Oct. 24, 1950 T. GORMAN, JR 2,527,252

MACHINE FOR PACKING CANS AND THE LIKE

Filed June 25, 1946 8 Sheets-Sheet 1

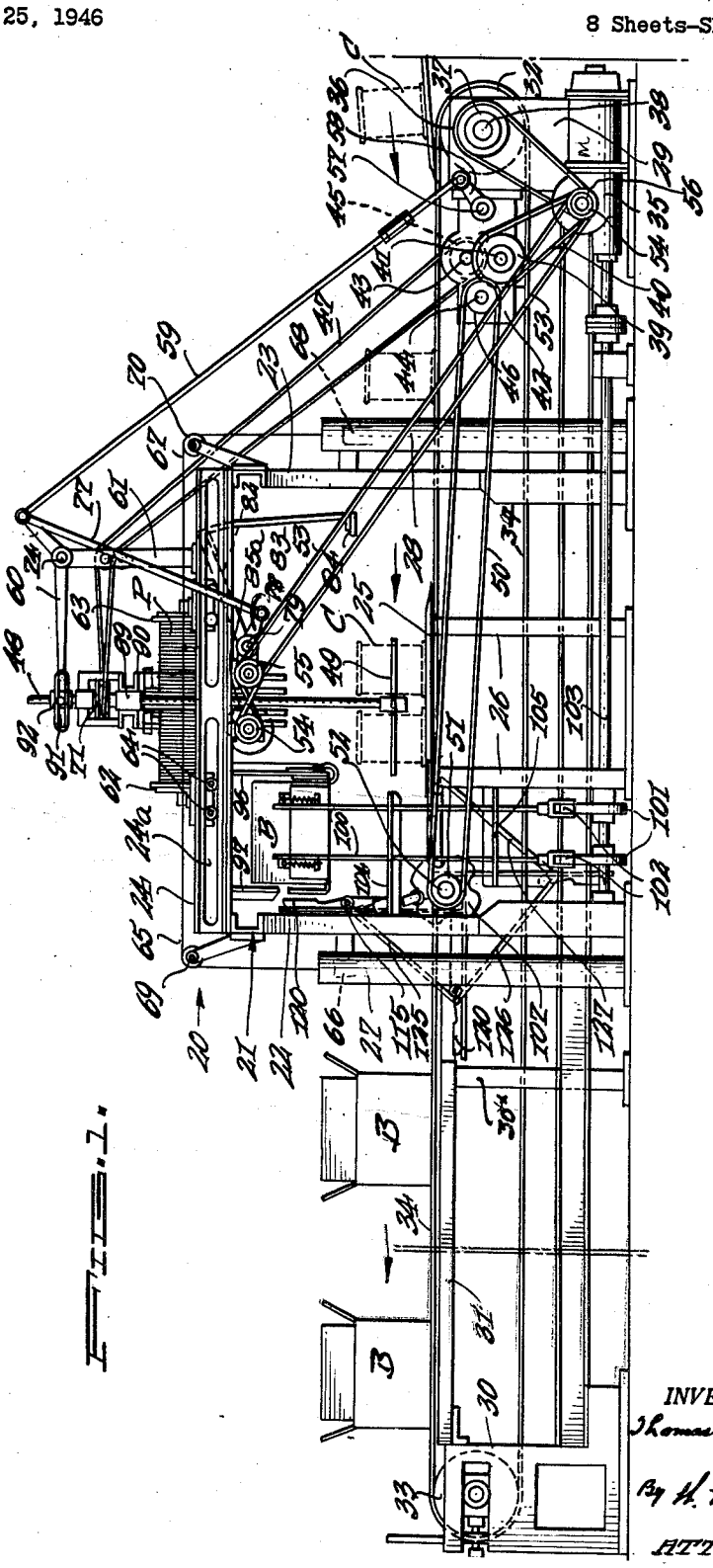


FIG. 1.

INVENTOR.
Thomas Gorman Jr.
By H. Lee Helm
ATTORNEY

Oct. 24, 1950 T. GORMAN, JR 2,527,252

MACHINE FOR PACKING CANS AND THE LIKE

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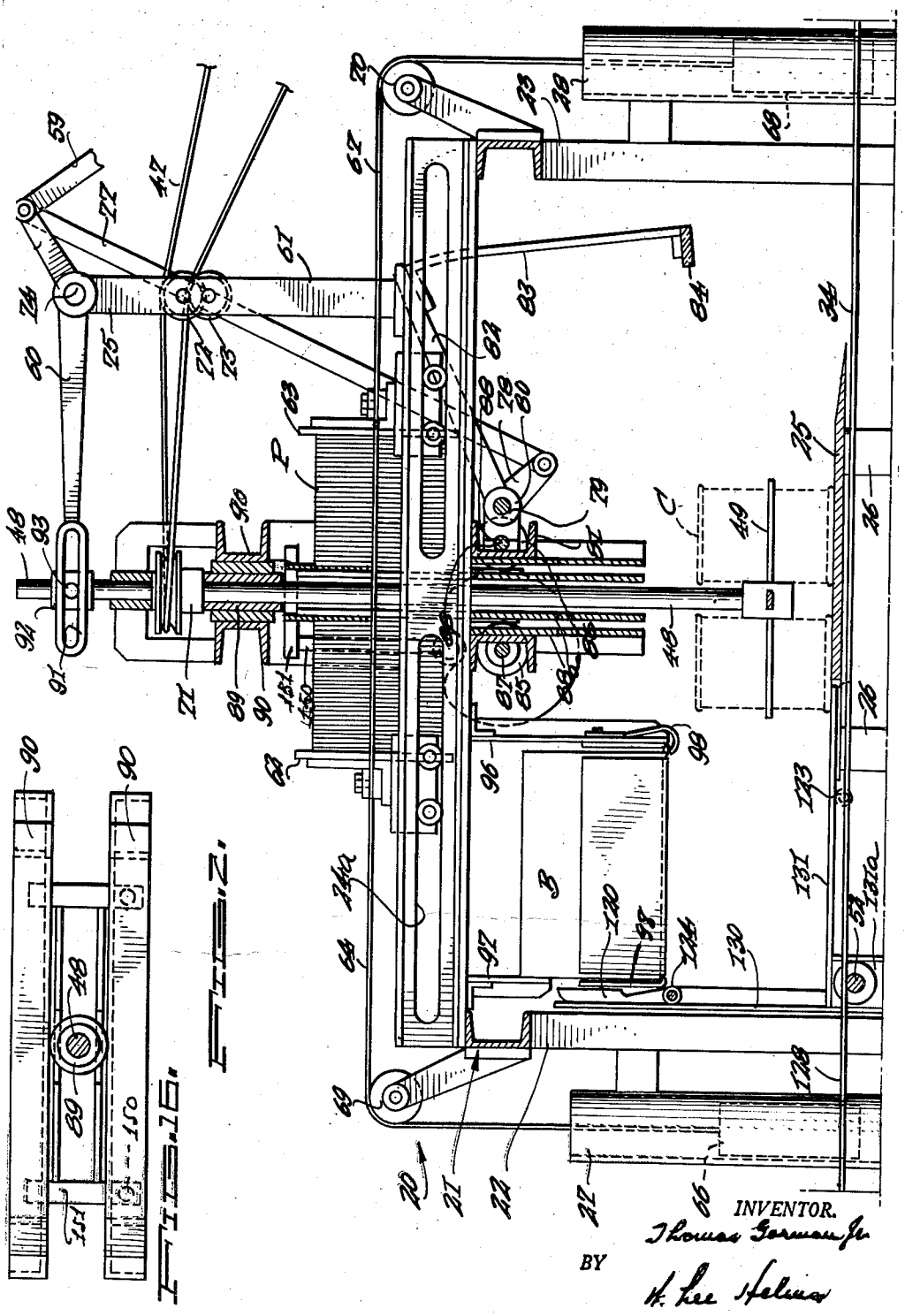


FIG. 2.

INVENTOR.
Thomas Gorman Jr.
BY
H. Lee Helms
ATTORNEY.

Oct. 24, 1950 T. GORMAN, JR 2,527,252

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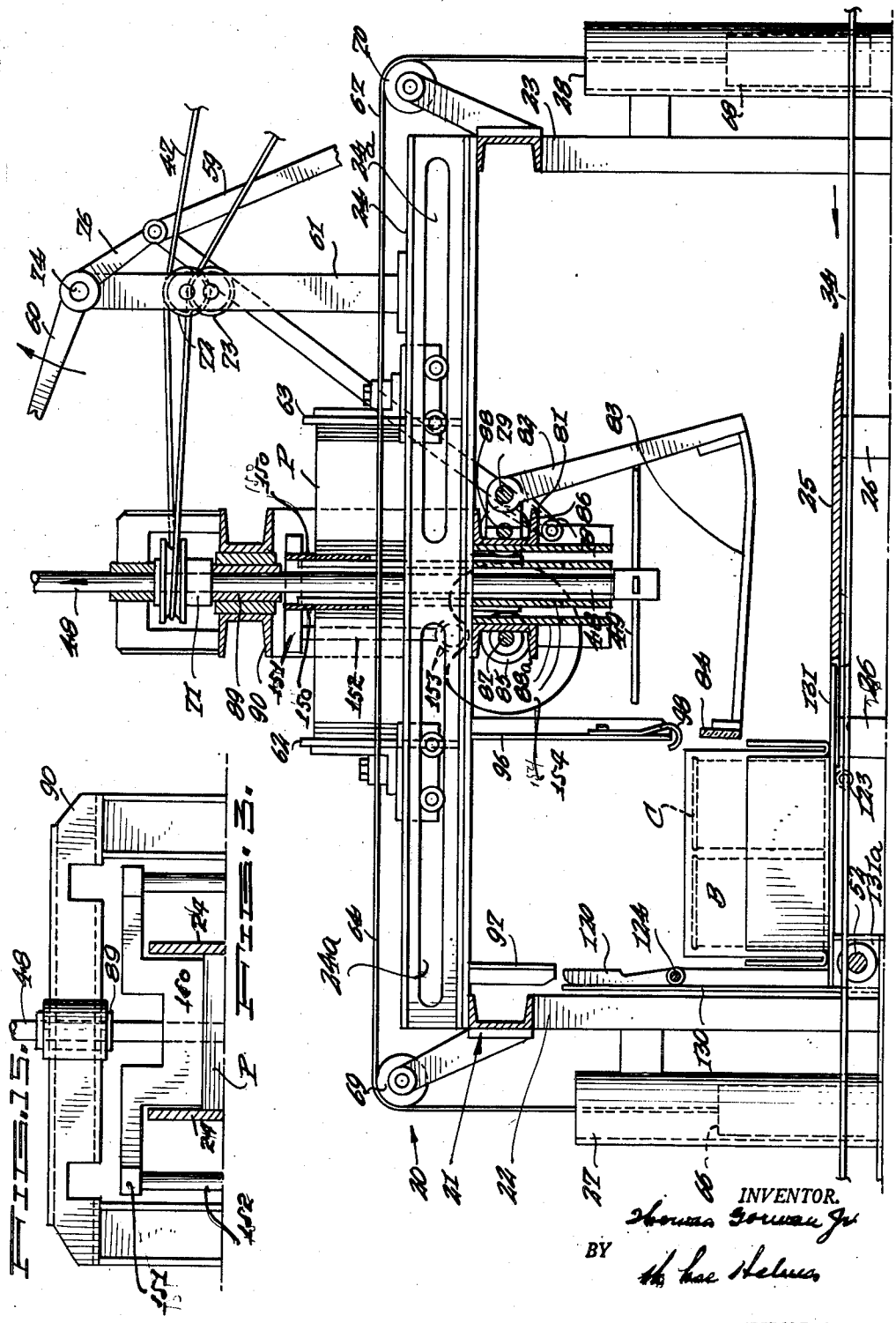


FIG. 3.

INVENTOR.
Thomas Gorman Jr
BY
H. Lee Helms
ATTORNEY.

Oct. 24, 1950 T. GORMAN, JR 2,527,252

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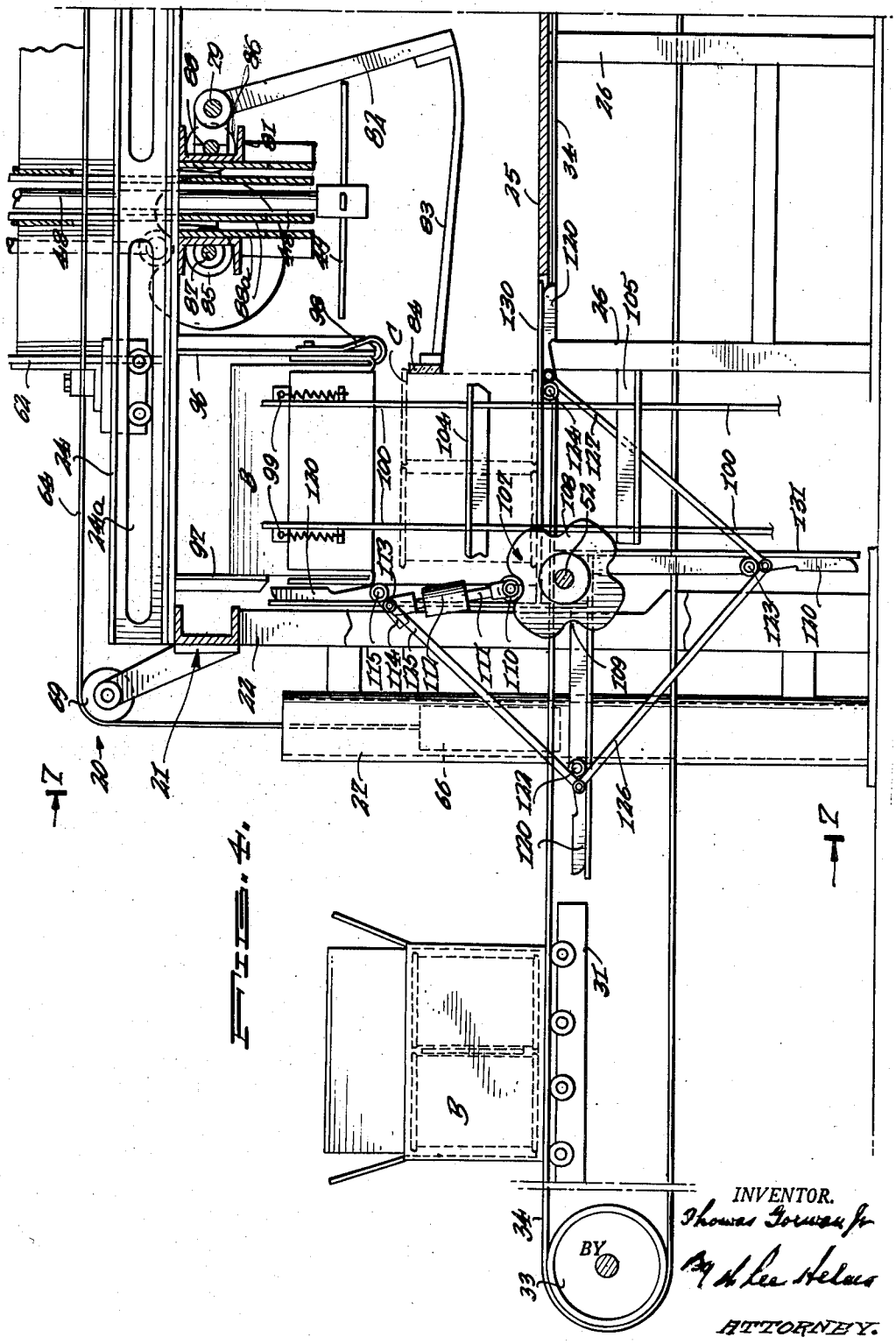


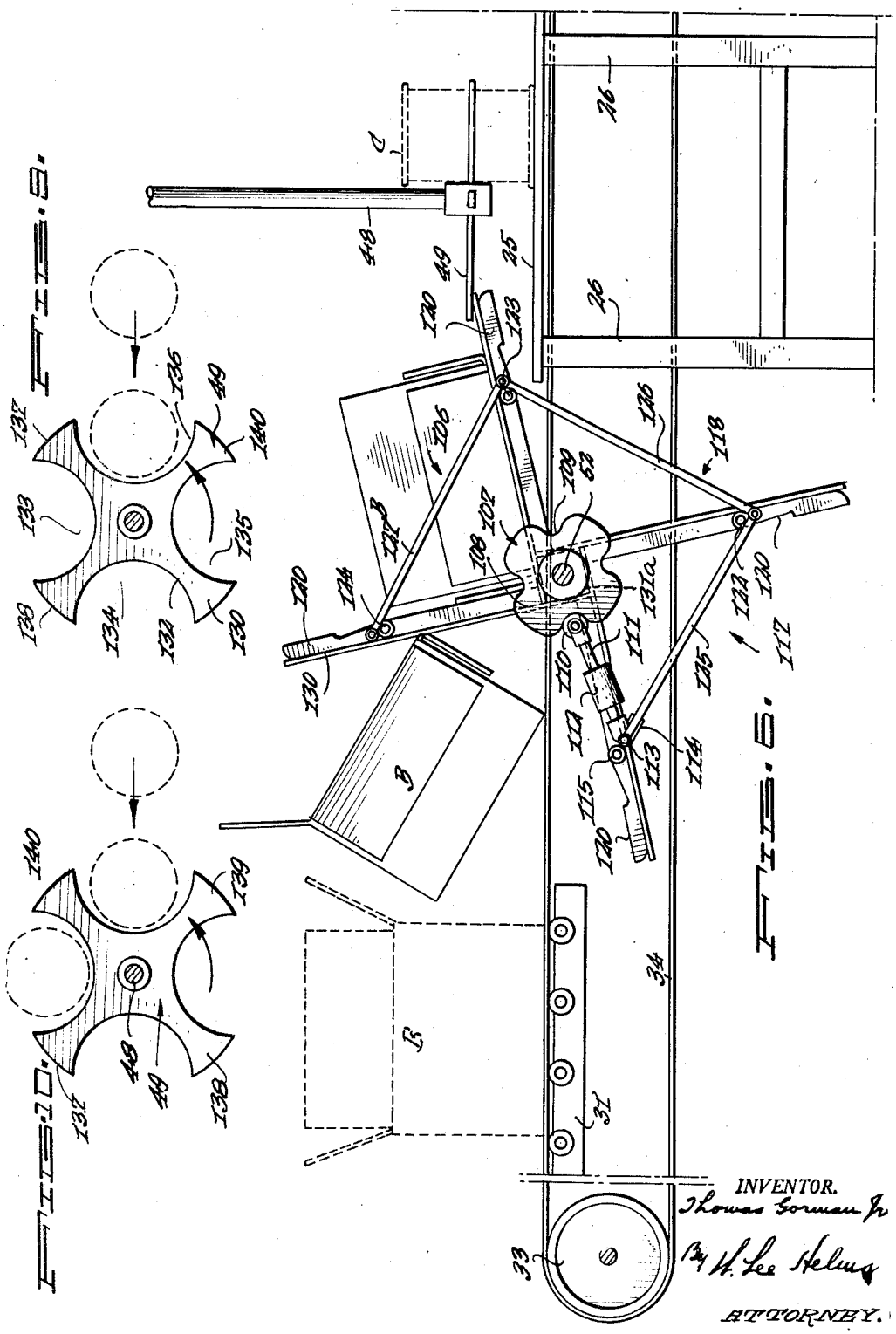
FIG. 4.

INVENTOR.
Thomas Gorman Jr
By Wheeler Helmes
ATTORNEY.

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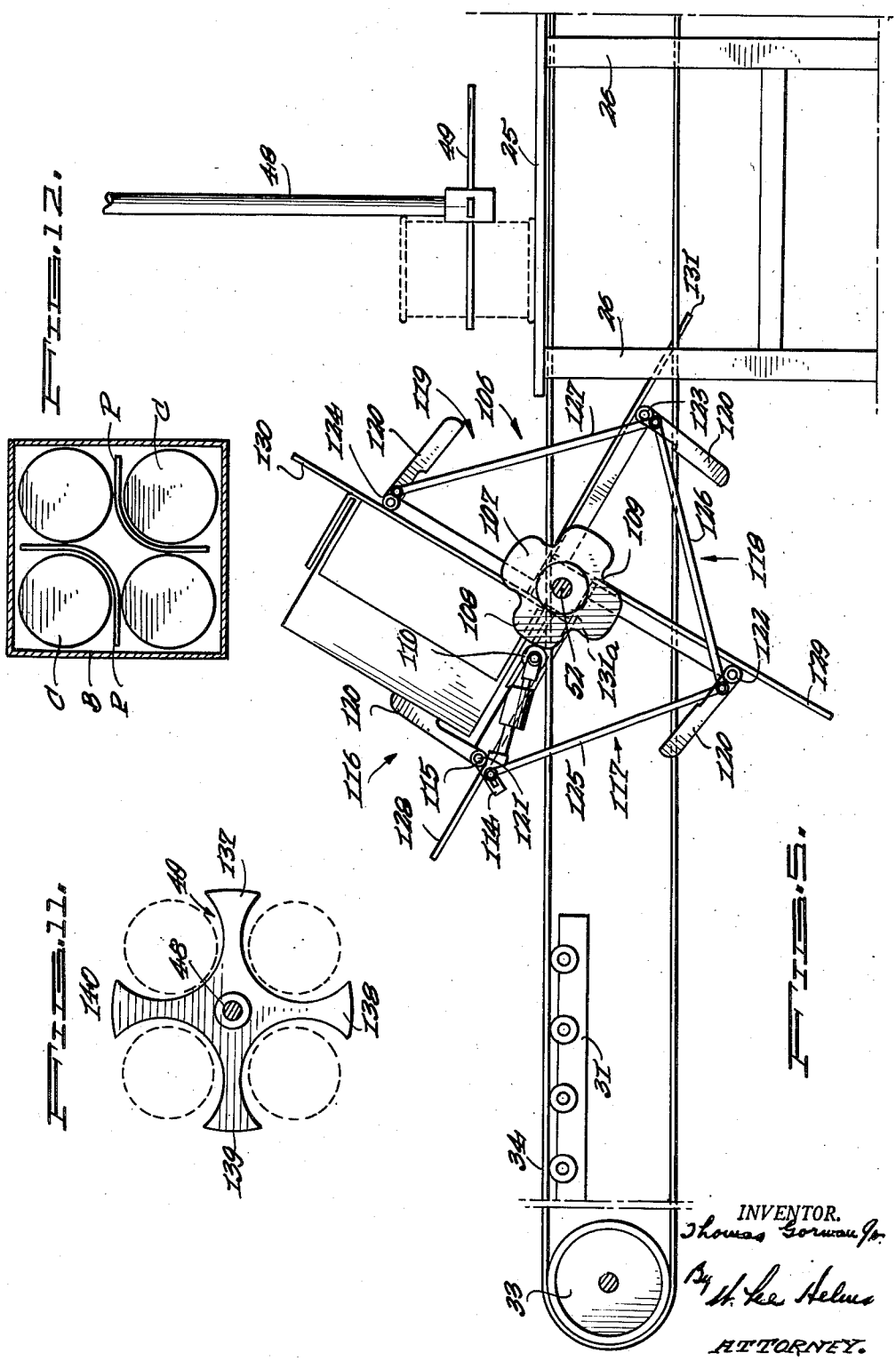


INVENTOR.
Thomas Gorman Jr
By H. Lee Helms
ATTORNEY.

Oct. 24, 1950 T. GORMAN, JR 2,527,252

MACHINE FOR PACKING CANS AND THE LIKE

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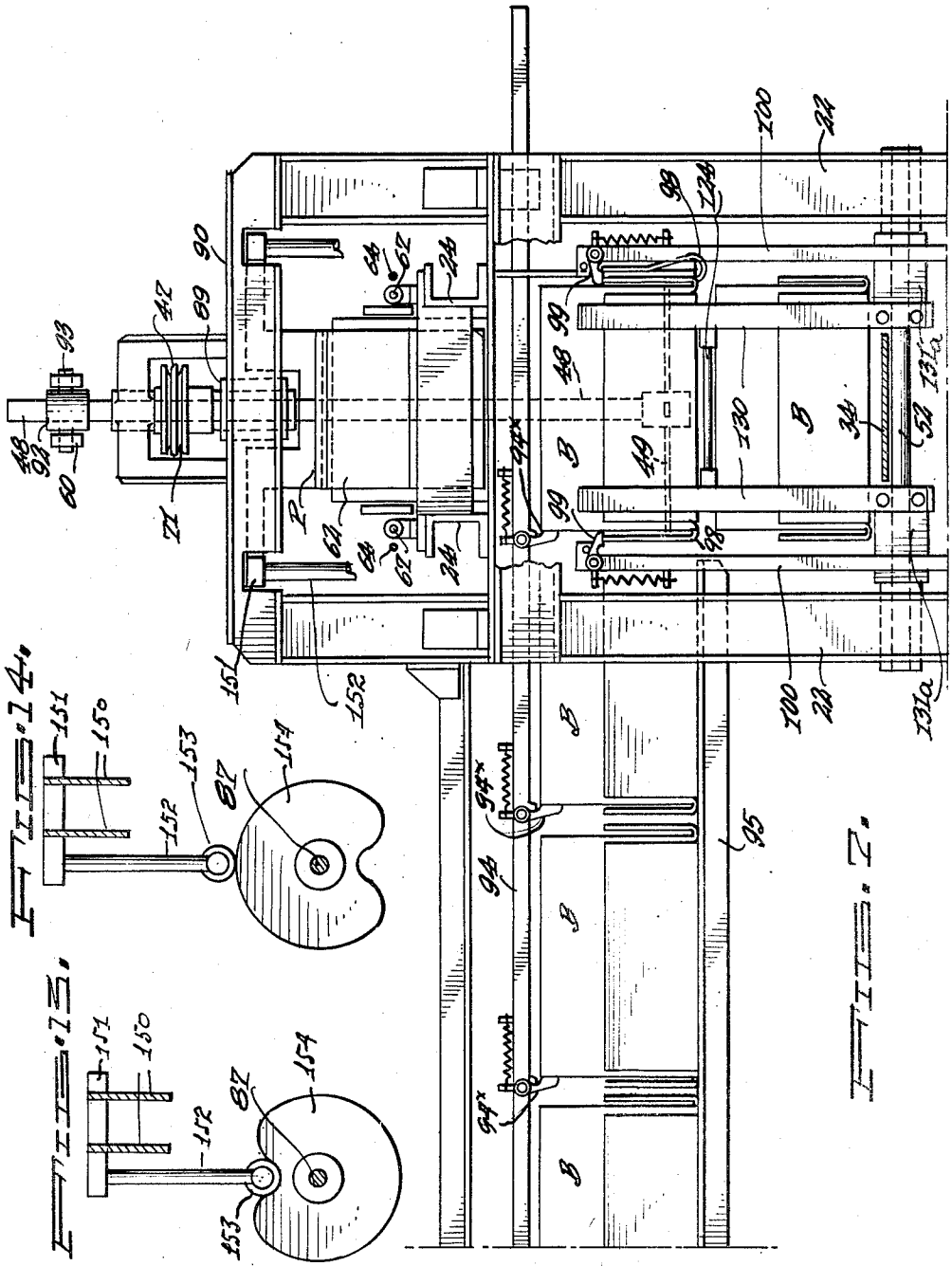


FIG. 7.

FIG. 14.

FIG. 13.

INVENTOR.
Thomas Gorman, Jr.
BY H. Lee Helms
ATTORNEY.

Oct. 24, 1950 T. GORMAN, JR 2,527,252

MACHINE FOR PACKING CANS AND THE LIKE

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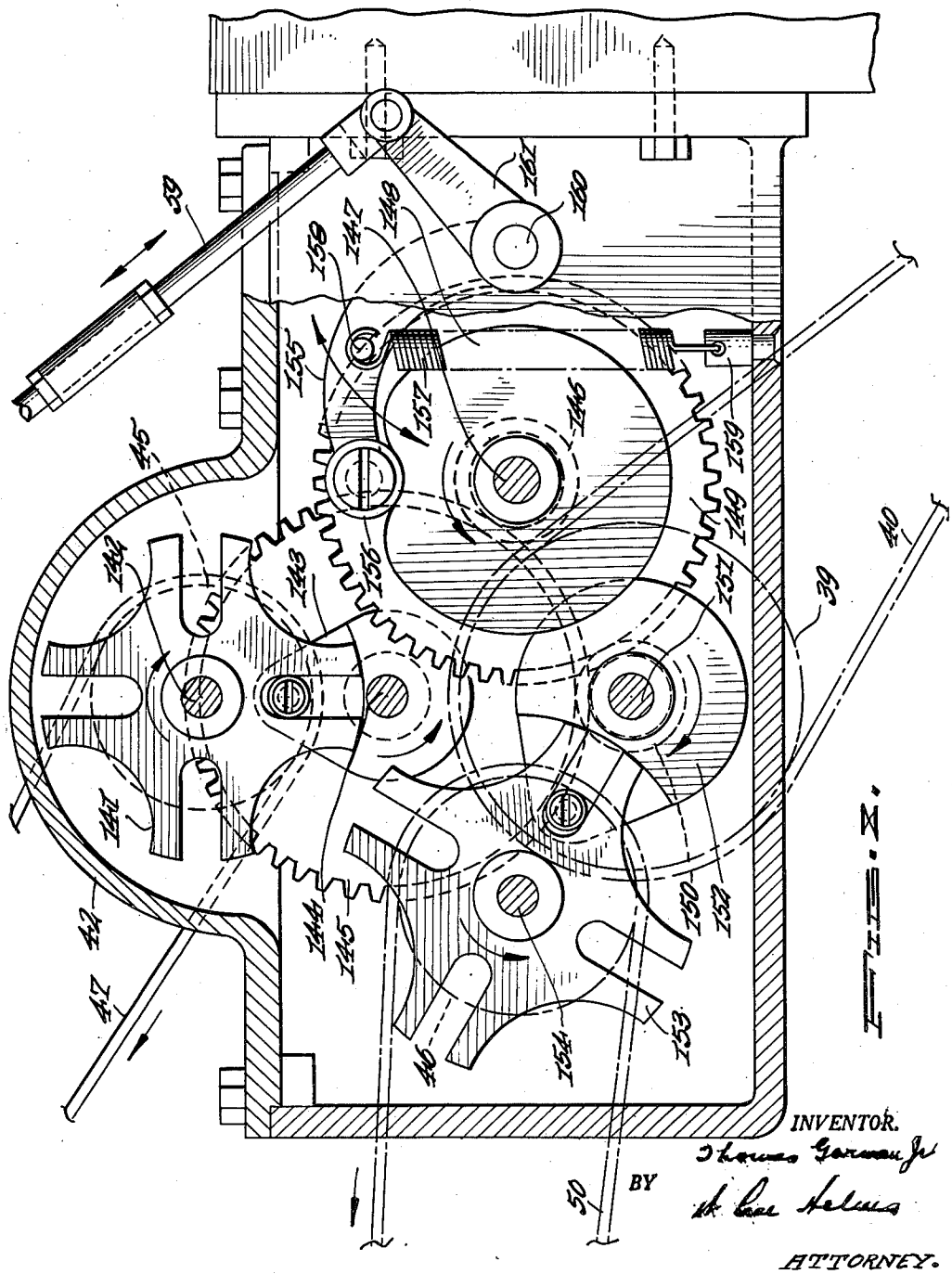


FIG. 7.

INVENTOR.
Thomas Gorman Jr
BY
H. Earl Helms
ATTORNEY.

Patented Oct. 24, 1950

2,527,252

UNITED STATES PATENT OFFICE

2,527,252

MACHINE FOR PACKING CANS AND THE LIKE

Thomas Gorman, Jr., Newark, N. J.

Application June 25, 1946, Serial No. 679,056

3 Claims. (Cl. 226—15)

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The characteristic of the present invention is the provision of an automatic machine which will receive cans containing any desired material, which will assemble a desired number at a receiving station, which will transfer the cans to the station at which they are received by a vertically moved inverted open container or box, whereupon the inverted but filled box will be moved to upright position and transferred to a sealing and shipping station.

The specific object of the invention will appear in the following specification, in which reference will be made to the accompanying drawings, in which:

Fig. 1 is a general assembly, in side elevation, of the can packing machine.

Fig. 2 is an enlarged transverse sectional elevation taken centrally of Fig. 1;

Fig. 3 is a view similar to Fig. 2 showing the star-shaped member raised in non-operating position, and the can discharge device at the end of an active throw;

Fig. 4 is a detail view in generally the same position as that of Figs. 2 and 3 showing the mechanism used for delivering the filled corrugated paper containers from the machine to the shipping station;

Fig. 5 is a detail view showing the filled container delivery means in operation and before a container has been turned finally to upright position;

Fig. 6 is a view similar to Fig. 5 showing the position of the filler container delivery means at the point where a container is dropped onto the delivery belt;

Fig. 7 is a transverse vertical section taken on the line 7—7 Fig. 4;

Fig. 8 is a cross-section through the gear box showing the set of gears used to operate the machine and the Geneva motion gears for timing the delivery and packing of the cans;

Fig. 9 is a plan showing one of the star-shaped members and in dotted lines cans in their movement toward the same;

Fig. 10 is a view similar to Fig. 9, illustrating the manner in which the star-shaped member gathers the cans together;

Fig. 11 is showing the position of four cans gathered by the star-shaped member ready for release as a group;

Fig. 12 shows corrugated paper partitions placed in between the cans;

Fig. 13 is a schematic view of the partition feed can and its pusher blades, the latter being in section and in down position;

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Fig. 14 is a view similar to Fig. 13 with the pusher blades in up position;

Fig. 15 is a fragmentary view in elevation showing the clearances in the cross members 90 for the pusher yoke bar; and

Fig. 16 is a top plan view of the structure shown in Fig. 15.

Referring to Fig. 1, numeral 20 designates the packing machine proper, while 21 is one of the upper transverse members of the frame, which includes a pair of upright members, 22 and 23. The upright members 22 and 23 support two parallel longitudinal channel members 24, each of which has two elongated slots 24*a*. A table 25 is supported upon legs 26, while a pair of tubular members 27 and 28 are held on either side of the frame 21.

Belt drum supporting castings 29 and 30 are positioned at each end of the machine and a belt table 31 is secured to casting 30 and to vertical support 30*x*. A pair of drive pulleys 32 and 33 are rotatively mounted upon the castings 29 and 30, and an endless belt 34 is horizontally movable through the rotation of the said pulleys.

To operate the belt, a pulley 32 is rotated through the medium of an electric motor M and gear reduction box 35 which, by means of a suitable drive pulley, and belt 36, drives pulley 37 on shaft 38, which in turn is keyed to the pulley 32.

An additional pulley 39 is driven through a belt 40 from the gear box 35 and is secured to a shaft 41 which operates a Geneva motion box 42. A pair of secondary shafts 43 and 44 extend outwardly from the Geneva motion box and are secured to pulleys 45 and 46. The pulley 45 operates a belt 47 leading to a pulley 71 on vertical shaft 48, while pulley 46 operates a belt 50 to turn a pulley 51. The pulley 51 is secured to a shaft 52, and another belt 53 is utilized to rotate pulley 54 clockwise and 55 counter-clockwise.

A shaft 57 extends outwardly from the Geneva box 42, and reciprocates a link 59 by means of a lever 58, the link transmitting motion to a rock arm 60, pivoted at 74 on upright 61. The rock arm 60 operates a shaft 48 in a vertical direction.

The corrugated paper partitions P are stacked vertically upon the horizontal members 24 and are delivered to the machine automatically. To make this possible, one end of a flexible cable 65 is secured to a wheeled abutment 63 and the other end supports a counterweight 66, which hangs within the tubular member 27, while a secondary flexible cable 67 has one end secured to a wheeled abutment 62 and the other supports a counter-weight 68 within the tubular

member 28. The wheels of these abutments ride in the channels of members 24. Both cables 65 and 67 run over pulleys 69 and 70 and the action of said counter-weights, 66 and 68, moves the wheeled abutments 62 and 63 in horizontal directions toward each other to feed the partitions toward pusher blades.

The pusher blades are shown at 150 in Figs. 13, 14 and 15. They are carried in spaced relationship by a yoke arm 151 carried at the upper end of a rod 152 at the lower end of which is a roller 153 which rides on the periphery of a heart cam 154 on shaft 87. Thus in last rotation of shaft 87 the pusher blades have a down active movement followed by an up movement and a dwell. In each down movement the blades push down the two innermost partitions at the center of the stack of partitions P into register with rotating feed rollers.

The corrugated partitions P are picked by the rotating rollers 85 and 86, are fed down through shaping plates and are dropped between the cans C as now to be described. The wheeled abutments 62 and 63 keep the stacked corrugated paper partitions in upright position at all times.

Referring to Fig. 2, the upright shaft 48 has at its lower end a star-shaped member 49. At its upper end, shaft 48 is secured to a pulley 71, which is rotated by means of the belt 47 from the intermittent or Geneva drive as hereinbefore pointed out. The belt 47 is carried over idlers 72 and 73, which are rotatively mounted upon the upright 61. The rock lever 60 is operated by means of the link 59 and the rock lever also operates a link 77 connected to a lever 78 on a shaft 79 held in bearing boss 80 that is fastened to a cross-piece 81. Shaft 79 carries an arm 82, having a pusher 83, which carries at its forward end a rubber plate 84.

The set of partition feed rollers 85 and 86 are secured upon shafts 87 and 88 respectively and are operated by means of the pulleys 54 and 55 and the belt connection 53 (Fig. 1). The roller 85 turns clockwise while the roller 86 turns counter-clockwise. Sets of partition shaping plates 88*a* (Fig. 2) serve to guide and curve the corrugated paper sheets P from the upper portion of the machine, where they are stacked, and to guide the partitions above and in register with spaces between the cans C into which spaces the partitions are dropped at the proper time.

The upright shaft 48 is slidably movable within a bearing 89, which is secured by means of the cross-members 90, and the rock arm 60 has at one end a slotted member 91. The upright shaft 48 has a collar 92 with a pin 93, the latter entering the slotted portion 91 of the fulcrum 60.

The corrugated boxes are fed to and in a direction transversely of belt 34 by means of a reciprocating bar 94 (see Fig. 7) having feed pawls 94*x*. The boxes are supported by angle bars 95 and are guided by the arms 96 and 97 which are supplied with a number of spring-like appendages 98, the latter serving to support the corrugated boxes B above the cans C (see Figs. 2 and 4). The containers B are placed over the cans C by means of the flexible fingers 99 which are secured to vertically movable bars 100. The bars 100 are operated in a vertical direction by means of cams 101 and rollers 102 (Fig. 1), and the cams are rotated by a shaft 103 which is operated by the motor M and gear reduction box 35. The upright bars 100 are supported by cross-members 104 and 105, respectively.

Referring more particularly to Figs. 4, 5 and 6, they illustrate the operation of the box delivery assembly which consists in the main of a drive shaft 52 which is driven by means of pulley 51 and belt 50 (see Fig. 1). A cam member 107 is keyed to the shaft 52. The cam 107 has four working surfaces 108, and four cam depressions 109. A roller 110 is secured to a reciprocation plunger 111 which is slidably held within the bearing 112. The plunger 111 extends beyond the bearing 112 and at 113 is secured to a lever 114 that is hingably held at 115. From Fig. 5 it can be seen that the delivery device 106 consists of four portions 116, 117, 118 and 119, each of which consists of a set of holding clamps 120 that are hingeably held at the four hinge portions 121, 122, 123 and 124, respectively. Three links 125, 126 and 127 are attached to the holding clamps 120 in such a manner as to operate all four clamps simultaneously. To facilitate the removal of the cartons from the filling machine the delivery device 106 is supplied with four pairs of pick-up arms, 128, 129, 130 and 131 which are held on a square bushing 131*a*, the latter being keyed to the shaft 52.

Referring to the star-shaped member 49 (Fig. 9), it consists of a plate which has four round shaped cut outs at 133, 134, 135 and 136, and four outwardly extending portions, 137, 138, 139 and 140. The star-shaped member 49 is intermittently rotated by the upright shaft 48 which by means of the pulley 71 and the belt 47 is driven from the Geneva motion box 42.

The Geneva motion box 42 (see Fig. 8) is supplied with a Geneva gear 141 which is keyed to a shaft 142, the latter rotating the pulley 45 which operates the belt 47. The Geneva gear 141 is intermittently rotated by the roller arm 142 which in turn is rotated by the shaft 144 and the large gear 145. The gear 145 is turned by the small spur gear 146 which is keyed to the shaft 147, the latter carrying a cam-shaped member 148. The shaft 147 is secured to a large gear 149 which is enmeshed with a small spur gear 150 which is keyed to the operating shaft 151. The operating shaft 151 is secured to a roller arm 152 which operates a secondary Geneva gear 153 that is fastened to a shaft 154. The secondary Geneva gear 153 operates the belt 50 by means of the shaft 154, and the pulley 46. The belt 50 operates the packing device 106, and the operating shaft 151 is turned by the large pulley 39 and the belt 40 which is operated by the gear box 45 (see Fig. 1).

Referring to the cam 148, it operates a cam arm 155 which has a cam roller 156. The cam arm 155 is under the tension of a spring 157 which is secured between a pin 158 upon the cam arm 155, and a bushing 159 held in the bottom of the Geneva box 42. The cam arm 155 is keyed to a shaft 160 which carries a fulcrum arm 161 located on the outside of the Geneva box. The fulcrum arm 161 operates the bar 59. The operation of the Geneva box will be described hereinafter.

Operation

Referring to Fig. 1, the cans C are delivered to the endless belt 34 of the carton filling machine 20 as from a can filling and closing machine (not shown). The endless belt 34 is driven by means of the pulleys 32 and 33 which are rotated by the

V-belt 36 and the pulley 37, the latter being operated from the gear box 35.

As the cans C enter upon the moving belt 34 they are brought to the gathering table 25 and each is forced, due to the motion of the endless belt 34 and the intermittent motion of the star collector 49 to enter one of the cut-outs thereof. The star collector 49 is secured to the upright shaft 48 which is intermittently rotated by means of the Geneva gear 141 which is contained within the Geneva box 42 (see Fig. 8). The Geneva gear 141 is keyed on the shaft 142 and operates a pulley 45 which rotates the upright shaft 48 through the medium of the belt 47 and a pulley 71 which is secured to the shaft 48. The intermittent motion of the feed belt 34 is timed with the rotation of the star-shaped member 49 in such a manner as to deliver one can at a time for each one-quarter rotation of the member 49. Therefore, it can be seen that for one complete rotation of the star-shaped member 49 four cans can be gathered upon the gathering table 25.

Referring more particularly to Fig. 8, it will be seen that the large gear 149 of the Geneva box 42 is supplied with a cam 148 which operates a cam arm 155. For one complete rotation of the cam 148 the cam arm 155 will, by means of the cam roller 156, swing the arm 161 out and then in and will in turn operate the rod 59. The rod 59 is connected to the rock arm 60 which is swung in such a manner as to raise the star-shaped member 49 every time the cam 148 completes a complete revolution. The gear reduction within the Geneva box 42 is such as to rotate the Geneva gear 141 one revolution for each revolution of the cam 148; therefore, every time the star-shaped member 49 gathers four cans upon the gathering table 25, the member 49 is raised above the cans upon the gathering table and to allow the latter to be moved from their original position upon the gathering table 25, to the packing station.

Preliminary to the movement of the cans from their gathering position to the packing position, a pair of flat corrugated sheets are curved and dropped between every two cans. This operation is being accomplished through operation of the pusher blades, the rotation of the feed rollers 85 and 86 which are rotated in opposite directions by means of the 8-shaped belt 85*a* and the action of the curving or forming plates heretofore described. The rollers 85 and 86 are driven by the pulleys 54 and 55 and the belt 53 which is operated from the gear box 35.

The cans C are moved into the packing station by means of the arm 82 which is pivotally secured to the shaft 79; the arm 82 is operated by means of the link 77 which is secured to the levers 76 and 78.

It will be seen from Fig. 1 that for every operation of the rock arm 60 the star collector 49 will be raised and the pusher 83 will be operated. This operation will move the cans from their original position upon the table 25 to the packing station. When this operation has been completed the arm 82 returns to its original starting position and the star-shaped member 49 is lowered to facilitate further gathering of the cans on the gathering table 25.

Immediately upon the delivery of the cans from the gathering position to the packing station, the foremost corrugated container B, which originally is held suspended over the cans, is lowered through the operation of the vertical rods 100, which are operated through the cams 101 and cam rollers 102. The cams 101 are rotated

by means of the shaft 103 which leads from the gear box 35. The cams 101 are turned one revolution for each packing operation and facilitate the delivery of one container at a time for each four cans that are delivered to the packing station.

After the operation of lowering the corrugated container over the top of the cans C has been completed, the appropriate holding finger 120 of the delivery device 116 descends upon the container B to hold the latter in position while the delivery device rotates 90 degrees. The said appropriate holding finger 120 holds the carton upon the delivery device 116 so that it will not overturn while it is delivered from the packing station to the shipping position of the machine. As the delivery device 116 turns around, the roller 110 will ride over the cam surface 108 of the cam 107 and will operate the holding fingers 120 by means of the fulcrum 114 which is hinged at 115. Further rotation of the delivery device 116 will allow the roller 110 to ride into a depression 109 of the cam 107 and force the holding fingers 120 to return to the original upright position, as shown in Fig. 6. After the container has been turned from its original upside position to the upright position shown in Fig. 6, the belt 34 picks it up and delivers it to the shipping station at the end of the machine, shown in dotted lines.

The description of operation of the delivery device 116 illustrates the manner in which one container is transferred from its packing position to the shipping station. The same operation repeats itself for every new carton delivered to the machine. The delivery of the cans to the machine is fully automatic, likewise the gathering of the cans upon the gathering table, their delivery to the packing position, and from there on to a shipping position.

Having described my invention what I claim as new and desire to secure by Letters Patent is as follows:

1. In a machine for packing cans the combination with a feed for filled cans, of a rotary collector adapted to collect from the feed a plurality of cans in laterally spaced position, means for retracting the collector, means for feeding partition members intermediate the said assembled cans, means for feeding inverted open boxes, means for mutually moving said assembled cans and one of the boxes to enclose the cans therein, and means for inverting the thus filled box, in combination with a swinging pusher member for moving the assembled cans to a box receiving station upon retraction of the collector.

2. In a machine for packing cans the combination with a feed for filled cans, of a rotary collector adapted to collect from the feed a plurality of cans in laterally spaced position, means for retracting the collector, means for feeding partition members intermediate the said assembled cans, means for feeding inverted open boxes, means for mutually moving said assembled cans and one of the boxes to enclose the cans therein, and means for inverting the thus filled box, the box inverting means consisting of a rotary member having a plurality of table-like supports, said member being movable to carry the supports successively to horizontal position thereby forming a box receiving station, and thence movable to and past vertical position to reverse the position of a box thereon, and auto-

matic clamping and releasing members carried by the inverter for the boxes.

3. In a machine for packing cans the combination with a feed for filled cans, of a rotary collector adapted to collect from the feed a plurality of cans in laterally spaced position, means for retracting the collector, means for feeding partition members intermediate the said assembled cans, means for feeding inverted open boxes, means for mutually moving said assembled cans and one of the boxes to enclose the cans therein, and means for inverting the thus filled box, in which the means for feeding inverted boxes consists of a guideway, a reciprocatory pawl device adapted to move the boxes step by step and in which the means for mutually moving the assembled cans and one of the boxes

to enclose the cans therein consists of a box holding clamp device normally held above the assembled cans, and means for actuating the clamp device for lowering the box upon said assembled cans.

THOMAS GORMAN, JR.

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