

March 18, 1969

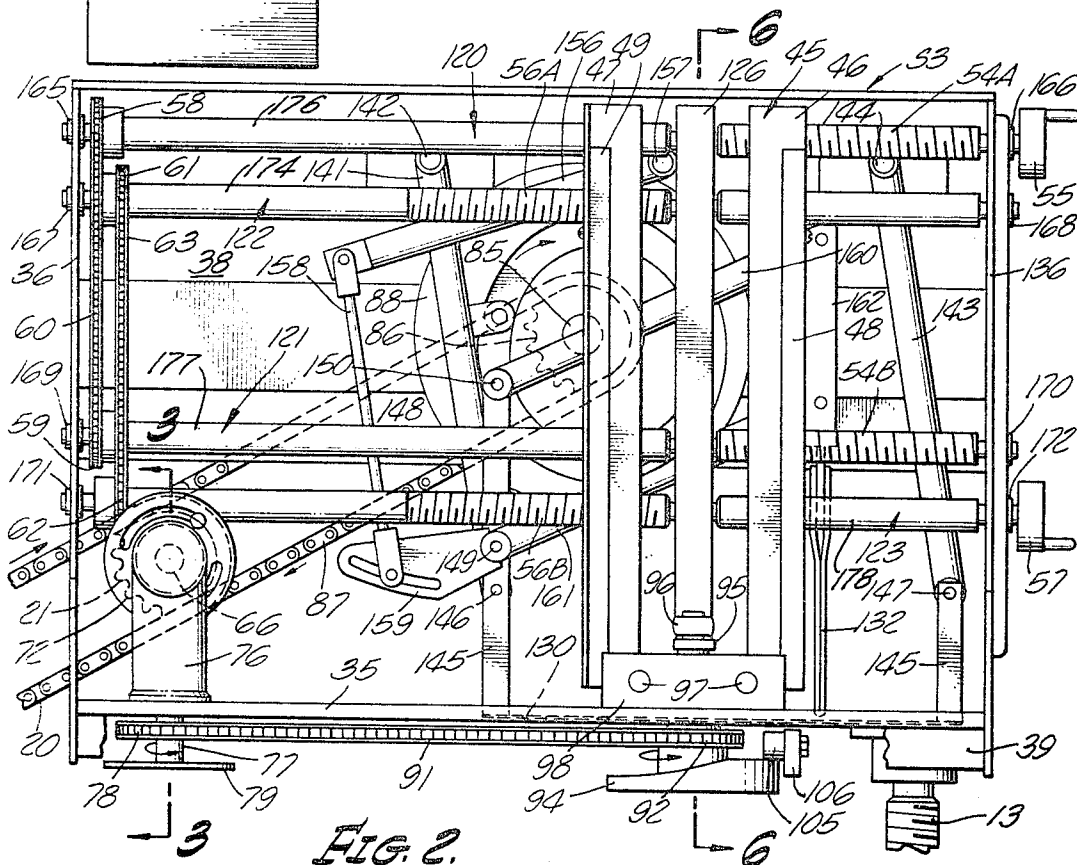
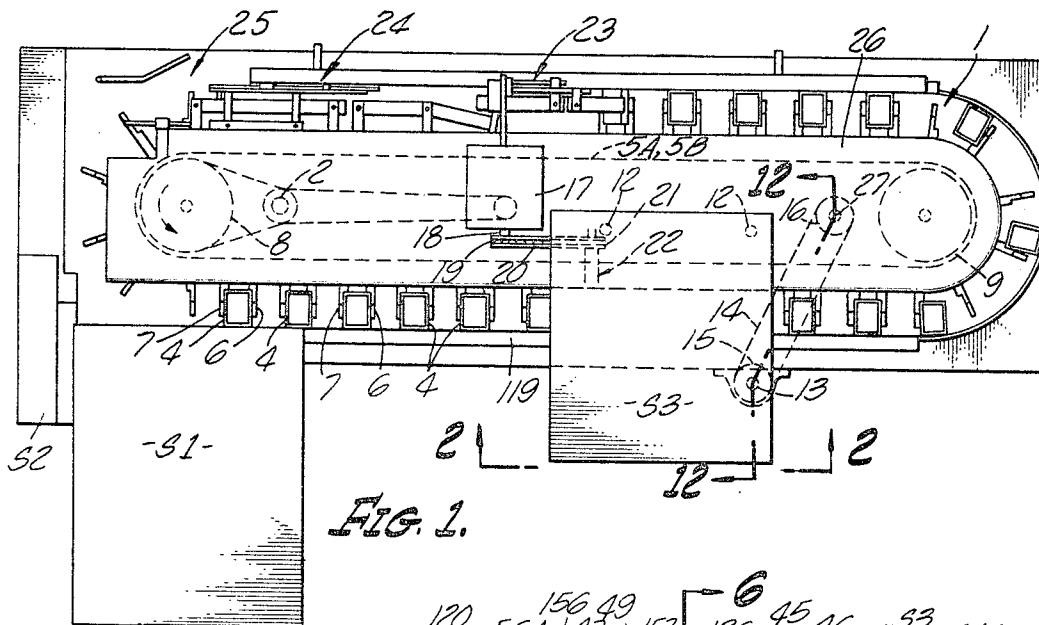
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3,432,984

STUFFER FOR TRAVELING CARTONS

Filed March 28, 1967

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FIG. 3.

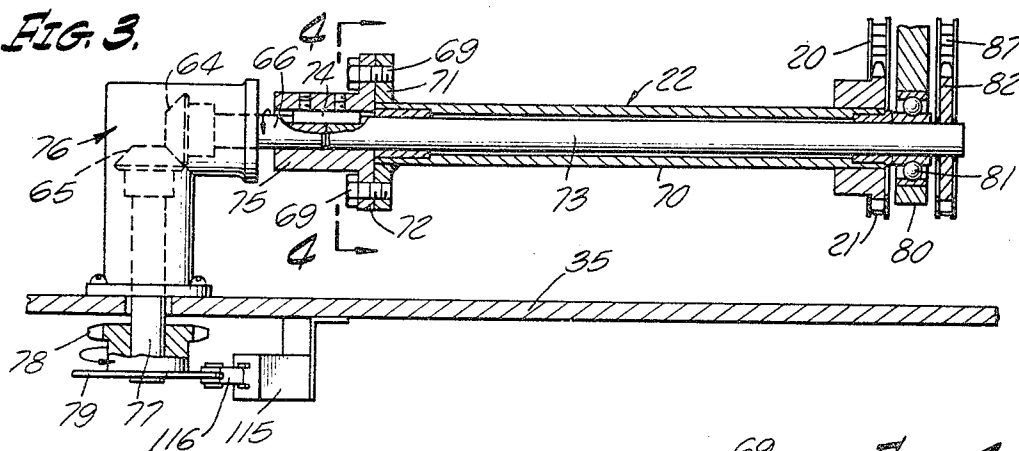


FIG. 4.

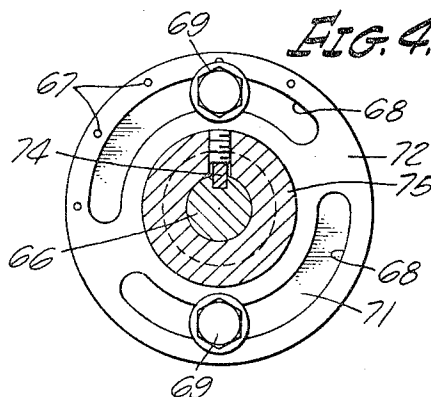
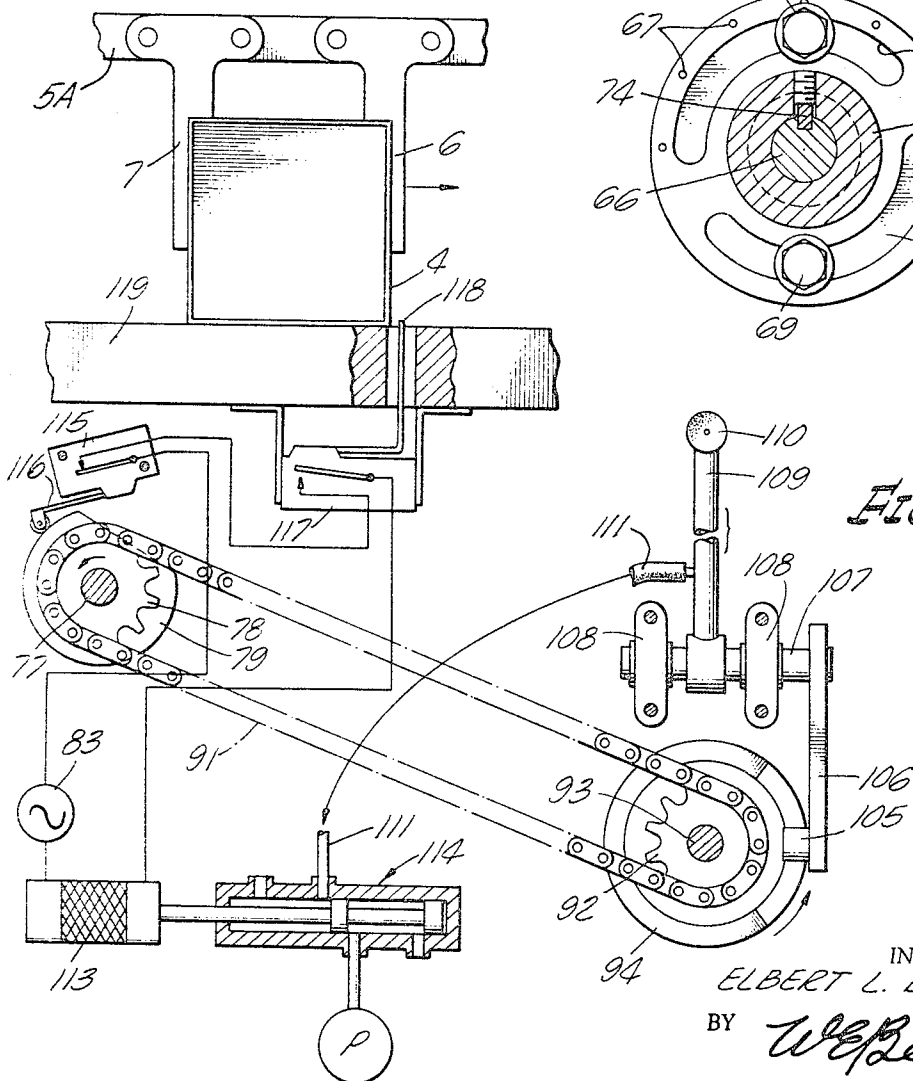


FIG. 5.



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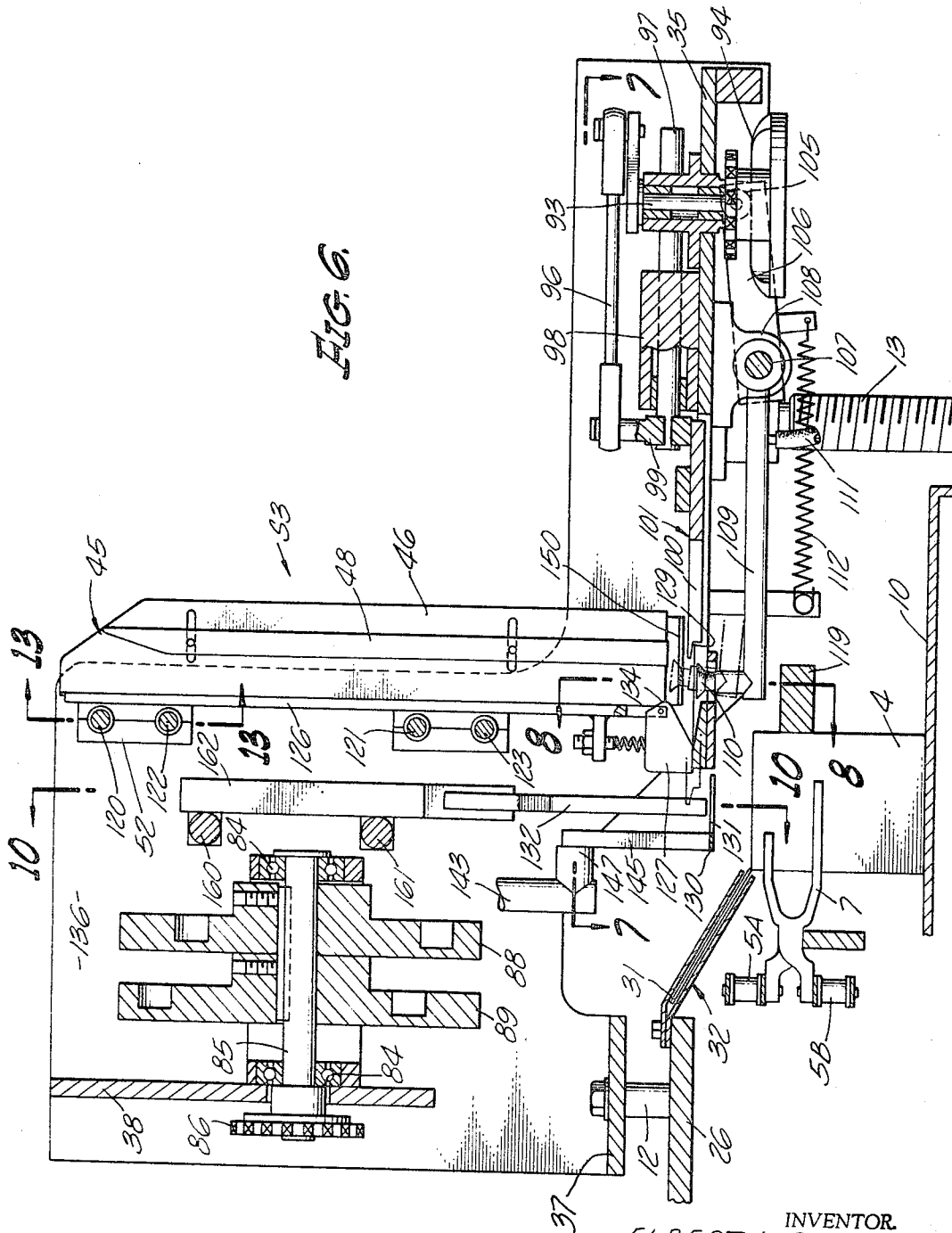
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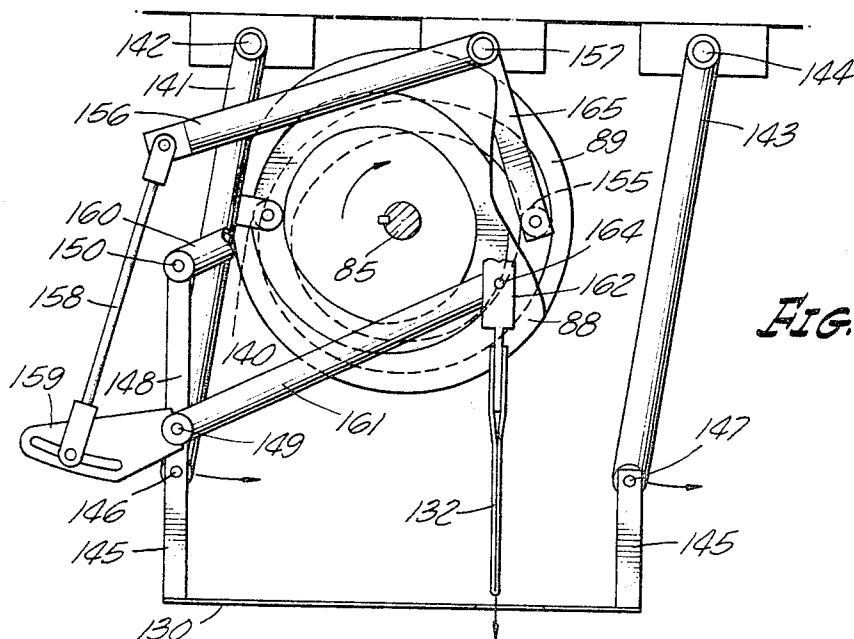


FIG. 10.

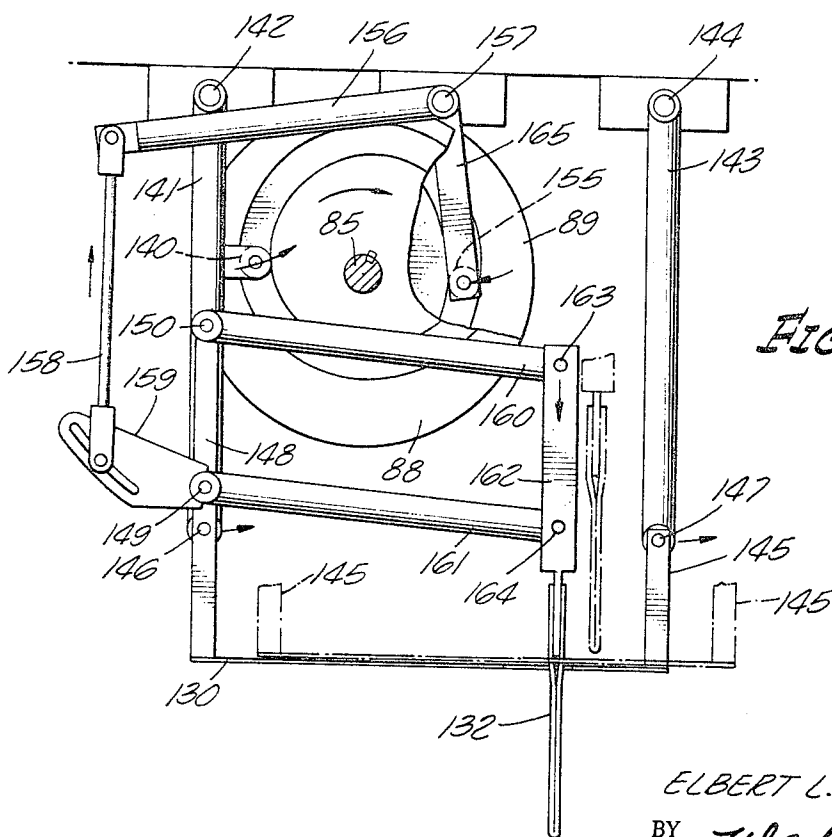


FIG. 11.

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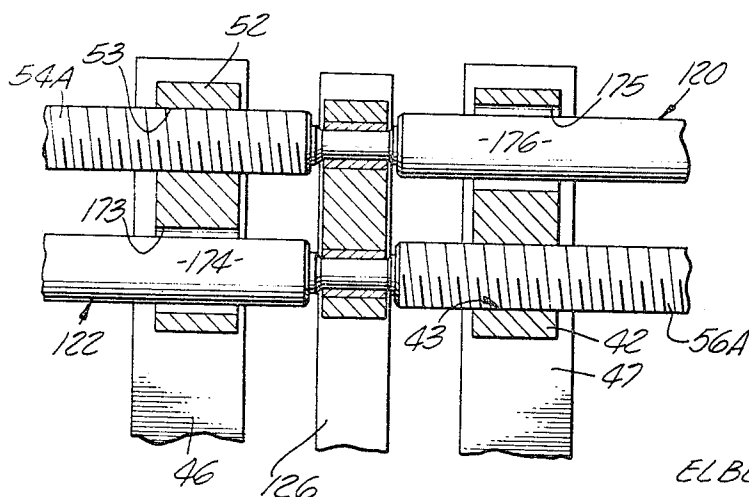
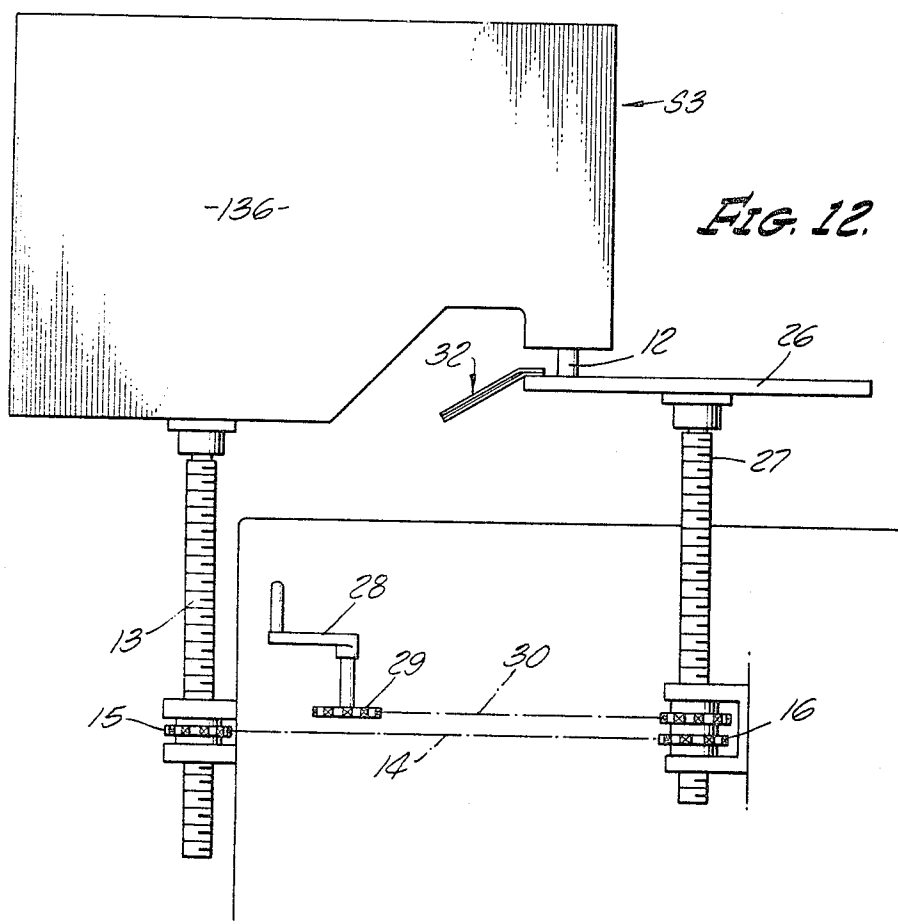
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3,432,984

STUFFER FOR TRAVELING CARTONS

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U.S. Cl. 53—120

Int. Cl. B65b 61/20, 63/04

15 Claims

ABSTRACT OF THE DISCLOSURE

The disclosure relates to a continuous conveyor of open, upright cartons with an inserter station where a leaflet, or the like, is inserted in each carton while the carton is in motion.

Cross references to related applications

Ser. No. 263,854, filed Mar. 8, 1963, now Patent 3,353,330, by Bivans et al., for "Stuffer for Traveling Cartons"; Ser. No. 316,950, filed Oct. 17, 1963, by Elbert L. Bivans, for "Drive for Uprighting Boxes," now Patent 3,306,422.

Background of prior art

This relates to conveyor or traveling cartons and particularly to a leaflet inserting machine. The prior art includes British Patent No. 1,027,536, which corresponds to U.S. Patent No. 3,353,330, referred to above. The suction head movement and mechanical movement for operating the carriage or bridge and ram and the adjustment of the phase of the conveyor with respect to the inserter have been simplified.

Brief summary of the invention

The former apparatus is simplified, using fewer parts and increasing the speed of operation, the inserter being in the form of an attachment for application to existing carton conveyors. The leaflet transfer is simplified by arranging a reciprocating suction head below the bottom of an upright leaflet magazine. The suction head removes the bottom leaflet and deposits it in front of a shuttle which pushes the leaflet over an opening on the carriage which moves forward with the carton. A ram folds the leaflet as it is pushed through the opening, tucking the leaflet into the carton. The carriage or bridge support is improved by suspending the carriage and ram from parallel link motions having overhead pivotal supports. Cam means are provided for oscillating the carriage and ram, a concentric cam reciprocating the ram.

The phase of the leaflet ram is adjusted with respect to the conveyor by providing an adjustable coupling between an outer hollow drive sleeve and an inner driven shaft on the base of the inserter. The drive sleeve has a main drive sprocket connected to the conveyor drive. The driven shaft drives the inserter elements, including the carriage and push rod cams, also the vacuum timing cam and a sprocket drive for the shuttle. The coupling has calibrations for locating the ram at the center offset with respect to the cartons.

The main machine has a jack screw to elevate or lower the upper box conveyor chain, a similar jack screw being provided for the front of the inserter base, the rear of this base being supported on the machine to ride up and down with the conveyor as it is adjusted to suit cartons of different heights.

A suction cup moves the center of the leaflet to a lower position while the opposite ends of the leaflet are still supported by shelves at the bottom of the magazine, plus a shuttle having fingers spaced apart to straddle the suction cup, the fingers having front ends having shoulders to

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engage the opposite inclined end portions of the leaflet and move it transversely of the axis of the magazine to a position over a carton for action by the ram to insert the leaflet at a selected position in the carton.

Brief description of the views of the drawings

FIG. 1 is a plan view of the leaflet inserter in position on a box conveyor.

FIG. 2 is an enlarged vertical elevation looking in the direction of the arrows 2—2 of FIG. 1.

FIG. 3 is a sectional view of line 3—3 of FIG. 2.

FIG. 4 is a sectional view enlarged on line 4—4 of FIG. 3.

FIG. 5 is a schematic view showing the control for the vacuum cup.

FIG. 6 is a transverse section taken on the line 6—6 of FIG. 2.

FIG. 7 is a horizontal section taken on the line 7—7 of FIG. 6.

FIG. 8 is a fragmentary section taken on the line 8—8 of FIG. 6 showing the leaflet magazine and feed means.

FIG. 9 is similar to FIG. 8 but showing a subsequent position during the feeding cycle.

FIG. 10 is a view taken on the line 10—10 of FIG. 6 and shows the relationship between the cams and follower carriage and push rod.

FIG. 11 is a view similar to FIG. 10 but showing a subsequent position.

FIG. 12 is a diagrammatic view as indicated by the lines 12—12 on FIG. 1 and shows the elevation means for the conveyor and leaflet inserter.

FIG. 13 is an enlarged fragmentary detail looking at the rear of the magazine adjustment means taken on the line 13—13 of FIG. 6, and

FIG. 14 is a plan view on section line 14—14 of FIG. 9 looking downwardly.

Detailed description

In FIG. 1, the station S-1 is a carton-forming machine, and station S-2 is a machine for uprighting the open cartons like 4 for delivery to the conveyor 1 which has sets of opposing fingers 6 and 7 to grasp the opposite sides of the open carton, as described in the above British patent. The conveyor operates at continuous speed to drive the spaced cartons through the leaflet inserter, station S-3, where a leaflet is inserted in each carton.

The main drive shaft 2 drives conveyor sprocket 8 and gear box 17, which has an output shaft 18 and sprocket 19 driving compound shaft 22 through chain 20 and sprocket 21. Sprocket 21 is on hollow drive shaft 70 having flange 71 receiving bolts 69 for curved slots 68 in flange 72 to provide an adjustable coupling, having index 67 for timing. This provides for adjustment of the place where the leaflet is inserted in the carton.

Flange 72 is on a sleeve 75 fastened by key 74 to driven shafts 66 and 73, suitably supported by right angle gear box 76 and bearing 81 on bearing support 80. On the outer end of shaft 73 is sprocket 82 to drive the cams for the carriage 130 and ram or push rod 132.

In FIG. 3, horizontal shaft 66 has a right angle drive by gears 64 and 65 with upright shaft 77 supported in gear box 76. One the lower end of shaft 77 is sprocket 78 and vacuum timing cam 79. Cam 79 operates switch 115 in series with switch 117 controlled by switch lever 118 acting as a carton sensor so that the vacuum cup 110 does not receive a suction from pump P to prevent a leaflet from being removed from the magazine unless a carton is present under the push rod 132. Switches 115, 117 are in circuit with a current source 83 and solenoid 113 which operates four-way valve 114 having a vacuum line connection 111 with vacuum cup 110. Cup 110 is on

a hollow arm 109 pivotally mounted on shaft 107 having bearings 108. Shaft 107 has arm 106 having cam follower 105 for cam 94. A spring 112 holds down the cam follower 105. The cup 110 rises and lowers as cam 94 is rotated. Cam 94 is on shaft 93 having sprocket 92 having chain 91 driven by sprocket 78.

Shaft 93 mounted on bed plate 35 has fixed thereto eccentric arm 95. Pivotally connected to arm 95 is Pitman rod 96 pivotally connected at its opposite end to support block 99 which carries two slide rods 97 reciprocally mounted in bearing block 98. Supported on block 99 is shuttle 101 having fingers 100. The fingers 100 transfer the leaflet from the vacuum cup 110 to the carriage 130. The fingers have undercuts or shoulders 129 which overlie the marginal edge of the leaflet and facilitate in the transfer by holding the leaflet down while pushing it forward. The forward ends of the fingers are bevelled as at 133 in FIG. 7 to facilitate the engagement of the fingers with spaced portions of the leaflet while it is in concave position, as shown in FIG. 9. The fingers 100 are spaced to clear the single suction cup 110 and also to provide stability to the leaflet during the transfer movement. The innermost position of the fingers is shown in broken lines in FIG. 7.

The leaflets are contained in magazine 45 having a right hand fence 46 mounted on (a) bracket 52 (see FIG. 13), having threaded bore 53 screw-driven by the threaded portion 54A of upper shaft 120, and (b) by a similar lower bracket (not shown) in FIG. 13 mounted on the lower portion of fence 46 and driven by the threaded portion 54B of lower shaft 121. The left hand fence 47 of magazine 45 is similarly mounted on (a) bracket 42 having a threaded bore 43 screw-driven by the threaded shaft portion 56A of shaft 122, and (b) a similar bracket (not shown) in FIG. 13 mounted on fence 47 and driven by the threaded portion 56B of lower shaft 123.

In FIG. 13, bracket 52 has a smooth bearing bore 173 for the smooth portion 174 of shaft 122, and bracket 42 has a smooth bearing bore 175 for the smooth portion 176 of shaft 120, the lower brackets (not shown) like 52 and 42 for the lower portions of fences 46 and 47 in FIG. 13, similarly have a threaded bore for the threaded shaft portion 54B of shaft 121 and 56B of shaft 123, while having smooth bearing bores, respectively, for the smooth portions 177 of shaft 121 and 178 of shaft 123 (see FIG. 2). Adjustable rails 48-49 suit the width of the leaflet.

As shown in FIG. 2, shaft 120 at its opposite ends has a bearing support 165 in the left hand side member 36 and a bearing 166 in the right hand side member 136. Shaft 122 similarly has a bearing 167 in the side member 36 and a bearing 168 in side member 136.

Shaft 121 similarly has a bearing 169 in side member 36 and a bearing 170 in side member 136.

Shaft 123 has a bearing 171 in side member 36 and a bearing 172 in side member 136.

The shafts 120, 121, 122, and 123 extend parallel to each other with their axes substantially in the same vertical plane, as is apparent from FIG. 6.

Referring to FIGS. 2, 6, and 13, it will be noted with reference to FIG. 2, in particular, that adjustable fence 46 is supported on threaded portion 54A of shaft 120 and on threaded portion 54B on shaft 121. Adjustable fence 47 is supported on threaded portion 56A of shaft 121 and on threaded portion 56B of shaft 123. The shafts 120-123 are rotatably mounted in side members 36 and 136 of the leaflet inserter S-3. Shafts 120-123 have bearing supports as follows:

Shaft 120 has mounted thereon the sprocket 58 which, through chain 60, drives sprocket 59 mounted on shaft 121. Similarly, shaft 122 mounts sprocket 61 which, through chain 63, drives sprocket 62 on shaft 123. Thus, it can be seen that by rotating the control wheel 55, both threaded portions 54A and 54B will be rotated in unison, and by rotating the control wheel 57, threaded portions

56B and 56A will be rotated in unison. Adjustable fence 46 is mounted on threaded portions 54A and 54B through brackets like 52 which have threaded engagement or bore like 53. Likewise, adjustable fence 47 is supported on threaded portions 56A and 56B through brackets like 42, each having threaded bore like 43. In this manner, each fence 46-47 can be independently adjusted.

Supported also on the shafts 120-123 is a center guide 126 which mounts at its lower end a spring-loaded detent 127 to aid in transfer of successive leaflets from the magazine 45 to the carriage platform 130.

Referring now to FIGS. 6, 8, and 9, it will be seen that the leaflets are restricted in their downward movement due to gravity by projection 134 on the detent 127 (see FIG. 6) until the vacuum cup 110 moves upwardly to engage the bottommost leaflet and to draw said leaflet in a downward direction to a position as shown by the phantom line of the leaflet 128 in FIG. 8. Further downward movement of the cup 110 will position leaflet 128 as shown in FIG. 9, where the ends of the leaflet rest on and are supported by ledges 50 and 51, the center 102 of the leaflet 128 being drawn to a lower position 103 for engagement by the fingers 100 while thus supported by ledges 50 and 51.

Referring to FIGS. 2, 3, 6, 10, and 11, and in particular to FIGS. 2 and 3, it will be seen that cam shaft 85 carries sprocket 86 which is driven by sprocket 82 through chain 87. Cam shaft 85 is supported from rear wall 38 in bearings 84 (see FIG. 6). Keyed to shaft 85 is a carriage cam 88 and a push rod cam 89, both cams being of the internal type. The purpose of these cams is to effect movement of the carriage 130 and push rod 132 in unison with the movement of the cartons 4 with the conveyor 1.

FIG. 10 illustrates the initial position of the carriage 130 and push rod 132 after receiving a leaflet from the shuttle 101. Carriage 130 is mounted on posts 145 pivoted as at 146 and 147 to the lower ends of the link supports 141 and 143, which are, in turn, pivotally mounted to the upper ends of link supports 142 and 144 to the stationary frame. Post 145 has an upward extension 148 which mounts pivots 149 and 150 which serve as anchor pins for parallel beams 160 and 161 mounting push rod support 162 at pivot pins 163 and 164.

Extending from parallel beam 161 is slotted member 159 connected through adjustable push rod 158, beam 156, pivoted at 157, and carrying follower arm 165 which mounts cam follower 155 engaging cam 89. The link 141 mounts cam follower 140 engaging cam 88.

Cam 88 rotates clockwise and swings links 141 and 143 to move the carriage and the push rod assemblies to the right, as viewed in FIG. 10, in timed relation to the movement of the box conveyor. As this movement is taking place, cam 89 is acting through follower arm 165, crank arm 156, push rod 158, and parallel beam 161 to effect a downward movement of the push rod which carries the leaflet through slot 131 in carriage 130 and down into the receiving box on the conveyor. Continued rotation of cams 88 and 89 withdraw push rod 132 and return the push rod and carriage assemblies to the initial position as shown in FIG. 10.

Referring to FIGS. 1, 2, 6, and in particular to FIG. 12, the leaflet inserter S-3 is mounted on a box conveyor which provides for adjustments for different size boxes. The inserter is mounted on the conveyor by means of two posts 12 and screw post 13. Posts 12 are mounted on conveyor support frame 26 which is adjustably mounted on screw post 27. Screw posts 13 and 27 are interconnected through sprockets 15 and 16 by chain 14, crank arm 28 driving drive sprocket 29 and chain 30 to elevate screw posts 13 and 27 in unison.

Referring to FIG. 6, the top cover flap 31 is guided in a slot means 32, forming no part of the present invention, means, not shown, being provided for guiding the top cover flap 31 into the slot means 32. This slot means acts as a support for the top of the carton 4, while it is mov-

ing, and acts as an abutment for certain flap closing means which may be employed for the bottom of the carton. This subject matter is disclosed and claimed in application, Ser. No. 448,101, filed Apr. 14, 1965, by applicant for "Cartoning Machine for Vertical Carton Flats," now Patent 3,373,665.

The stuffer of the present invention may be applied to other types of carton machines, such as the machine of Patent 3,373,665.

I claim:

1. Stuffer apparatus for traveling cartons comprising the combination of a conveyor traveling at constant speed, said conveyor having a series of uniformly spaced upright formed containers open at the top, a stuffer for articles, said stuffer having repeated forward strokes, traveling at substantially the same speed and direction as said conveyor, said strokes being successively in juxtaposition with successive ones of said containers, a shuttle, an upright magazine for the articles, a suction head below the bottom of said magazine for removing the articles one at a time and for depositing the same in the path of said shuttle, said shuttle supplying to said stuffer a series of articles to be stuffed in said containers, means for operating said shuttle, and means for operating said stuffer for said stuffing purposes.

2. Stuffer apparatus according to claim 1, said shuttle having a cooperating friction draw preventing retraction of the article, which has been advanced by said shuttle, when said shuttle is retracted.

3. Stuffer apparatus according to claim 1, said articles being folded leaflets, said shuttle having a forward end having spaced arms, each having upright shoulder means to engage and push the lagging edge of a folded leaflet, and a friction drag for the leaflet between the paths of said arms.

4. Stuffer apparatus according to claim 1, said conveyor operating in a certain path, and means providing for said shuttle a path substantially at right angles to said path of said conveyor.

5. Stuffer apparatus according to claim 1, said articles being folded leaflets, said magazine having shelves supporting the opposite ends of the leaflets while the centers of the leaflets are moved to a lower position by said suction head.

6. Stuffer apparatus according to claim 1, said articles being folded leaflets, said magazine having shelves supporting the opposite ends of the leaflets while the centers of the leaflets are moved to a lower position by said suction head, said shuttle having fingers spaced apart to straddle said suction head, said fingers having front ends, each having a shoulder, said shoulders engaging the oppositely inclined end portions of the leaflet and move it transversely of the axis of said magazine to a position over a carton, and a conveyor for said carton.

7. A leaflet inserter device comprising an upright magazine for leaflets, said magazine having an open bottom having a stop in position to intercept the bottom leaflet of a stack, a suction head below the bottom of said magazine, means for reciprocating said suction head with an upward stroke to urge the stack away from said stop, said operating means thereafter moving said suction head downwardly with the selected bottom leaflet attached thereto away from said magazine to thereby deposit said last-mentioned leaflet on a support, a bridge having a gap, a shuttle acting to transfer the selected leaflet from said support to said bridge over the gap, a reciprocating ram, means supporting said ram for movement through said gap, means for conveying a series of containers at uniform speed under said bridge, and separate means for operating said suction head, said shuttle, and said ram in timed relation with each other and with the travel of said containers.

8. A leaflet inserter device comprising a conveyor operating at continuous speed and having a series of spaced

upright formed containers open at their tops, a reciprocating carriage having a forward stroke in synchronism with said conveyor, said carriage having a bridge having a gap, parallel link means suspending said carriage for oscillating movement, cam means for operating said carriage, a ram mounted in position to operate through said gap, said ram having a parallel link means supporting said ram on said carriage for reciprocation with a forward stroke through said gap, other cam means for operating said ram, a leaflet magazine, and means for transferring leaflets from said magazine to said bridge over said gap.

9. Inserter apparatus comprising:

- (1) a support,
- (2) a carriage having a bridge having a gap,
- (3) parallel link means pivotally connected to said support and said carriage suspending said carriage for oscillation,
- (4) a ram for said gap,
- (5) means on said carriage for supporting said ram for reciprocation with a forward stroke through said gap,
- (6) means for supplying stuffer articles to said bridge,
- (7) means for oscillating said carriage, and
- (8) other means for operating said ram for stuffing said articles through said gap.

10. Inserter apparatus according to claim 9, said means on said carriage for supporting said ram comprising

- (1) parallel link means pivotally connected to said carriage and said ram.

11. Inserter apparatus according to claim 9, comprising

- (1) a conveyor operating at continuous speed,
- (2) said conveyor having thereon a series of spaced open upright formed boxes,
- (3) said conveyor conveying said boxes below said gap,
- (4) means for operating said conveyor in timed relation with said carriage and said ram,
- (5) said ram being operative to stuff one of said articles in successive boxes.

12. Inserter apparatus comprising:

- (1) a support,
- (2) a carriage having a bridge having a gap,
- (3) means on said support for suspending said carriage for oscillation,
- (4) a ram for said gap,
- (5) means on said carriage for supporting said ram for reciprocation with a forward stroke through said gap,
- (6) a magazine for articles to be inserted through said gap,
- (7) a suction head for periodically removing the articles from said magazine,
- (8) a shuttle for transferring the articles thus removed to said bridge over said gap,
- (9) means for oscillating said carriage, and
- (10) other means for operating said ram.

13. A leaflet inserter device comprising a conveyor operating at continuous speed and having a series of spaced upright formed containers open at their tops, a reciprocating carriage having a forward stroke in synchronism with said conveyors, said carriage having a bridge having a gap, means supporting said carriage for oscillating movement, cam means for operating said carriage, a ram mounted in position to operate through said gap, means supporting said ram on said carriage for reciprocation with a forward stroke through said gap, other cam means for operating said ram, a magazine for articles to be inserted in said containers, means for transferring the articles from said magazine to said bridge over said gap, a drive for said conveyor, a horizontal hollow shaft connected at its inner end to said conveyor drive, an inner shaft in said hollow shaft, means at the outer end of said hollow shaft for coupling said inner shaft to said outer shaft, said coupling being angularly adjustable to adjust the relative angular position of said

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hollow shaft and said inner shaft, each of said cam means having a driving connection with the rear end of said inner shaft.

14. A leaflet inserter device according to claim 13, said coupling means including relatively rotatable members having a calibration indicating the relative angular adjustment of said hollow shaft and said inner shaft to align said ram with the center of containers of different widths, said coupling being adjustable to intermediate positions to relatively displace said ram off center, said coupling being adjustable to disconnect said inner shaft from said hollow shaft to render said carriage and said ram idle for containers not requiring said articles to be inserted therein.

15. A leaflet inserter device according to claim 13, said means for transferring the articles from said magazine

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to said bridge over said gap having a driving connection through a reduction gear with the front end portion of said inner shaft.

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U.S. Cl. X.R.

53—50, 252