. Consequently the cover, in closing, moves in a direction transverse to the motion of the carton. Conventional closing means such as inclined shoes, rods or belts, therefore, impart frictional impedienc to the motion of the carton or impose a drag which distorts or skews the cover as it is being closed. This interferes with proper functioning of the locking or sealing mechanism, whichever may be used, and results in a carton which is not uniform in shape and, therefore, unsightly.

It is the object of the present invention to provide means to close the cover of a carton which is moving in a direction parallel to the line of the hinged connection of the cover by imparting firm pressure to the cover without imposing friction or drag in opposition to the movement of the carton.

A further object of the invention is to provide means to close a hinged carton cover without skewing the cover and while it is in motion between members employed for holding its front and back walls from bulging during the application of closing pressure.

Further and more specific objects and advantages of the invention and the manner in which it is carried into practice are made apparent in the following specification wherein the invention is described in detail by reference to the accompanying drawing.

In the drawing:

Fig. 1 is a schematic view of carton closing apparatus embodying the present invention;

Fig. 2 is an enlarged schematic view representing a cross-section through the center of said apparatus and illustrating parts which are not shown in Fig. 1; and

Fig. 3 is a schematic view of a typical drive means.

The present invention is adaptable to closing cartons of various designs and a typical carton is illustrated in Fig. 1 as having a back wall 10, a front wall 11 and end walls 12. Dust flaps 13 extend inwardly from the upper edges of the end walls and a cover 14 hinged to the upper edge of the back wall 10 is provided with a front flap member 15. The front flap has a tab 16 insertable

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into a slit 17 in the front wall of the carton and in this particular instance, shaped to form a locking connection therewith. The invention, however, is not concerned with the particular means of holding the cover in its closed position, but gluing, heat sealing or various forms of interlocking connections may be employed.

In the drawing, the first of a series of cartons is generally indicated at 20, a second at 21 and a third at 22.

The cartons are represented in the drawing as being advanced from right to left by a belt generally indicated at 24 which has received the cartons from a filling machine, not shown, and is advancing them through the lid closing apparatus. The carton 20 is illustrated as empty only for the purpose of better disclosing its shape.

The belt 24 is shown as formed of two separate belt-like members of the positively driven type having teeth or corrugations 25 on its inner surface meshing with teeth on rollers 27 over which it is trained. Between the two belt parts is a chain 28 trained over sprockets, one of which is shown at 29, having the same pitch diameter as the rollers 27 whereby the belt parts and chain will advance at the same speed. The chain carries spaced driving lugs 30 for advancing the cartons at constant speed in spaced relationship. While the belt 24, as illustrated in two parts and as having a chain with lugs for driving the cartons, it is to be understood that a single part belt might be used with the lugs fastened directly on the belt. Furthermore, any suitable type of flexible conveyor may be employed and the term belt as used in the appended claims is to be taken as including any such conveying means.

For closing the lids of the cartons as they are advanced on the upper reach of the belt 24, a second belt is shown at 32 as disposed directly above and in line with the belt 24 and the direction of movement of the belt 32 is opposite to that of the belt 24 so that its lower reach travels in the same direction as the upper reach of the belt 24. The belt 32 is disposed at a slight angle throughout its length to the belt 24 so that as the carton as shown at 20 approaches it, the partially open lid can be received beneath the lower reach of the upper belt and gradually urged toward the partially closed position illustrated at 21 and thence to the fully closed position illustrated at 22.

Since the upper belt 32 is inclined with respect to the lower belt 24, its operation at the same lineal speed as the belt 24 would result in its having a different speed with reference to the plane of the upper surface of the top reach of the belt 24 upon which the cartons are supported and with which they are being advanced. Since this speed would be slightly slower, it would tend to impose a retarding friction on the lids of the cartons which would skew them to prevent perfect closing and result in a distorted carton. Therefore, in accordance with the present invention, the upper belt 32 is driven at a speed slightly greater than the speed of the lower belt so that its speed or forward motion with respect to the plane of the lower belt is identical. In other words, the resultant of the speed of the upper belt in the plane of the lower belt is the same as the speed of the lower belt.

Because of this precise selection of speeds of the two belts, the upper belt gradually but forcefully closes the carton lid without friction and without skewing. Backing members are employed behind the reaches of the belt which support the carton and close the carton lid and may assume the form shown in Fig. 2 of the drawing wherein a flat shoe 34 is shown behind the lower reach of the top belt 32 and right angular shoes or guides 35 are illustrated as underlying the separate parts of the belts 24 supporting the belts against downward movement. The members 35 also have upstanding parts adjacent the edges of the belt spaced to embrace the front and back walls of the cartons as they are advanced through the lid clos-

ing mechanism to prevent bulging of these walls which might occur as a result of the pressure imparted in the lid closing operation.

Any suitable means for imparting a positive non-slipping drive to the belts may be employed, one such means being schematically shown in Fig. 3. In this figure, a motor 40 through reduction gears (not shown) drives a gear 41 meshing with a slightly smaller gear 42. The gears carry sprockets 43 and 44 which through chains 45 and 46 turn sprockets 47 and 48 on the rollers of belts 32 and 24, respectively. Alternately, the gears 41 and 42 may be the same size and the sprocket sizes selected to obtain the desired speed differential.

I claim:

1. A machine for closing hinged carton lids which comprises, a driven belt to support and advance cartons, a second driven belt disposed over the first belt and inclined at an angle which diminishes in the direction of movement of the cartons to engage and close the lids of the cartons, and means to drive the second belt at a

speed the resultant of which in the plane of the first belt is the same as the speed of the first belt.

2. A machine for closing hinged carton lids which comprises, a driven belt to support and advance cartons, a second driven belt disposed over the first belt and inclined at an angle which diminishes in the direction of movement of the cartons to engage and close the lids of the cartons, means to drive the belts in opposite directions whereby the bottom reach of the second belt will travel in the same direction as the top reach of the first belt, and means to correlate the speeds of the belts to obtain identical resultants in the plane of operation of the first belt.

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