Dec. 19, 1967 W. A. REYNOLDS 3,358,808

APPARATUS FOR ORIENTING CARTONS DURING THE ADVANCEMENT THEREOF

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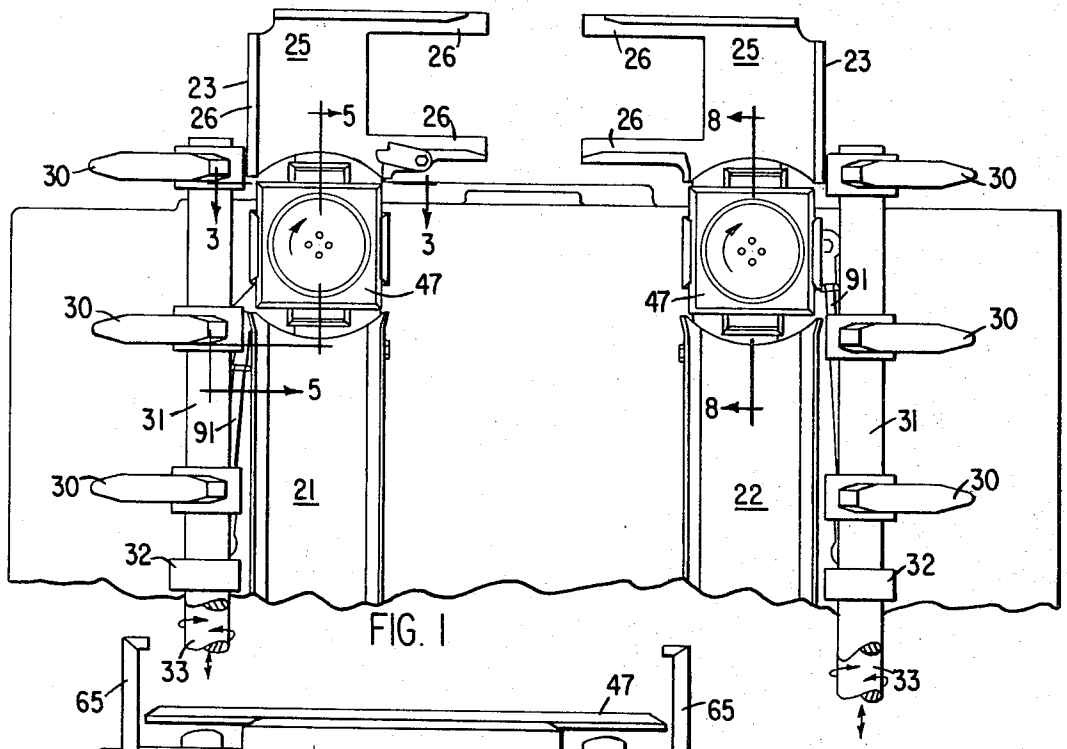



FIG. 1

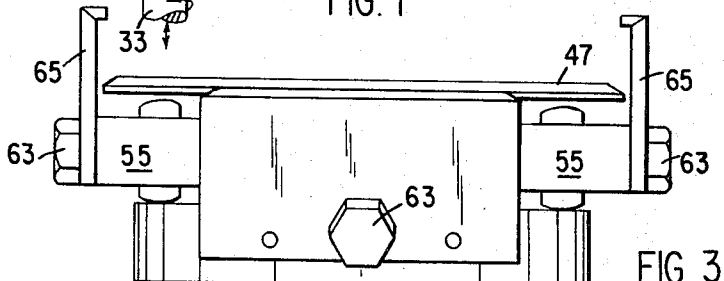



FIG. 3

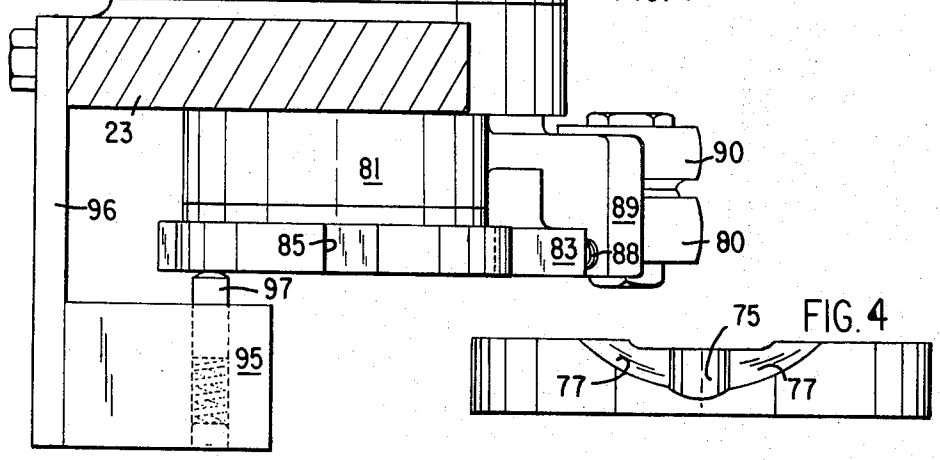






FIG. 4

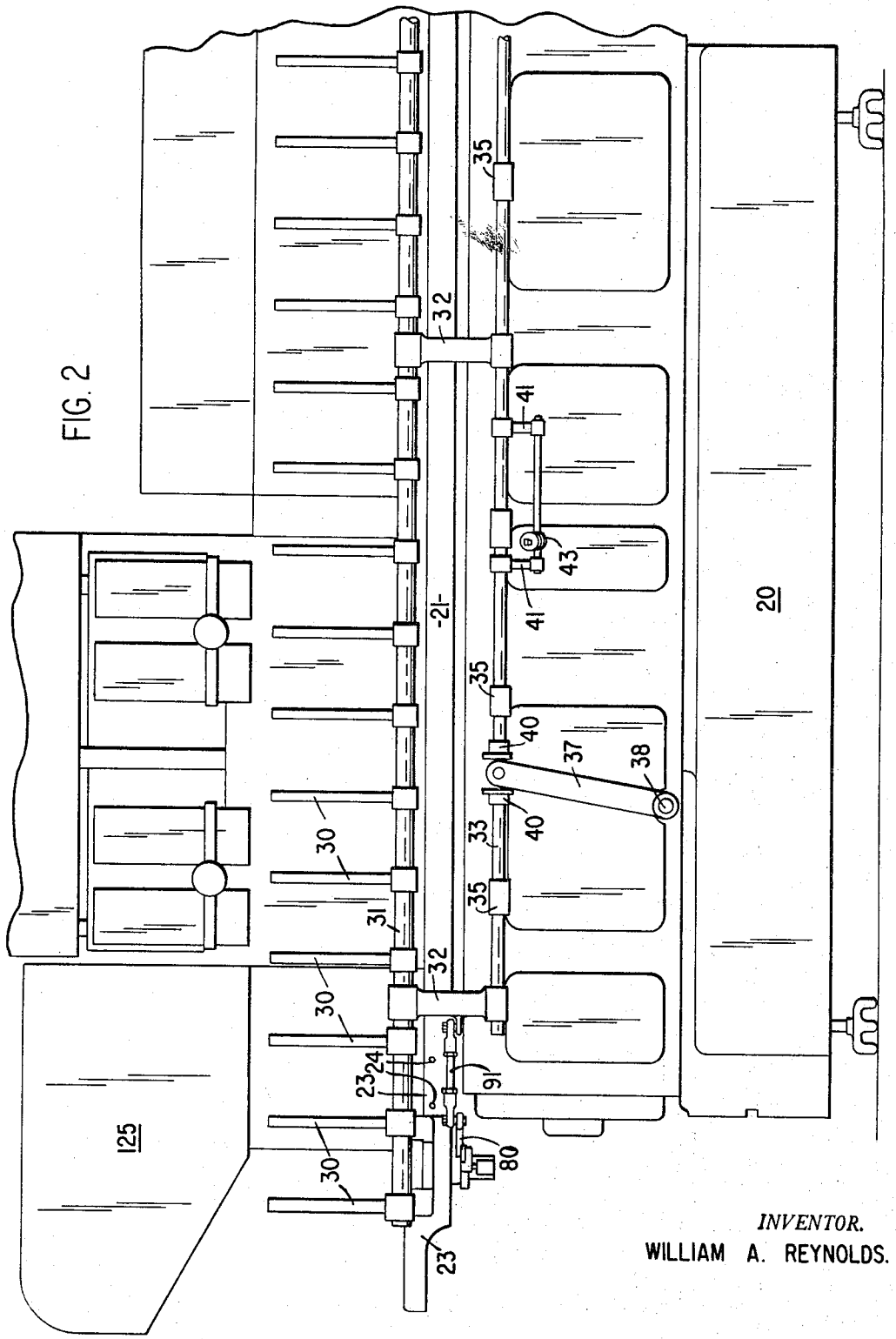
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APPARATUS FOR ORIENTING CARTONS DURING THE ADVANCEMENT THEREOF

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FIG. 2



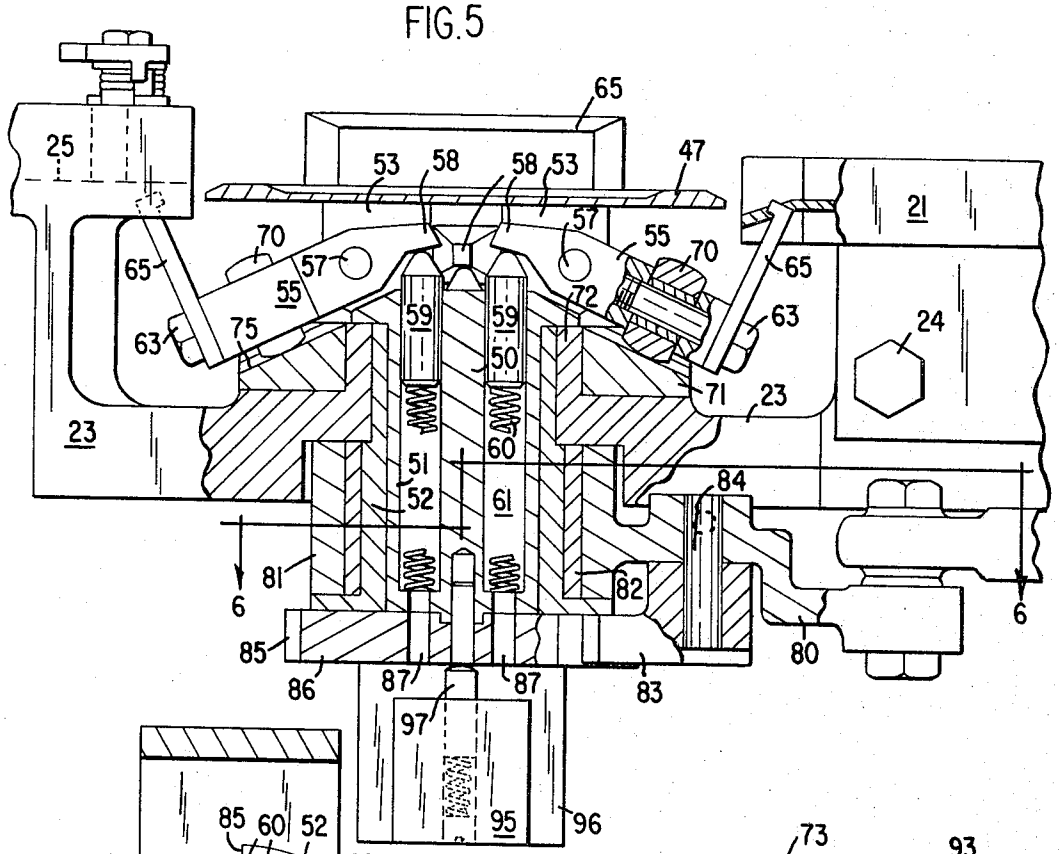

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APPARATUS FOR ORIENTING CARTONS DURING THE ADVANCEMENT THEREOF

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FIG. 5



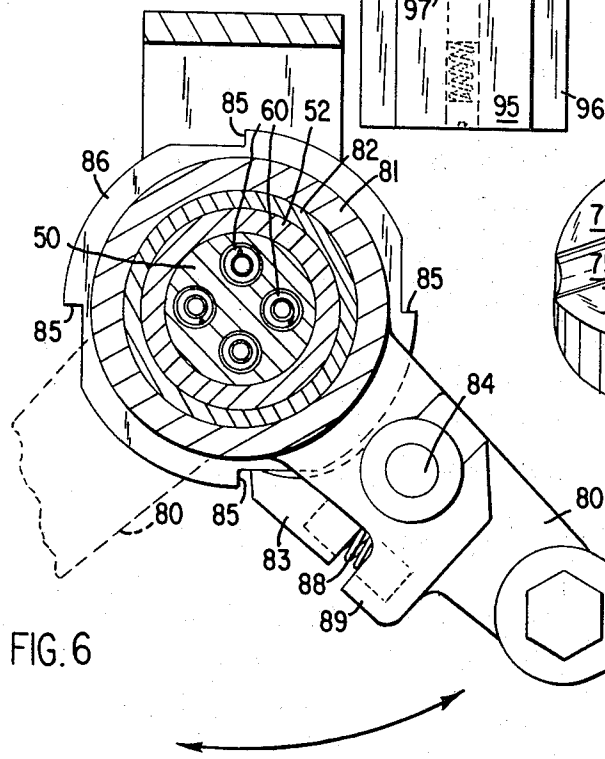




FIG. 6

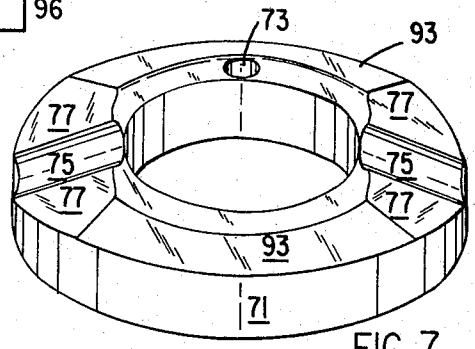



FIG. 7

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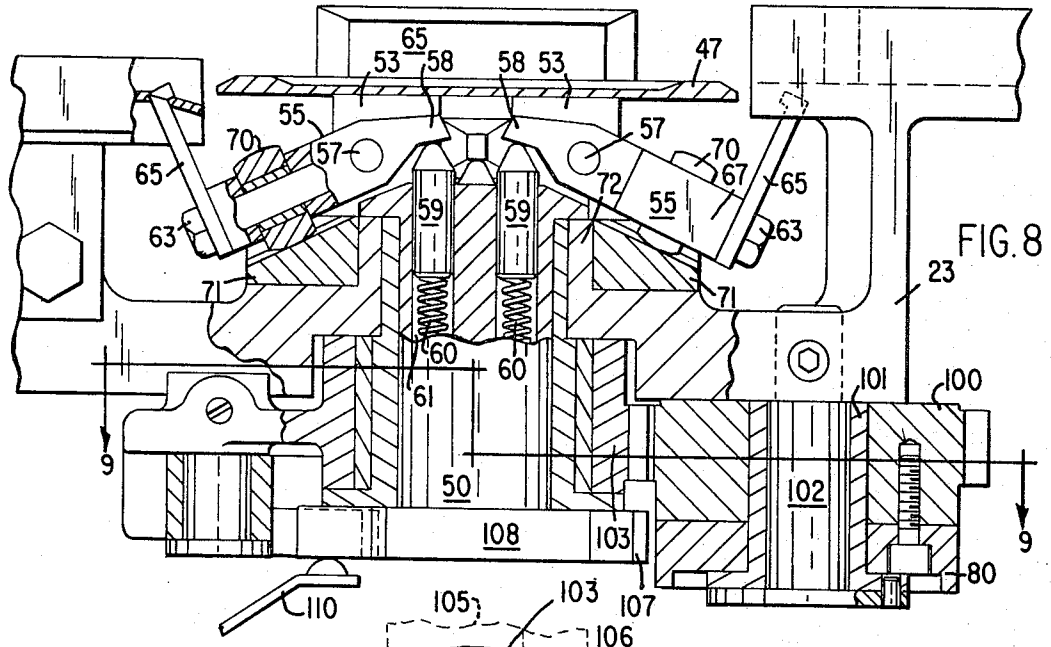



FIG. 8

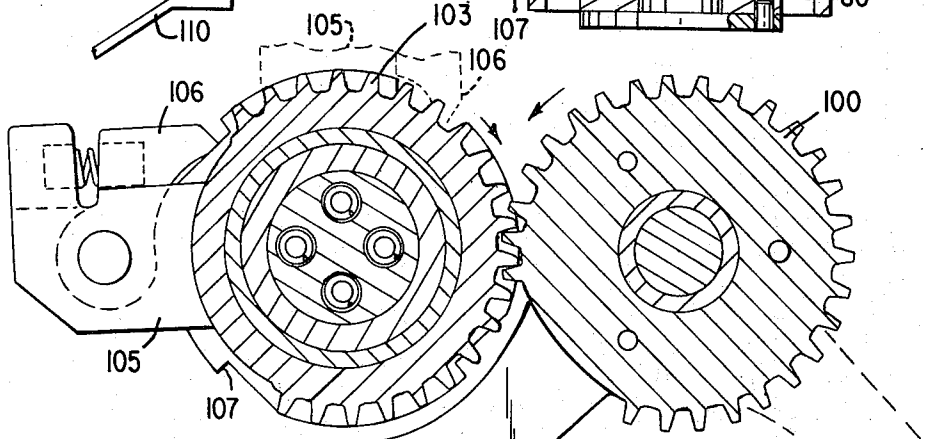



FIG. 9

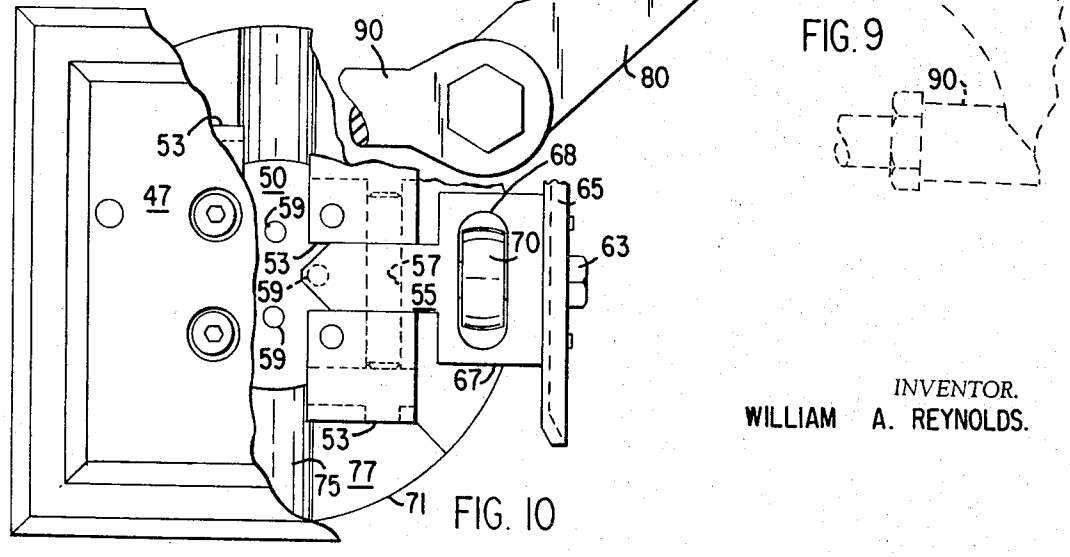



FIG. 10

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FIG. 11

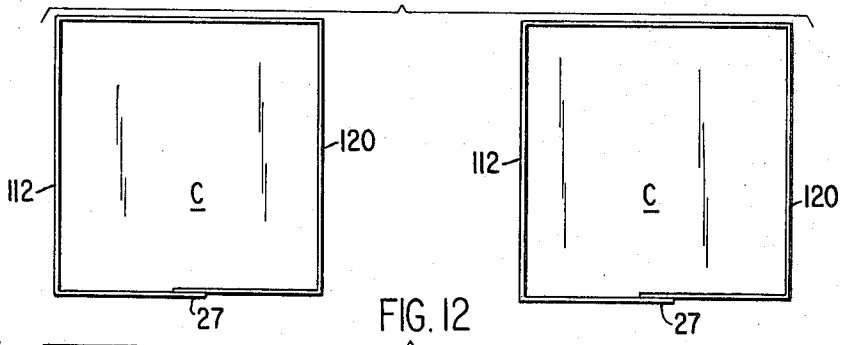
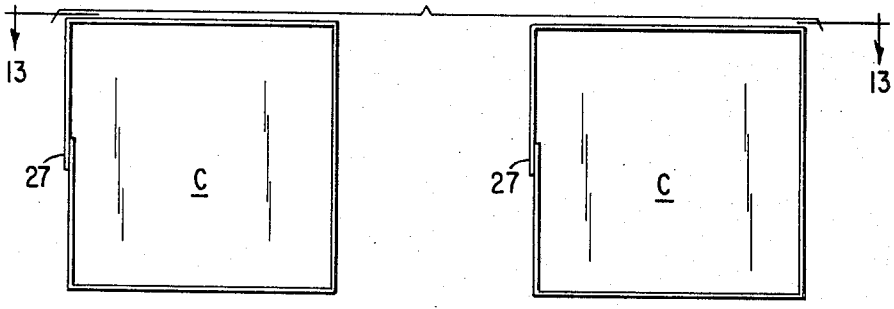



FIG. 12



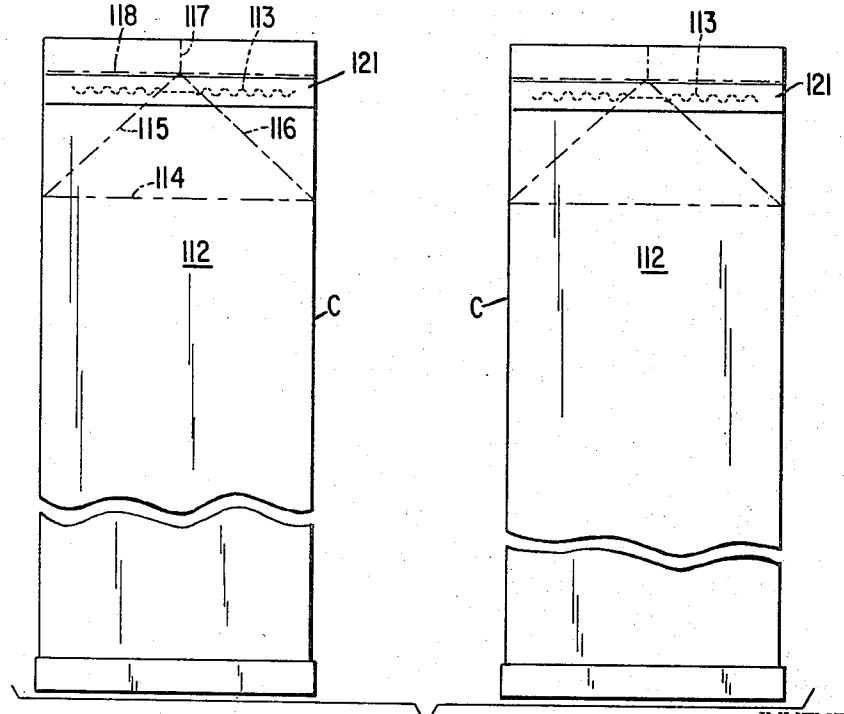




FIG. 13

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United States Patent Office 3,358,808 Patented Dec. 19, 1967



3,358,808

# APPARATUS FOR ORIENTING CARTONS DURING THE ADVANCEMENT THEREOF

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Filed June 24, 1966, Ser. No. 560,182
4 Claims. (Cl. 198—33)

This invention relates to apparatus for orienting cartons during the advancement thereof in a procession. The invention is particularly useful as an embodiment in a machine for forming, filling, and closing cartons formed of sheet material, such as paperboard. Such cartons are now employed extensively for the packaging of food products, such as milk. A machine for forming, filling and closing such type of carton is shown in patents to Barnes et al., No. 2,726,583, and to Wilcox et al., No. 2,692,463. The latter patent discloses that portion of the machine in which the formed cartons are advanced in a procession to the filling apparatus of the machine, and thence to the closing mechanism.

When the cartons embody certain structural arrangements, it is necessary that the cartons be oriented in a preselected relation in order that certain operations may be performed on the cartons before they are filled and closed as, for example, the sealing of a strip of tape over an incised, or perforated, area of the carton which later, upon removal of the tape becomes an opening through which the contents of the carton is dispensed.

This invention has as an object an efficient mechanism operable, during the dwell of the advancing procession of cartons, to orient each carton in the procession, whereby the cartons are positioned for further processing during their advancement.

The invention has as a further object, apparatus of the type referred to embodying a particularly compact structural arrangement, economical to produce and assemble in the carton forming, filling and closing machine, and which will function over extended periods of time without failure and with positive operation.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

In the drawings—

FIGURE 1 is a top plan view of apparatus embodying my invention.

FIGURE 2 is a side elevational view looking to the left in FIGURE 1, and including some additional superstructure not shown in FIGURE 1.

FIGURE 3 is an enlarged view taken on line 3—3, FIGURE 1.

FIGURE 4 is a side elevational view of the cam for actuating the carton clamp members.

FIGURE 5 is an enlarged vertical sectional view taken on line 5—5, FIGURE 1.

FIGURE 6 is a sectional view taken on line 6—6, FIGURE 5.

FIGURE 7 is a perspective view of the clamp operating cam.

FIGURE 8 is an enlarged view taken on line 8—8, FIGURE 1.

FIGURE 9 is a view taken on line 9—9, FIGURE 8.

FIGURE 10 is a top plan view of the carton turning mechanism with part of the carton supporting plate broken away.

FIGURE 11 is a top plan view of a pair of cartons positioned at the upstream end of the guideways.

FIGURE 12 is a view, similar to FIGURE 11, showing



the pair of cartons as oriented after being turned 90° by the turning mechanism, and

FIGURE 13 is a view looking downstream, as indicated by line 13—13, FIGURE 12, on the guideways of the downstream sides of the turned cartons.

As previously stated, the invention is disclosed as being embodied in a filling and closing section of a carton machine. The machine includes a base section **20** on which are mounted elongated guideways **21, 22**, extending along each side of the base. At the upstream ends of the guideways **21, 22**—that is, at the upper ends thereof as shown in FIGURE 1, there is attached to the base section **20**, an L-shaped bracket **23**, as by cap screws **24**, see FIGURES 1 and 2. These brackets are formed with carton supporting surfaces **25** positioned upstream from the guideways **21, 22**, and arranged in coplanar relationship thereto. The surface portions **25** have inwardly extending spaced apart leg portions **26**. The inner ends of the legs **26** are arranged in spaced apart confronting relation.

The cartons from the carton forming section of the machine, as shown in Patent No. 2,726,583, are stripped from the mandrels thereof into an upending mechanism which positions the formed cartons, open end up, in the space between the bracket legs **26**, and the cartons are then moved alternately onto the surfaces **25** of the bracket to make up the two processions of cartons for advancement along the guideways **21, 22**.

The cartons C are illustrated in FIGURES 11, 12 and 13. The cartons C are oriented, as shown in FIGURE 11, when positioned on the bracket surfaces **25**, with the side wall seams of the cartons **27** facing forwardly toward the guideways **21, 22**.

The cartons are advanced intermittently from the bracket surfaces **25** to and along the guide rails **21, 22**. Different structural arrangements may be employed to effect the intermittent advancement of the procession of cartons on the guideways. In the arrangement shown, the carton advancing mechanism is similar to that disclosed in Patent No. 2,692,463, in that it includes a linear series of spaced apart fingers to which is imparted a rectangular motion, whereby the fingers are moved inwardly across the guideways **21, 22**, and then forwardly for advancement of the carton, thence outwardly, and then rearwardly. Referring to FIGURES 1 and 2, the fingers of the carton advancing mechanism are indicated at **30** and are secured at their lower ends to a rod **31**, and are bent inwardly at their upper ends.

The rods **31** are fixedly secured to arms **32**, the lower ends of which are fixed to shafts **33** journalled in bearing supports **35** fixed to the base **20**. The shafts **33** are reciprocated in a direction lengthwise of the guide rails **21, 22**, by levers **37** fixed to a shaft **38** journalled for oscillation in the base section **20**. The upper ends of the levers **37** are positioned between collars **40** fixed to the shafts **33**.

The shafts **33** are also oscillated about their axes in timed relation to the reciprocation of the shafts by arms **37**. Arms **41** are fixed to the shafts **33** and are operatively connected by a cam actuated member **43** operated by a cam in base **20**.

In operation, the fingers **30** of the carton advancing mechanism are moved rearwardly—that is, upwardly in FIGURE 1 and to the left in FIGURE 2. They are then moved inwardly rearwardly of the cartons positioned on the guideways **21, 22**, and the bracket surfaces **25**. The fingers **30** then move forwardly to advance the cartons along the guideways **21, 22**, from one rest or dwell position to the next. This means that the two cartons positioned on the bracket surfaces **25** will be moved onto carton supporting plates **47**. These plates are mounted in the brackets **23**, intermediate the upstream ends of

the guideways 21, 22, and the supporting surfaces 25 of the brackets 23.

Referring to FIGURE 5, the plate 47 is fixedly secured to the upper end of a supporting member 50, which is formed with a downwardly extending cylindrical portion 51 journalled in a bushing 52. The support members 50, see also FIGURES 8 and 10, are formed in their upper ends with four radially extending notches 53. A bar 55 is positioned in each of the notches 53 and is mounted for pivotal movement therein on a pin 57. The inner end 58 of each bar 55 is engaged by a poppet 59, spring pressed upwardly by a compression spring 60, the poppets 59 and spring 60 being located in axially extending passageways 61 formed in the supporting member 50. A stud 63 is threaded into the outer end of each of the bars 55. The studs 63 serve to attach clamp plates 65 to the outer ends of the bars 55.

The bars 55 extend outwardly through the slots 53 and are formed with enlarged outer end portions 67 which, in turn, are formed with transversely extending apertures 68, see FIGURE 10. A cam follower roller 70 is positioned in each of the apertures 68 and is journalled for rotation on the studs 63. The rollers 70 are dimensioned for engagement with the upper surface of an annular cam member 71 which encircles an upstanding cylindrical flange 72 formed on the bracket 23 and the cam is affixed thereto by a pin extending through an aperture 73 in the cam member, which serves to orient the same with low portions 75 at opposite sides of the cam aligned fore and aft with the lengthwise direction of the guideways 21, 22. There is a rise surface 77 at each side of the low surface 75. The rise surfaces 77 on the cam are relatively steep.

Referring to FIGURES 5 and 8, the rollers 70 are positioned on the low surfaces 75 of the cam 71. The poppets 59 and springs 60 exerting an upward force on the inner ends 58 of the bars 55, maintain the rollers 70 in engagement with the cam 71. With the rollers 70 positioned in engagement with the low area 75 of the cam and with the bars 55 inclining outwardly and downwardly from the pivot pins 57, the carton clamp members 65 are positioned below the plane of the guideways 21, 22, the bracket surfaces 25, and the plate 47. The carton clamp 65, positioned at the opposite sides of the plate 47, are in the up position. With the support 50 so positioned, a carton may be advanced from the bracket surface 25 on to the supporting plate 47.

The support 50 is rotated in a clockwise direction, FIGURE 1, upon the return movement of the advancing fingers 30. Referring to FIGURE 5, a ratchet lever 80 has a hub portion 81 journalled for rotation on the lower portion of the bearing 52. There is a bearing bushing 82 positioned intermediate the hub 81 of the lever and the bearing sleeve 52. A pawl 83 is journalled on a pin 84 fixed to and depending from the lever 80. The pawl is positioned to engage notches 85 in a ratchet wheel 86 fixed to the lower end of the support member 50, as by pins 87. The pawl 83 is yieldingly urged against the periphery of the ratchet wheel 86 by a compression spring 88 interposed between the pawl and a boss 89 on lever 80.

The free end of the lever 80 is pivotally connected to a rod end 90 fixed to a rod 91, the opposite end of which is pivotally connected to one of the arms 32 of the carton advancing mechanism.

Referring to the structure shown in FIGURES 5 and 6, which is positioned at the turning station at the end of the guideway 21, return movement of the carton advancing mechanism will effect clockwise movement of the lever 80 and by engagement of the pawl 83 with the notch 85, will likewise effect clockwise movement of the ratchet wheel 86 and the support 50.

Immediately upon initial rotation of the support 50, the rollers 70 move out of the low cam area 75 and upwardly on the inclined area 77. This will effect upward movement of the clamp jaws 65 about the pivots 57, so



that the upper ends of the clamp jaws 65 move contiguous to opposite sides of the carton positioned on the plate 47 and preferably engage and grip the sides of the carton. This gripping is maintained during rotation of the support 50 due to the fact that the rollers 70 are then riding upon the upper flat surface 93 of cam 71. This gripping of the carton is only under slight pressure to the end of preventing relative movement between the carton and the plate 47. Upon rotation of the support and plate through an arc of 90°, the clamp member 65, at the opposite sides of the plate, will drop down below the plane of the guideway 21, to permit advancement of the turned carton from the plate 47 to the guideway 21.

Referring to FIGURE 3, a block 95 is carried by a bracket 96 secured to and depending from the main supporting bracket 23. The block 95 is formed with a vertically disposed aperture in which is slidably mounted a poppet 97, this poppet being yieldably urged upwardly against the under side of the ratchet wheel 86, the poppet 97 serving to maintain the turning mechanism in assembled condition and to also provide frictional engagement between the ratchet wheel 86 and the radial flange on the bottom of the bearing member 52 to prevent any coasting of the support member and plate after the same have been rotated through the 90° arc by the lever 80 and pawl 83.

The same turning mechanism is employed at the upstream end of the guideway 22 except, in this instance, the lever 80 is attached to the under side of a spur gear 100 journalled for rotation on a bearing sleeve 101 carried by a stud 102 depending from the bracket 23, see FIGURES 8 and 9.

The spur gear 100 is arranged in mesh with a mating gear 103. The gear 103 is journalled concentrically with the lower end of the support 50, similar to the arrangement of the hub 81 of lever 80 in FIGURE 5. The gear 103 has a radially extending boss 105 to which a pawl 106 is pivotally mounted, the pawl being arranged for engagement with notches 107 in a ratchet wheel 108 fixedly secured to the bottom of the support 50. The reason for this gear arrangement is that, in reference to FIGURE 1, it will be observed that the actuating link 91 is necessarily positioned on the opposite side of the support relative to the linkage for the turning mechanism at the turning station at the end of the guideway 21. Accordingly, upon rearward movement of the carton advancing mechanism, the gear 100 will be rotated counterclockwise, and the gear 103 rotated clockwise, to effect the clockwise rotation of the associated carton support plate 47. Also in this arrangement, the ratchet wheel 108 is yieldingly urged upwardly by a spring member 110, see FIGURE 8.

Referring to FIGURES 11, 12 and 13, as previously stated, the cartons C are initially positioned on the bracket supporting areas 25, with the side wall seams 27 facing towards the guide rails. The sides of the carton, indicated at 112, are formed adjacent their upper ends with a sinusoidal incision 113. The upper portion of this side wall 112 is also provided with score lines 114, 115, 116, 117, 118, and the opposite side wall 120 is scored in like manner. This is conventional scoring to permit the top portion of the carton to be folded into a gable top structure.

The incision 113 is overlaid by a piece of tape 121 which is permanently adhered to the carton immediately after it has been turned from the position shown in FIGURE 11, to the position shown in FIGURE 12, and advanced off from the turning plate 47 to the next rest, or dwell, position. The tape is applied by apparatus mounted in the enclosure 125, FIGURE 2.

It will be apparent that I have provided a compact turning structure which may be readily attached to carton machines of conventional form, and which function to orient each carton in the procession by rotating it about its vertical axis through an arc of 90°.

What I claim is:

1. Apparatus for orienting cartons during the advancement thereof comprising an elongated guideway for supporting a procession of cartons, a carton turning station located along said guideway, a carton advancing member mounted for reciprocation through repeated cycles forwardly and rearwardly in a direction lengthwise of said guideway, said advancing member being operable upon forward movement to engage the cartons of said procession and advance the same successively to said turning station, a carton turning mechanism at said station including a support member journalled for rotation about a vertical axis, a plate fixed to the upper end of said support and arranged in substantially coplanar relation to said guideway for the reception of a carton advanced thereon, carton clamp members mounted on said support, said clamp members being movable from a down position below the plane of said guideway to an up position above the plane of said guideway to form a quadrate wall about the periphery of said plate for the retention of a carton thereon, actuating mechanism operatively connecting said support to said carton advancing member and operable upon rearward movement of said carton advancing member to effect rotation of said support and plate through an arc of 90°, and means operable to maintain said clamp members in up position during such rotation.



2. Apparatus as set forth in claim 1, wherein said actuating mechanism includes a ratchet and pawl structure.

3. Apparatus as defined in claim 1 and including means for frictionally restraining rotation of said support.

4. Apparatus as set forth in claim 1, wherein the means operable to maintain said clamp members in up position includes a fixed cam member.

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