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B. T. HENSGEN ET AL

2,907,152

METHOD AND MACHINE FOR USE IN PACKAGING OF BACON OR THE LIKE

Filed Dec. 20, 1956

6 Sheets-Sheet 1

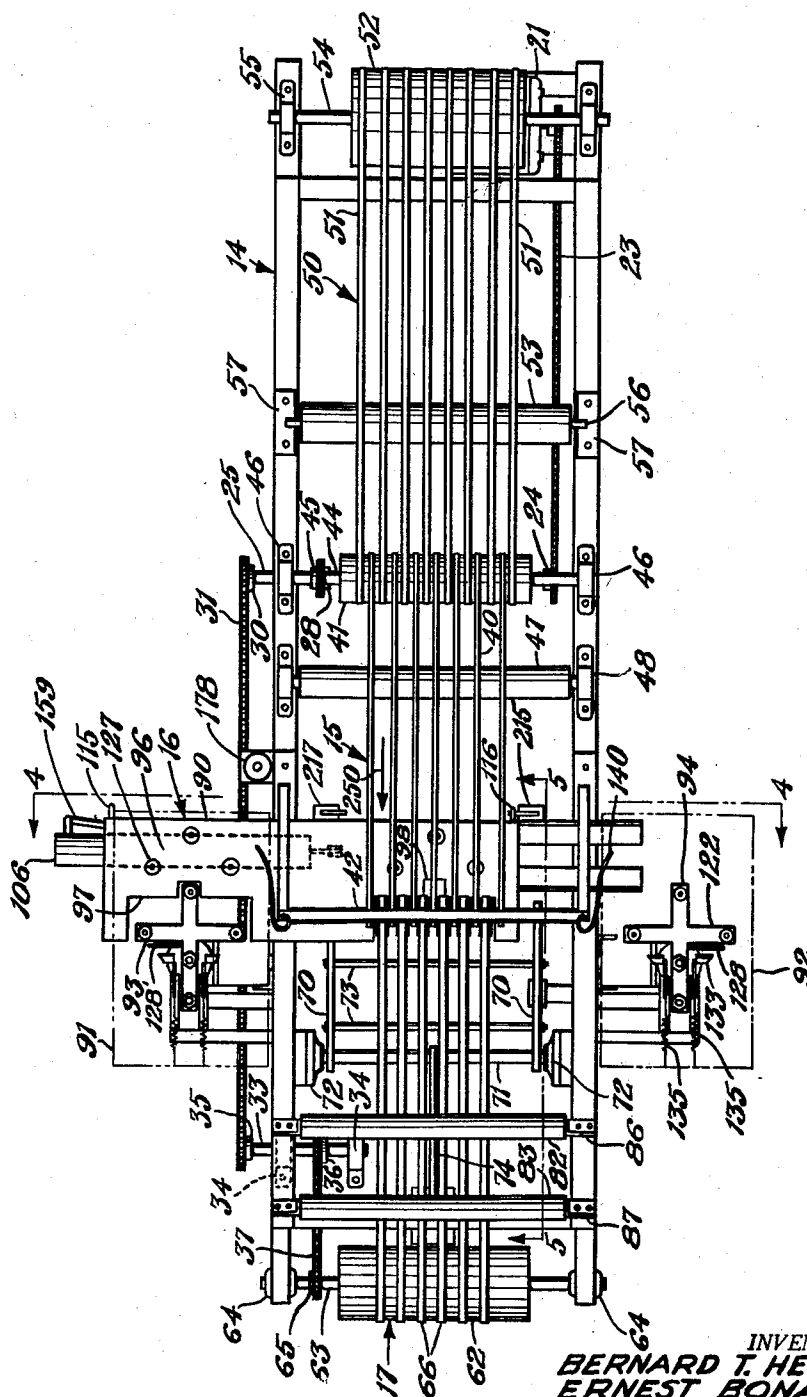


Fig. 1

INVENTORS
 BERNARD T. HENSGEN
 ERNEST BONAMI
 OGDEN A. CLEMENS
 BY *R. G. Story*
 ATTORNEY

Oct. 6, 1959

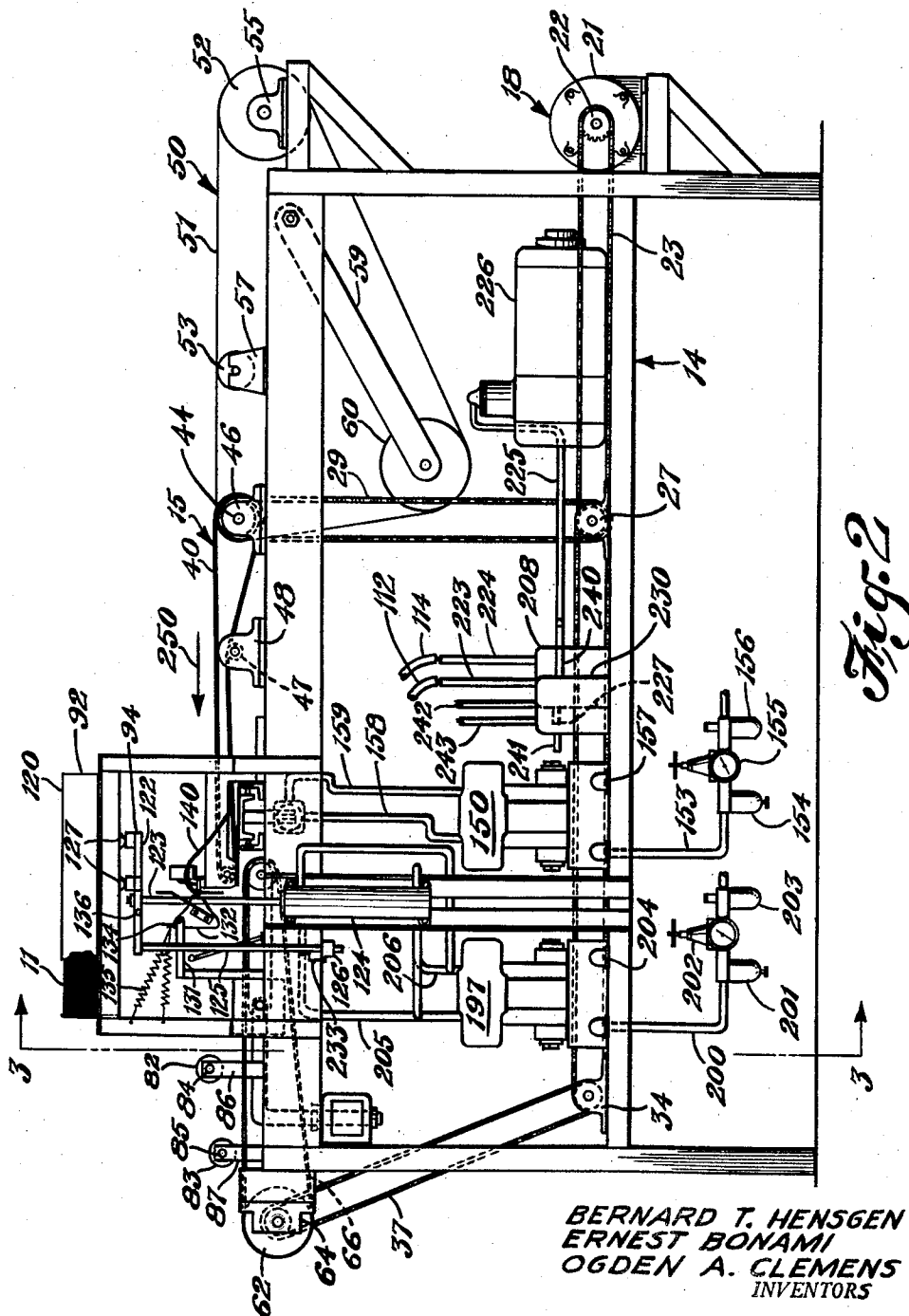
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BY *R. G. Story*

ATTORNEY

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6 Sheets-Sheet 3

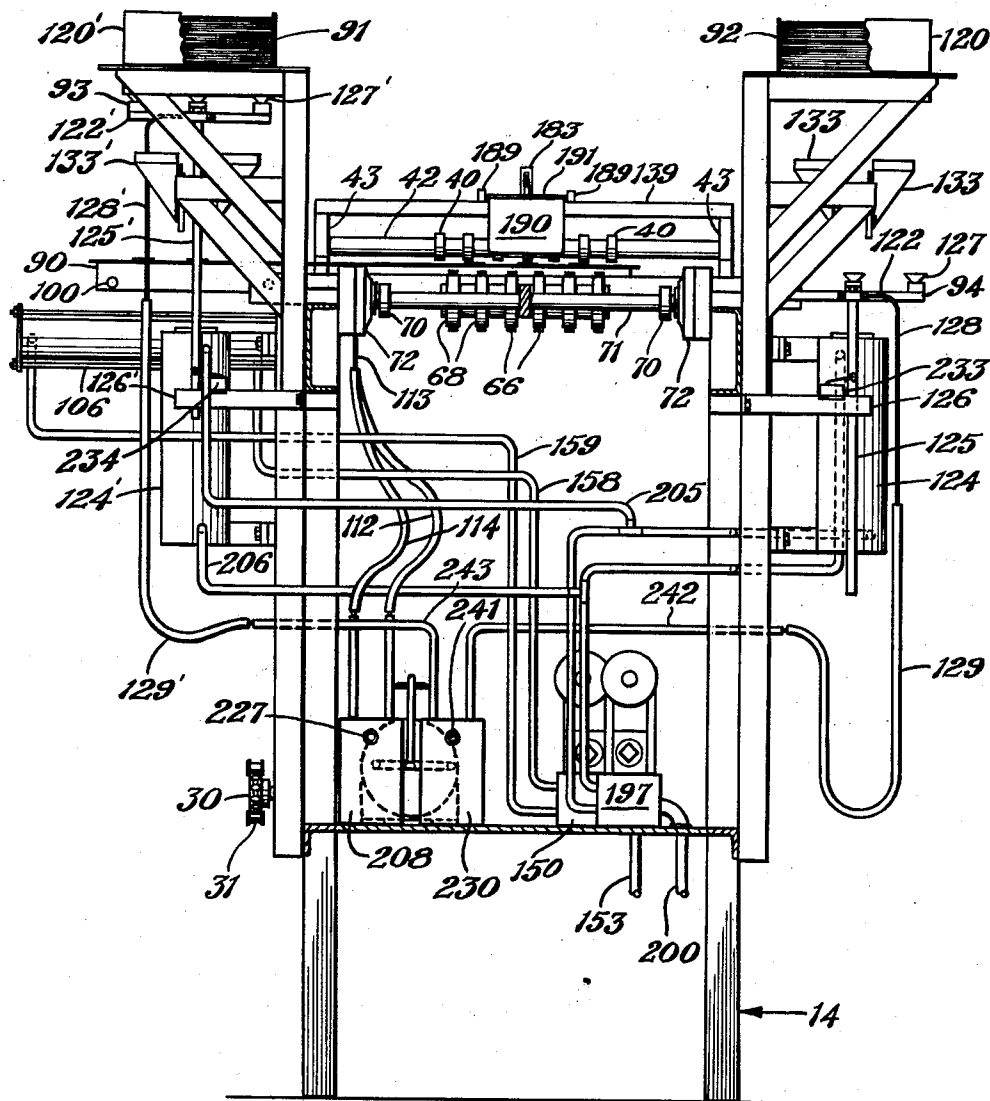


Fig. 3

BERNARD T. HENSGEN
ERNEST BONAMI
OGDEN A. CLEMENS
INVENTORS

BY

R. G. Story
ATTORNEY

Oct. 6, 1959

B. T. HENSGEN ET AL

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6 Sheets-Sheet 4

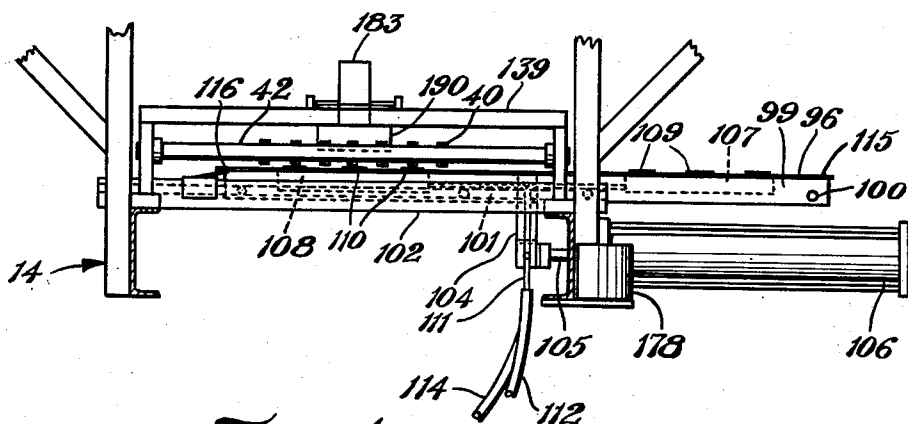


Fig. 4

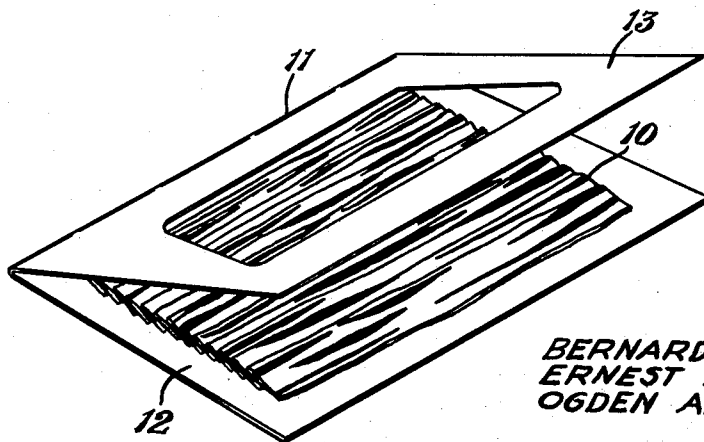


Fig. 8

BERNARD T. HENSGEN
ERNEST BONAMI
OGDEN A. CLEMENS
INVENTORS

BY *R. G. Story*
ATTORNEY

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B. T. HENSGEN ET AL

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6 Sheets-Sheet 5

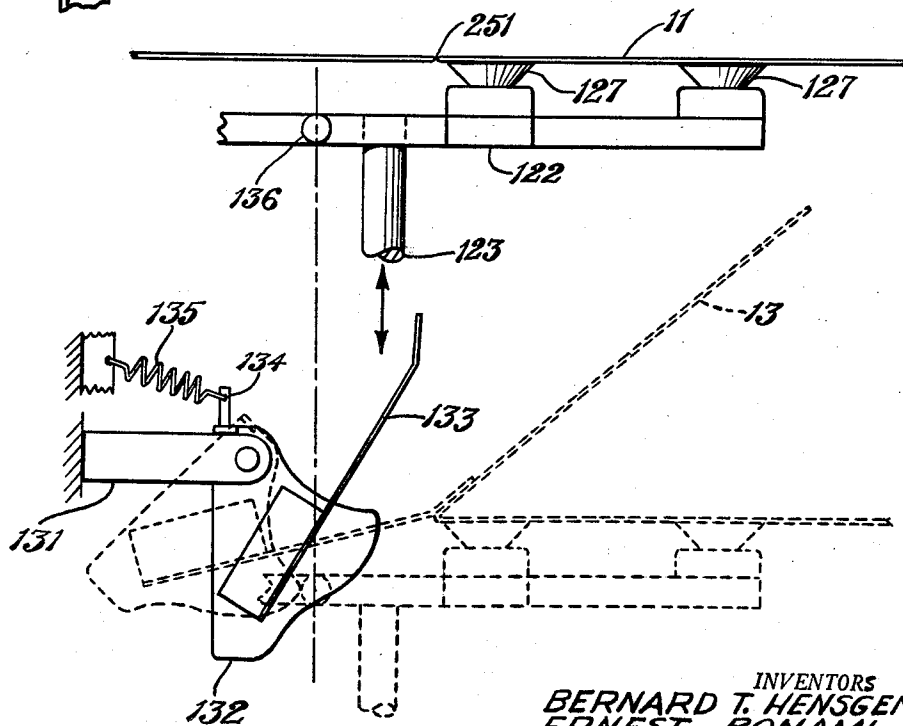
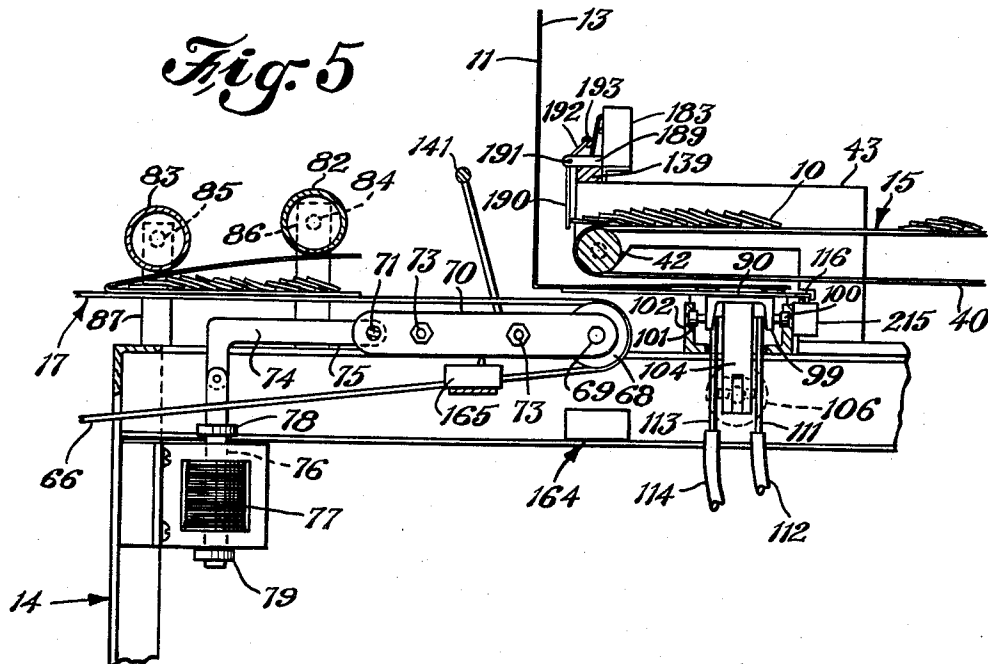


Fig. 6

INVENTORS
 BERNARD T. HENSGEN
 ERNEST BONAMI
 OGDEN A. CLEMENS
 BY *R. L. Story*
 ATTORNEY

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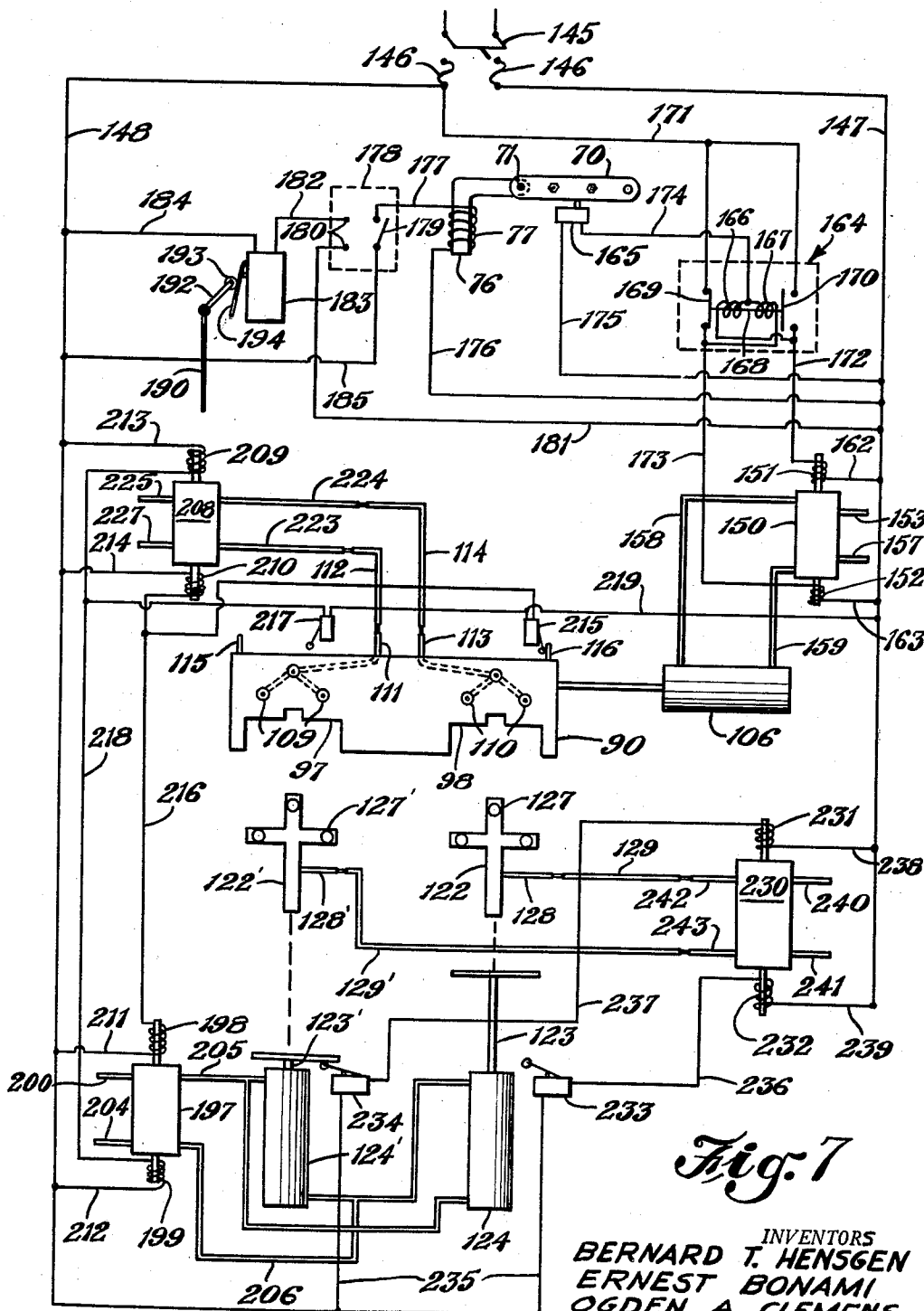


Fig. 7

INVENTORS
 BERNARD T. HENSGEN
 ERNEST BONAMI
 OGDEN A. CLEMENS
 BY *R. E. Story*
 ATTORNEY

1

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**METHOD AND MACHINE FOR USE IN PACK-
AGING OF BACON OR THE LIKE**

Bernard T. Hensgen, Ernest Bonami, and Ogden A. Clemens, Chicago, Ill., assignors to Swift & Company, Chicago, Ill., a corporation of Illinois

Application December 20, 1956, Serial No. 629,531

21 Claims. (Cl. 53—35)

The present invention relates to a method and apparatus for placing units of product on a sheet of cardboard or the like, and is more specifically directed to such a method and apparatus for positioning shingled slices of meat such as bacon on the cardboard dividers used in packaging the meat.

Various types of bacon slicing and shingling machines are in use today. One type of such machine is illustrated and described in United States patent application No. 348,932, filed April 15, 1953, now Patent No. 2,898,722, the disclosure of which is incorporated herein by reference. Many of such devices, as illustrated by the one to which reference has been made, incorporate apparatus for dividing the shingled slices into groups on a conveyor. It is the present practice in the industry to run these groups to packing tables, at which tables sit workers who put the groups onto dividers, weigh the amount of product on the divider, make such corrections as may be necessary in the amount of product as indicated by the weighing step, fold half of the divider down over the product on the remaining half of the divider and pass the product along for wrapping which is done in a sheet of cellophane or the like. The principal object of the present invention is to provide a novel method and an apparatus for taking the shingled groups of bacon and enclosing them in a divider.

The present invention is important because it enables the production of automatic bacon producing apparatus. Existing apparatus is already commercially available for slicing and shingling the bacon into groups on a conveyor. Automatic apparatus for check weighing a series of units is commercially available and machines are available for automatically wrapping dividers of sliced and shingled bacon. The present invention breaches the remaining gap in the automatic flow of bacon from the slicer to the wrapped package.

A further object of the invention is to provide an apparatus of the type described wherein all the timing of the movement of the parts of the apparatus originates with or is tied to the arrival of the unit of product, whether it be a group of slices of bacon or otherwise, at a given point along a conveyor. This is quite advantageous because it eliminates any necessity for having an exact spacing between the units of product (as long as the units are spaced sufficiently far apart to allow for the positioning of a divider as hereinafter described) nor is it necessary that the speed of movement of the feed conveyor be accurately timed so as to time the movement of other parts with respect thereto. In the present invention a unit of product arriving at the end of the feed conveyor initiates a sequence of operations with the steps in the sequence being initiated by the occurrence of the preceding step or steps.

One of the advantages obtained by the method and apparatus we have devised is speed of operation. This is important from the standpoint of not having this particular step in the complete chain of operations acting

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as a bottleneck for the complete chain. By moving the cards on which the product is positioned from opposite sides of the conveyor on which the product is moved rapid operation is obtained. Furthermore, such a procedure facilitates the handling of pre-folded cards.

Other objects and advantages will become apparent from the following description taken in conjunction with the drawings, in which:

Figure 1 is a plan view of an embodiment of the invention with the two magazines for holding the dividers removed;

Figure 2 is a side elevation of the embodiment with a portion of one of the magazines broken away;

Figure 3 is a section taken at line 3—3 of Figure 2;

Figure 4 is a partial section taken at line 4—4 of Figure 1;

Figure 5 is an enlarged partial section taken at line 5—5 of Figure 1;

Figure 6 is an enlarged side view of the means for withdrawing the dividers from the magazine and for pre-folding the dividers;

Figure 7 is a schematic representation of the control apparatus; and

Figure 8 is an isometric view of the shingled group of bacon positioned on a divider with the divider partially folded thereover.

The method of the present invention comprises taking the shingled groups of slices of meat and moving the groups in spaced relationship along a particular path having a particular terminal point. The dividers on which the groups of bacon or meat are to be placed are positioned at the terminal point with one portion of the divider extending rearwardly from the terminal point, that is in the reverse of the direction of movement of the groups, and below the path traveled by the groups. The other portion of the divider extends forwardly of this terminal point and preferably extends upwardly above the level of the path of travel of the groups. As a group approaches the terminal point and commences to move past that point the divider is moved in the same direction at substantially the same rate of speed, with the group being deposited on the divider as each moves along. The forward portion of the divider is then folded back over the group that has been deposited on the divider. As soon as one divider has moved away from the terminal point a new divider is positioned at that point. Preferably this is done by moving the divider along a course transverse to the path of travel of the groups.

Illustrated in Figure 8 is a singled group 10 of slices of bacon positioned on a divider 11. The portion 12 of the divider 11 was the portion that was positioned under the path of travel of the slices and rearwardly of the terminal point of that path. The portion 13 was positioned forwardly of that terminal point and has been bent partially down over the group 10 in the illustration of Figure 8. According to the usual practices the two portions 12 and 13 of the divider 11 will be brought together around their peripheries and then wrapped in cellophane or other suitable packaging material to complete the product for shipment.

An embodiment of the machine for carrying out this method has been illustrated in the drawings. This machine comprises the following general elements mounted on a frame generally 14: a feed conveyor generally 15 for the groups of shingled slices, a card positioning means generally 16 for feeding the dividers into the position outlined in the foregoing description of the method, a take-away conveyor generally 17, power means generally 18 and a control means, the various elements of which are illustrated in Figure 7.

Power means

The power means 18 includes a motor 21 having a sprocket 22 mounted on the output shaft thereof. Sprocket 22 is connected by a chain 23 to a sprocket 24 on a shaft 25. Shaft 25 is mounted in suitable bearings 27 secured to frame 14. Also attached to shaft 25 is a sprocket 28 which drives the feed conveyor 15 through a chain 29, as hereinafter described, and a sprocket 30 driving a chain 31. A jack shaft 33 mounted in bearings 34 carries a pair of sprockets 35 and 36. Sprocket 35 is driven by chain 31, while sprocket 36 drives the take-way conveyor 17 through a chain 37.

Feed conveyor

The feed conveyor 15 comprises a plurality of endless belts 40 passing over a pair of pulleys 41 and 42. Preferably pulley 42 is of a relatively small radius so as to facilitate the proper positioning of the groups of slices of product onto the dividers. Because of the relatively small radius of pulley 42 and in order to insure even traction of the groups of product moving along the conveyor, belts 40 are made of a rubber or similar material. Pulley 42 is journaled in arms 43 (Figure 3) forming a part of frame 14. Pulley 41 is attached to a shaft 44 to which is also attached a sprocket 45. Sprocket 45 is driven from the power means 18 by the chain 29. Shaft 44 is suitably mounted in bearings 46. A roller 47 mounted in bearings 48 has a plurality of slots (not shown) therein into which fit the lower runs of belts 40. Roller 47 serves as a belt tightener and as a guide to hold the belts in alignment on pulleys 41 and 42.

Because of it being more difficult to clean the rubber belts 40 than it is to clean belts of other material, for example stainless steel, these belts are made of relatively short length. The groups of slices are brought to the feed conveyor 15 by another conveyor generally 50 consisting of a plurality of stainless steel belts 51 carried on roller 41, roller 52 and an intermediate supporting roller 53. Roller 52 is mounted on axle 54 journaled in bearings 55. Roller 53 has axles 56 rotatably supported in brackets 57. The drive for belts 51 comes from pulley 41 through sprocket 45 and chain 29. Preferably roller 52 is grooved so as to form guides for the belts 51. A pair of arms 59 pivotally connected to frame 14 rotatably support a roller 60 about which the belts 51 pass and which serves as a tightener for the belts.

Take-away conveyor

The take-away conveyor 17 includes a roller 62 mounted on a shaft 63 supported in bearings 64. A sprocket 65 also attached to shaft 63 is driven by chain 37. A plurality of belts 66 pass about roller 62 and are driven thereby. The other ends of the belts 66 are carried on a plurality of pulleys 68 rotatably mounted on a shaft 69 (Figure 5). Shaft 69 is carried on a pivotable subframe formed by a pair of arms 70 attached to shaft 71 (Figures 1, 3 and 5). Shaft 71 is mounted in bearings 72. A pair of cross bars 73 hold arms 70 rigid. An L-shaped actuating member 74 has an end of one leg 75 thereof attached to shaft 71, while the other leg 76 extends into and forms an armature for a solenoid 77. A pair of stops 78 and 79 on leg 76 serve to limit the motion of the roller 68 as the frame is pivoted with the energizing and de-energizing of solenoid 77.

While not actually a part of the take-away conveyor, immediately thereabove are a pair of rollers 82 and 83 whose axles 84 and 85, respectively, are journaled in brackets 86 and 87, respectively. As is apparent, particularly in Figure 5, roller 83 is at a lesser elevation than is roller 82. The two rollers serve to complete the folding of the upper portion 13 of the divider 11 down over the group 10 of slices as is hereinafter described.

Card positioning means

The card positioning means 16 comprises a transfer

table 90, a pair of magazines 91 and 92, one of which is at each side of the machine, and a pair of feeding means 93 and 94, one at each side of the machine, for removing a divider at a time from the magazines and positioning the dividers on the transfer table. Table 90 includes a top plate 96 having a cutout 97 and 98 adjacent each end thereof. The shape of each cutout is to fit around the pulleys 68 and about an extending portion of the feeding means 93 and 94. Plate 96 is attached to an inverted channel 99 (Figures 4 and 5). Pairs of rollers 100 rotatably attached to channel 99 travel in slots 101 milled in angles 102 forming a part of frame 14. A depending arm 104 secured to channel 99 is attached to the piston rod 105 of an air cylinder 106. Air cylinder 106 is suitably secured to frame 14.

Secured to channel 99 are a pair of vacuum manifolds 107 and 108 each with a hollow interior. The hollow interior of manifold 107 communicates with three vacuum heads 109 and that of manifold 108 communicates with three vacuum heads 110. Each of the group of three vacuum heads 109 and 110, respectively, form a divider engaging means on the transfer table 90. A pipe 111 to which is connected a hose 112 communicates with the hollow interior of vacuum head 107. A corresponding pipe 113 and hose 114 communicates with vacuum manifold 108.

A pair of pins 115 and 116 project from the side of table 90 to actuate a pair of microswitches of the control means as hereinafter described.

The two magazines 91 and 92 are duplicates as are the two feeding means 93 and 94, except for their being on opposite sides of the machine. The feeding means 94 and magazine 92 on the front side of the machine, as seen in Figures 1 and 2, will be described and to the extent that reference is made to the corresponding parts of the magazine 91 and feeding means 93 on the back side of the machine, the same numbers will be applied to the parts except for the use of a prime (') after the numbers.

Magazine 92 is mounted on an upstanding portion of the frame 14 and comprises a holder 120 for the stack of dividers 11. The bottom of the holder is open except for small projecting lips (not shown) preferably only on two sides to support the dividers in the magazine.

Feeding means 94 comprises a cross shaped vacuum manifold 122 secured to the upper end of a piston rod 123 of an air cylinder 124 (see Figures 1, 2 and 3). A rod guide 125 passing through a guide bearing 126 on frame 14 is also secured to manifold 122 to prevent any rotation of the manifold yet to permit its vertical movement. Communicating with the hollow interior of the vacuum manifold are three vacuum cups 127 and a vacuum line 128. A vacuum hose 129 connects to pipe 128.

A bracket 131 forming a part of frame 14 pivotally supports a pair of cam plates 132. Attached to the cam plates are divider folding plates 133. A pin 134 projecting from cam plates 132 is used as a mounting for one end of spring 135. On each side of the machine, elements 131 through 135 are in duplicate, with each of the duplicate pieces being spaced a short distance apart so that the base of vacuum manifold 122 will pass therebetween (see particularly Figure 1). On each side of the vacuum manifold 122 is a projecting pin 136 which moves cam plates 132 between the full line and dotted line positions shown in Figure 6.

A cross member 139 is secured to arms 43 and carries a pair of guides 140. A cross guide 141 which also serves as a preliminary folder is mounted on frame 14 just beyond (in the direction of movement of the product) cross member 139.

Control means

The various units of the control means are illustrated schematically in association with other parts of the machine in Figure 7. The electrical control apparatus is connected to a suitable source of electrical supply through

a main switch 145 and a pair of fuses 146. From these fuses are two main power lines 147 and 148, respectively.

The operation of the air cylinder 106 for the transfer table 90 is controlled by an electrically actuated four-way valve 150 having a pair of actuating solenoids 151 and 152. An air supply pipe 153 from the valve 150 connects to a suitable source of air pressure through a strainer 154, a pressure regulating valve 155 and a lubricator 156 (Figure 2). Pipe 157 is an air exhaust. Pipes 158 and 159 connect valve 150 with cylinder 106.

One side of each of solenoids 151 and 152 is connected to line 147 by wires 162 and 163, respectively, with the other side of the two solenoids being connected to a two-position stepping switch generally 164 which is actuated by the movement of arms 70 through a momentary contact switch 165 (positioned as seen in Figure 5). Various forms of stepping switches 164 might be employed. As a matter of fact, the electrical actuation through switch 165 could well be replaced by a mechanical movement as is well-known in the art. In any event the stepping relay 164 illustrated comprises a pair of solenoids 166 and 167 having a common armature 168 constructed to close either switch 169 or switch 170. One side of each of switches 169 and 170 is connected to line 148 through a wire 171. The opposite side of switch 170 is connected to solenoid 151 and to solenoid 166 by a wire 172. Similarly, the opposite side of switch 169 is connected to solenoid 152 and to solenoid 167 by a wire 173. The opposite side of the two solenoids 166 and 167 are connected to switch 165 by a wire 174 and switch 165 is connected to line 147 by a wire 175.

As previously mentioned the movement of arms 70 is provided by a solenoid 77. One side of this solenoid is connected to line 147 by a wire 176 and the other side of the solenoid is connected by a wire 177 to a time delay relay 178. The time delay relay may be of any well-known type, preferably one providing adjustable periods of time delay such as for example an Agastat time delay relay type I. Such a relay has a switch 179 which is closed immediately upon the energizing of the relay and which opens a predetermined time after the relay was energized no matter what happens in the energizing circuit in the meantime. One of contacts 180 is connected to line 147 by a wire 181 and the other contact 180 is connected by a wire 182 to a snap-action switch 183. The other side of snap-action switch 183 is connected to line 148 by a wire 184. One side of switch 179 is connected to line 148 by a wire 185.

Referring again to Figures 2, 3, and 5, switch 183 is mounted on cross bar 139. Also mounted on cross member 139 are a pair of supports 189 on which a flapper 190 is pivotally supported by a pin 191. Secured to flapper 190 is a finger 192 having a roller 193 rotatably mounted on the end thereof. Roller 193 contacts the actuating member 194 of switch 183.

The air cylinders 124 and 124' are actuated by a four-way air valve 197 operated by a pair of solenoids 198 and 199. A pipe 200 connects valve 197 to a suitable source of air pressure through a strainer 201, a pressure regulating valve 202 and a lubricator 203 (Figure 2). Pipe 204 is the valve exhaust. The two air cylinders 124 and 124' operate in the reverse of each other and therefore one side of four-way valve 197 is connected by a pipe 205 to the upper end of cylinder 124' and the lower end of cylinder 124. Similarly, a pipe 206 connects the lower end of cylinder 124' and the upper end of cylinder 124 to four-way valve 197 (see also Figures 2 and 3).

Four-way air valve 197 is actuated in synchronism with a four-way vacuum valve 208 having a pair of operating solenoids 209 and 210. As will be seen, one side of each of solenoids 198, 199, 209 and 210 is connected to line 148 by wires 211 through 214, respectively. The opposite side of solenoids 198 and 210 are connected together and to a snap-action switch 215 by a wire 216. Similarly, the opposite sides of the two

solenoids 199 and 209 are connected together and to a snap-action switch 217 by a wire 218. Switch 215 is mounted on frame 14 in a position to be contacted by pin 116 on table 90 (see Figure 1) and switch 217 is similarly mounted to be contacted by pin 115. The opposite sides of the two switches 215 and 217 are connected together by a wire 219 which leads to line 147.

Pipe 111 and hose 112 connected to vacuum heads 109 also communicate with valve 208 through a pipe 223. Similarly, vacuum heads 110, pipe 113 and hose 114 are connected to valve 208 by a pipe 224. Pipe 225 connects valve 208 with a suitable source of vacuum such as vacuum pump 226. Pipe 227 is an exhaust pipe.

The application of the vacuum to vacuum heads 127 and 127' is determined by a four-way vacuum valve 230 having operating solenoids 231 and 232 and by snap-action switches 233 and 234. As will be seen in Figures 2 and 3, switches 233 and 234 are positioned to be actuated by manifolds 122 and 122' respectively, as the two manifolds reach the lower end of their vertical stroke. One side of each of the switches 233 and 234 is connected to line 148 by a wire 235. The opposite side of switch 233 is connected to solenoid 232 by a wire 236. Similarly the opposite side of switch 234 is connected to solenoid 231 by a wire 237. Solenoids 231 and 232 are connected to line 147 by wires 238 and 239, respectively. Valve 230 communicates with vacuum pump 226 through a pipe 240. Pipe 241 is an exhaust pipe. Vacuum hose 129 connects to valve 230 by a pipe 242. Similarly hose 129' connects to valve 230 through a pipe 243.

Operation

In commencing the operation of the machine the switch 145 will be closed to energize the control system, vacuum pump 226 will be started, and pipes 153 and 200 will be connected to a suitable source of air pressure to operate the air cylinders. The groups of shingled slices of bacon will move into the card positioner along feed conveyor 15 in the direction indicated by arrow 250. Assume that a divider 11 has been positioned in front of the feed conveyor as shown in Figure 5 (it will be apparent from the following description that this can be done to commence the operations either by manually positioning a card at that point or manually actuating switch 143 several times). Further assume that the transfer table 90 is in the position illustrated in Figure 1. When the table is in this position the piston rod 123 of cylinder 124 should be extended and the piston rod 123' of cylinder 124' should be retracted as illustrated in Figure 7. The retraction of piston rod 123' will have brought a card down from magazine 91, which card will be held by vacuum cups 109 of transfer table 90.

As a group of slices 10 reach the end of the feed conveyor 15, the slices push flapper 190 to actuate switch 183 which energizes relay 178 and closes switch 179. Solenoid 77 is energized through the circuit from line 148, wire 185, switch 179, wire 177, solenoid 77, and wire 176 to line 147. The solenoid 77 pulse armature 76 down pivoting arms 70 in a counterclockwise direction about shaft 71 to raise pulleys 68. The pulleys and their associated belts 66 come up within the cutout 97 in transfer table 90 to contact the bottom surface of the divider and commence moving the divider in the same direction that the bacon was moving. The speed of movement of the divider should be substantially identical with the speed of movement of the group of slices 10 so that the bacon is deposited evenly on the divider.

At the end of the time delay period after relay 178 was energized, switch 179 of that relay opens. This results in a de-energization of the circuit through solenoid 77 previously described, whereupon the weight of arms 70 and the parts associated therewith lower these arms to actuate switch 165. Switch 165 is a momentary contact switch. During this momentary contact a circuit is

created from line 147, wire 175, switch 165, wire 174, solenoid 167, switch 169 and wire 171 to line 148. This energizes solenoid 147 to move armature 168 to the right in Figure 7 to open switch 169 and close switch 170. The closing of switch 170 creates a circuit from line 147 through solenoid 151 of valve 150 by means of wires 172, switch 170, and wire 171 to line 148. Solenoid 151 reverses the position of valve 150 to apply the air pressure to the other end of cylinder 106. The air cylinder 106 thereupon moves table 90 to the opposite end of its stroke where it comes to rest. As it moves to the other end of its stroke it carries with it a new divider 11 from magazine 91 which is held on table 90 by vacuum cups 109. The unoccupied end of table 90 from which the divider has been removed as just described moves under magazine 92.

The movement of table 90 brings pin 115 into contact with switch 217 and closes the switch to produce a circuit from line 147 through solenoid 209 of valve 208 and through solenoid 199 of valve 197. The circuit through solenoid 209, i.e. wire 219, switch 217, wire 218, solenoid 209 and wire 213, repositions valve 208 to cut off the vacuum to vacuum cups 109 through pipe 223 and to exhaust this pipe to atmosphere. At the same time a vacuum is applied to cups 110 through pipe 224. The release of the vacuum on vacuum cups 109 permits the divider that is now positioned at the end of feed conveyor 15 to be moved away with the next subsequent group of slices 10 proceeding along the feed conveyor. The application of vacuum to cups 110 puts these cups in a position to grasp a divider as it is brought from magazine 92 as hereinafter described.

The energizing of solenoid 199 (circuit from line 147 through wire 219, switch 217, wire 218, solenoid 199 and wire 212 to line 148) repositions valve 197 so that air under pressure is now applied through pipe 206 to the upper end of cylinder 124 and to the lower end of cylinder 124'. The vacuum cups 127 on manifold 122 have previously grasped the bottom of a divider in magazine 92. As the manifold 122 moves downwardly with the divider 11, pin 136 strikes the upper surface of cam plates 132 pivoting cam plates 132 clockwise as shown in Figure 6. The movement of the cam plates and the folding plates 133 from the full line to the dotted line position shown in Figure 6 folds the divider into two portions. Preferably the divider 11 has been scored along a line as indicated at 251 in Figure 6 so as to facilitate the folding of the divider. As the manifold 122 reaches its lower position the divider 11 thereon is grasped by vacuum cups 110 on transfer table 90.

Coinciding with the movement of manifold 122 downwardly, manifold 122' moves upwardly. Again referring to Figure 6, the upward movement of manifold 122' brings pins 136' into contact with the lower right-hand surface of cam plates 132' whereupon these cam plates again pivot in a clockwise direction to permit the pins 136' to pass by. When the manifold 122' reaches the upper end of its stroke the vacuum cups 127' are in contact with the lowermost divider in magazine 91.

As manifold 122 reaches the bottom end of its stroke it actuates switch 233 to complete a circuit from line 147 through wire 239, solenoid 232, wire 236, switch 233, and wire 235 to line 148. Solenoid 232 being energized repositions four-way valve 230 to cut off the vacuum to manifold 122 and exhaust that manifold to air, thereby releasing the divider 11 that had been brought into contact with vacuum cups 110 and grasped thereby. At the same time valve 230 applied a vacuum to manifold 122' through pipe 243 so that vacuum cups 127' which are in contact with the bottom divider in magazine 91 will grasp that divider.

In the meantime a new group of slices could have actuated switch 183. In any event when switch 183 is next actuated by a group of slices contacting flapper 190, solenoid 77 is energized. When it is energized,

the take-away conveyor 17 engages the divider positioned at the end of the feed conveyor 15 to withdraw the divider with the group of slices thereon. After the proper time interval during which the bacon has been deposited on the divider, the take-away conveyor comes down to actuate switch 175 and create a momentary circuit through solenoid 166 of stepping switch 164 to again open switch 170 and close switch 169 thereof. The repositioning of the two switches 169 and 170 energizes solenoid 152 and de-energizes solenoid 151 of valve 150 to apply air pressure to the opposite end of air cylinder 106 and move transfer table 90 to the opposite end of its stroke. As it moves to the opposite end of its stroke the vacuum cups 110 carry the divider (which has just been withdrawn from magazine 92 by manifold 122) to the proper position under feed conveyor 15. In doing so, usually the upper portion 13 of the divider, which was bent over as described in connection with Figure 6, has returned to a position more upright than that shown in the dotted line position in Figure 6. However, if the upper portion of the divider remains bent too far it will be straightened up by guides 140. Any excessive bending of the upright portion of the divider in the opposite direction will be corrected by guide 141.

With the repositioning of table 90, switch 217 is opened and switch 215 is closed to produce an electrical circuit through the solenoids 210 and 198 of valves 208 and 197, respectively. Energizing solenoid 210 repositions valve 208 to apply a vacuum to vacuum cups 109 and release the vacuum from vacuum cups 110. Thus the divider that has been moved under the feed conveyor 15 is released to receive product while the vacuum cups under magazine 91 are ready to grasp a new divider when it is moved to them. The repositioning of valve 197 by energizing solenoid 198 applies air pressure through pipe 205 to raise manifold 122 and applies pressure to cylinder 124' to lower manifold 122'. As manifold 122' comes down it draws with it the bottom divider in magazine 91 which had been grasped by vacuum cups 127'. The divider is bent by the folding plates 133' as previously described with respect to Figure 6. Upon reaching the lower end of its stroke manifold 122' actuates switch 234 to produce a circuit through solenoid 231 of valve 230 resulting in the repositioning of valve 230. Valve 230 now releases the vacuum from vacuum cups 127' and applies vacuum to cups 127.

From the foregoing description it will be apparent that the cycle of operations is initiated by the movement of a group of slices 10 along feeding conveyor 15; thus, the problems of timing of the machine with respect to the movement of the groups of slices on the feed conveyor are taken care of. The only requirement is that the groups of slices be sufficiently far apart on the feed conveyor 15 so that a new divider 11 may be moved into position by transfer table 90 after the preceding divider is moved out of the way. The actuations of the other components are all tied in sequence to the initial actuation of switch 183 by flapper 190.

As the dividers 11 with the groups of slices 10 thereon move away from the feed conveyor 15 by the urging of the take-away conveyor 17, the divider is first pushed down by bar 141 with the folding of the upper portion 13 of divider 11 being completed by rollers 82 and 83 (Figure 5).

The foregoing detailed description is only for clearness of understanding and for the purpose of complying with 35 U.S.C. 112, and we do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art. For example, the time delay of relay 178 has been incorporated to insure that one card positioned at the end of feed conveyor 15 is moved out of the way by take-away conveyor 17 before a new

card is moved into position by card positioning means 16. The same result could be achieved by the use of a card sensing means, such as a switch, along take-away conveyor 17 to determine when the card had been moved clear of table 90.

We claim:

1. A device for placing product on cards or the like, said device comprising a conveyor having a conveying surface for moving individual units of product along a path in a given direction to a predetermined point, card positioning means to position one card at a time below said surface at said point, a second conveyor at said point normally ineffective to move said one card from said point, and means connected to said second conveyor to render said second conveyor effective to move said one card from said point in response to a unit of product reaching a given point along said path and connected to said positioning means to move an additional card to said point.

2. A device for placing product on cards or the like, said device comprising a conveyor having a conveying surface for moving individual units of product along a path in a given direction to a predetermined point, card positioning means to position one card at a time below said surface at said point, a second conveyor at said point and movable between a first position at which said second conveyor will not engage said one card and a second position at which it will engage said one card, and means connected to said second conveyor to move it from said first to said second position in response to a unit of product reaching a given point along said path.

3. A device for placing product on cards or the like, said device comprising a conveyor having a conveying surface for moving individual units of product along a path in a given direction to a predetermined point, card positioning means to position one card at a time below said surface at said point, a second conveyor at said point and movable between a first position at which said second conveyor will not engage said one card and a second position at which it will engage said one card, and means connected to said second conveyor to move it from said first to said second position when a unit of product reaches said point and to move it from said second position to said first position a predetermined length of time after said unit of product reaches said point.

4. A device for placing product on cards or the like, said device comprising a conveyor having a conveying surface for moving individual units of product along a path in a given direction to a predetermined point, card positioning means to position one card at a time below said surface at said point by moving cards alternately from opposite sides of said point and positioning them at said point after the card previously positioned at said point has been removed, a second conveyor at said point normally ineffective to move said one card from said point, and means connected to said second conveyor to render said second conveyor effective to move said one card from said point in response to a unit of product reaching a given point along said path and connected to said positioning means subsequently to move an additional card to said point.

5. A device for placing product on cards or the like, said device comprising a conveyor having a conveying surface for moving individual units of product along a path in a given direction to a predetermined point, a transfer table movable between a first position below said surface at said point and the opposite sides of said conveyor, magazine means for said cards, means to remove a card from the magazine means and to place it on the table when the table is moved to each side of said conveyor, a second conveyor at said point, and control means connected to said second conveyor and to said table to cause said second conveyor to engage a card on said table at said first position in response to a

unit of product reaching a given point along said path and to move said table to place another card at said first position.

6. A device for placing product on cards or the like, said device comprising a conveyor having a conveying surface for moving individual units of product along a path in a given direction to a predetermined point, a transfer table having two spaced card engaging means, said table being movable from a position at which one of said engaging means is below said surface at said point with the other engaging means at a side of said conveyor to a second position at which said one engaging means is at the opposite side of said conveyor with the other engaging means below said surface at said point, card magazine means, means to remove a card from said magazine means and move the card to the engaging means projecting from a side of said conveyor, a second conveyor at said point, and control means connected to said second conveyor and to said table to cause said second conveyor to engage a card on said table at said point in response to a unit of product reaching a given point along said path and to move said table from its existing position to the other of its two positions.

7. A device for placing product on cards or the like, said device comprising a conveyor having a conveying surface for moving individual units of product along a path in a given direction to a predetermined point, a transfer table having two spaced card engaging means, said table being movable from a position at which one of said engaging means is below said surface at said point with the other engaging means at a side of said conveyor to a second position at which said one engaging means is at the opposite side of said conveyor with the other engaging means below said surface at said point, a card magazine at each side of said table, feeding means at each side of said table to move a card from the magazine at each side to the engaging means at that side, a second conveyor at said point, and control means connected to said second conveyor and to said table to cause said second conveyor to engage a card at said point in response to a unit of product reaching a given point along said path, to move said table from its existing position to the other of its two positions, and to actuate the card engaging means to remove a card from the magazine at the side of the first conveyor at which side an engaging means projects and moves said removed card to the projecting engaging means.

8. A device for placing product on cards or the like, said device comprising a conveyor having a conveying surface for moving individual units of product along a path in a given direction to a predetermined point, a transfer table movable between a first position below said surface at said point and the opposite sides of said conveyor, magazine means for said cards, means to remove a card from the magazine means and to place it on the table when the table is moved to each side of said conveyor, a second conveyor at said point and movable between a first position at which said second conveyor will not engage said one card and a second position at which it will engage said one card, and control means connected to said second conveyor and to said table to move said second conveyor from said first to said second position of the second conveyor to engage a card on said table at said first position of the table in response to a unit of product reaching a given point along said path and to move said table to place another card at said first position of the table.

9. A device for placing product on cards or the like, said device comprising a conveyor having a conveying surface for moving individual units of product along a path in a given direction to a predetermined point, a transfer table having two spaced card engaging means, said table being movable from a position at which one of said engaging means is below said surface at said point with the other engaging means at a side of said conveyor

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to a second position at which said one engaging means is at the opposite side of said conveyor with the other engaging means below said surface at said point, card magazine means, means to remove a card from said magazine means and move the card to the engaging means projecting from a side of said conveyor, a second conveyor at said point having a conveying surface movable between a first position at which said surface is below a card on said table with said surface free of said card to a second, higher position at which said surface of said second conveyor engages said card, and control means connected to said second conveyor and to said table to raise said surface of said second conveyor from said first to said second position to cause said second conveyor to engage a card on said table at said point in response to a unit of product reaching a given point along said path and to move said table from its existing position to the other of its two positions.

10. A device for placing product on cards or the like, said device comprising a first conveyor having a conveying surface ending at a given point for moving units of product in a given direction across said point, card positioning means to place a card, at least partially folded into two portions, with one of said portions below said surface with the fold immediately adjacent said point and said one portion extending in the reverse of said direction from said fold and with the other portion extending upwardly from said fold across the end of said surface, a second conveyor at said point normally ineffective to move said one card from said point, and means connected to said second conveyor to render said second conveyor effective to move said one card from said point in response to a unit of product reaching a given point along said path and connected to said positioning means to move an additional card to said point.

11. A device for placing product on cards or the like, said device comprising a first conveyor having a conveying surface ending at a given point for moving units of product in a given direction across said point, a magazine for holding the cards, means to remove one card at a time from said magazine and to fold said one card into two portions, card positioning means to place said folded one card with one of said portions below said surface with the fold immediately adjacent said point and said one portion extending in the reverse of said direction from said fold and with the other portion extending upwardly from said fold across the end of said surface, a second conveyor at said point normally ineffective to move said one card from said point, and means connected to said second conveyor to render said second conveyor effective to move said one card from said point in response to a unit of product reaching a given point along said path and connected to said positioning means to move an additional card to said point.

12. A device for placing product on cards or the like, said device comprising a first conveyor having a conveying surface ending at a given point for moving units of product in a given direction across said point, a transfer table movable between a first position below said surface at said point and the opposite sides of said conveyor, magazine means to hold the flat cards, means to remove one card at a time from magazine means and to fold said one card into two portions and to place it on the table when the table is moved to each side of said conveyor with the card in a position such that when the portion of the table carrying said one card is moved to said first position said card will be positioned with one of said portions below said surface with the fold immediately adjacent said point and said one portion extending in the reverse of said direction from said fold and with the other portion extending upwardly from said fold across the end of said surface, a second conveyor at said point, and control means connected to said second conveyor and to said table to cause said second conveyor to engage a card on said table at said first position in

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response to a unit of product reaching a given point along said path and to move said table to place another card at said first position.

13. A device for placing shingled groups of slices of meat onto a cardboard divider or the like, said device comprising an endless conveyor mounted on a plurality of pulleys forming a generally horizontal run terminating at one of said pulleys toward which the groups move along said run in a given first direction, a transfer table positioned below said one pulley and having divider engaging means to hold a divider on said table at two places on said table spaced across said table in a direction transverse to said run, said table being mounted for movement from a first position at which one place is below said run with the other place at a side of said run to a second position at which said one place is at the opposite side of said run and said other place is below said run, divider feeding means to place a divider on each place when each place is at a side of said conveyor with a portion of said card extending in the first direction a distance beyond the extent of said run in said direction whereby as said divider is moved under said run said portion of said divider will be beyond said one pulley in said direction, and means to withdraw the divider from the place positioned under said run as a group is deposited thereon from said conveyor.

14. A device for placing shingled groups of slices of meat onto a cardboard divider or the like, said device comprising an endless conveyor mounted on a plurality of pulleys forming a generally horizontal run terminating at one of said pulleys toward which the groups move along said run in a given first direction, a transfer table positioned below said one pulley and having divider engaging means to hold a divider on said table at two places on said table spaced across said table in a direction transverse to said run, said table being mounted for movement from a first position at which one place is below said run with the other place at a side of said run to a second position at which said one place is at the opposite side of said run and said other place is below said run, magazine means to hold said dividers, divider feeding means to withdraw a divider from said magazine means, bend the divider into two portions, and place the divider on each place when each place is at a side of said conveyor with one of said portions being generally horizontal and the other of said portions extending upwardly in a position such that when that place is moved under said run said other portion will be beyond said one pulley in said direction, and means to withdraw the divider from the place positioned under said run as a group is deposited thereon from said conveyor.

15. A device for placing shingled groups of slices of meat onto a cardboard divider or the like, said device comprising an endless conveyor mounted on a plurality of pulleys forming a generally horizontal run terminating at one of said pulleys toward which the groups move along said run in a given first direction at a given rate of speed, a transfer table positioned below said one pulley and having divider engaging means to hold a divider on said table at two places on said table spaced across said table in a direction transverse to said run, said table being mounted for movement from a first position at which one place is below said run with the other place at a side of said run to a second position at which said one place is at the opposite side of said run and said other place is below said run, magazine means to hold said dividers, divider feeding means to withdraw a divider from said magazine means, bend the divider into two portions, and place the divider on each place when each place is at a side of said conveyor with one of said portions being generally horizontal and the other of said portions extending upwardly in a position such that when that place is moved under said run said other portion will be beyond said one pulley in said direction, a second endless conveyor having a generally horizontal run along which

dividers may be moved in said first direction at substantially said rate of speed with the initial portion of said run being below the location of a divider on said table when said one portion of said divider is under said first mentioned run, said second conveyor being movable from a position at which the run thereof is out of contact with said one portion of a divider so positioned to a second position at which the run thereof is in contact with said one portion of a divider so positioned, and means to move said second conveyor from said first to said second position in response to a group reaching a given point along the first conveyor.

16. The method of placing shingled groups of slices of meat into a cardboard divider including the steps of moving spaced groups in a given direction at a given rate of speed toward a given point along a path, sequentially positioning a divider at said point with a portion of the divider so positioned being below said path and extending in the reverse of said direction from said point and another portion of said divider inclined at least slightly upwardly with respect to said first portion and extending beyond said point in said direction, moving said divider so positioned in said direction after said group reaches said point at substantially the same rate of speed as said given rate, positioning each succeeding divider at said point upon the removal of the preceding divider so positioned and before the succeeding group reaches said point, and folding said other portion of each divider over the top of the group on said each divider.

17. The method of placing shingled groups of slices of meat into a cardboard divider including the steps of moving spaced groups in a given direction at a given rate of speed toward a given point along a path, bending said dividers into two portions, sequentially positioning a bent divider at said point with a portion of the divider so positioned being below said path and extending in the reverse of said direction from said point and the other portion of said divider extending beyond said point in an upwardly direction, moving said divider so positioned in said direction after said group reaches said point at substantially the same rate of speed as said given rate, positioning the succeeding divider at said point upon the removal of the preceding divider so positioned and before the succeeding group reaches said point, and folding said other portion of each divider over the top of the group on said each divider.

18. The method of placing shingled groups of slices of meat into a cardboard divider including the steps of moving spaced groups in a given direction at a given rate of speed toward a given point along a path, bending said dividers into two portions, sequentially moving dividers from opposite sides of said path with one portion of said divider below said path and the other portion of said divider extending upwardly above the level of said path beyond said point in said direction after the removal of the preceding divider from the next following described position, and sequentially positioning each divider moved from opposite sides of said path at said point with a portion of the divider so positioned being below said path and extending in the reverse of said direction from said point and the other portion of said divider extending beyond said point in an upwardly direction, moving said divider so positioned in said direction after said group reaches said point at substantially the same rate of speed as said given rate.

19. The method of enfolding a shingled group of slices of meat in a sheet of divider material including the steps of moving spaced groups in a given direction at a given rate of speed toward a given point along a path, sequentially moving successive sheets of divider material from opposite sides of said path to beneath said point with a first portion of each sheet below said path and a second portion of said sheet extending generally upwardly with respect to said first portion and forwardly of said point in said direction, moving said divider in said direction as a group passes said point at substantially the same rate of speed as said given rate whereby the shingled group is received upon said first portion of the sheet, and folding the second portion of said sheet over the top of the group while advancing said sheet.

20. A device for placing product on cards or the like, said device comprising a first conveyor having a conveyor surface ending at a given point for moving units of product in a given direction across said point, card positioning means to place a card, at least partially folded into two portions, with one of said portions below said surface with the fold immediately adjacent said point and said one portion extending in the reverse of said direction from said fold and with the other portion extending upwardly from said fold across the end of said surface, a second conveyor at said point normally ineffective to move said one card from said point, means connected to said second conveyor to render said second conveyor effective to move said one card from said point in response to a unit of product reaching a given point along said path and connected to said positioning means to move an additional card to said point, and bending means spaced from said point in said direction along said second conveyor to fold said other portion of the card over said product.

21. A device for placing product on cards or the like, said device comprising a first conveyor having a conveyor surface ending at a given point for moving units of product in a given direction across said point, a transfer table movable between a first position below said surface at said point and the opposite sides of said conveyor, magazine means to hold the flat cards, means to remove one card at a time from magazine means and to fold said one card into two portions and to place it on the table when the table is moved to each side of said conveyor with the card in a position such that when the portion of the table carrying said one card is moved to said first position said card will be positioned to one of said portions below said surface with the fold immediately adjacent said point and said one portion extending in the reverse of said direction from said fold with the other portion extending upwardly from said fold across the end of said surface, a second conveyor at said point, control means connected to said second conveyor and to said table to cause said second conveyor to engage a card on said table at said first position in response to a unit of product reaching a given point along said path and to move said table to place another card at said first position, and bending means along said second conveyor beyond said table in said direction to fold said other portion of the card over the product.

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