March 17, 1931. J. T. GORDON 1,797,191

CARTON SEALING MACHINE

Filed Dec. 29, 1926 9 Sheets-Sheet 1

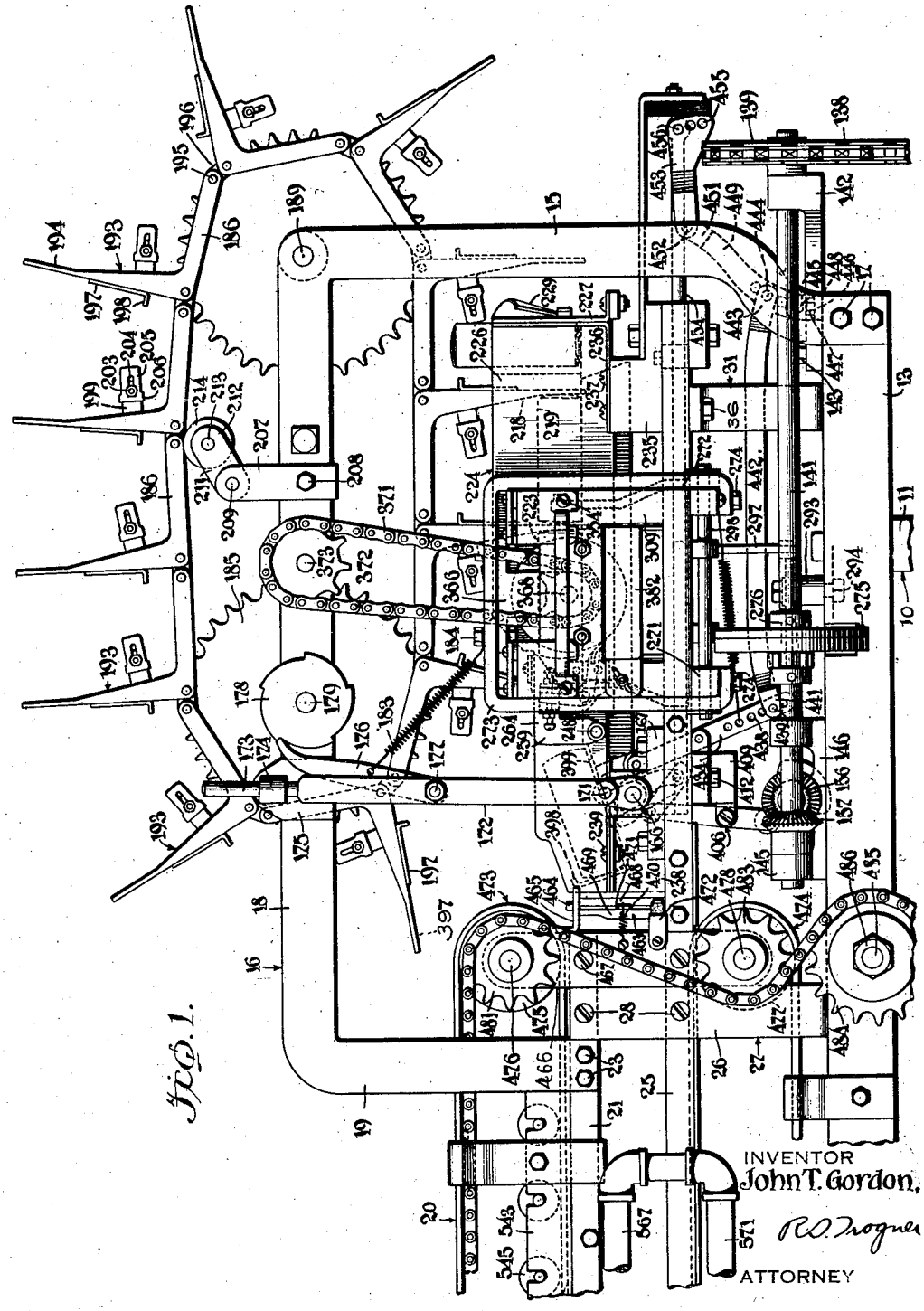


Fig. 1.

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CARTON SEALING MACHINE

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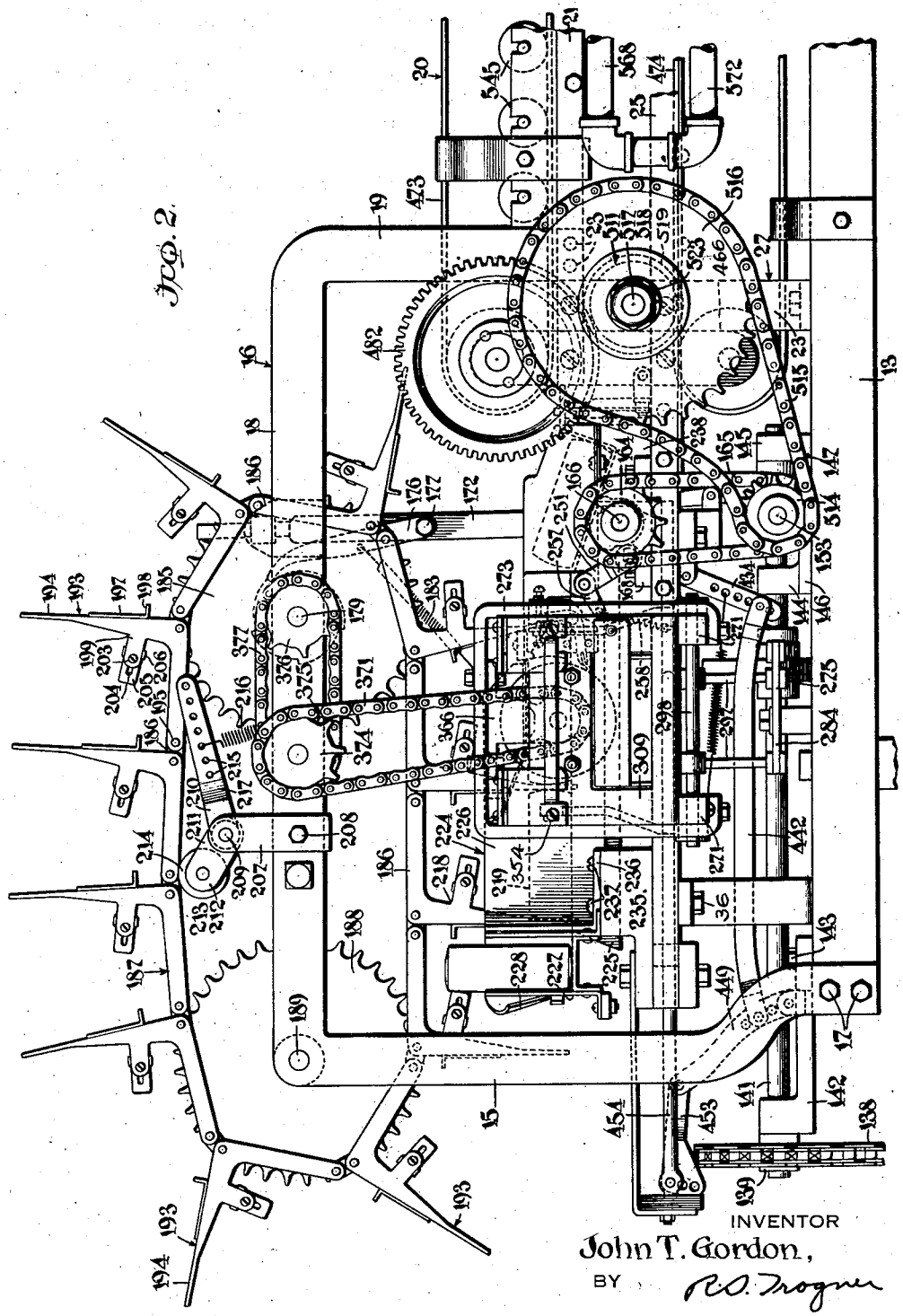


Fig. 2.

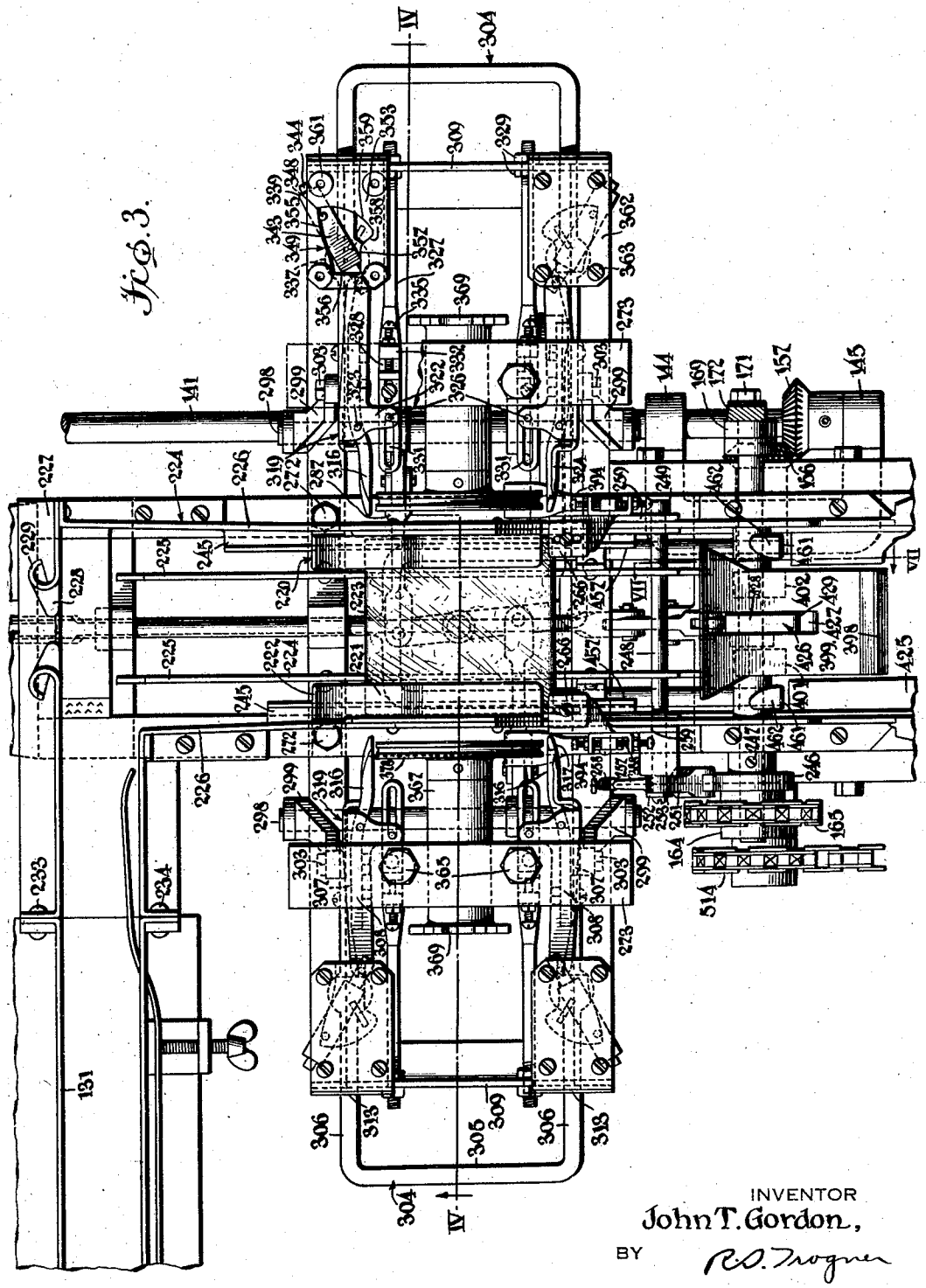
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CARTON SEALING MACHINE

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Fig. 3.



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CARTON SEALING MACHINE

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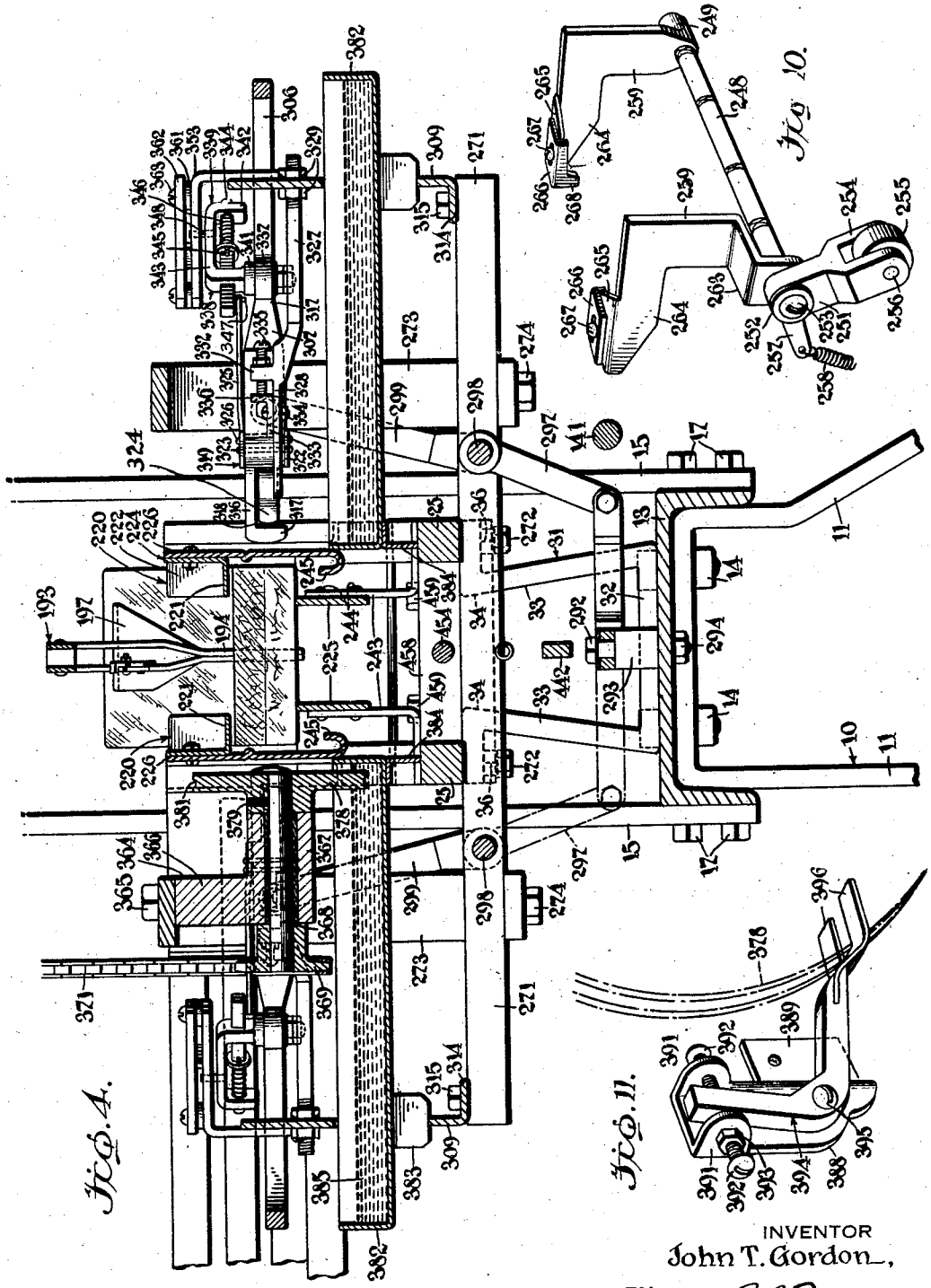


Fig. 4.

Fig. 10.

Fig. 11.

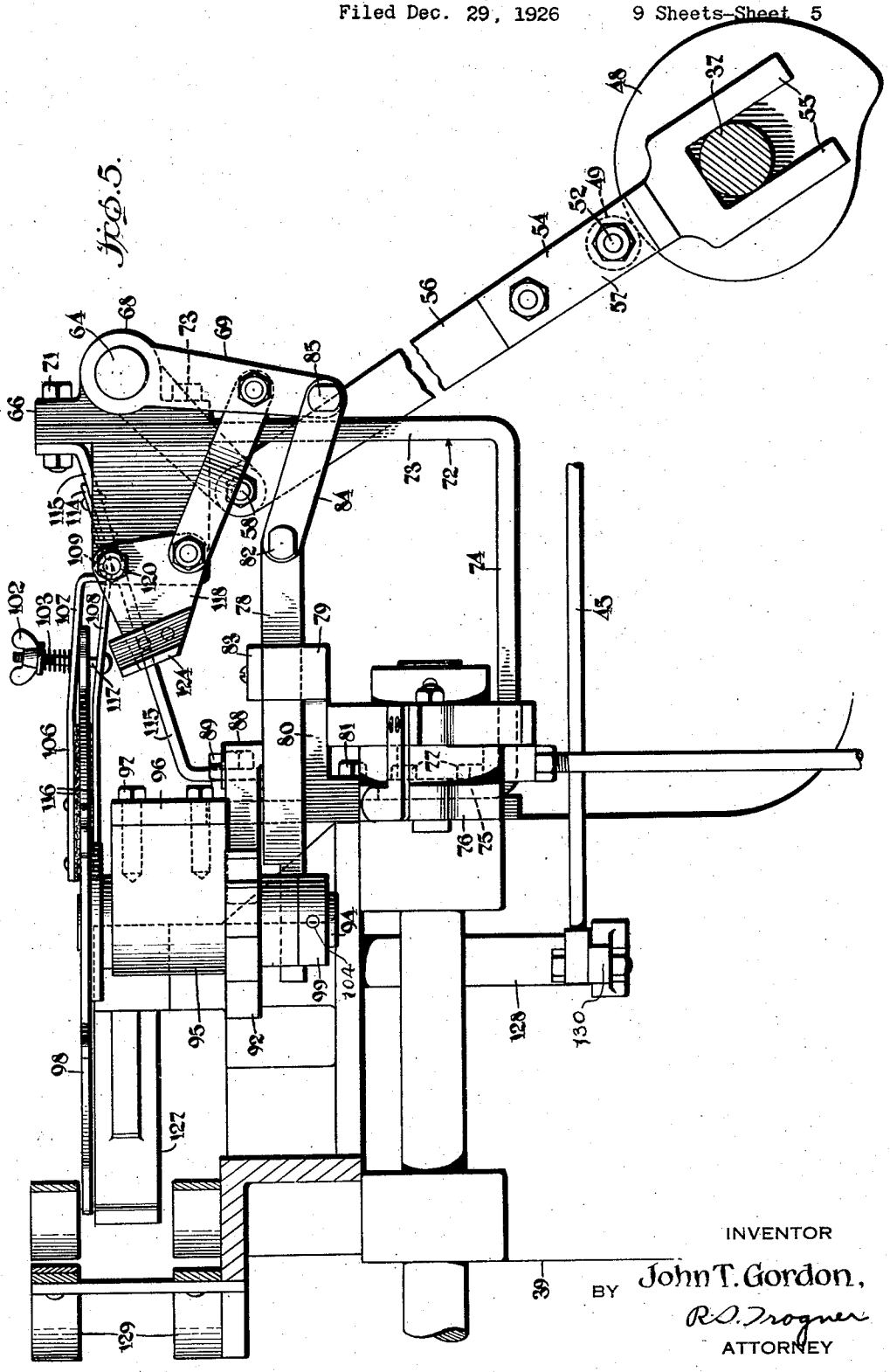
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Fig. 5.



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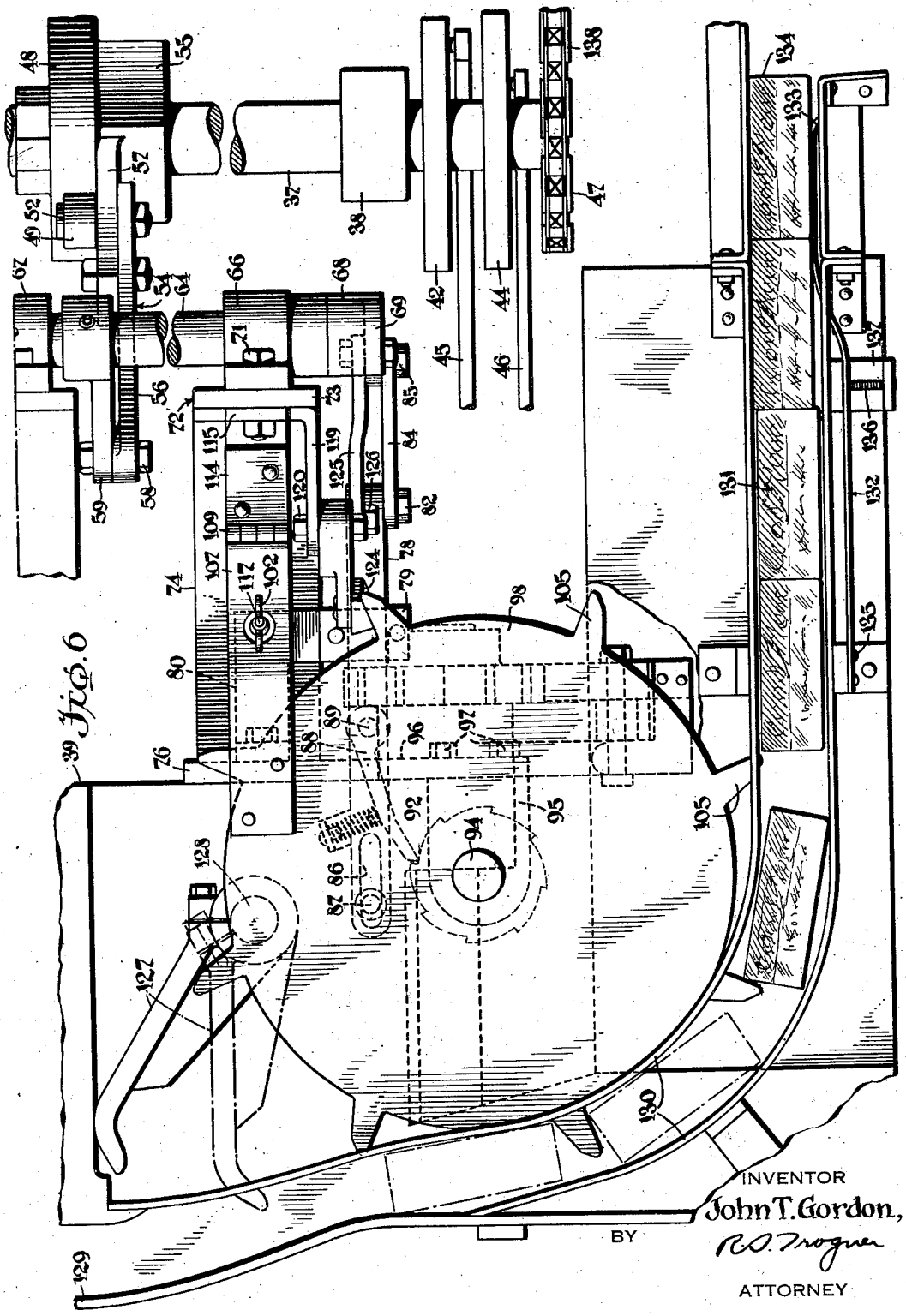


Fig. 6

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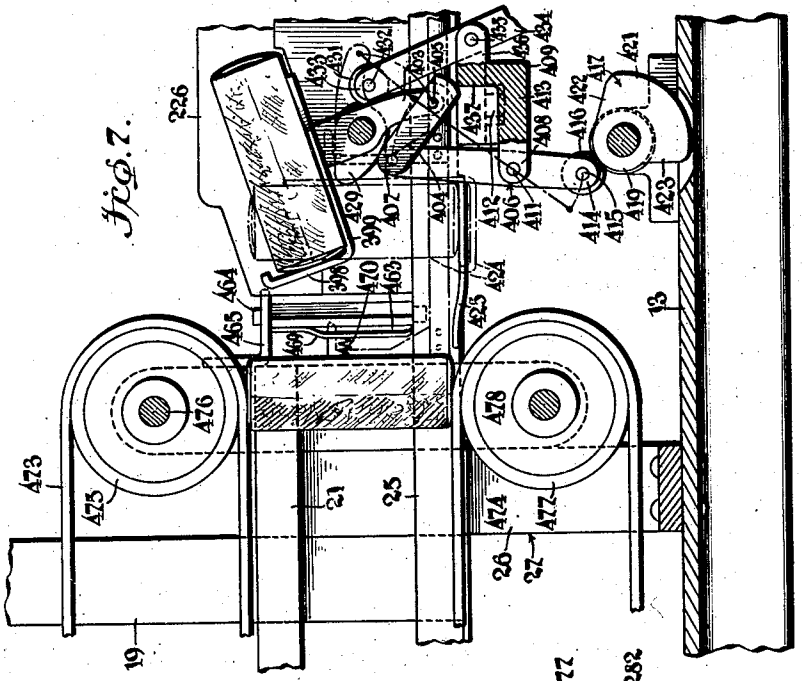


Fig. 7.

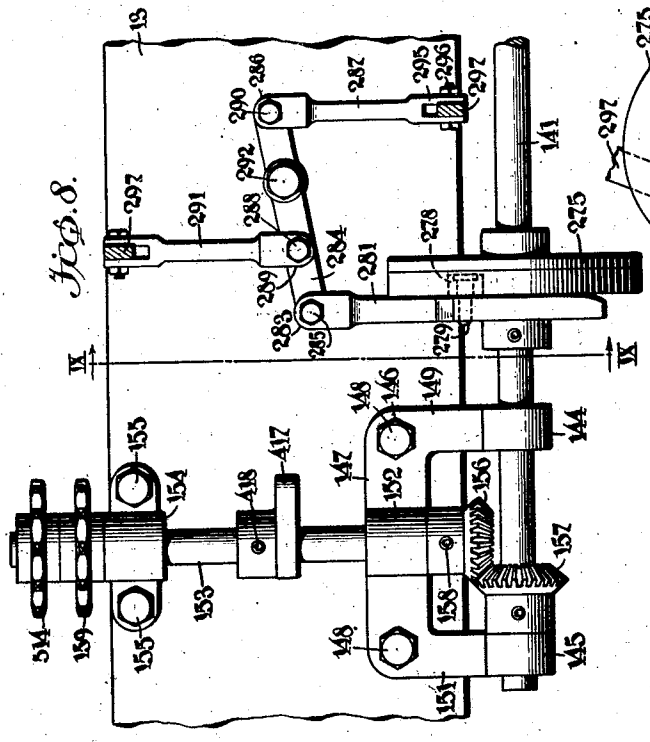


Fig. 8.

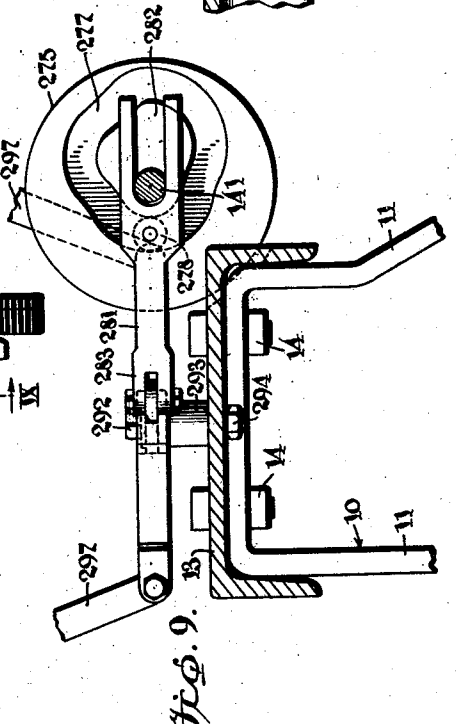


Fig. 9.

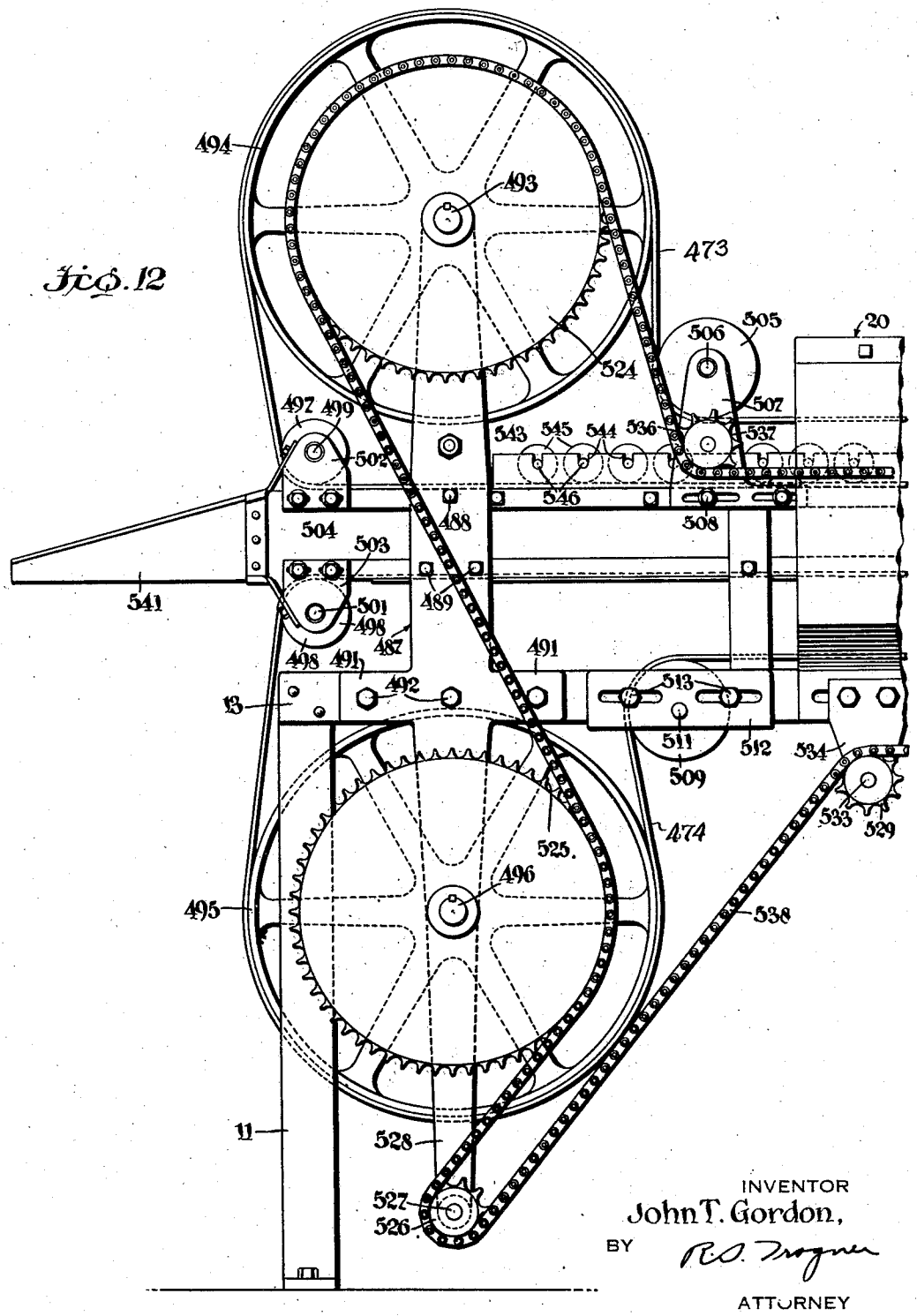
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Fig. 12



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Fig. 15.

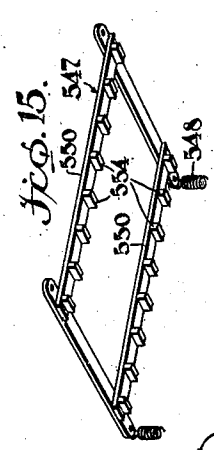
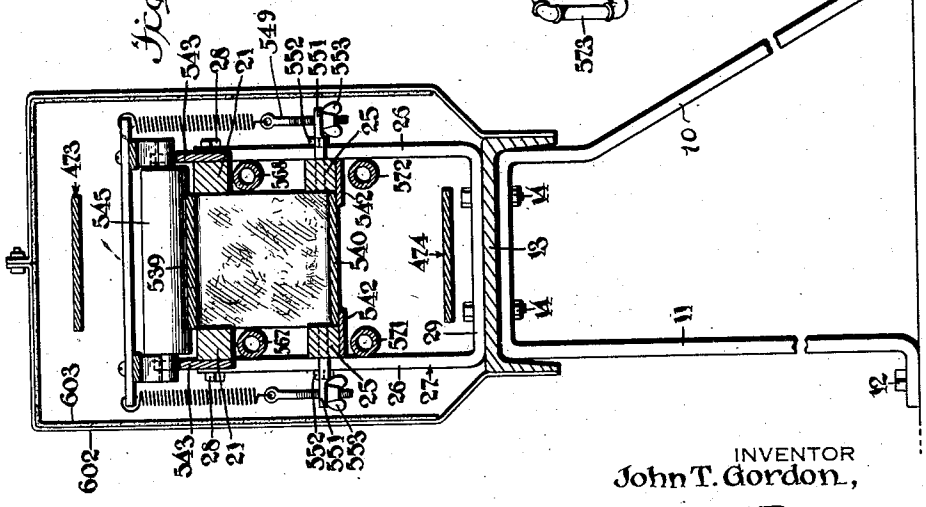


Fig. 14.

Fig. 13.



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UNITED STATES PATENT OFFICE

JOHN T. GORDON, OF AKRON, OHIO, ASSIGNOR TO THE GOODYEAR TIRE & RUBBER COMPANY, OF AKRON, OHIO, A CORPORATION OF OHIO

CARTON-SEALING MACHINE

Application filed December 29, 1926. Serial No. 157,696.

My invention relates generally to machines which are adapted to prepare manufactured articles for shipment, and it has particular relation to machines of the above designated character which shall be especially adapted for sealing cartons in which the articles have already been placed.

More specifically, my invention relates to a machine for automatically sealing relatively small cartons of the type having end closing members consisting of two relatively short edge flaps and a single relatively long two part hinged side flap.

One object of my invention is to provide a novel type of machine which is adapted to receive and seal cartons in which articles have been placed by machines operating in conjunction therewith.

Another object of my invention is to provide a type of machine which lends itself to positive operations on the carton and to the accurate timing of its several operations to properly coordinate its operations with those of cooperating machines.

A further object of my invention is to provide a machine which will occupy a minimum of space, will eliminate all manual operations and will close and seal cartons of the character indicated in a minimum length of time.

A previously known method of preparing articles for shipment consists of packing the article units, which may include any number of separate elements, into individual cartons by means of an automatic carton packing machine. This machine assembles and packs the cartons at a relatively high rate of speed, after which a number of cartons so assembled and packed are placed manually in a larger shipping carton for the purpose of transportation and distribution. The ends of the individual cartons assembled by this machine are each closed by means of a relatively long integral two part creased or hinged flap projecting from one side of the carton which is folded over a pair of shorter flaps projecting from sides adjacent thereto and with the end thereof extending within the carton adjacent the side opposite from that to which it is attached. Small articles have been packed and shipped in this type of carton for a great number of years, but, as the free end of the carton closing flap, if not sealed, becomes easily dislodged from its totally closed position, it occasionally happens that some or all of the articles contained therein are lost, particularly if those articles are small compared to the size of the carton.

However, a great amount of labor and floor space is required in the process of sealing the cartons manually, which my invention is designed to minimize.

The particular type of carton which is illustrated in connection with the specific embodiment of my invention disclosed by this application may be constructed from paper board or other suitable flexible sheet material and comprises four interconnected sides with suitable flaps extending from the ends of certain of the sides for closing the open end thereof. Two of the opposite parallel sides of the carton may be narrower than the remaining two, if the carton is of rectangular cross-section, and relatively short flaps are adapted to extend from each end of each of these sides. Two other flaps, which are substantially longer than the width of the sides having the short flaps, extend from opposite ends of each of the remaining sides and each of these flaps is adapted to fold over two of the short flaps and the hinged end portions thereof are adapted to extend into the carton adjacent the side thereof opposite that to which it is attached. However, my machine is not limited in its application to cartons of this exact construction, but may be readily adapted to operate upon any other type of carton.

My invention comprises an apparatus which is adapted to receive cartons from a conveyor of another machine, or it may be operated independently, the cartons being supplied to the ingress guideway of the machine by any suitable means, either manually or automatically. When supplied to the machine, the cartons are arranged in alignment within a guideway with the ends to be sealed by the machine abutting the respective ends of other adjacent cartons. An appropriate feeding mechanism intermittently moves additional cartons into the guideway,

and as a result thereof, the carton at the opposite end is forced from the guideway into a second guideway disposed at right angles to the first.

The cartons are intermittently moved forwardly within the second guideway into a position adjacent a stop mechanism and a plurality of fingers intermittently reciprocating in a direction transverse to the previous motion of the carton extend between the closed flaps of adjacent sides of the carton and deposit a quantity of sealing liquid therebetween. When the stop mechanism releases the carton, it is moved to a position between a pair of movable conveyor belts, which travel at the same speed in the same direction and which are adapted to exert a pressure upon the sealed flap portions of the carton as it is carried along thereby through a heated drying chamber.

When the cartons emerge from the heating chamber, the sealing liquid upon the flaps thereof will have become hardened and the flaps thereafter will be securely maintained in a closed position, after which the cartons may be packed by any suitable method, into larger packing cases adapted for shipment.

For a better understanding of my invention, reference may now be had to the accompanying drawings, in which:

Fig. 1 is a side elevational view of a portion of the machine disclosed by this specification which illustrates one embodiment of my invention;

Fig. 2 is also a side elevational view of a portion of my machine, the view being taken from the side opposite to that shown by Fig. 1;

Fig. 3 is a plan view of the machine illustrated in Figs. 1 and 2, certain portions thereof being omitted for the sake of clearness;

Fig. 4 is a cross-sectional view of my machine, the section being taken along the lines IV—IV of Fig. 3;

Fig. 5 is a view, partially in elevation and partially in cross-section, of the driving and feeding mechanism of my machine, showing a portion of a machine adapted to pack and assemble the cartons, which may be operatively associated with my machine, if desired.

Fig. 6 is a plan view of the mechanism illustrated by Fig. 5;

Fig. 7 is a detail view, partially in elevation and partially in cross-section, of a portion of the carton handling mechanism of my machine, the view being taken substantially along the line VII—VII of Fig. 3;

Fig. 8 is an elevational view illustrating a portion of the machine operating mechanism actuated by a driving shaft thereof;

Fig. 9 is a view partially in elevation and partially in section taken substantially along the line IX—IX of Fig. 8;

Fig. 10 is a perspective view of the mechanism employed to stop and maintain the cartons in a fixed position while the gluing operation is being performed;

Fig. 11 is a perspective view of a mechanism adapted to cooperate with a glue dispensing apparatus to insure a uniform rate of feed of glue to the glue distributing mechanism;

Fig. 12 is a side elevational view of the end of the conveyor opposite to that illustrated in part by Figs. 1 and 2, showing the driving mechanism for the conveyor belts, and also illustrating in part the sealing liquid drier which is associated therewith;

Fig. 13 is a cross-sectional view of the drying chamber constituting a portion of my machine;

Fig. 14 is an isometric view of the steam heating system which is employed to heat the drying chamber; and,

Fig. 15 is a perspective view of one of the units which are employed for exerting additional and variable pressure upon the cartons through the agency of the conveyor belts.

In practicing my invention I employ a plurality of brackets 10, of an irregular substantially U-shape, as best shown in Figs. 1 and 13, which are adapted to serve as supporting members for the apparatus. The brackets 10 comprise legs 11, portions of which are arranged in parallel relationship and are adapted to be secured to the floor by means of bolts 12. A channel iron 13 is bolted to the top of each of the brackets 10 by means of bolts 14. As best illustrated in Figs. 1 and 2, a pair of spaced strap iron frame members 16 are fastened to the flanges of the channel iron 13 adjacent one end thereof, by means of bolts 17 and comprise vertically extending portions 15. These frame members 16 comprise, in addition to the vertically disposed portions 15, horizontally extending portions 18 extending at right angles from the upper ends of the vertical portions 15 and vertical portions 19 extending downwardly from the opposite ends of the horizontal portions 18.

The lower end of each of the vertical portions 19 of the frame 16 is bolted to the end of one of a pair of parallel iron bars 21, as illustrated by the numerals 23. The bars 21 are adapted to serve as longitudinal supports for a sealing liquid drying apparatus 20, which is one of the elements of my machine. A second pair of bars 25 are disposed directly beneath and parallel to the bars 21, to provide additional longitudinal supports for the liquid drying apparatus 20. These bars extend beyond the ends of the members 21 and constitute a portion of the frame of the carton sealing mechanism.

A strap metal member 27, of substantially U-shape, is provided with vertical portions 26, each of which is fastened to one of the bars 21 and 25, by means of the bolts 28, as

best shown in Figs. 1 and 13. A horizontal portion 29 of the strap member 27 is securely fastened upon the upper surface of the channel iron 13, the bolts 14, which secure the channel iron 13 upon one of the members 10, being employed for this purpose. The ends of the bars 25, which extend into and serve as longitudinal frame members for the glue applying mechanism, are supported by means of a bracket 31 which is provided with a horizontal portion 32 secured to the channel iron 13 and two substantially vertically inclined portions 33, having ends 34 extending at substantially right angles thereto, to each of which one of the bars 25 may be securely fastened by means of a machine screw 36, as best shown in Fig. 4.

As illustrated in Fig. 6, a main power shaft 37 is journalled adjacent one end in a bearing 38 which may, if desired, be mounted upon an associated packing and assembling machine, a portion of which is indicated at 39.

Briefly, the assembling and packing machine 39 is adapted to open the carton blanks into which the articles are packed and fold and close the end flaps thereof prior to the operation of my machine. Of course, it is to be understood that the cartons may be folded and packed in any desired manner, either manually or automatically, and the drive shaft 37 and its bearings may be independent of any other machine.

As shown in Fig. 6, cams 42 and 44, which are mounted upon the shaft 37 and two rods 45 and 46, which are respectively actuated by the cams 42 and 44, are elements of the mechanism of the packing machine 39 and form no part of the present invention.

In connection with the operation of my machine, the shaft 37 may be provided with a sprocket wheel 47 and a cam 48, both of which may be keyed or otherwise rigidly secured to the shaft 37. A roller member 49 is rotatably mounted upon a pin 52 which extends transversely from one side of a bifurcated arm 54. The roller 49 is adapted to rest upon and is actuated by the peripheral surface of the cam 48.

The shaft 37 is adapted to extend between bifurcated portions 55 of the arm 54, and the roller member 49, while traversing the irregular surface of the cam 48, reciprocates the arm 54 upon the shaft 37. The arm 54 may be formed integral if desired or, as shown by Figs. 5 and 6, may be composed of two separate pieces 56 and 57, the latter being bifurcated to receive the shaft 37. The portions 56 and 57 are securely fastened together by means of suitable fastening means. As shown, the pin 52, on which the roller member 49 is mounted, is employed for this purpose. The arm 54 is pivotally mounted upon the end of an arm 59, by means of a bolt 58. The arm 59 is rigidly mounted upon a collar 62, which is rigidly secured to a shaft 64 by means of a set screw 65.

The shaft 64 is journalled at opposite ends in bearing members 66 and 67. A collar 68, which is keyed to the end of the shaft 64, extends beyond the bearing 66 and is provided with an arm 69 which extends radially therefrom, as best illustrated in Fig. 5. The bearing 67 may be secured to an adjacent portion of the frame of the packing machine 39, while the bearing 66 is fastened to a bracket 72 by means of bolts 71. The bracket 72 comprises a vertical portion 73, a horizontal portion 74 extending from the lower end thereof, and a vertical portion 75 extending upwardly from the opposite end of the horizontal portion 74. The vertical portion 75 of the bracket 72, together with a vertically extending leg of an angular bracket 76, is secured to the side of the frame of the machine 39 by means of bolts 77.

A bar 78 is slidably mounted within a recess in a block 79, the block being formed integral with the end of a right-angular bracket 80. The lower end of the transverse portion of the bracket 80 abuts the end of the vertical portion 75 of the bracket 72 and is also secured to the frame of the machine 39 adjacent the bracket 76 by means of a bolt 81. The top surface of the block 79 may be covered by a plate 83, which is adapted to maintain the bar 78 in a positive position within the recess which is formed in the block.

To one end of the bar 78 is pivotally secured a link member 84 by means of a pin 82. An opening in the opposite end of the link 84 is adapted to receive a pin 85 which also extends through an opening in the end of the arm 69 and pivotally secures the link thereto. The end of the bar 78 opposite to that pivotally secured to the link 84 is provided with an elongate opening 86, as best shown in Fig. 6, which slidably engages a pin 87 rigidly secured to the machine 39 and adapted to serve as a guide for the end of the bar 78. Between the slot 86 and the block 79 a pawl 88 is pivotally secured to the bar 78 by means of a pin 89. The pawl is adapted to operatively engage the teeth of a ratchet wheel 92, keyed upon a short vertical shaft 94. The shaft 94 is journalled in a bearing 95, which is rigidly secured to a portion 96 of the vertically disposed leg of the bracket 76, by means of machine screws 97.

Rigidly secured to the upper end of the shaft 94 I have provided a disc or wheel 98, the hub portion of which rests upon the upper surface of the bearing 95. The opposite end of the shaft 94 has a collar 99 secured thereupon by means of a set screw 104, which is adapted to prevent end play of the shaft 94. The disc or wheel 98 is provided with a plurality of spaced teeth-like projections 105, extending radially from the periphery there-

of, the spacing of these projections being determined by the size of the cartons upon which the machine is designed to operate.

It is evident that, as the shaft 37 rotates the cam 48, the roller member 49 will cause lengthwise reciprocation of the bifurcated member 54, which will in turn oscillate the shaft 64 and operate the ratchet and pawl mechanism giving intermittent rotation to the wheel 98.

In order to prevent spinning of the wheel 98, when the teeth of the ratchet wheel 92 are forcibly engaged by the pawl 88, I provide a friction brake 106, which is adapted to engage the opposite sides of the wheel 98, as best illustrated in Figs. 5 and 6. The brake mechanism 106 comprises a pair of metallic strap members 107 and 108 pivotally secured together at one end upon a pin 109, in order to provide a hinged joint for the strap members. The pin 109 is rigidly secured between circular lug portions extending from one end of a short strap member 114, which may be riveted to a member 115, secured at one end by one of the bolts 71, and at the opposite end to a portion of the frame of the machine 39. The member 115, besides providing means upon which to secure the strap member 114, also serves as a brace to prevent vibration of the vertical portion 73 of the bracket 72.

A friction lining 116 comprising a pair of strips of leather or other suitable material may be secured to the strap members 107 and 108 adjacent opposite surfaces of the wheel 98. A bolt 117, which extends through the strap members 107 and 108 at a point spaced from the periphery of the wheel 98 is provided with a wing nut 102 and spring 103, by means of which the leather strips on the arms 107 and 108 are maintained in adjustable frictional engagement with the wheel 98.

I have also provided positive means to completely stop the rotation of the wheel 98 at approximately the point where the ratchet and pawl discontinues the rotation thereof. This stop mechanism includes a member 118 of triangular shape, as best shown in Figs. 5 and 6, pivotally secured at one corner thereof to an angular bracket 119, by means of a bolt 120. The remaining leg of the angular bracket 119 may be bolted or otherwise conveniently secured to the vertical portion 73 of the bracket 72. A lug 124 is secured to another corner of the member 118, which is adapted to move into the path of the projections 105 extending from the periphery of the wheel 98, when the member 118 is rotated in a clockwise direction about the bolt 120. The remaining corner of the member 118 is secured to one end of a link 125 by means of a bolt 126, and the opposite end of the link is pivotally secured to the arm 69 between the bolt 85 and the shaft 64. When the arm 69 actuates the ratchet and pawl mechanism, the arm will also rotate the member 118 about the bolt 120 as a pivot and the lug 124 will move toward the wheel 98. The relative motion of the lug 124 and the teeth 105 of the wheel 98 is such that the lug will pass between two of the teeth 105 of the wheel and engage the approaching tooth at approximately the same time that the pawl 88 disengages the tooth of the ratchet wheel 92, and the rotation of the wheel 98 discontinues immediately. Concurrent with the return movement of the pawl, the lug 124 moves perpendicularly to the plane of the wheel 98 and out of the path of movement of the teeth 105, and thereafter a repetition of the previously described cycle of operation occurs.

An arm 127, rigidly secured on the upper end of a vertically disposed shaft 128, is journaled in bearing portions (not shown) of the carton packing and assembling machine in cooperation with which my machine is adapted to operate. The arm 127 is oscillated intermittently between the two positions illustrated in Fig. 6 by the cam actuated rod 45 which is secured at one end to a crank 130 that is mounted on the lower end of the shaft 128. This arm is adapted to push the cartons successively from a conveyor mechanism 129 of the machine 39, and the movement of the wheel 98 is so timed with respect thereto that a carton is disposed between a pair of the teeth 105 at each oscillation of the arm. The motion of the arm 127 is, of course, synchronized with the intermittent motion of the wheel 98 and the teeth 105 which project into the guideway 120 move the cartons therethrough and into a guideway 131.

A leaf spring 132, which is arranged at one side of the guideway 131, has a portion 133 extending thereinto and this spring is adapted to exert a light pressure upon one side of a carton indicated by the numeral 134, which occupies the position at the end of the guideway 131 opposite the wheel 98, and by forcing the carton against the opposite side of the guideway prevents free motion thereof during the interval in which the wheel 98 is at rest. The end of the spring opposite the portion 133 may be riveted or otherwise conveniently secured to the guideway 131, as indicated at 135. A portion of the leaf spring intermediate the ends thereof rests against the end of a set screw 136 extending through a bracket 137, secured to the guideway 131. The screw 136 serves as a stop to adjust the extent of the force which may be exerted by the portion 133 against the carton which occupies the position illustrated by the numeral 134.

It is evident that when the wheel 98 moves a carton into the guideway 131, a carton at the opposite end thereof is discharged from the guideway. The operation of the machine upon this latter carton will be more completely described hereinafter.

As shown in Figs. 1, 2 and 6, the sprocket

wheel 47, which is keyed to the end of the shaft 37, is adapted to drive a chain 138, which also engages the teeth of a sprocket wheel 139. The sprocket wheel 139 is keyed to the end of a shaft 141, and the shaft is journaled adjacent the sprocket wheel 139 in a bearing bracket 142. The bearing bracket may be bolted or otherwise rigidly secured to the channel iron 13, as indicated at 143. The opposite end of the shaft 141 is journaled in each of two bearing portions 144 and 145 which project from a bracket 146. The bracket 146 has an elongate horizontally extending portion 147, which is bolted to the channel iron 13 as indicated at 148 and portions 149 and 151 extending horizontally at each end thereof carry the respective bearing portions 144 and 145 at the extremities thereof.

The elongate portion 147 of the bracket 146 is enlarged intermediate the ends thereof to provide a bearing portion 152, and a shaft 153 is journaled at one end therein. The opposite end of the shaft 153 is journaled in a pillow block 154 which may be bolted to the channel iron 13 as indicated at 155. Bevel gears of equal diameter 156 and 157 are rigidly secured upon the shafts 153 and 141, respectively, by means of the set screws 158. The bevel gears 156 and 157 are adapted to intermesh and the shaft 141 therefor drives the shaft 153 at an equal rate of rotation. A sprocket wheel 159 is keyed to the shaft 153 beyond the pillow block 154, and is adapted to drive a sprocket wheel 164 through the medium of a chain 165, as shown in Fig. 2. The sprocket wheel 164 is keyed upon a shaft 166 which is journaled adjacent the opposite ends thereof in the pillow blocks 167 and 168. The pillow blocks are each bolted to one of the frame member bars 25.

The shaft 166 has a crank arm 169 keyed thereto at the end of the shaft opposite the sprocket wheel 164 and beyond the bearing 167. The end of this arm carries a pin 171 integral therewith, which pivotally engages an opening in one end of an elongate rod or link 172. The opposite end of the rod 172 is cylindrical in form, as indicated at 173, and this portion of the rod slidably moves within an opening in a guide block 174. The block 174 is provided with a pin-like projection extending therefrom transversely to the opening in which the portion 173 is adapted to slide, and this pin is pivotally mounted in the upper portion of a plate 175. The plate 175 may be riveted or otherwise conveniently secured to the horizontal portion 18 of one of the frame members 16.

As best shown in Figs. 1 and 2, a pawl 176 is pivotally secured to the rod 172 intermediate the pivotal point 171 and the guide portion 173 by means of a bolt 177, and the opposite end of the pawl is adapted to operatively engage the notches of a ratchet wheel 178. This wheel which is rigidly secured upon a shaft 179 is journaled within openings in each of the horizontal portions 18 of the frame members 16. The pawl 176 is resiliently maintained in operative position with respect to the teeth of the ratchet wheel 178, by means of a coil spring 183, one end of which engages an opening intermediate the ends of the pawl, the opposite end thereof being secured to a convenient portion of the machine by means of a bolt 184. A sprocket wheel 185 is keyed upon the shaft 179 approximately midway between the frame members 16 and this sprocket wheel is adapted to operatively engage link elements 186 of a pusher type conveyor 187.

An idler sprocket wheel 188 is rotatably mounted upon a shaft 189 which is secured within openings in each of the frame members 16 that are located where the vertical portions 15 and the horizontal portions 18 thereof join and this sprocket wheel cooperates with the sprocket wheel 185 to operatively support the conveyor 187.

The conveyor 187 comprises a plurality of members 193 of substantially L-shape, each of which are formed of two sheet iron blanks of similar shape, which may be welded together at one end to form pusher fingers, as indicated by the numeral 194. Beyond the fingers 194 the blanks are spaced to form elements of the links 186 between which portions of the sprocket wheels 185 and 188 are adapted to extend.

Openings are formed in the opposite ends of the spaced link portions 186, and these openings are adapted to receive pins 195 which also pivotally engage openings in the ends of shorter links 186. The elements of the shorter links 186 are also spaced to receive the sprocket wheels 185 and 188 therebetween, and the spacing thereof may be maintained by means of shoulders upon the pins 195.

A plate 197 of approximately triangular shape is welded or otherwise firmly secured upon the side of each of the fingers 194 on the side thereof external to the angle of the members 193, and is provided with a flange 198 bent at right angles to the main body of the plate at the edge thereof opposite to the fingers 194.

A short strap of sheet iron 199 is riveted to a portion of one of the members 193 adjacent the finger portions 194 and extends approximately normally therefrom into the angle of the member 193. A small bolt 203 extends through an opening in the projecting end of the strap 199, which is adapted to cooperatively engage a slot 204 formed longitudinally in a short strap of sheet iron 205. Ears 206 projecting from opposite sides of the strap 205 at one end thereof and in a direction normally to the center line of the slot 204 are adapted to be bent about the

strap 199 in order to form the guides for the strap 205. The strap 205 therefore is slidably mounted upon the strap 199, and the combined length of the straps may be varied by locating the strap 205 at different positions upon the other.

A pair of short straps 207, which are each bolted, as indicated at 208, to the horizontal portions 18 of one of the frame members 16 and extend transversely to the horizontal portions 18, are provided with openings at the ends thereof opposite the bolts 208. A short rod or shaft 209 may be conveniently secured at opposite ends in the openings of the straps 207 and a rocker arm 211 pivotally engages the shaft 209 between the straps 207. One end of the rock arm 211 is bifurcated to provide two spaced lugs 212, and a pin 213 secured in openings in the ends thereof, rotatably supports a roller member 214. The opposite end 210 of the rocker arm 211 is provided with a plurality of spaced openings 215, which are adapted to receive one of the ends of a coil spring 216. The opposite end of the coil spring 216 is secured in an opening in the horizontal portion of one of the frame members 16.

The end 210 of the arm 211 may be offset a convenient distance from the plane of the roller 214, as indicated at 217, in order that the portion of the arm 210, provided with the openings 215, may be located directly above the horizontal portion 18 of the frame member 16. The roller 214 serves to maintain the chain portion of the conveyor 187 taut, and the tightening effect of the roller 214 may be varied by locating the proper end of the coil spring 216 in a different one of the openings 215.

It is evident that the shaft 141 will, by virtue of the ratchet and pawl mechanism actuated thereby, impart to the conveyor 187 a rotative motion which is intermittent, and as a result thereof, the fingers 194 will be moved for a distance and then stop abruptly for predetermined intervals of time. The number and spacing of the teeth upon the ratchet wheel 178 is such that one of the fingers 194 will always stop in the position designated by the numeral 218, and that during each period of motion, the fingers will move a distance equal to the spacing between adjacent fingers. The relative timing of the motion of the conveyor 187 and the wheel 98 is such that the carton displaced from the guideway 131 by the wheel 98 moves into a position directly between a pair of the fingers 194 during an interval when the conveyor 187 is at rest. Immediately thereafter, when the conveyor 187 moves a distance equal to the spacing between the fingers 194, the end of the strap 204 engages the carton 134 near the top thereof and the carton is tilted about one of its lower corners until it falls into a horizontal position. Further movement of the conveyor 187 carries the finger 194 into engagement with the side of the carton upon which it previously rested and the carton is then pushed into the dotted line position indicated by the numeral 219. A repetition of this cycle of operation places another carton between the fingers 194 and this carton is operated upon in like manner, the carton indicated at 219 being moved into the position indicated by the numeral 223.

The cartons as they are moved by the conveyor 187 are adapted to be supported by a guideway 224, as best shown in Fig. 3, which comprises a pair of rails 225 which form the bottom of the guideway 224 and a pair of sheet iron side portions 226 forming two substantially parallel sides thereof. The end of the guideway 224, where the cartons enter from the guideway 131, is closed by another piece of sheet iron 227, which is provided with an opening 228. The opening 228 may be formed in the sheet iron plate 227 by cutting a vertical slit therein and bending the edges of the plate adjacent the slit, as indicated at 229.

An extension of the plate 227 connects with and forms a part of the guideway 131 and may be secured thereto by means of rivets 233. Likewise, a portion of one of the plates 226 is bent at right angles to the guideway 224 at a point spaced from the end plate 227 approximately the width of a carton and the bent portion thereof is secured to one wall of the guideway 131 by means of rivets 234 and forms a side of the guideway 131 opposite to that formed by the extension of the plate 227.

As illustrated in Figs. 1 and 2, blocks 235 are arranged on the top side of each of the frame members 25 and machine screws 36 are adapted to extend through the members 25 and into the blocks 235. A flange 236 is formed on the lower edge at one end of each of the plates 226, and these flanges are adapted to rest upon and to be fastened to the blocks 235 by means of suitable screws 237. The end of the plates 226 opposite to that supported by the blocks 235 may be supported by plates 238, which have a flange portion at each end thereof, and the flange at one end of the plates is adapted to engage corresponding flanges on the ends of each of the plates 226. The flanges may be secured together by means of the slotted bolts 239. At the opposite end of each of the plates 238 the flange is adapted to rest upon one of the members 25 and may be secured thereto by means of bolts similar to the bolts 239.

The rails 225, upon which the cartons are adapted to slide while traversing the guideway 224, may be constructed of elongate straps of sheet metal and supported at each of the ends thereof by means of angular brackets 243. One leg of each of the brackets 243 may be secured to the rails 225 by means of the rivets 244 while the transversely ex-

tending ends thereof rest upon the frame members 25 and may be secured thereto in any convenient manner. A portion along the lower edge of each of the side portions 226 may be bent upwardly, as indicated at 245, forming a trough-like recess which is adapted to collect glue or dirt therein to prevent the same from falling upon the working parts of the mechanism below.

Upon the rotating shaft 166, which drives the ratchet and pawl mechanism and consequently the conveyor 187 with an intermittent motion, is a cam 246, as shown in Figs. 3 and 10, which is located between the sprocket 164 and the pillow blocks 168. The cam may be rigidly secured upon the shaft by means of a set screw 247. A shaft 248 extends through openings in each of the rails 225 and also the side plates 226 and is adapted to be rotatably journalled therein. One end of the shaft 248 carries a collar 249 rigidly mounted thereupon, which abuts the adjacent side plate 226 while the opposite end of the shaft carries a rocker arm 251. The rocker arm 251 is splined upon the shaft 248 and may be prevented from sliding therefrom by means of a washer 252. The washer is adapted to engage the rocker arm and the end of the shaft 248, and is secured to the shaft by means of a suitable screw 253.

One end of the rocker arm 251 is bifurcated to form lugs 254 between which a roller member 255 is rotatably mounted upon a pin 256. The remaining portion of the rocker arm comprises a crank arm 257 having an opening formed in the extreme end portion thereof, which is adapted to receive one end of a coiled tension spring 258, and the other end of which is adapted to be fastened to any convenient portion of the frame. A pair of angular brackets 259 are rigidly secured upon each end of the shaft 248 outside of and immediately adjacent to each of the plates 226.

An offset portion 263 in one of the brackets 259 supports a portion thereof which engages the rocker arm 251 and prevents the arm from sliding on the shaft 248 in the direction away from the washer 252. Offset portions 264 of each of the angular brackets 259 are provided with flanges 265 bent at right angles to the planes of the portions 264. Adjustable plates 266, having elongate slots therein which extend in a direction parallel to the planes of the angular brackets 259, are secured to the flanges 265 by means of bolts 267. These bolts, which extend through openings in the flanges 265 and the elongate slots in the plates 266 are adapted to permit relative adjustment of the position of the plates with respect to the flange. The plates 266 are each provided with flanges 268, formed on the adjacent sides of the plates which extend in planes parallel to the planes of the brackets 259. It is evident from an inspection of the structure just described that the brackets 259, the shaft 248 and the rocker arm 251 comprise a rigid unit which is pivotally supported by the shaft 248.

The surface of the cam 246 comprises a concentric portion and a lug portion, the surface of which extends beyond the radius of the concentric portion. The roller 255 is adapted to engage the cam 246 and is maintained in engagement therewith by means of the tension spring 258. When the roller 255 rests upon the concentric surface of the cam 246, the flanges 268 serve as stops which abut against a carton when it is in the position illustrated by the numeral 223, and the plates 266 may be so adjusted upon the flanges 265 that the carton will be rigidly secured between the flanges 268 and the adjacent finger 194 of the conveyor 187.

As the shaft 166 rotates the cam 246, the lug portion of the cam engages the roller 255 and the angular brackets 259 are rotated about the shaft 248 raising the flanges 268 out of the path of the carton previously engaged thereby, which is then free to be moved by the contacting finger 194.

In order to prevent any portion of the carton from disengaging the supporting rails 225, in the position indicated by the numeral 223, I provide a pair of guide brackets 220 which may be secured in a horizontal position adjacent the upper edge of the side plates 226 by means of the small bolts. The brackets 220 are provided with transversely extending flanges 221 which serve as horizontal guide surfaces for the edges at the upper surface of the carton. The ends of the flanges 221, under which the carton first moves, are inclined upwardly, as indicated at 222, in order to insure unobstructed movement of the carton.

Having now described the mechanism which conveys the cartons into the machine and securely maintains one of them in the desired position, I will now proceed to the description of the structure and operation of the mechanism which is adapted to seal the flaps while the carton is in this position.

A pair of elongate iron bars at 271, which are spaced, as illustrated by Fig. 1, extend across the machine at right angles to the bars 25, and each of the bars 271 are secured to each of the bars 25 by means of bolts 272, as best shown in Fig. 3. Two identical brackets 273, each having a horizontal portion and two vertical portions extending downwardly therefrom and provided with bent portions at the lower ends thereof are secured to the bars 271 by means of bolts 274. One of the brackets is secured to the bars 271 intermediate one end thereof and one of the bars 25, while the other is secured thereto intermediate the opposite end of the bars 271 and the other of the bars 25.

As best shown in Figs. 1, 8 and 9, a circular member 275 is secured upon the shaft 141,

which has heretofore been described in connection with the conveyor and stop mechanism by means of a set screw 276. The disk 275 is provided with an irregular recess 277 extending into the interior from one side thereof. The recess 277, which is in the form of a closed curve, is of equal depth throughout, but various points of the recess are located at unequal distances from the center of rotation of the wheel. The recess 277 is adapted to serve as a cam surface upon the opposite edges of which a roller 278 intermittently rests. The roller 278 is rotatably secured upon a pin 279, which projects from one side of a member 281. The member 281 is bifurcated at the end adjacent the roller 278 to provide a guideway 282, in which the shaft 141 is adapted to rotate. The end of the member 281 opposite the guideway 282 is provided with spaced lugs 283, between which one end of an elongate bar 284 is pivotally secured by means of a bolt 285. The opposite end of the bar 284 is pivotally secured upon a pin 290 which extends between lugs 286, projecting from one end of a link 287.

Between the ends of the bar 284 and more closely adjacent the end thereof which is attached to the member 281, a pin 288 extending through the bar extends within an opening in a pair of lugs 289 which are formed at the end of a link 291, thus forming a pivotal connection between the member 281 and the bar 284. An opening in the bar 284 spaced midway between the pins 288 and 286 is adapted to receive a bolt 292. A collar 293, having a longitudinal opening therein, is disposed about the bolt 292 between the bar 284 and the channel iron 13. The bolt 292 extends from the opening in the collar 293, through an opening in the channel iron 13 and engages a lock nut 294, located upon the opposite side of the channel iron 13. The cam surface 277 within the annular member 275 carries the roller 278 upon either of the opposed surfaces thereof, and the member 281 is thereby reciprocated transversely of the shaft 141, which rotates within the guideway 282.

The bar 284, being pivoted thereto at 283, is consequently oscillated about its pivotal point 292, and this movement of the bar 284 intermittently moves the links 291 and 287 equal distances in opposite directions.

The links 287 and 291 are identical in construction and each of the links actuates a separate unit of mechanism which is located upon each of the ends of the pair of frame bars 271 at opposite sides of the frame bars 25. The separate units of mechanism so located are also identical in every detail of construction, the only difference being the motion of the elements of the units which is in relatively opposite directions. It is therefore obviously unnecessary to make a duplicate description of these units and in order to avoid confusion, only one of them will be described. The reference characters employed may therefore be considered to apply to the elements of either of the units.

The end of the link 287 opposite to the pivotal point 290 is provided with lugs 295 and a bolt 296 which extends between the lugs pivotally engages the end of a crank arm 297. The opposite end of the arm 297 is rigidly secured upon a shaft 298, which is journalled at opposite ends in aligned openings in each of the bars 271. As shown in Fig. 3, a pair of identical arms 299 are rigidly secured to the ends of the shaft 298, which project beyond the bars 271. The ends of the arms 299 opposite the shaft 298 are provided with openings which are adapted to slidably engage bolts 303.

As indicated in Fig. 3, a reciprocating shuttle member 304 is provided with a portion 305 from the opposite end of which parallel bars 306 extend at right angles thereto and in the same direction. The ends of each of the parallel portions 306 are flattened out into relatively broader sections 307 and one of a pair of irregularly shaped guide members 308 are adapted to lie along side of the sections 307. These guides, together with the sections 307, are provided with openings therein adapted to receive the bolts 303, which are journalled in the openings in the ends of the arms 299.

The parallel bars 306 of the shuttle 304 are slidably journalled in openings in an end plate 309, as indicated at 313. The end plate 309 is provided with a flange 314, as best illustrated in Figs. 3 and 4, along the lower edge thereof, each end of which is adapted to rest upon the upper end portion of one of the cross bars 271, the ends being secured thereto by means of the bolts 315. The shuttle 304, therefore, is adapted to reciprocate within the openings 313 by the rocking of the arms 299 upon their pivotal points within the shaft 298.

The guide members 308 each comprise a straight portion which is adapted to lie adjacent to the section 307 of one of the parallel portions 306 and a portion 316 in parallel alignment therewith, but slightly offset therefrom. The extreme end of the portions 316 of the guide members 308 may be inclined from opposite surfaces thereof into relatively sharp edges and the corners thereof may be rounded in such manner that the ends of each of the members will be similar to a wedge. By reason of this configuration, the guide portions 316 are suitably adapted to be inserted beneath the end flaps of a carton, the flaps having previously been closed. A lug 317 projects at right angles to the wedge shaped end of each of the guide members 308 and each of the lugs is of wedge shape cross-section.

A recess 318 is formed in each of the portions 316 at the side thereof towards which one of the lugs 317 projects and extends between the lug and those portions of the guide member which engage the flattened section of the shuttle 304. Rocker-like members 319 are pivoted vertically upon each of the guides 308 by means of pins 323 and are adapted to reciprocate as a portion of the guide member units. The rocker-like members each comprise a portion 322, of substantially U-shape, which is adapted to carry the pin 323 between the parallel sections thereof. An off-set finger-like portion 324, which projects from the base of the member 322, extends into the recess 318 in alignment with the guide portion 316, and an arm 325 extends from one of the parallel sections of the member 322 in approximate alignment with one of the arms 306 of the shuttle 304.

Another pin 326 extends between the parallel sections of each of the members 322 and is spaced beyond the pin 323 a convenient distance from the guide member 308. Rods 327, each having a flattened extension 328 at one end thereof, are each inserted within one of two spaced openings in the end plate 309, and nuts 329 threadably engage a threaded end portion of each of the rods on the opposite sides of the plate. The flattened portions 328 of the rods 327 are each provided with slots 331 in alignment therewith through each of which one of the pins 326 is adapted to extend. The flattened portions 328 are also provided with lugs 332, which project normally to the surfaces thereof, and have threaded openings formed therein which extend in parallel alignment with the surface of the portion 328. Stop members 333 are each provided with slots which extend in alignment with the slots 331 and bolts 334 slidably engage the slots to maintain each of the members 333 against the portions 328. Machine screws 335, having lock nuts therefor, extend through the threaded openings in the lugs 332 and are adapted to abut endwise against flanges 336, which are formed at one end of the stop member 333. The ends of the stop members 333 opposite the flanges 336 are adapted to extend over the adjacent end of the slots 331 and the relative position of the stop members with respect to the slots may be determined by appropriate adjustment of the machine screws 335. The pins 326, as they reciprocate with the shuttle 304, are adapted to engage the stops 333 at one limit of their motion, and at the opposite limit the pins are adapted to engage the end of the slots 331 remote from the stops. Appropriate adjustment of the stops 333 is adapted to vary the first limit, and proper adjustment of the nuts 329 is adapted to vary the second.

Each of the parallel bars 306 of the shuttle 304 are also provided with laterally extending enlargements 337 intermediate the portion 305 and the flattened sections of the shuttle. Cam follower members 338 are pivotally mounted in openings within the enlarged portions 337.

As each of the shuttles 304 on opposite sides of the machine is provided with two of the members 338, all of which are identical in construction, only one thereof will be described, and the reference characters employed may be considered to apply to the corresponding elements of any of these units.

The cam follower members 338 each include a guide bracket 339, one end of which is adapted to serve as an axis 341 of the follower member assembly.

A lug 342, spaced from and in parallel alignment with the axis 341, is integrally connected thereto by means of an integral connecting portion 343. The squared end of a rod 344 is adapted to extend through an opening of similar shape in the axis portion 341, and the opposite end of the rod, which may be circular, if desired, extends through a similar opening in the lug 342. A collar 345, which is positioned intermediate the lug 342 and the axis 341, may be conveniently supported against a pin which extends transversely through the rod 344 on the side of the washer adjacent the axis 341, and a coil spring 346 is adapted to surround the rod 344 with its opposite ends abutting the washer 345 and the lug 342. The squared end of the rod 344 beyond the axis 341 is provided with a pin 347, which is adapted to extend through an opening in the extreme end of the arm 325, which projects from one of the parallel sides of the U-shaped portion 322 of the rocker-like member 319.

It is evident from the description of the structure immediately preceding that if the axis 341, the pin 347 and the pin 323 are not in alignment, the spring 346 will tend to cause rotation of the rocker-like member 319 about its pivotal point 323 in the direction in which the pin 347 varies from the alignment of the other points. The direction of rotation of the rocker-like member 319, which the spring 346 may tend to produce is determined by the position of a pin 348 which extends from the portion 343 of the guide bracket 339. This pin is adapted to extend into a cam opening 349 which is formed within one of the plane surfaces of an angular plate 353, a flange of which may be secured to the end plate 309 by means of the bolts 354. The cam opening 349 is defined by a number of effective surfaces which may be illustrated by the numerals 355, 356, 357, 358 and 359. The upper surface of the bracket 353 is adapted to support appropriate spacing lugs 361, and a spaced plate 362, which is secured upon the lugs by means of screws 363, covers the cam opening 349.

A carton in the position within the ma-

chine illustrated by the numeral 223 has one of the larger end flaps thereof attached to the upper surface of the carton as it rests in this position, and the corresponding flap at the opposite end attached to the lower or supporting surface thereof.

The guide members 308 are adapted to be arranged in such manner with respect to the end flaps of the carton that each of the lugs 317 will extend in a direction towards the side of the carton from which the larger end closing flap is attached. The relative arrangement of the recesses 318 and the lugs 317 will therefore be opposite at each end of the carton. This, however, is not an essential difference in the construction of the members, but is rather an adaptation of the machine which depends entirely upon the construction of the cartons.

As the shuttle 304 reciprocates under the influence of the arms 299, each of the guide members 319 and the corresponding finger 324 move inwardly between one of the short flaps and the larger end closing flap of the carton with the pin 348 sliding upon the surface 355 of the cam opening 349. The surface 355 of the cam 349, being slightly curved out of alignment with the motion of the shuttle 304, tends to move the axis 341, and the pins 347 and 323 into direct alignment, but the pin 347 does not, however, cross a straight line extending between the other two. This slight rotation of the rocker-like member 319 likewise does not move the glue fingers 324 out of alignment with the portion 316 of the guide members 308, but as the pin 348 approaches the end of the surface 355 adjacent the surface 356, the pin 326 is adapted to strike the end of the guideway 331 opposite to the stop member 333.

As the limit of travel of the shuttle 304 has not yet been reached, the pin 326, which rests against the end of the guideway 331, abruptly rotates the rocker member 319 about its axis 323 and the glue fingers 324 move out of alignment with the portions 316 and against the short flaps which extend from the sides of the carbon adjacent each of the larger flaps. Simultaneously with this movement of the fingers 324, the arm 325 of the rocker member 319 carries the pin 347 across the alignment of the pins 341 and 323. The axis 348 is consequently moved rapidly across the surface 356 of the cam opening 349 and the spring 346 tends to maintain the pin at the end of this surface opposite the surface 355. The limit of the motion of the shuttle 304 in this direction having then been reached, the return motion of the shuttle begins and the pin 348 traverses the surface 357. During this motion the fingers 324 are always carried in the same position relative to the portion 316 of the guide members 308 which they occupied when the shuttle 304 was at its inner limit of travel, and as the pin 348 descends upon the surface 358, the fingers 324 are moved farther out of alignment with the guide portions 316. When the pin 348 reaches the end of the surface 359 adjacent the surface 358, the movement of the fingers 324 in this direction ceases. As the motion of the shuttle continues and the pin 348 begins to traverse the surface 359, the motion of the fingers 324 reverses and they again tend to assume a position in alignment with the guide portions 316.

While the pin 348 is moved upon the surface 359, it abruptly strikes the stop member 333, and the pin 348 is snapped across to its original position against the surface 355. This motion of the pin 348 also carries the pin 347 across the alignment of the pins 341 and 323, and the spring 346 consequently tends to maintain the pin 348 against the surface 355. This cycle of operation repeats with each reciprocation of the shuttle 304 and is adapted to occur once during each intermittent movement of the conveyor 187.

The top portion of each of the brackets 273 carries a bearing bracket 364, best shown in Figs. 1 and 4, which is securely fastened thereto by means of bolts 365. The bearing brackets 364 comprise a vertically extending portion 366, which is fastened at the upper end thereof to the brackets 273, and a horizontal section 367 which extends transversely from the lower end thereof. The section 367 is provided with a longitudinal opening therein which is adapted to receive the shaft 368, one end of which carries a sprocket wheel 369 rigidly mounted thereupon. The sprocket wheel 369 is driven by a chain 371, which is carried at its opposite end by a sprocket wheel 372.

The sprocket wheel 372 is rigidly secured upon one end of a shaft 373, which is journalled in the horizontal portion 18 of each of the frame members 16. The opposite end of the shaft 373 is provided with a sprocket wheel 374, as shown in Fig. 2, rigidly secured thereto, identical with the sprocket wheel 373 and a sprocket wheel 375 is also secured upon this end of the shaft between the sprocket wheel 374, and the horizontal portion 18 of one of the frame members 16. The sprocket wheel 375 is driven through the medium of a chain 377 by a sprocket wheel 376, which is rigidly secured upon the end of the shaft 179 opposite to the ratchet wheel 178.

The end of the shaft 368 opposite to that which carries the sprocket wheel 369, as shown in Fig. 4, is provided with a disk 378 rigidly secured thereupon by means of a set screw 379, and the disk 378 is provided with a peripheral groove 381.

A pan 382 is adapted to extend through an opening in the end plate 309 and is supported at one end thereof upon the lower edge of the opening by means of brackets 383. The opposite end of the pan 382 is sup-

ported upon one of the frame members 25 by a flange of an angular shaped member 384, the other flange of which may be secured in any convenient manner against the bottom of the pan 382. A quantity of sealing liquid 385 is adapted to be contained within the pan 382 and the grooved wheel 378 is positioned so that the edge thereof extends within the pan and into the sealing liquid.

The shaft 179, upon the end of which the sprocket wheel 376 is rigidly mounted, is intermittently rotated and consequently the grooved wheel 381, which is driven thereby, is also intermittently rotated. Such intermittent rotation of the wheel 378, however, is not necessary to the successful operation of this machine and the wheel may be driven continuously, if so desired.

It is evident that as the wheel 378 rotates with a portion thereof extending beneath the lever of the sealing liquid 385 contained within the pan 382, a small quantity of the sealing liquid will adhere to the periphery of the wheel. The surface tension of the liquid upon the periphery of the wheel 378 causes a large part of the liquid to be collected in the vicinity of the groove 381 and the liquid thus collected extends outwardly from the wheel beyond the circumference thereof.

There is another of the sealing liquid units identical to the one described above which is driven by a sprocket wheel 374 and another chain 371. These units are located at opposite sides of the machine and each cooperates with the elements of one of the shuttles 304.

The diameter and location of the wheel 378 is such that the fingers 324, when moved further out of alignment with the guide portions 316 as the pin 348 traverses the surface 358 of the cam opening 349, approach closely adjacent to opposite edges of the wheel and some of the sealing liquid which extends from the circumference thereof is deposited upon each of the fingers. The sealing liquid, which is thus deposited upon the fingers, is carried inwardly by the opposite movement of the shuttle 304 and transferred to the short flaps of the carton when the pin 326 engages the end of the slot 331 opposite to the stop 333.

A bracket 388 is secured to each of the side plates 226 of the guideway 224 adjacent the portion of the wheels 378, which are receding from the sealing liquid 385. Offset portions 389 of the brackets 388 are adapted to space a portion of the brackets 388 a short distance from the side plates 266 in order that the angular brackets 259 of the stop mechanism heretofore described may lie therebetween. The upper end portion of the brackets 388 are provided with parallel lugs 391 which extend from the edges of the brackets at right angles thereto, and oppositely disposed adjusting screws 392 having lock nuts 393 are threaded into the lugs 391 through aligned openings therein.

Angular arms 394 are pivotally supported against each of the plates 388 by means of a bolt 395 and one end of each of the arms is adapted to be engaged upon opposite surfaces thereof by a pair of the adjusting screws 392. The opposite end of the arm 394 is bifurcated to form the lugs 396 and the inner edges of the lugs are adapted to slidably engage the adjacent portion of one of the grooved disks 378. The sealing liquid which may adhere to the sides of the grooved disk 378 adjacent the grooved edge thereof will be scraped therefrom by the lugs 396, and, due to the angular position at which the lugs are arranged with respect to the circumference thereof at this point, the liquid will be directed into the vicinity of the groove 381. The closed end of the slot between the lugs 396 is adapted to limit the amount of the liquid upon the edge of the wheel which may pass this point, and any desired variation of the limitation of the sealing material thereby may be effected by the appropriate adjustment of the position of the opposite end of the bracket between the screws 392.

Immediately after the sealing of the flaps of the carton, when it is in the position indicated by the numeral 223, the stops 268 rise from in front thereof and one of the fingers 194 moves the carton from this position. During this movement of the carton, the finger immediately in front thereof moves into the position indicated by the numeral 397, and being then out of alignment with the guideway 224 it does not prevent the continued motion of the carton when the motion of the conveyor discontinues.

The carton thereafter slides upon the guideways 225 until it strikes the then vertically inclined portion 398 of the rocker table 399, as best shown in Fig. 7. One side of the rocker table 399 is supported by one end of a rocker arm 401, which is pivotally supported upon the rotating shaft 166. The other side of the rocker table 399 is supported by an arm 402, as best shown in Fig. 3, which is merely adapted to rock idly upon the shaft 166. A lever portion 403 of the rocker arm 401 is pivotally secured to one end of a link 404 by means of a pin 405, and the opposite end of the link 404 is also pivotally secured to one end of another rocker arm 406, by means of a pin 407. The rocker arm 406 is pivotally secured between lugs 408 extending from a lowermost web 413 of the bracket 409, by means of a pin 411. The bracket 409 is adapted to extend across the frame bars 25 and may be conveniently secured upon the under side of each of the bars, as illustrated by the bolts 412.

The opposite end of the rocker arm 406 is provided with lugs 414, in which a se-

cured a pin 415, upon which is rotatably mounted a roller member 416. The roller member 416 is adapted to ride upon a cam 417, which is rigidly secured upon the rotatable shaft 153 by means of the set screws 418, as shown in Fig. 8. The cam 417 is provided with two oppositely disposed concentric surfaces 419 and 421, and these concentric surfaces are each connected at opposite ends by surfaces 422 and 423. The carton is received by the rocker table 399 during the interval while the roller member 416 is traversing the surface 419, and as it rises upon the surface 422, the table moves toward the position shown by the dot and dash lines indicated by the numeral 424. This position of the table permits the carton to be supported by rails 425, between which the portion 398 of the table is adapted to descend.

A cam 426 is rigidly mounted upon the rotating shaft 166, between the arms 401 and 402 upon which the table 399 is adapted to rock, and a slot 427 is formed in the table 399 to accommodate the rotation of this cam. The greater portion 428 of the surface of the cam 426 is concentric with respect to the center of rotation of the shaft upon which it is mounted and the remainder of the surface thereof comprises a lug 429, best shown in Fig. 7, which projects from one side thereof. The position of the cam 426 upon the shaft 166, with respect to the timing of the rocker table 399, is such that the lug 429 passes through the notch 427 in the table immediately before the carton is deposited thereupon from the rails 225, and the concentric surface thereof is not of sufficient diameter to extend through the notch during the interval while a carton is being manipulated by the table.

A roller 431 is rotatably secured upon a pin 432, which is rigidly secured between lugs 433, which extend from one end of a rock arm 434, and this roller is adapted to traverse the surface of the cam 426. The arm 434 intermediate the ends thereof is pivotally secured upon a pin 435, which is carried by a pair of lugs 436, which extend at right angles to the upper intermediate portion of a web 437, the web being integral with and formed along one side of the bracket 409. The end of the rocker arm 434 opposite the pivotal point 432 is provided with a plurality of openings 438, any one of which is adapted to pivotally receive a pin 439, as illustrated in Fig. 1. The pin 439 is rigidly secured between a pair of lugs 441 which extend from one end of a link 442. The opposite end of the link 442 is also provided with lugs 443 similar to the lugs 441 and between which a pin 444 is rigidly secured.

Lugs 445 extend normally from a block 446, which is adapted to be bolted adjacent the middle portion of the channel iron 13 adjacent the extreme end thereof, as indicated at 447, and a pin 448, extending between these lugs, is rigidly mounted in openings therein. The portion of the pin 448 between the lugs 445 is adapted to pivotally engage an opening in one end of a lever arm 449, and the pin 444 which is supported by the lugs 441 is adapted to pivotally engage any one of a plurality of openings formed at various distances from the end of the lever 449. The end of the lever 449 opposite the point 448 is bifurcated to form a pair of lugs 451, and each of the lugs 451 is provided with a pin 452, upon which the offset portion of one of a pair of links 453 is adapted to be pivotally mounted.

The lugs 451, which are bifurcations of the lever 449, are spaced a substantial distance from each other in order that the ends of links 453, from which the offset portions that are pivotally mounted upon the pins 452 extend, may also be spaced a sufficient distance to receive the end of a rod 454 therebetween. A plurality of aligned transversely extending openings 455 are formed in this end of each of the links 453.

An opening is formed in the end of the rod 454, which is adapted to extend between the links 453 and a pin 456 may be inserted through this opening in any desired pair of the openings 455. The rod 454 extends horizontally for a distance approximately parallel to the guideway 224 and is thereafter bifurcated to form the arms 457, which extend continuously in parallel alignment with the rod 454. The rod 454 is slidably journalled adjacent the bifurcation thereof in a block 458, which may be secured upon the upper surface between the frame bars 25 adjacent one of the bars 271, by means of the machine screws 459.

The ends of the arms 457 opposite the bifurcation of the rod 454 are bent at right angles to the rods, as indicated by the numerals 461 and the free ends of the bent portions are again bent at right angles thereto to form the lugs 462. The right angle portions 461 of the arms are each flattened upon the face thereof opposite to the rod 454 and the flattened surface is continued upon the lugs 462.

It is evident from an inspection of the structure previously described (see Fig. 3) that the arms 457 are adapted to be intermittently reciprocated by the rotation of the cam 426. It may also be seen by inspection of this figure that the arms 457 are at rest in the position shown, during the interval of time while the roller 431 is traversing the concentric surface of the cam, and the arms 457 are adapted to be moved from this position only when the lug 429 engages the roller 431. The movement of the arms 457 is timed to occur approximately when the carton upon the rock table 399 is moved into the dot and dash position illustrated by the numerals 424 (see

Fig. 7) and the right angle portion 461 of the arms 457 then engage the sides of the carton, which project beyond the width of the rocker table 399, and translate a carton upon the rails 425 from engagement with the table.

A pair of guide members 463 are resiliently mounted in such a manner as to engage the sides of the carton while it is being moved by the right angle portions 461 of the arms 457, and these resilient guide portions are adapted to maintain the carton in its original vertical position, while the movement occurs. The guide members 463 each comprise a pin 464, which is adapted to be pivotally supported in a vertical position with the lower end thereof journalled in an opening in the top of one of the frame bars 25, and the opposite end pivotally supported in an opening in an angular bracket 465.

The opposite leg of the bracket 465 may be secured in any convenient manner to an elongate bar 466, which may be securely fastened to one of each of the frame members 21 and 25, by means of the machine screws 467. A web portion 468 is adapted to extend normally from the pin 464 between the journal portions thereof and in a direction away from the adjacent guideway portion of the machine. A plate 469, having an arm-like projection 471 extending therefrom intermediate the ends thereof, is adapted to be rigidly mounted upon one side of the web 468, a portion, however, of the plate 469 extending at an angle into the guideway of the machine so as to engage the carton as it is moved by the arms 457.

Stops 472 are mounted upon each of the bars 466, the ends of which are adapted to engage the web portions 465, and coil springs 470, each having the opposite ends thereof secured to one of the bars 466 and the arm-like projection 441 respectively resiliently maintains the web 468 against the stop 472. The plates 469 are adapted to yieldingly engage the carton during the translation thereof by the arms 457, and the guides 463 thereafter return to normal position against the stops 472.

Parallel conveyor belts 473 and 474 are rotatably mounted in the guideway 224 adjacent the guide members 463 and are adapted to receive the carton therebetween when it is deposited at the limit of movement of the arms 457. The direction of rotation of these conveyor belts is such that the carton so received will be carried therebetween and discharged from the opposite end thereof. The rate of rotation of the conveyor belts being exactly the same, the carton which is received in a vertical position with the end flaps having the sealing liquid deposited thereupon being at the upper and lower ends thereof will be carried throughout the length of the conveyors in this position.

The conveyor belt 473 is rotatably mounted at one end of its path of travel upon the roller 475, which roller is idly mounted upon a shaft 476 journalled within openings in the projecting ends of each of the bars 466.

The corresponding end of the conveyor belt 473 is similarly mounted upon a roller 477 which is idly mounted upon a shaft 478 journalled within openings in the opposite projecting ends of the bars 466. A sprocket wheel 481 is rigidly secured upon one end of the shaft 476 beyond the bar 466, and a large gear wheel 482 is likewise secured beyond the bar 466 at the opposite end of the shaft. A sprocket wheel 483 is rigidly secured upon the shaft 478 directly below the sprocket wheel 481 and on the opposite side of the bar 466 from the roller 477. A sprocket wheel 484 is rotatably mounted upon a pin 485 directly below and in axial alignment with the sprocket wheels 481 and 483. The pin 485 is adapted to be securely mounted in one flange of the channel iron 13 and the gear wheel 484 may be secured thereupon by means of the nut 486.

A pair of elongate brackets 487 are rigidly mounted upon each side of the frame which supports the conveyor belts 473 and 474 and are positioned transversely to the alignment of the belts. Each of the brackets 487 is secured to the adjacent one of frame bars 21 by means of bolts 488 and to the adjacent one of the frame bars 25 by means of the bolts 489. Adjacent the channel iron 13, the brackets 487 are provided with oppositely extending lugs 491 and each of these lugs, together with the portion of the bracket to which they are attached, are secured to the flange portions of the channel iron by means of bolts 492.

As best shown in Fig. 12, the upper ends of each of the brackets 487 are provided with openings in which a short shaft 493 is rotatably journalled, and a relatively large pulley 494 is keyed thereupon between the brackets 487. A pulley 495, which is identical with the pulley 494, is keyed upon a shaft 496, which is rotatably journalled in aligned openings in each of the brackets 487, located below the channel iron 13 a sufficient distance to permit rotation of the pulley thereunder.

Rollers 497 and 498 are each rotatably mounted upon shafts 499 and 501 respectively, and the opposite ends of these shafts are rigidly secured within openings in plates 502 and 503, which are each adjustably mounted upon one of the frame bars 21 and 25 respectively. Bolts 504 extend through slots in the plates 502 and 503 and permit the movement of the pulleys 497 and 498 in a direction parallel to the conveyor belts. A roller 505 is rotatably mounted upon a shaft 506, which is rigidly secured at opposite ends within openings at the end of the brackets 507. The brackets 507 are provided with slots adjacent the lower ends thereof, and bolts 508 extending through the slots adjust-

ably secure each of the brackets to one of the frame bars 21.

A roller 509, which is similar to the roller 505, is also rotatably mounted upon a shaft 511 and the opposite ends of this shaft are rigidly mounted within openings in plates 512. The plates 512 are also provided with slots extending in parallel alignment to the conveyor belts and bolts 513, which extend through these slots, adjustably secure the plates 512 to each of the frame bars 25. As may be observed from an inspection of Fig. 12, the end of the conveyor belt 473 opposite to that which is supported upon the roller 475 is carried by the rollers 497 and 505, and the pulley 494, the lower portion of the belt extending beneath the roller 497, around the pulley 494 and returning as the upper portion of the belt beneath the roller 505. The end of the conveyor belt 474 opposite to that which engages the roller 477 is supported in like manner by the rollers 498 and 509, and the pulley 495.

A sprocket wheel 514 is rigidly mounted upon the end of the shaft 153 beyond the sprocket wheel 159, and this sprocket wheel is adapted to drive a chain 515. The opposite end of the chain 515 is adapted to engage the teeth of a relatively large sprocket wheel 516, which is rotatably mounted upon a pin 517 which extends laterally from one of the frame bars 27 and is rigidly secured thereto. The nut 518, which is threaded upon the end of the pin 517, engages a shoulder formed thereupon and maintains the sprocket wheel in position upon the pin.

A small gear wheel 519 is also mounted upon the pin 517 between the sprocket wheel 516 and the frame member 27, and the teeth of this gear wheel are adapted to operatively engage the teeth of the gear wheel 482. The gear wheel 519 and the sprocket wheel 516 are adapted to rotate as a unit, and this may be accomplished by rigidly mounting the two upon a sleeve 523, which may rotate freely upon the pin 517. The sprocket wheel 514, which rotates continuously with the shaft 153, is adapted to drive the shaft 476 of the gear wheel 482 at a greatly reduced rate of speed, and this gear wheel, being rigidly secured upon the shaft 476, drives the sprocket wheel 481, which is also rigidly secured to the shaft 476 at the opposite end thereof.

The sprocket wheels 524 and 525 are respectively keyed upon corresponding ends of the shafts 493 and 496 and the pulleys 494 and 495, which are also keyed respectively to the same shafts, are thereafter adapted to be driven by the sprocket wheels. An idler sprocket wheel 526 is adapted to be rotatably mounted upon a pin 527, which may be secured within the end of an extension 528 of one of the bracket members 487. Another idler sprocket wheel 529 is rotatably mounted upon a pin 533, which may be rigidly supported within the end of a plate 534 secured to one flange of the channel iron 13, by means of the bolts 535. A third idler sprocket wheel 536 is rotatably mounted upon a pin 537, which may be rigidly secured within an opening to one of the bracket members 507.

The sprocket wheels 481, 483, 484, 529, 526, 525, 524 and 536 are all adapted to rotate within the same plane of motion and a chain 538 operatively engages each of the above mentioned sprocket wheels in the manner illustrated by Figs. 1 and 12 of the drawing. It may also be observed from an inspection of these figures that the chain 538, which is positively driven by the sprocket wheel 481, is adapted to drive the pulleys 494 and 495 in opposite directions of rotation. The purchase between the pulleys and the respective belts thereupon is adapted to drive portions 539 and 540 of the belts in the same direction and the cartons which are positioned therebetween by reason of the movement of the arms 457 are carried between these belts and discharged therefrom into the trough 541 at the opposite ends thereof. After several of the cartons have been discharged into the trough 541, they may be manually removed therefrom and packed in suitable cartons for shipment.

The edges of the portion 540 of the conveyor belt 474 are adapted to be slidably supported upon the edges of strips 542, which project from beneath each of the longitudinal frame bars 25. These strips may be conveniently fastened upon the lower edge of the bars by means of machine screws or in any suitable manner not shown. Elongate plates 543 may be fastened in any suitable manner upon the outside vertical edges of the longitudinal frame bars 21, and the edges of the plates are adapted to extend a convenient distance above the top of the bars 21. The plates 543, and likewise the strips 542, are adapted to extend approximately throughout the entire length of the conveyor belt portions 539 and 540.

A plurality of recesses 544 are formed in the upper edge of each of the plates 543, each recess being arranged in alignment with another recess upon the opposite plate. A plurality of rollers 545, having short pins 546 projecting axially from opposite ends thereof, are adapted to rest upon the conveyor belt portions 539 with the pins 546 of each of the rollers extending within a corresponding pair of the recesses 544. The weight of each of the rollers 545 is carried by the conveyor belt portion 539 when the belts are forcibly separated by reason of the cartons therebetween. At such times as the conveyor belt portions 539 and 540 do not engage the cartons, the weight of the rollers 545 is carried by the lower portion of the notches 544.

In order that the pressure, which is exerted upon the end flaps of the cartons by the roll-

ers 545, may be increased to any desirable extent, I have provided a plurality of rectangular frames 547 having one end of coil springs 548 attached at each corner thereof. The opposite ends of the springs 548 are adapted to be inserted through the openings in eye bolts 549, and the threaded ends of these bolts extend through openings in the ends of other eye-bolts 551. The eye bolts 551 may be threaded into openings in the side of the longitudinal frame bars 25 and securely locked therein by means of nuts 552. Wing nuts 553 are adapted to cooperatively engage the threaded ends of the eye bolts 549 and the tension of the springs 548 may be conveniently adjusted thereby.

Two of the parallel sides 550 of the rectangular frame members 547 are adapted to extend in alignment with and directly over the pins 546 at opposite ends of the rollers 545, and lugs 554 are spaced along the lower edge of the sides 550 at points directly above the pins 546. The lower edge of each of the lugs 554 is beveled so as to conform to the configuration of the pins 546, and the width of the lugs is such that they may extend into the recesses 544 and rest upon the pins.

The pressure which may be exerted by the rollers 545, through the conveyor belt portion 539 upon the end flaps of the cartons between the conveyor belts, may be varied to any desired extent above the actual weight of the members themselves by the proper adjustment of the tension of the springs 548. The sealing material which has been previously deposited upon the closing flaps of the cartons has a tendency to solidify rapidly when thinly distributed upon an absorbent surface, and the length of the conveyor and its rate of movement are adjusted so that this modification or change of state in the sealing material is complete when the cartons are discharged within the trough 541.

However, in order that a relatively short conveyor may be employed, I have provided a heating system 555, which is adapted to accelerate this change in the state of the sealing material. The heating system 555, which I have illustrated in this application, has been designed for the use of steam as the heating medium, but I am aware that other types of heating systems might be employed for the same purpose and I am also aware of the fact that means other than heat may be employed to accelerate the change in the state of the sealing material, such as for example, the circulation of air through the conveyor in the vicinity of the cartons, by means of fans or pumps.

In the heating system illustrated, the numeral 556 represents a pipe which may be connected to any suitable source of steam.

The end of the pipe 556 opposite the source is threaded into the right angular opening of a T-coupling 557, and a globe valve 558 and T-coupling 559 are arranged in the pipe 556 anterior to the T-coupling 557. The T-coupling 557 is positioned midway between the ends of a pipe 563, and these ends are each threaded into elbow connections 566 which communicate with pipes 564 and 565. The opposite ends of these pipes communicate respectively with relatively long horizontally extending pipes 567 and 568 intermediate the ends thereof through appropriate elbows and T-connections illustrated by the numeral 569.

The pipes 567 and 568 extend substantially the length of the conveyor belts 473 and 474 and one of the pipes is adapted to lie directly beneath each of the longitudinal frame bars 21. A pair of similar pipes 571 and 572 are spaced a convenient distance beneath each of the pipes 567 and 568 respectively, and the ends of these pipes terminate at points directly opposite to the ends of the first mentioned pipes. The opposite ends of the pipes 567 and 571 are each interconnected by means of the short pipes 573, having appropriate elbows operatively connected therewith, and pipes 568 and 572 are likewise connected at their opposite ends by means of pipes 574. The upper ends of vertically positioned short pipes 575 are threaded into appropriate T-couplings 576, which are located intermediate the ends of the pipes 571 and 572. The lower ends of each of these pipes are interconnected by means of the pipe 577 having appropriate elbows at the opposite ends thereof into which the pipes are threaded.

A T-coupling 578, having aligned openings which constitute an intermediate portion of the pipe 577, threadedly receives the end of a pipe 579 within the transverse opening thereof and a globe valve 581 is located in the pipe adjacent the T-coupling 578. Beyond the globe valve 581 a T-coupling 582 connects an intermediate portion of the pipe with a pipe 583 which also has a globe valve 584 intermediate the ends thereof. At the end of the pipe 583, opposite the T-coupling 582, a pipe nipple 584 communicates with the inlet of a steam trap 585. A suitable pan 580 supports the steam trap 585 and receives any leakage therefrom or from the adjacent piping in order to prevent the floor from becoming damp. An outlet 586 for the steam trap 585 may be connected with an appropriate reservoir or drainage sewer by mean of the pipe 587, and a globe valve 588 may be arranged in this pipe at some convenient point adjacent to the outlet 586. A second globe valve 589 is arranged within the pipe 579 intermediate the T-coupling 582 and the end of the pipe opposite the T-coupling 578, and a short pipe 591 is adapted to connect this end of the pipe with an intermediate portion of the pipe 587.

The T-coupling 559, which is located anterior to the globe valve 558 within the pipe 556, is adapted to receive the end of a short

pipe 592, and the opposite end thereof communicates with one end of a vertically extending pipe 593 which is provided with a globe valve 594 intermediate the ends thereof. The opposite end of this pipe communicates with a globe valve 595 and a reduction elbow 596 in series respectively, the reduced end of the elbow being adapted to receive a short length of pipe 597. One end of a flexible hose, not shown, having a nozzle at the opposite end thereof, may be connected to the free end of the pipe 597. The hose is adapted to convey steam through the nozzle for the purpose of cleaning dirt, sealing material, or other foreign material which may collect upon the apparatus therefrom.

A pipe 598 is adapted to communicate with a portion of the pipe 593 intermediate the valves 594 and 595 through an appropriate T-coupling 599 and the opposite end of this pipe is adapted to communicate with a portion of the pipe 579 intermediate the globe valve 581 and the T-coupling 582 through a short length of pipe 601.

It is evident that when the valves 558, 581, 584 and 588 are opened, the valves 594, 595 and 589 being closed, steam from the pipe 556 will be discharged into an intermediate portion of each of the pipes 567 and 568 and the steam will flow from the opposite ends of these pipes into each end of the pipes 571 and 572. The heat from the steam within these pipes will be radiated in the vicinity of the cartons between the conveyor belts 473 and 474 and the heat thus applied is adapted to dry the sealing liquid upon the closing flaps thereof which are held in position by the belts.

A sheet metal jacket 602 is adapted to surround the entire heating and conveying system and the lower edges of this jacket may be securely fastened to the flanges of the channel iron 13 in any convenient manner, not shown. The jacket 602 may be lined, as indicated at 603, with any suitable insulating material, such as asbestos, for example, in order to conserve the heat energy which is supplied to the system.

As the description of the operation of each of the mechanical units of this machine has been previously given in connection with the detailed description thereof, it does not appear to be necessary to give a complete description of the sequence of these operations in order that the machine may be readily understood.

It is evident from the foregoing description that the machine which I have disclosed in this specification, being positively operated in every essential respect, is capable of being operated at any practical rate of production within the limits of stress of the materials of which the machine is constructed, and that the machine is capable of being operated at a practically negligible cost.

Although I have illustrated but one form which my invention may assume and described in detail, but a single application thereof, it will be apparent to those skilled in the art that it is not so limited but that various minor modifications and changes may be made therein without departing from the spirit of my invention or from the scope of the appended claims.

What I claim is:

1. A sealing machine comprising a finger adapted to have a sealing agent deposited thereon, means adapted to move the finger to a position within the closing flap of a carton and means thereafter adapted to move the finger in a direction approximately normal to the first plane of motion of the finger whereby the sealing agent is transferred to a portion of the carton.

2. A sealing machine comprising a finger adapted to move intermittently between two extreme positions and means operatively associated therewith adapted to move the finger tranversely with respect to the first mentioned motion thereof adjacent each extreme position.

3. A carton sealing machine comprising a reciprocating member provided with a paddle shaped finger pivoted thereto and in alignment therewith and means adapted to rotate the finger out of alignment with the member adjacent one limit of travel of the member.

4. A carton sealing machine comprising a reciprocating member having an end portion adapted when the member is in one extreme position to extend within the closed, but unsealed flap of a carton and means located adjacent the end portion when the member is at the opposite extreme position for depositing sealing materials thereupon.

5. A carton sealing machine comprising means adapted to apply a sealing agent to the closing flaps of a carton, a pivoted plate for supporting the carton and means for oscillating the plate about a center remote from the carton supporting surface thereof.

6. A sealing machine comprising means adapted to apply a sealing agent to the closing flaps of a carton, means adapted to maintain the flaps in closed position and a reciprocating member adapted to transfer the carton from operative position with respect to the first means into operative position with respect to the second means.

7. A sealing machine comprising means adapted to apply a sealing agent to the closing flaps of a carton, a pair of spaced parallel conveyor belts adapted to receive the carton therebetween after the sealing operation, a closely arranged series of roller members operatively associated with one of the conveyor belts, the shafts of the roller members being provided with guideways open at one end adapted to permit variation in the

position of the rollers and resiliently mounted means adapted to maintain the rollers in position within the guideways against the conveyor belt.

8. A sealing machine comprising means adapted to apply a sealing agent to the closing flaps of a carton, means thereafter adapted to rotate the carton about an axis and a pair of resiliently mounted members adapted to receive the carton from the last means and prevent further rotation thereof.

9. A sealing machine comprising a guideway adapted to support a carton, an arm projecting within the guideway having means associated therewith for rotating the carton upon the initial movement thereof, the arm being thereafter adapted to move the carton a predetermined distance upon the guideway and means adapted to seal the closing flaps of the carton.

10. A sealing machine comprising an endless series of relatively movable interconnected arms which are spaced to receive cartons therebetween, a guideway parallel to and adjacent the arms which is adapted to support entirely the cartons positioned between the respective arms, means adapted to intermittently move the arms a predetermined distance along the guideway and means adapted to seal the closing flaps of one of the cartons when the mechanism is at rest.

11. A sealing machine comprising a series of spaced interconnected arms adapted to receive cartons therebetween, a guideway parallel to and adjacent the arms adapted to support the cartons arranged between the arms, means adapted to intermittently move the arms a predetermined distance along the guideway, the arms being constructed so as to accomplish both rotation and translation of the carton by the translatory motion thereof and means adapted to seal the closing flaps of the carton.

12. A carton sealing machine comprising means for depositing a sealing agent on the closing flaps of a carton, means for maintaining the flaps in closed position thereafter, means for raising the temperature of the atmosphere surrounding the carton while the flaps are maintained in closed position by the aforesaid means and an insulating jacket surrounding the two last mentioned means.

13. A sealing machine comprising means for projecting a carton within a guideway, means for engaging an upper portion of the carton for rotatably moving it within the guideway, means adapted to rigidly secure the carton upon the guideway in the latter position and means adapted to seal the closing flaps thereof.

In witness whereof, I have hereunto signed my name.

JOHN T. GORDON.