July 8, 1941. T. M. VAUGHAN 2,248,290

FRUIT WRAPPING MACHINE

Filed Aug. 4, 1939 7 Sheets-Sheet 1

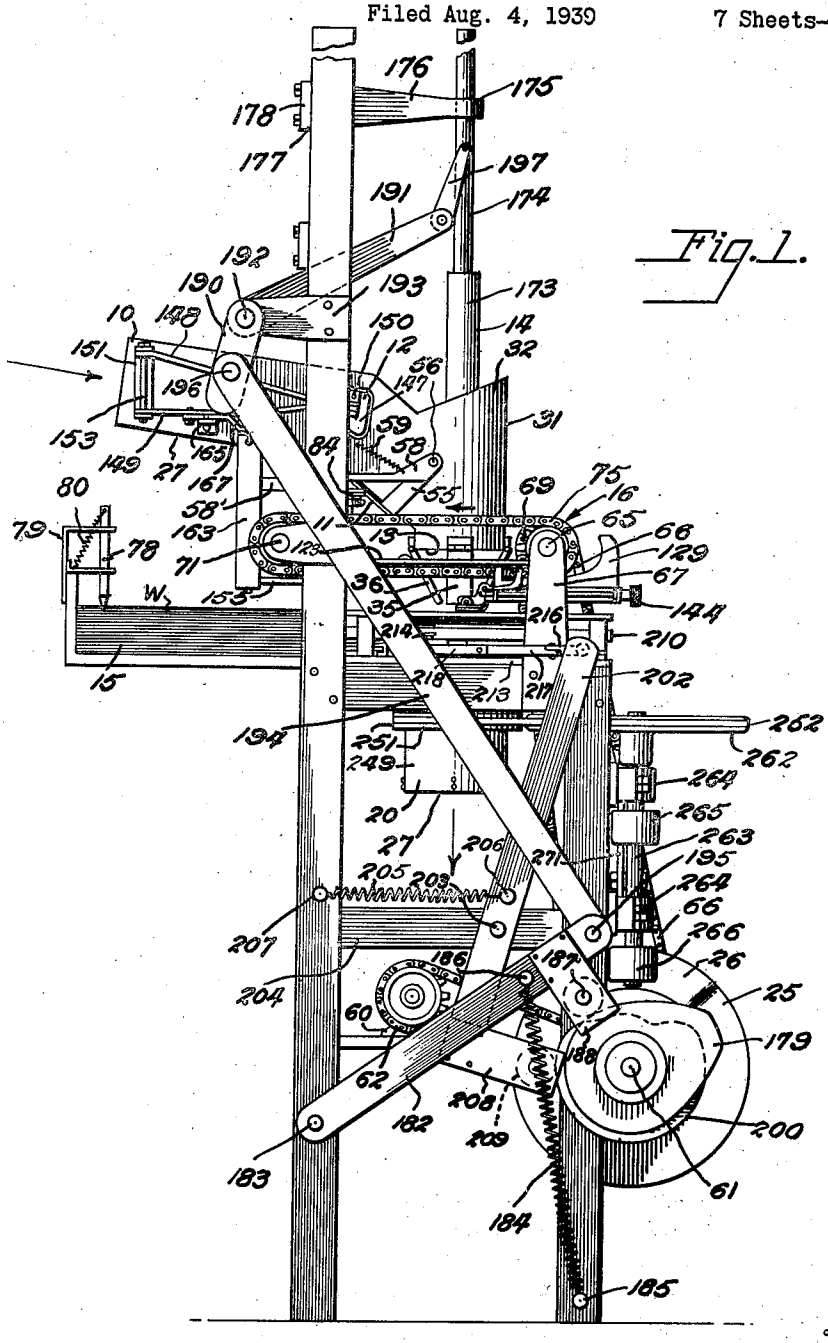


Fig. 1.

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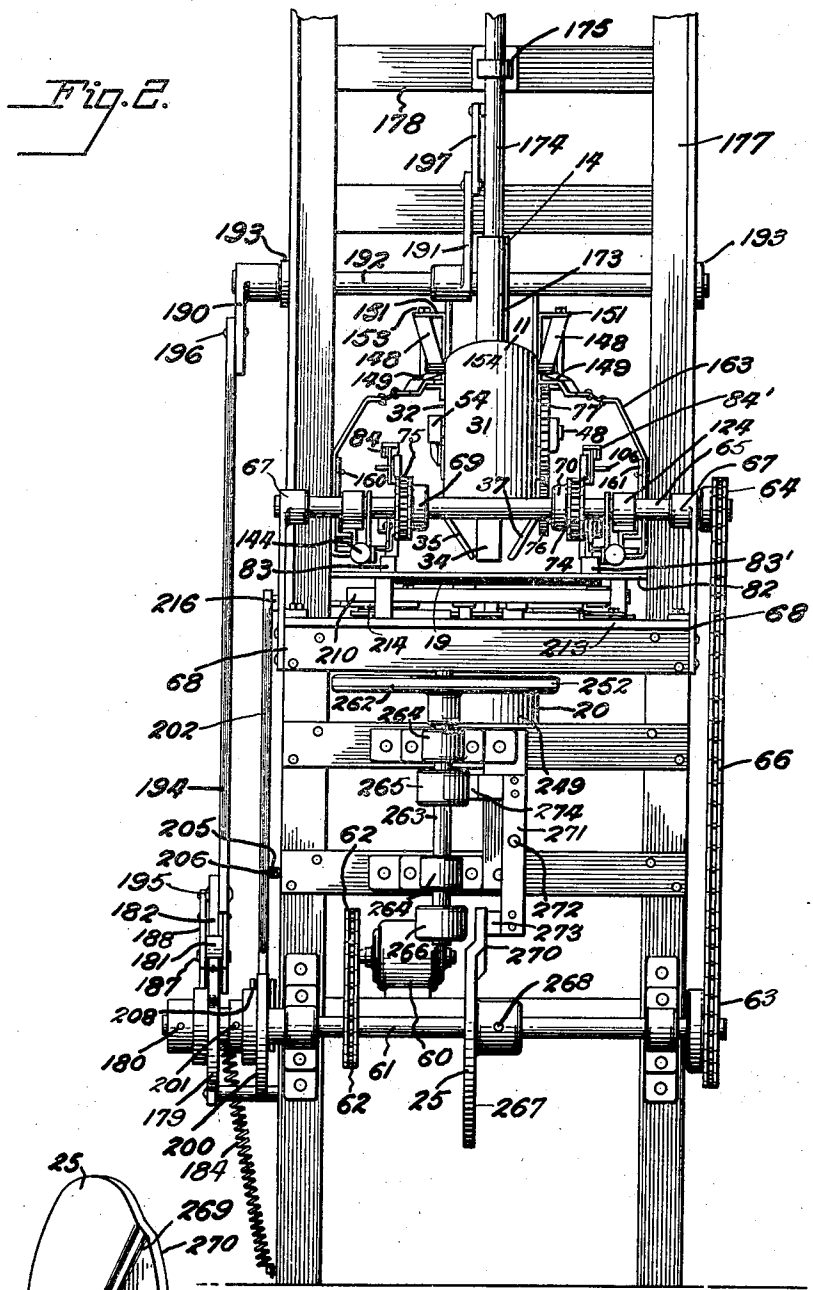
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FRUIT WRAPPING MACHINE

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Fig. 2.



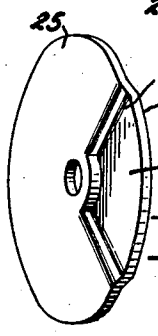


Fig. 1B.

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FRUIT WRAPPING MACHINE

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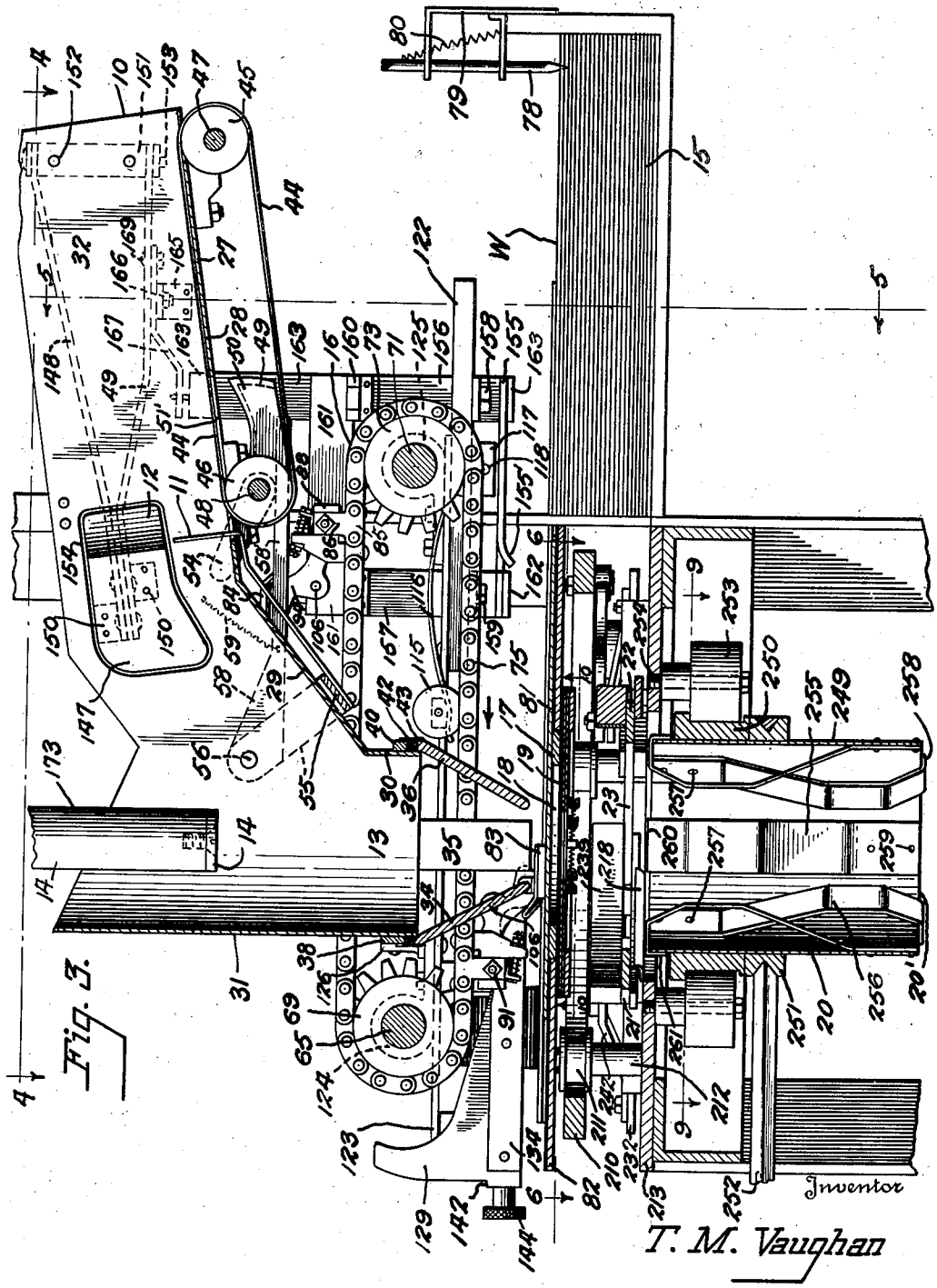


Fig. 3.

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FRUIT WRAPPING MACHINE

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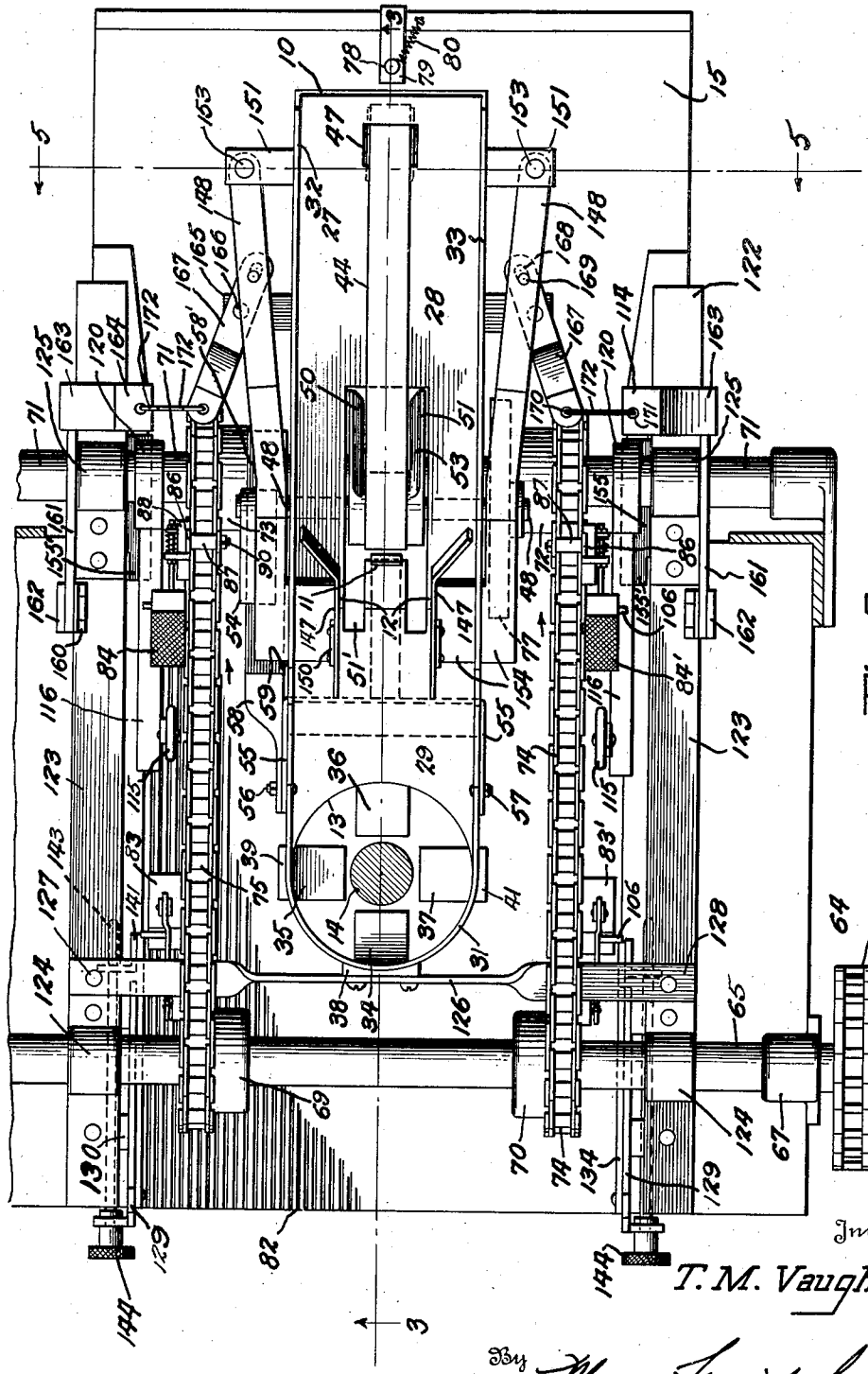


Fig. 4.

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FRUIT WRAPPING MACHINE

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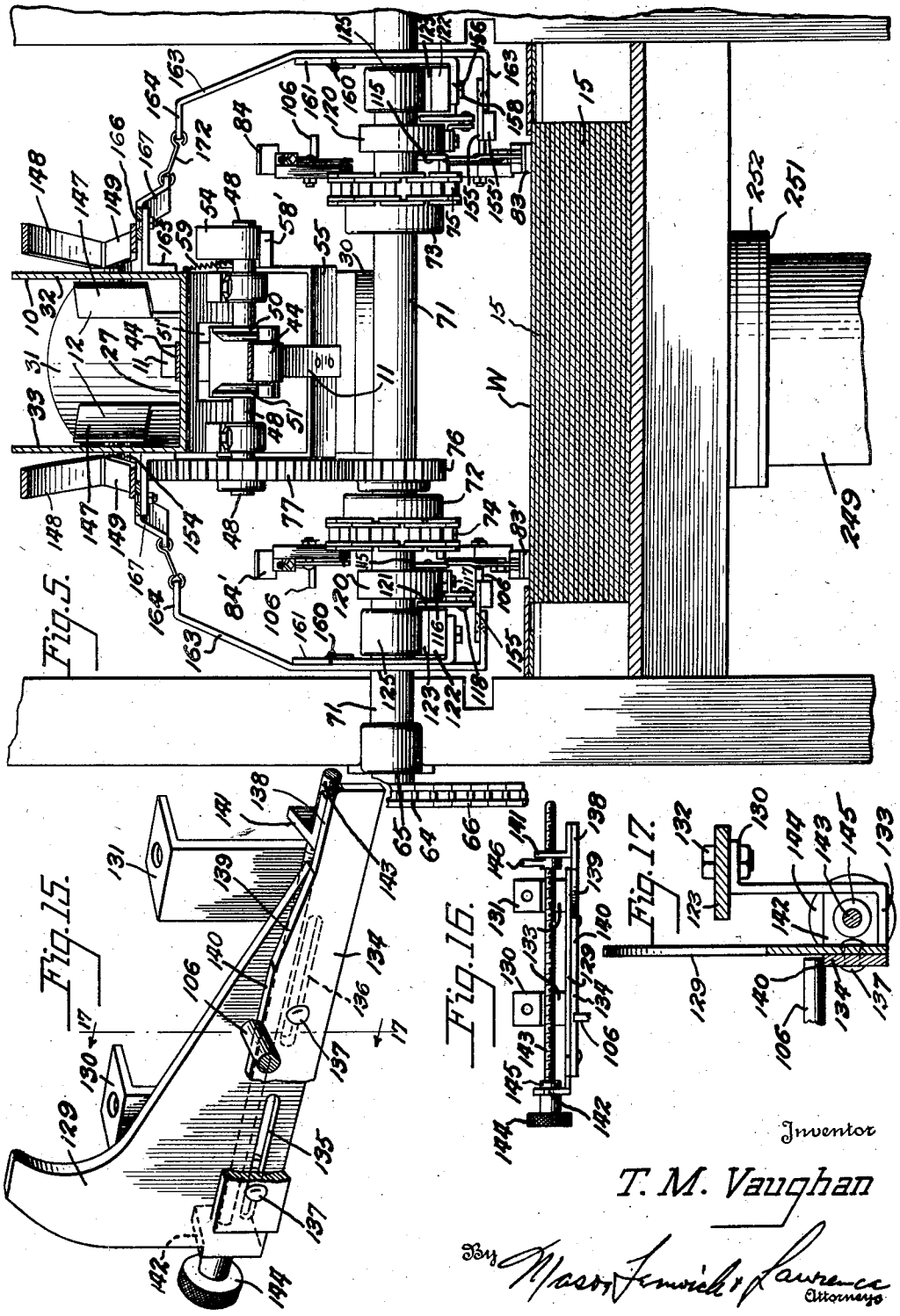


Fig. 5.

Fig. 15.

Fig. 16.

Fig. 17.

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FRUIT WRAPPING MACHINE

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Fig. 6.

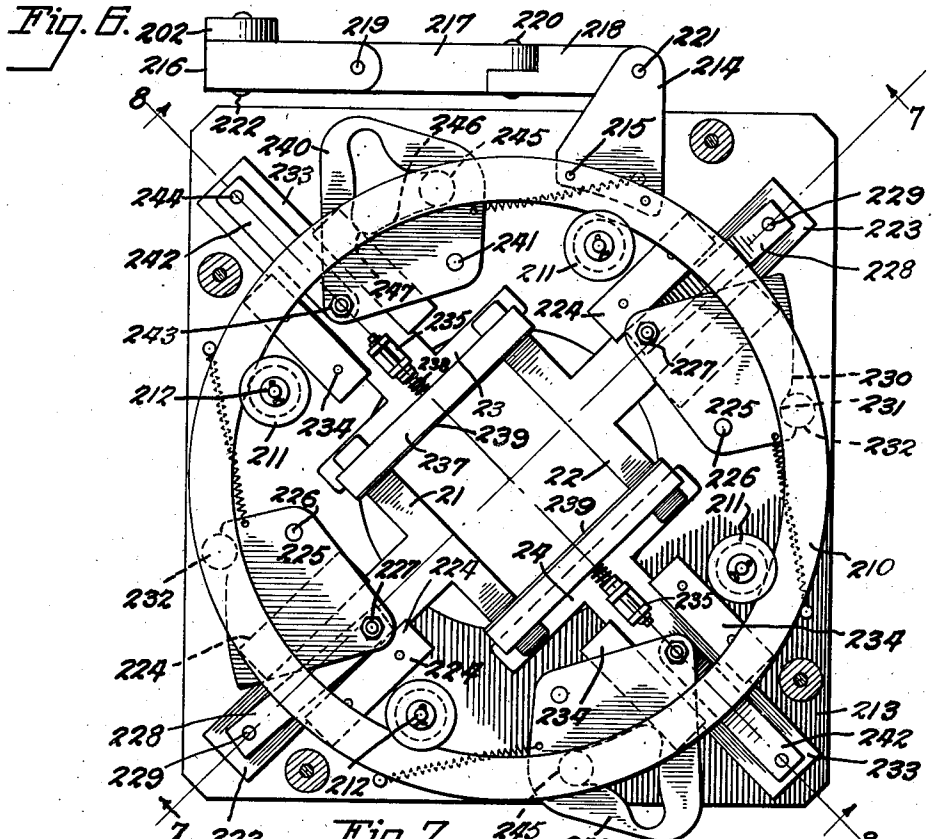


Fig. 7.

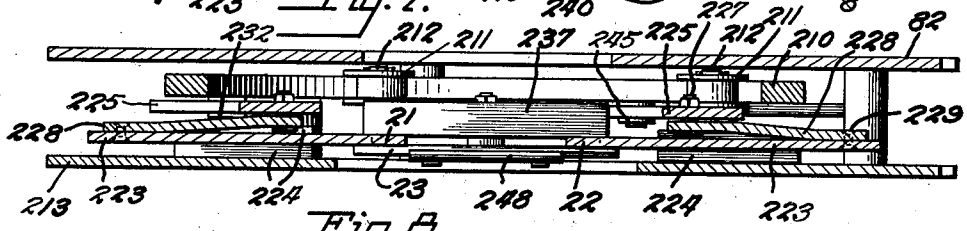
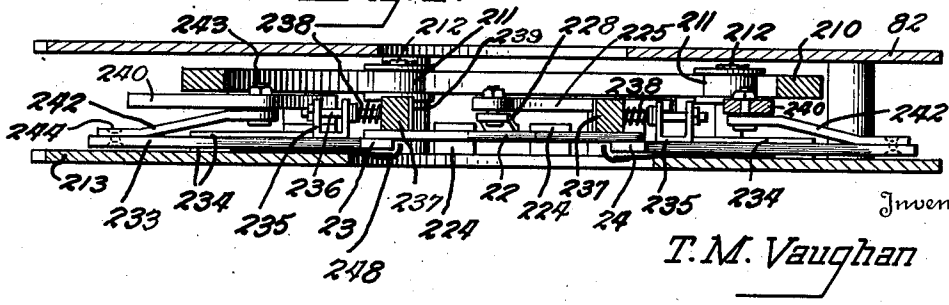


Fig. 8.



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FRUIT WRAPPING MACHINE

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Fig. 9.

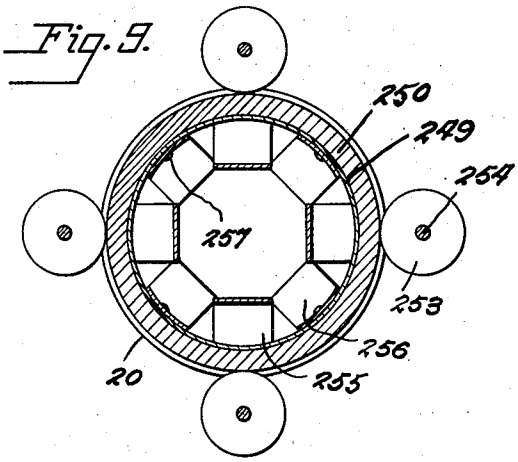


Fig. 10.

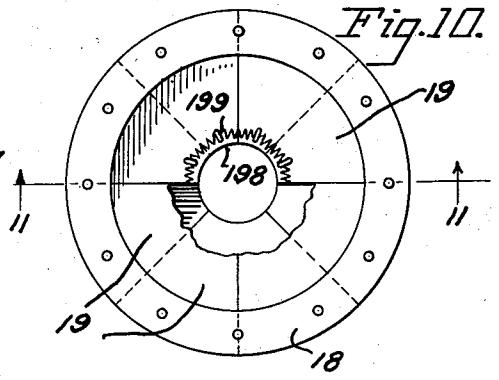


Fig. 11.

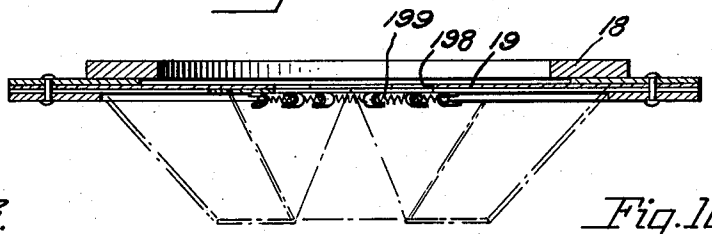


Fig. 13.

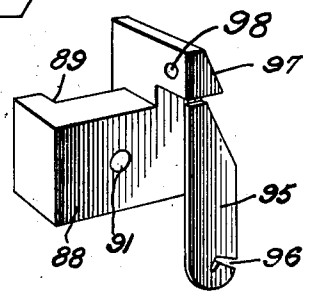


Fig. 12.

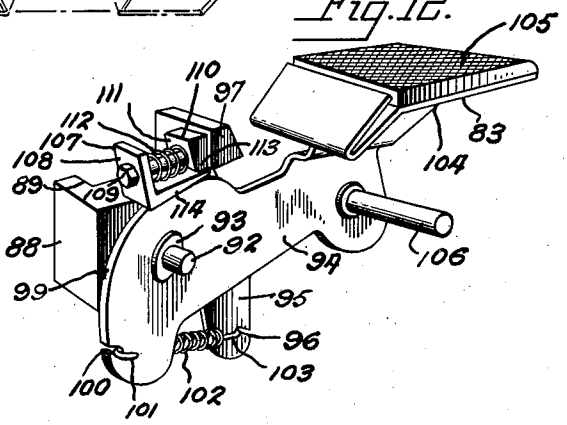
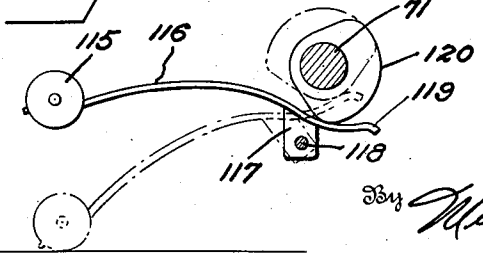


Fig. 14.



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Patented July 8, 1941

2,248,290

UNITED STATES PATENT OFFICE

2,248,290

FRUIT WRAPPING MACHINE

Thomas M. Vaughan, Tampa, Fla., assignor to Ely Meyer, Hillsborough County, Fla., a trustee

Application August 4, 1939, Serial No. 288,457

16 Claims. (Cl. 93—2)

This invention relates to wrapping machines and more particularly to machines adapted for wrapping citrus or other fruits and vegetables.

One object of this invention is to provide a completely automatic machine for wrapping fruits.

Another object of this invention is to provide a machine which will automatically apply a wrapper to the fruit.

A further object is to provide a mechanism which will avoid feeding wrappers to the machine when fruit is not in position to be wrapped.

A further object is to provide an improved orange feeding apparatus.

A further object is to provide an improved paper feeding mechanism.

Still another object is to provide an improved fruit actuated control of the wrapper mechanism.

Other objects and advantages include means for wrapping the paper closely about the fruit; means to prevent tearing of the paper wrappers; means to quickly rotate the fruit to secure the wrapper thereabout; means for stopping the wrapping operation quickly; and means arranged to force the wrapped fruit out of the mechanism.

Other objects and advantages of this invention will appear from the following description taken in connection with the accompanying drawings.

In the drawings wherein like reference characters indicate the corresponding parts in the various figures:

Figure 1 is a vertical side elevation illustrating a preferred embodiment incorporating features of this inventive concept.

Figure 2 is an end elevation of the device of Figure 1.

Figure 3 is a partial vertical section substantially on line 3—3 of Figure 4, showing the orange and paper feeding and wrapping mechanisms.

Figure 4 is a partial transverse cross-section substantially on the line 4—4 in Figure 3, showing the orange feeding and paper feeding mechanisms.

Figure 5 is a partial vertical cross-section taken substantially on line 5—5 of Figures 3 and 4, showing the interlocked fruit feeding and wrapper feeding mechanisms.

Figure 6 is a partial plan view taken substantially on line 6—6 of Figure 3, and showing the paper gripping means.

Figure 7 is a partial vertical cross-section taken substantially on line 7—7 of Figure 6, showing the folded paper gripping means.

Figure 8 is a transverse vertical cross-section taken substantially on line 8—8 of Figure 6, showing another view of the folded wrapper gripping means.

Figure 9 is a transverse horizontal partial cross-section of the partially wrapped fruit spinning mechanism taken on line 9—9 of Figure 3.

Figure 10 is a horizontal cross-section partly broken away, showing the initial wrapping mechanism and corresponding to a view substantially on line 10—10 of Figure 3.

Figure 11 is a vertical cross-section substantially on line 11—11 of Figure 10, illustrating the initial wrapping means on an enlarged scale and in extended position.

Figure 12 is a partial perspective view of one of the paper gripping means and a part of the automatic control means.

Figure 13 is a perspective view of the mounting means for one of the paper feeding gripping elements.

Figure 14 is a side elevation indicating the wrapper holding means.

Figure 15 is an enlarged partial perspective view of the paper feed adjusting cam.

Figure 16 is a plan view of the mechanism in Figure 15.

Figure 17 is a transverse section of the cam mechanism taken substantially on line 17—17 of Figure 15.

Figure 18 is an enlarged view of the combination disc-gear and cam.

In the drawings, the mechanism as illustrated is applied to a single wrapping unit; however, it will be understood that a plurality of these units may be assembled upon a single framework.

The oranges or other fruit, vegetables, etc., are automatically or manually fed into the conduit or fruit channel 10 in any suitable manner. The fruit or vegetables move by gravity to the left, in Figure 3, past the stop 11, control 12, and downwardly to the discharge outlet 13, at which point they are forced downwardly by an ejecting mechanism 14. Paper wrappers W are stored in a pile 15 from which they are fed to the left by the paper feeding mechanism 16 and are held in place at 17 below the outlet of the fruit feeding means. The ejector 14 then forces the fruit downwardly through the relatively movable shutter or wiper 18, during which movement the fruit is enfolded within the wrapper. The flexible flaps 19 yieldably engage the wrapper and urge or wipe it smoothly and tightly about the fruit being wrapped. The fruit then continues downwardly in its movement, and is gripped in

the wrapper twisting mechanism 20. While the partially wrapped fruit is held in the twisting means, the upper ends of the wrapper are gripped by the relatively movable arms 21 and 22, after which the arms 23 and 24 move inwardly to firmly grip the edges of the paper. At this time, the twisting mechanism is rapidly revolved five times by means of the disc gear 25, Figures 2 and 18, after which the step cam portion 26 of the gear disengages from the twisting drive and applies a brake to stop the rotation of the wrapped orange. At this time, the next orange is ejected by the ejector means 14, and the completed cycle of operation is repeated.

The machine is arranged to be power driven and to be completely automatic. A conveyor or conduit may continuously feed fruit into the machine inlet 10, resulting in a continuous discharge of the completely wrapped fruit from the outlet 20'. The machine is designed for economical production and operation.

Considering the drawings in greater detail, the fruit conveying chute comprises a bottom 27, preferably composed of three portions extending angularly at different angles. The initial portion 28 comprises the bottom between the entrance 10 and the limit stop 11, the portion 29 extending more sharply at an angle more or less between the limit stop 11 and outlet 13, and the final portion 30 comprising substantially a side wall portion of the outlet. The opposite end of this fruit chute is closed by an end-wall 31 and the sides are formed by walls 32 and 33. The outlet of the chute is yieldably closed by a series of spring biased pivotal doors or flaps 34, 35, 36, 37. Each flap is secured to its corresponding abutment 38, 39, 40, 41 respectively by hinges 42, utilizing springs 43 to yieldably bias the flaps into outlet closing position.

To assist gravity in moving the oranges or other fruit or vegetables through the fruit chute, an endless conveyor 44 is arranged to move with one strand extending centrally through the initial portion 28 of the chute bottom 27 to controllably and uniformly feed the articles to be wrapped against the limit stop 11, and thereafter past the limit stop and into the wrapping mechanism per se.

Furthermore, in addition to the endless belt 44 carried upon appropriate pulleys 45 and 46, which in turn are secured to the shafts 47 and 48 to respectively rotate therewith, a fruit feeding means 49 is also provided. This latter means comprises two arcuately shaped fruit engaging fingers 50 and 51, Figures 3 and 4, forming wings in pulley 46 and secured upon shaft 48. As the shaft continues to rotate, these fingers pass upon opposite sides of the conveyor 44 and rotate about the shaft 48 through the aperture 51'. The arcuate sides 52 are likewise arcuate in transverse section at 53, providing proper surface for engaging the fruit without harming the same. The spacing and angularity of these arcuate portions are arranged to properly engage oranges, grapefruit, lemons, apples, and other fruits or vegetables of various sizes.

Mounted upon the outer end of shaft 48 is a cam 54 constructed and arranged to operate the limit stop 11, Figure 5. The limit stop is pivotally supported upon the chute by means of the yoke 55, which latter is pivoted at the points 56 and 57 on the sides of the chute, Figures 3 and 4. An arm 58 is likewise pivotally secured at 56 and arranged to move in unison with the pivotal movement of the yoke 55. The arm 58 extends along the side of the chute for an appreciable distance, as indicated at 58'. The limit stop and these parts are arranged to be biased into the position shown in Figure 3, by means of the spring 59.

The continuous rotation of shaft 48 results in rotation of the cam 54 which periodically engages a portion of the arm 58', thereby withdrawing the limit stop 11 from the interior of the chute, and as the cam moves along the arm 58' gradually moving the limit stop to a maximum downward position and subsequently allowing it to be restored to the position indicated in Figure 3. This cyclic operation forces a fruit which has been stopped against the limit stop, periodically through the chute.

The continuous rotation of these parts by means of a source of power is obtained from an electric motor 60, Figure 2, or other source of power, arranged to drive a main drive shaft 61 by gearing or belting 62. At the right hand end of this shaft, as viewed in Figure 2, is mounted a sprocket wheel 63. Another sprocket wheel 64 is secured to the outer end of a cross-shaft 65, which latter is located near the level of the wrapping table of the machine. A sprocket chain 66 interconnects the two sprocket wheels and serves as the means for transmitting power between them. The shaft 65 is supported within bearings 67, mounted at opposite sides of the machine and secured to the framework 68. At each side of the chute and secured to this shaft are additional sprocket wheels 69 and 70. At the rear of the machine framework is similarly mounted a transverse shaft 71, Figure 4, carrying similarly secured sprocket wheels 72 and 73. Rotation of the shaft 71 is effected by means of two sprocket chains 74 and 75, which encircle the respective pairs of sprocket wheels 70—72 and 69—73. Gear wheels 76—77 are mounted respectively upon the shafts 71 and 48 and thereby effect rotation of the shaft 48.

It will, therefore, be seen that so long as the power means 60 is in operation, the shaft 48 will continue to operate. If desired, however, a clutch may be placed between the power source and the main shaft 61, but since the relative weight of the moving parts is small and the load relatively light, a direct connected power drive can be readily used.

The supply 15 of wrappers W are stored upon the machine so that individual wrappers may be fed into the mechanism for the purpose of wrapping each article of fruit. A pointed member 78 is carried by the bracket 79 and biased by spring 80 into engagement with two or three of the wrappers W. In this manner, it will require a definite application of force to remove each individual wrapper 81, and a very small tear in the wrapper will occur when it is released from the pin. The individual wrappers, when removed from the storage pile 15, are carried across the wrapping plate 82, which is grooved, as clearly seen in Figure 4, to prevent the wrappers from sticking in the machine.

To effect this feeding of individual wrappers into the machine, wrapper feeding mechanism is provided, including wrapper gripping elements carried at each side of the chute. These elements are carried upon the sprocket chains 74 and 75, and comprise pairs of paper gripping elements 83—83' and 84—84', spacedly secured upon the sprocket chains.

The paper gripping elements are secured upon the sprocket chain by link members 85 having

transversely extending apertured arm portions 86. The two link members are spaced by cylindrical member 87. A backing and adjusting block 88, as seen in Figure 13, is adapted to receive one of the vertical link elements within the recess 89. The tubular spacer, the two links and the block are secured together by bolt and nut 90, which extend through the aperture 91 in the block.

As seen in Figure 12, the bolt 90 has a rounded head 92, which rests against a washer 93, so as to hold the paper engaging pad mechanism, including the pivoted arm 94. The block 88 has integrally formed therewith a bracket arm 95 provided adjacent its lower end with a receiving slot 96. The upper end of the block is provided with a laterally extending boss 97 which is apertured at 98.

The arm 94 is preferably made of sheet metal of appropriate thickness having an arcuate cam surface 99 extending about its pivot axis, which extends through the bolt 92. A notched slot 100 is arranged in this bell crank shaped member receiving the end 101 of a spring 102 having its opposite end 103 in slot 96. The spring and these two slotted connections are so arranged as to urge the paper engaging mechanism outwardly; that is, away from the carrying sprocket upon which it is carried.

Adjacent the opposite end of the pivoted bell crank 94 the metal parts are folded to provide a supporting shelf or base 104. Upon this shelf is secured a paper engaging pad 105, which is of appropriate composition, to suitably engage the paper. It may be a rubber composition or any other suitable material. Oppositely disposed along the same general portion of the bell crank is a pin 106 extending laterally therefrom, and arranged for cooperation with other parts of the apparatus, as will be more clearly set forth hereinafter.

An adjusting mechanism for the paper feeding members is provided to allow for variations in paper thickness, as well as for controlling forces exerted upon the paper during the feeding operation. This mechanism comprises a cam or bracket 107 in the form of an angle, having an apertured arm 108 which is supported upon a bolt 109, threaded into the hole 98 on the block 88. An abutment block wedge-shaped to provide a face 111 normal to the axis of the bolt 109, serves as one abutment for the spring 112, which encircles the bolt 109 and abuts the arm 108 at its opposite end. The lower surface 113 of the block 110 is a backing face for the end of the arm 114 of the angle 107. As noted in Figure 12, the arm 114 is tapered to throw the lower face out of parallel with the bolt 109. Turning bolt 109 into or out of the hole 98 a greater or less extent against the compression of spring 112, moves the lower surface of the arm 114 longitudinally to provide an abutment for the cam-shaped face 99 respectively further away from or nearer to the line of the bolt 109 to position the surface of the gripper 105 relative to the block 88 in accordance with the desired gripping engagement against the paper. To increase the gripping action of 105, the bolt 109 is retracted, and it is rotated into the hole 98 of the block 88 to decrease gripping action.

The operation of this paper feeding mechanism can now be understood, and takes place in the following general manner: The sprocket chains 74 and 75 moving in the direction of the arrows, in Figures 1, 3 and 4, allow the paper gripping elements 83 and 84, etc. to engage the surface of the uppermost sheet of paper 81. Continued movement of the sprocket chain applies a pulling force to the topmost sheet, tearing it free from the pin 78 and feeding it across the plate 82 until it is centered below the fruit outlet 13. At this point, the paper is engaged by paper holding means, and the paper gripping means is released automatically.

The paper feeding mechanism is driven from the power source 60 as a result of the chain drive inter-connecting the shafts 61 and 65 on the one hand, and shafts 65 and 71 on the other.

This automatic operation is obtained by control of the paper feeding mechanism on the one hand and control of the paper holding mechanism on the other. The control of this latter mechanism will be discussed first.

The means for yieldably holding the wrappers in position for enfolding the fruit includes wrapper engaging rollers 115, one of which is pivotally located at each side of the fruit outlet 13. These rollers are rotatably supported on spring arms 116 which latter are secured to bearing brackets 117, and pivotally mounted on shafts 118. The spring arms 116 extend beyond the pivot, having a portion 119 which is engaged by the cam 120 secured to shaft 71. The rotation of the shaft 71, being coordinated with the other rotating or moving parts of the machine, as previously described, and having a cam surface 120 of proper shape secured thereon, is effective in allowing the rollers 115 to drop into engagement with the wrapper at the proper time. The rollers 115 are heavier to the left of their pivots 118, as seen in Figure 14, so that gravity urges them toward the wrappers, whereas the cam 120 controls their movement away from and toward the wrapper.

As seen in Figure 3, a wrapper 81 is being moved into position. The wrapper engaging elements 83 will continue to move to the left, in Figure 3, approximately to the position of the nut 91, before they are released from the wrapper. At such moment, the cams 120 will have operated to lower the paper holding rollers 115. This cycle of operation will continue throughout the operation of the machine, with the paper engaging elements normally gripping a sheet of paper moving it into position and then being released therefrom, with the paper holding means engaging the paper when it is released from the gripping means and continuing to yieldably engage it until the fruit is partially enfolded by the wrapper.

The pivot shafts 118 are secured to a downwardly extending bracket 121, which in turn is fastened to the frame support 122. The latter is secured to frame plates 123 which extend on each side of the machine from the wrapper supply to the opposite end. These frame plates are supported upon the shafts 65 and 71 by means of bearing brackets 124 and 125 respectively.

A metal strap 126 has its opposite ends 127 and 128 secured to the frame plates 123, and is also secured centrally to the wall 31 of the fruit feeding chute.

The automatic control of the paper feeding mechanism release will now be more particularly described. This mechanism is likewise supported upon the frame plates 123, but is secured thereon adjacent the opposite ends from which the paper holding means are mounted.

Guard plates 129 are secured to the frame plates 123 by means of brackets 130 and 131, bolted thereon by the bolts 132, which brackets

are integral parts of the plates, as clearly seen by the section in Figure 17. This integral arrangement is the result of the inter-connecting strap or saddle portions 133. The cam 134 is slidably secured upon the plate 129, being mounted to slide in the slots 135 and 136 of the cam by means of pins 137. Cam surface 138 will extend below the pins 106 in their normal travel, having the surface 139 for raising the pin and paper engaging mechanism away from the paper. The upper surface 140 of the cam is such as to carry the cam until the curvature of the sprocket chain moves the pin away from the cam.

For the purpose of adjusting the cam, a threaded bracket 141 is secured to one end of the slide cam, and a bracket 142 is integral with the plate 129. A long screw 143 is arranged to engage the threaded aperture into bracket 141 and causes the slide cam to move to the right or left. This screw is operated by a thumb wheel 144 and is rotatably secured to the bracket 142 by locking collar 145. A thumb nut 146 is threadably engaged with the screw and can be used to lock the screw against the bracket 141 so that after setting the cam for operation at an appropriate point, further movement of the cam will be prohibited. As clearly seen in Figure 3, the pin 106 will ride up the cam surface and move the member 83 off of the paper.

The feeding of the fruit and feeding of the wrappers has been set forth. The interlocking automatic control of these two feeding mechanisms will now be set forth.

The control 12 includes a pair of pivotally supported fruit engaging gates 147, which are angular in transverse section, as clearly seen in Figures 4 and 5. These gates are located on opposite sides of the fruit chute and are rigidly secured to upper and lower arms 148 and 149 by means of the bolted bracket connection 150, as seen in Figure 3. These arms are pivotally secured to the channel shaped bracket 151, which is secured to the outer walls of the chute 10 by fastening means 152. The pivotal connection is accomplished by means of the pin 153. The arms 148 and 149 are provided with laterally extending plate portions 154 which extend through the side walls of the chute 10 and provide the parts directly connecting the brackets 150 to the arms. A study of the various figures shows that these arms and their gates may readily move about the pivot axis 153.

With the gates as thus far described, fruit, acting by gravity, might open the gates of their own weight; however, additional parts of the control mechanism are connected to these arms by appropriate levers in such a manner that the weight of said parts acts against the weight of the fruit, and thereby urges the gates in the position which precludes the passage of fruit. As a result of this arrangement of parts, it is necessary for the fruit to force the gates apart in passage through the chute. The members 50 provide the necessary power to force the gates away from each other. The control from the fruit engaging gates is duplicated at each side of the fruit chute, and the description of the parts at one side of the chute will be sufficient, it being readily understood that corresponding parts are located at the opposite sides of the chute and similarly numbered.

At each side of the machine is mounted mechanism for controlling the paper feed. This control is accomplished by arranging to hold the paper gripping means away from the paper supply during that portion of its movement wherein it can engage the top wrapper W. To do this, guide members 155 are mounted at either side of the machine to engage the pins 106 and hold the paper gripping pads 84 away from the paper. Brackets 156 and 157 are secured to the longitudinally extending frame element 122 by bolts 158 and 159 respectively. At the upper ends of each of these L-shaped brackets are secured hinge bearings 160, which have their upper portions secured to a longitudinally extending brace 161 which extends between the two brackets, as readily seen in Figure 3. To the outer side of the brace 161 and adjacent the supporting brackets are secured L-shaped members arranged to jointly support the guide member 155. The L-shaped member 162 is shorter in length than the member 163, the latter having an upwardly extending arm, at the top of which is located a laterally extending flange 164, extending toward the fruit chute. The guide member 155 is provided with a downwardly extending arcuate portion 155' which allows the pin 106 to gradually approach its normal position.

With the parts as shown in Figure 5, pin 106 on the paper engaging means during its movement about the shaft 71, will engage the upper surface of the guide 155. This will act against the springs 112, thereby holding the paper engaging pad above the topmost wrapper W. As the sprocket chains continue to move, the paper gripping means will be carried to the left, in Figure 3, and the pin will ride down off of the portion 155' thereby allowing the paper gripping element to return to its normal level of travel. At this point, however, it will have completely passed the wrapper pile 15, so that it will be unable to grip a wrapper.

When fruit passes through the chute 10, the gates 147 will be forced apart, and in turn will remove the guide just described transversely of the mechanism and into a position whereby it will be unable to engage the pins 106. This is accomplished by inter-connecting the upper flange 164 of the guide carrying arm 163 to the supporting lever system 149 of the fruit gates. A bracket 165, secured to the outer wall of the chute, has a laterally extending arm to which is pivotally connected at 166 a lever 167. One end of the lever 167 is provided with an elongated aperture 168, and is pivotally connected to the arm 149 by means of the pin 169. Movement of the fruit gates will therefore effect a rocking movement of the lever 167 about its pivot point.

The opposite end of the lever 167 is provided with an aperture 170, similar to an aperture 171 and the flange 164. These two apertures are inter-connected by link 172, tieing together the lever and the L-shaped bracket member.

It will now be understood that passage of the fruit through the fruit chute will cause the gates 147 to move outwardly, as seen in Figure 4, and in turn move the levers 148 and 149 about their pivot points. This will move the right-hand end of the lever 167 in a counterclockwise direction about its pivot, in turn pulling upon the link 172, thereby rocking the entire supporting structure of the guide 155 with the result that the guide is moved to the right, as seen in Figure 5, to such a point that it cannot engage the pins 106. With the parts as thus described, passage of fruit allows the feeding of a wrapper into position below the outlet of the fruit chute, and a lack of fruit in the chute allows the guide 155 to prevent the feeding of a wrapper into the machine.

The mechanism as thus far described is capable of automatically feeding fruit and wrappers to the outlet 13 of the chute, and to position them at this point for automatic wrapping. With the wrapper positioned centrally below the outlet 13, and the fruit located above the wrapper, the folding of the fruit within the paper wrapper then takes place to complete the wrapping operation. The first step in this direction is accomplished by the ejecting mechanism 14 which forces the fruit through the spring flaps 34, downwardly against the wrapper.

The ejecting mechanism comprises a plunger 173 having an enlarged lower end, which is carried by slide rod 174 arranged to slide through appropriate bearings 175 carried upon supporting arms 176, which are in turn secured to cross-members at 178 of the framework 177. Vertical movement of this push-rod 174 is coordinated with the operation of the other parts of the mechanism, and the movement itself is controlled by means of the outer cam 179 secured to shaft 61 by a pin connection 180. Movement controlled by the cam surface is transmitted to the push-rod by a system of links and levers. The cam follower comprises a roller 181 pivotally supported upon the cam follower arm 182, which latter is pivoted on the frame at 183 and urged downwardly by means of the spring 184, which latter is secured to the front frame structure at 185 and to the follower arm at 186. The follower itself is supported upon the shaft 187 carried by the oppositely disposed plates 188, which are fastened to the follower arm 182, as indicated.

A bell crank in the form of two separate crank arms 190 and 191 is secured on the shaft 192, which latter is carried by bearing brackets 193 appropriately secured to the frame. The right-hand end of the follower arm 182 is connected to the crank arm 190 by a link arm 194, which is pivotally secured to the follower arm at 195 and to the crank arm at 196. The crank arm 191 is connected to the push-rod 174 by a link 197.

Rotation of the shaft 61 in turn causes the cam 179 to turn, imparting its control surface motion to the follower 181. The follower moves in an arc about its pivot point 183, transmitting its motion by link 194 to the bell cranks operating about their pivot axis 192. This motion causes a thrust or pull upon the link 197 resulting in the vertical reciprocation of the ejecting mechanism 14.

The downward thrust on the ejector forces the fruit from the outlet 13 down through an aperture in the machine bed plate 82. The opening is surrounded by the shutter mechanism 18, comprising a series of flexible flaps 19 arranged so that their radially inner ends form a relatively small opening 198. The inner ends of the flaps are yieldably held together by means of a spring annulus 199, which is secured to each of the flap parts. The upper surface of the ring 18 is flush with the machine plate 82 and the parts are arranged to be forced into the dotted position by a fruit moving under the force of the ejector.

As illustrated in detail in Figure 10, the flaps 19 are disposed in overlapping relationship to provide sufficient width to the several flaps for complete contact throughout the circumference of a piece of fruit when the flaps 19 are deflected by the fruit being projected through the shutter mechanism 18. Pursuant to this purpose, according to the disclosed embodiment, there are two sets of flaps disposed in face to face relationship held between the rings of the shutter 18 by any suitable means, such as the rivets shown, Figures 10 and 11. In accordance with the shown embodiment, each set of flaps comprises four vanes projecting radially inwardly, each comprising a quadrant of the circle. The four vanes of each set may complete the circumference of the circle, as shown, or there may be a gap between adjacent vanes of a set. The respective sets of vanes are displaced relative to each other to the extent of 45°, to dispose the quadrants of the respective sets of vanes 45° apart. By this means any gap between adjacent vanes of one set, such as occurs when they are projected out of their plane of rest by a piece of fruit, is covered by the body of a vane of the other set. The annular spring 199 cooperates with the inherent resilient nature of the vanes to press them toward the surface of the fruit throughout its circumference, to wipe the interposed wrapper smoothly against the fruit surface. The spring 199, being disposed on the bottom surface of the lowermost set of vanes, which is the forward surface in the direction of travel of the fruit, provides a spring backing for all vanes to urge them toward the fruit as it is projected through the shutter 18, and to urge the sets of vanes to their planes of rest after the fruit has been projected through the shutter.

As the fruit is forced downwardly upon the wrapper 81 and then through the shutter mechanism, the wrapper is firmly, yet yieldably enfolded about the fruit, with the partially enfolded fruit continuing to the twisting mechanism 20. The shutter flaps close in upon the wrapper and yieldably hold the loose ends of the same. The shutter flaps will have a sphincter-like method of operation with all of its adjacent flaps moving uniformly outwardly to enlarge the circumference of the opening 198, until the partially enfolded fruit has passed through this opening and then the plurality of flaps will be drawn uniformly inwardly to reduce the opening to its normal diameter.

The next step in the fruit wrapping operation will be a more complete folding of the wrapper about the fruit. The continued downward movement of the partially wrapped fruit moves the fruit into the mechanism 20, while leaving the loose ends of the wrapper extending through the opening 198. With the partially wrapped fruit in this position, the wrapper is then more tightly pressed about the fruit. The arms 21 and 22 are moved inwardly to a position where they very loosely grip the loose edges of the partially enfolded wrapper. Then the arms 23 and 24 are moved inwardly firmly engaging the loose ends of the wrapper and holding the same in a small compact mass. This is accomplished by a power operated means driven by the electric motor 60, through a control cam 200 secured to shaft 61 at 201, and by appropriate levers and links to transmit this motion to the wrapper gripping means.

A crank 202 is pivotally supported at 203 upon a horizontal frame member 204, and is biased in a counterclockwise direction, as viewed in Figure 1, by means of the spring 205 connected to the crank arm at 206 and to the frame at 207. The lower end of this crank is bifurcated at 208, holding a cam following roller 209 arranged in a similar manner to the follower on crank arm 182. The control surface of cam 200 is so designed and arranged to give the proper movement to the lever 202 and to coordinate the paper gripping arms with the operation of the remain-

ing parts of the apparatus. The operation of the paper gripping arms is directly controlled by a ring cam 210, which is rotatably supported beneath the shutter mechanism by a series of channel shaped roller bearings 211, each of which is rotatably mounted upon an appropriate shaft 212, which in turn is secured to the machine frame plate 213. The ring cam 210 is freely rotatable in this bearing support, and is arranged to be oscillated therein by the lever 202 moving in response to its cam control 200. The motion of this lever is transmitted to the ring cam by a series of links or levers inter-connecting the lever 202, and a bracket 214 secured at 215 to the ring cam. This connection is so arranged as to provide in effect a universal connection between the lever and bracket to allow for the arcuate motion of the bracket in one plane, and the arcuate motion of the lever in a plane at right angles thereto. Three links are used for this purpose, comprising link members 216, 217 and 218. Links 216 and 217 are connected by a pivot 219 providing relative movement in one plane, and links 217 and 218 are inter-connected by a pivot 220 providing relative movement in a different plane. Link 218 is connected to the bracket by pivot 221, and link 216 is connected to the lever by pivot 222. As a result of this arrangement, links 216 and 217 serve as a unitary connection between the pivot points 220 and 222, whereas links 217 and 218 serve as a unitary connection between the pivot points 219 and 221. The effect of the oscillating movement of the ring cam 210 will now be explained.

Arms 21 and 22 are T-shaped in plan view, as clearly seen in Figure 6, having the leg 223 of the T arranged to slide between appropriately slotted guide members 224.

Cam cranks 225 are pivotally supported upon the plate 213 by bearing pivots 226. One end of the cam crank is connected at 227 to a link 228, and the latter is pivoted at 229 upon the leg 223 of the T. The outer surface 230 of these cam cranks is provided with a depression 231 to receive rollers 232 which serve as the actuating means carried by the cam ring. Partial rotation of the cam ring 210 in a counter-clockwise direction, as viewed in Figure 6, allows the roller 232 to rotate the cam about its pivot, thereby pulling the link 228 toward the center of the mechanism, and in turn moving the T arm 22 toward the center of the opening. At the same time, the arm 21 moving in the opposite direction and approaching the arm 22, provides a loose gripping of the loose ends of the partially folded wrapper.

Similarly shaped T-head arms 23 and 24 have the legs of the T 233 similarly arranged to move between guides 234 and located at right angles to the just described arms. Each of these arms carries a channel bracket 235, having each leg of the channel apertured to receive a bolt 236 carrying at its outer end a spaced arm element 237, which is yieldably urged toward the central opening of the machine by a spring 238. The radially extending faces of these auxiliary arms are provided with yieldable or resilient surfaces 239 to grip the wrappers. These arms are double, as readily seen in Figure 8, having the lower T cross head 23 and the upper cross head 237. They are vertically spaced to allow the angularly disposed arms 21 and 22 to slide between them, as readily seen in Figure 8. These arms move radially inwardly, engaging the relatively compacted ends of the wrapper which are relatively loosely held between the arms 21 and 22, and firmly gripped.

Relative movement of these arms is accomplished in a somewhat similar manner to the previously described arms, but by means of a differently shaped cam so that the first set of arms will come together before the second set of arms move inwardly. This movement is accomplished by means of cam 240 pivoted on the plate 213 by bearings 241, and having one part of the cam ring connected to a link 242 at 243, with the opposite end of the link connected at 244 to the leg of the T arm. The rollers 245 carried by the ring cam in this case roll upon the arcuate surface 246, without causing any relative movement of the cam crank. However, when the roller reaches the end 247 of this part, it is beyond the fulcrum 241 and causes the cam crank to move about its pivot thrusting the arms inwardly.

These arms carry spring members 248 which are arranged to smooth the paper about the fruit. Reverse rotation; that is, clockwise rotation of the cam ring 210, results in a restoration of the crank cams to the position shown in Figure 6 and a consequent opening or outward movement of the arms.

The next step in the operation of the machine results in the wrapper being firmly and tightly engaged upon the fruit, as a result of the movement of the twisting mechanism. The twisting mechanism and its operation will now be described in greater detail.

This mechanism comprises a substantially cylindrical sheet metal member 249 which is secured to a bearing annulus 250, having at its lower end a pulley annulus 251, which latter is arranged to be driven by appropriate belt 252. The bearing annulus is supported upon a plurality of roller bearings 253 supported on the lower face of the frame plate 213 by bolted bearings 254.

Within the cylinder 249, a plurality of biased spring elements 255 and 256 are secured at their opposite ends. The spring elements 256 are secured to the cylinder at their upper ends by rivets or other means 257, extending downwardly and having their lower ends 258 provided with upwardly extending flanges positioned exteriorly of the cylinder. The other alternate series of spring elements 255 are riveted at 259 to the lower end of the cylinder, and have their upper ends 260 provided with flange portions 261, extending exteriorly of the cylinder. These mechanisms firmly engage the fruit throughout its motion through them, providing a wave motion as a result of movement of the fruit through this device. The enfolded fruit is firmly gripped by these spring elements, and then the twisting mechanism is rapidly rotated approximately five times to tightly twist the wrapper about the fruit. This twisting motion is accomplished by power drive through the belt 252. This belt passes about a pulley 262, which is fastened to shaft 263, which latter is supported upon the framework of the machine by two bearings 264.

The shaft 263, in addition to the foregoing pulley, also carries two pulley wheels 265 and 266 respectively. The former serves as a brake wheel, whereas the latter serves as a cylindrical pinion wheel. A disc-cam wheel 267 is keyed on shaft 61 at 268 and rotates with this shaft. The circumference of this disc-gear is stepped

at 26, and the remaining portion of the disc-gear is of such extent as to rotate wheel 266 five times during one rotation of the disc-gear cam 267. Rotation of this member engages the wheel 266 and spins the twisting mechanism five times, at which time the edge 269 of the cam arrives at the wheel and dis-engages the surface of the disc-gear from the wheel 266. This removes the power drive from the twisting mechanism. The twisting mechanism would continue to rotate, however, but for the purpose of quick and efficient operation, the step portion has a cam face 270 which serves to control a brake and stopping the rotation of the twisting means. Lever 271 is pivoted upon the machine frame at 272, having at its lower end a cam follower 273, and at its upper end a brake shoe 274. As soon as the follower rides upon the cam surface, the brake shoe is engaged with the brake wheel 265, and the twisting means is stopped from rotating.

Although a preferred embodiment of this invention is illustrated and described, variations within the true spirit and scope of the same are to be determined by the appended claims.

What I claim is:

1. In a wrapping machine for fruit and the like, a wrapper wiper comprising an annulus of a size sufficient to permit passage of the largest fruit to be accommodated by the machine, a plurality of flaps of flexible material fixed to the annulus and disposed radially to provide a web-like closure for the annulus, the flaps overlapping each other in their normal position and being of sufficient width to provide an enclosed passage for the fruit when they are deflected out of their normal position.

2. In a wrapping machine for fruit and the like, a wrapper wiper comprising an annulus of a size sufficient to permit passage of the largest fruit to be accommodated by the machine, a plurality of flaps of flexible material fixed to the annulus and disposed radially to provide a web-like closure for the annulus, a wrapping mechanism disposed on one side of the wiper, means to transport wrappers successively and to position them across the face of the annulus opposite the wrapping mechanism, means to project the fruit against the wrapper through the annulus and beyond to the wrapping mechanism carrying the wrapper with it, the flaps of the wiper being of sufficient width to overlap each other in their normal position and to provide an enclosed passage for the fruit when they are deflected out of their normal position by the passage of the fruit, whereby the wrapper is wiped smoothly against the surface of the fruit.

3. In a wrapping machine for fruit and the like, a wrapper wiper comprising an annulus of a size sufficient to permit passage of the largest fruit to be accommodated by the machine, a plurality of flaps of flexible material fixed to the annulus and disposed radially to provide a web-like closure for the annulus, a wrapping mechanism disposed on one side of the wiper, means to transport wrappers successively and to position them across the face of the annulus opposite the wrapping mechanism and centered therewith, means to project the fruit against the wrapper through the annulus and beyond to the wrapping mechanism carrying the wrapper with it, the flaps of the wiper being of sufficient width to overlap each other in their normal position and to provide an enclosed passage for the fruit when they are deflected out of their normal position by the passage of the fruit, whereby the wrapper is wiped smoothly against the surface of the fruit in precise position.

4. In a wrapping machine for fruit and the like, a wrapper wiper comprising an annulus of a size sufficient to permit passage of the largest fruit to be accommodated by the machine, a plurality of flaps of flexible material fixed to the annulus and disposed radially to provide a web-like closure for the annulus, a wrapping mechanism disposed below the annulus, means to transport wrappers successively and lay them on the annulus, means to transport fruit successively and position them upon successive wrappers, means to project the fruit through the annulus carrying the wrapper with it to and into engagement with the wrapping mechanism, the flaps of the wiper being of sufficient width to overlap each other in their normal position and to provide an enclosed passage for the fruit when they are deflected out of their normal position by the passage of the fruit whereby the wrapper is wiped smoothly against the surface of the fruit, and means to operate the wrapping mechanism to envelop the fruit in the wrapper.

5. In a wrapping machine for fruit and the like, a wrapper wiper comprising an annulus of a size sufficient to permit passage of the largest fruit to be accommodated by the machine, a plurality of flaps of flexible material fixed to the annulus and disposed radially to provide a web-like closure for the annulus, a wrapping mechanism disposed on one side of the wiper and comprising grippers in line with the annulus, means to transport wrappers successively and position them across the face of the annulus opposite the wrapping mechanism, means to transport pieces of fruit successively into engagement with the successive wrappers, means to project the fruit through the annulus carrying the wrapper with it and into the grippers, the flaps of the wiper being of sufficient width to overlap each other in their normal position and to provide an enclosed passage for the fruit whereby the wrapper is wiped smoothly against the surface of the fruit and the edges of the wrapper are gathered, laterally movable fingers between the grippers and the annulus, means to move the fingers laterally in timed relationship with the engagement of the fruit by the grippers to hold the gathered edges of the wrapper, and means to rotate the grippers relative to the fingers to envelop the fruit in the wrapper.

6. In a wrapping machine for fruit and the like, a wrapper wiper engaging the wrapper uniformly throughout the circumference of the fruit to wipe the wrapper smoothly and precisely against the surface of the fruit, a wrapping mechanism disposed on one side of the wiper and comprising grippers in line therewith, means to project pieces of fruit successively through the wiper and into the grippers each carrying a wrapper with it, the wrapping mechanism including laterally movable fingers between the grippers and the wipers, follower members between the fingers and the grippers, and driving mechanism to operate the wrapping mechanism in timed relationship to actuate the fingers to engage the bunched edges of the wrapper and hold them, to simultaneously actuate the follower members to brush the wrapper smoothly around the surface of the fruit toward the bunched edges, and to return the grippers relative to the fingers while they engage the bunched edges to envelop the fruit in the wrapper.

7. In a wrapping machine for fruit and the like, a wrapping mechanism comprising grippers to engage a piece of fruit with a wrapper around its surface, fingers movable laterally to hold the edges of the wrapper in bunched condition, follower members movable with the fingers to wipe the wrapper smoothly against the surface of the fruit on the side in the direction of the wrapper edges.

8. In a fruit wrapping machine for fruit and the like, a wrapping mechanism comprising grippers to engage a piece of fruit with a wrapper around its surface, fingers movable laterally to hold the edges of the wrapper in bunched condition, follower members movable with the fingers to wipe the wrapper smoothly against the surface of the fruit on the side in the direction of the wrapper edges, means to rotate the grippers relative to the fingers holding the bunched edges of the wrapper.

9. In a wrapping machine for fruit and the like, a wrapping mechanism comprising grippers to engage a piece of fruit with a wrapper around its surface, fingers movable laterally to hold the edges of the wrapper in bunched condition, follower members movable with the fingers to wipe the wrapper smoothly against the surface of the fruit on the side in the direction of the wrapper edges, means to rotate the gripper relative to the fingers holding the bunched edges of the wrapper a predetermined number of turns and to stop the rotation by braking action in timed relationship.

10. In a wrapping machine for fruit and the like, wrapping mechanism comprising grippers to engage a piece of fruit with a wrapper around its surface, fingers to hold the edges of the wrappers in bunched condition, driving mechanism to drive the grippers to rotate them a predetermined number of turns and to apply a brake to the grippers when the predetermined number of turns is completed.

11. In a wrapping machine for fruit and the like, a wrapping mechanism comprising grippers to engage a piece of fruit with the wrapper around its surface, means to bunch the edges of the wrapper, means to engage the bunched edges of the wrapper firmly near to and yielding more remote from the surface of the fruit, and means to twist the fruit while the edges of the wrapper are held as defined.

12. Wrapper feed mechanism for a commodity wrapping machine, comprising gripper fingers to engage the top one of a stack of wrappers and transport it into position to receive the commodity, mechanism to release one commodity from a supply and transport it to the wrapper, means responsive to a failure of the commodity supply to render the gripper fingers inoperative.

13. Wrapper feed mechanism for a commodity wrapping machine, comprising gripper fingers to engage the top one of a stack of wrappers and transport it into position to receive the commodity, mechanism to release one commodity from a supply and transport it to the wrapper, means responsive to a failure of commodity supply to shift the fingers out of engaging position in their movement to engage a wrapper at the wrapper supply.

14. In a commodity wrapping machine, means to place a wrapper in position to be engaged by a commodity, means to transport a unit of the commodity into engagement with the wrapper, grippers, means to project the commodity and wrapper into engagement with the grippers, means to gather the edges of the wrapper around the commodity and hold them in gathered condition, means comprising an intermittent drive to spin the grippers a predetermined number of turns and to apply a brake when the drive disengages.

15. In a fruit wrapping machine or the like, means to transport pieces of fruit successively from a bulk supply to a position to be wrapped, means to transport wrappers successively from a stack supply of sheet wrappers to a position to be successively wrapped on successive pieces of fruit, the wrapper feeding mechanism including means to take a sheet of wrapping material at a time from the stack, the fruit transporting mechanism comprising a bin, a chute associated with the bin for aligning the pieces of fruit in order to be delivered from the bin, one by one, means to engage and push the successive pieces of fruit out of chute one by one, and mechanism to transport the pieces of fruit to the wrapping mechanism, detector mechanism operable when the pusher means fails to push a piece of fruit into the transporting mechanism to render the sheet taking mechanism inoperative.

16. In a wrapping machine for fruit and the like, a wrapper wiper comprising an annulus of a size sufficient to permit passage of the largest fruit to be accommodated by the machine, a plurality of flaps of flexible material fixed to the annulus and disposed radially to provide a web-like closure for the annulus, the flaps overlapping each other in their normal position and being of sufficient width to provide an enclosed passage for the fruit when they are deflected out of their normal position, an annular spring backing the flaps.

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