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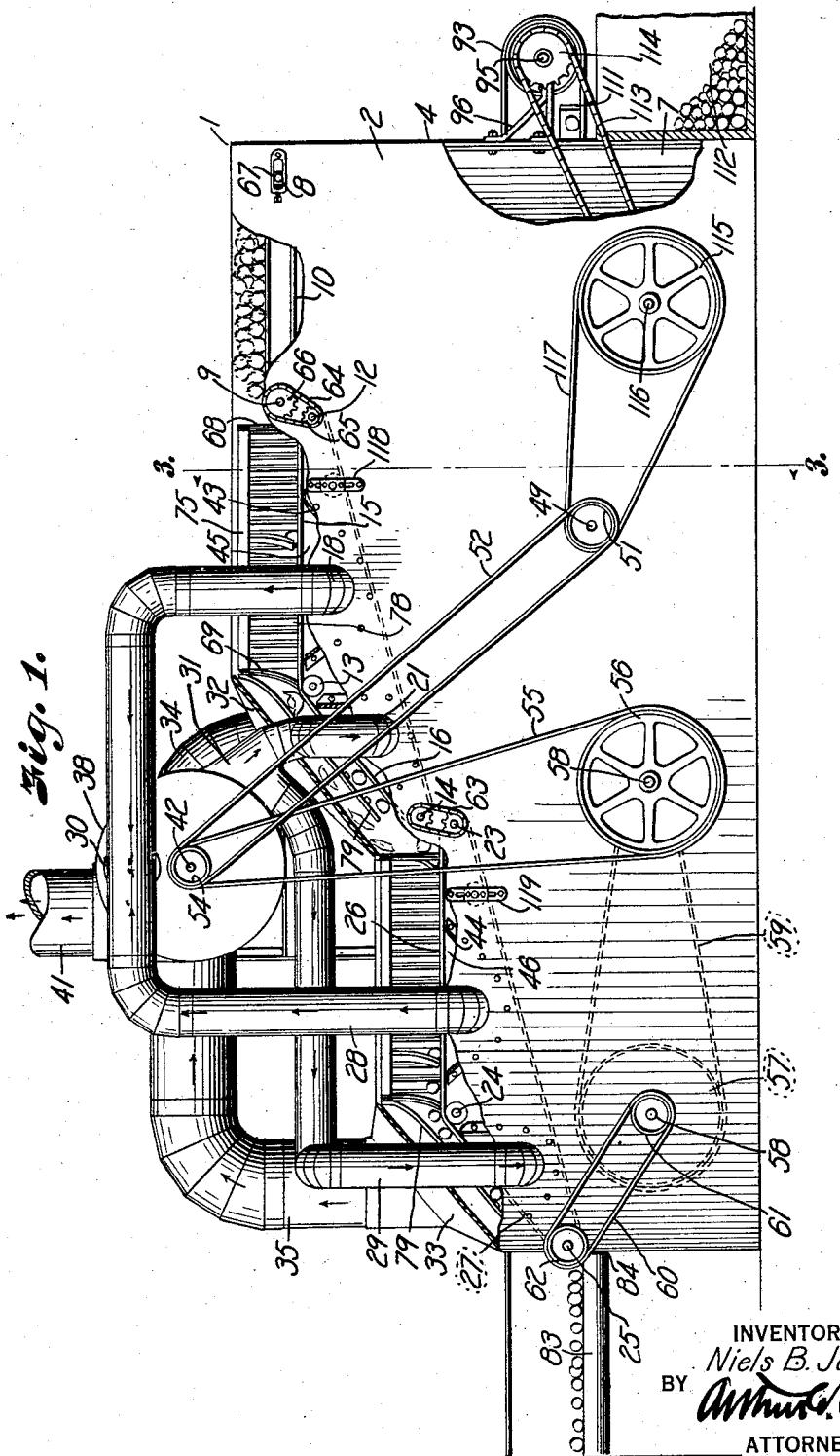
N. B. JANSSEN

1,853,816

## **TOMATO UNWRAPPING MACHINE**

Filed Feb. 11, 1929

4 Sheets-Sheet 1



April 12, 1932.

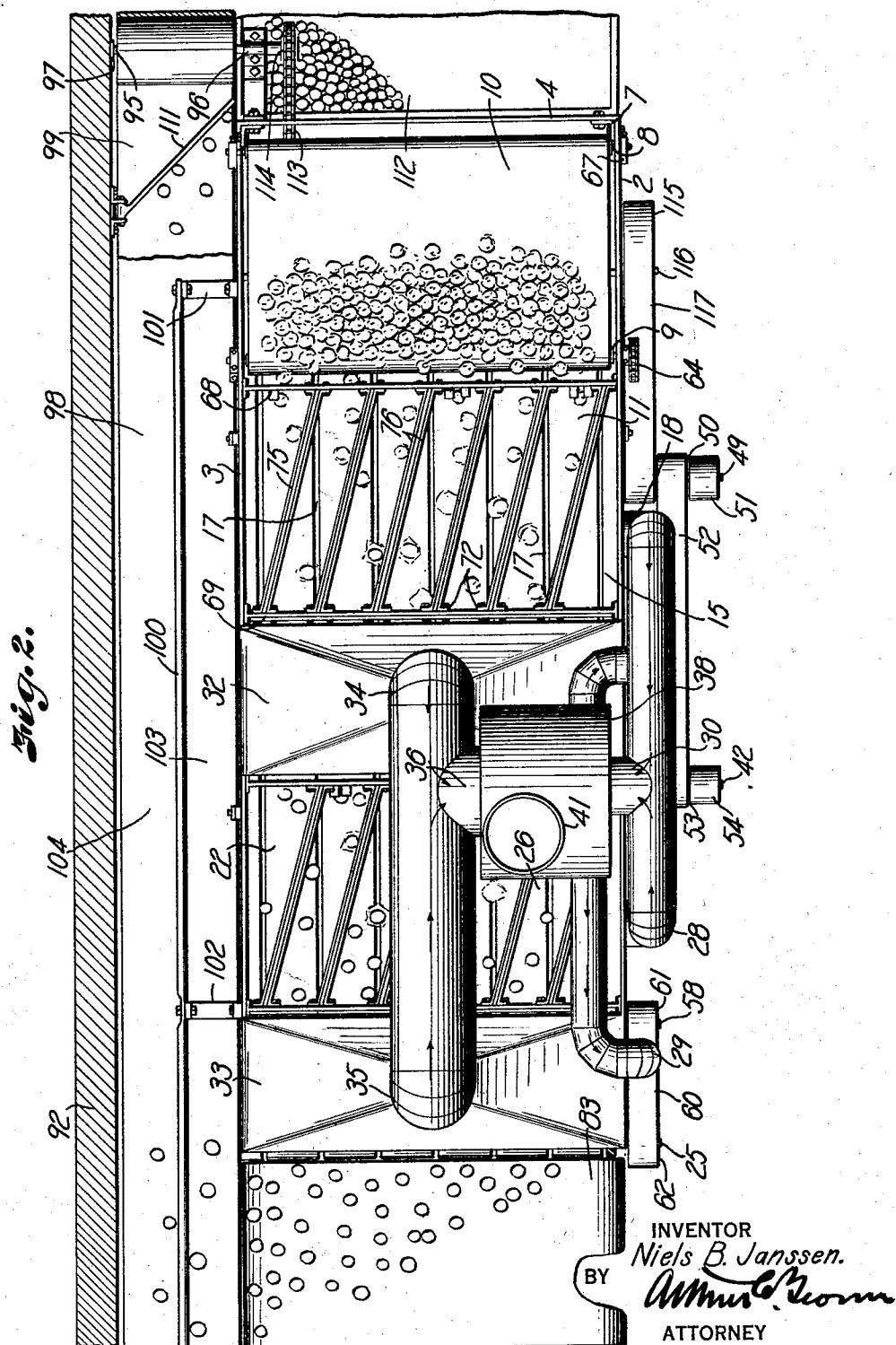
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TOMATO UNWRAPPING MACHINE

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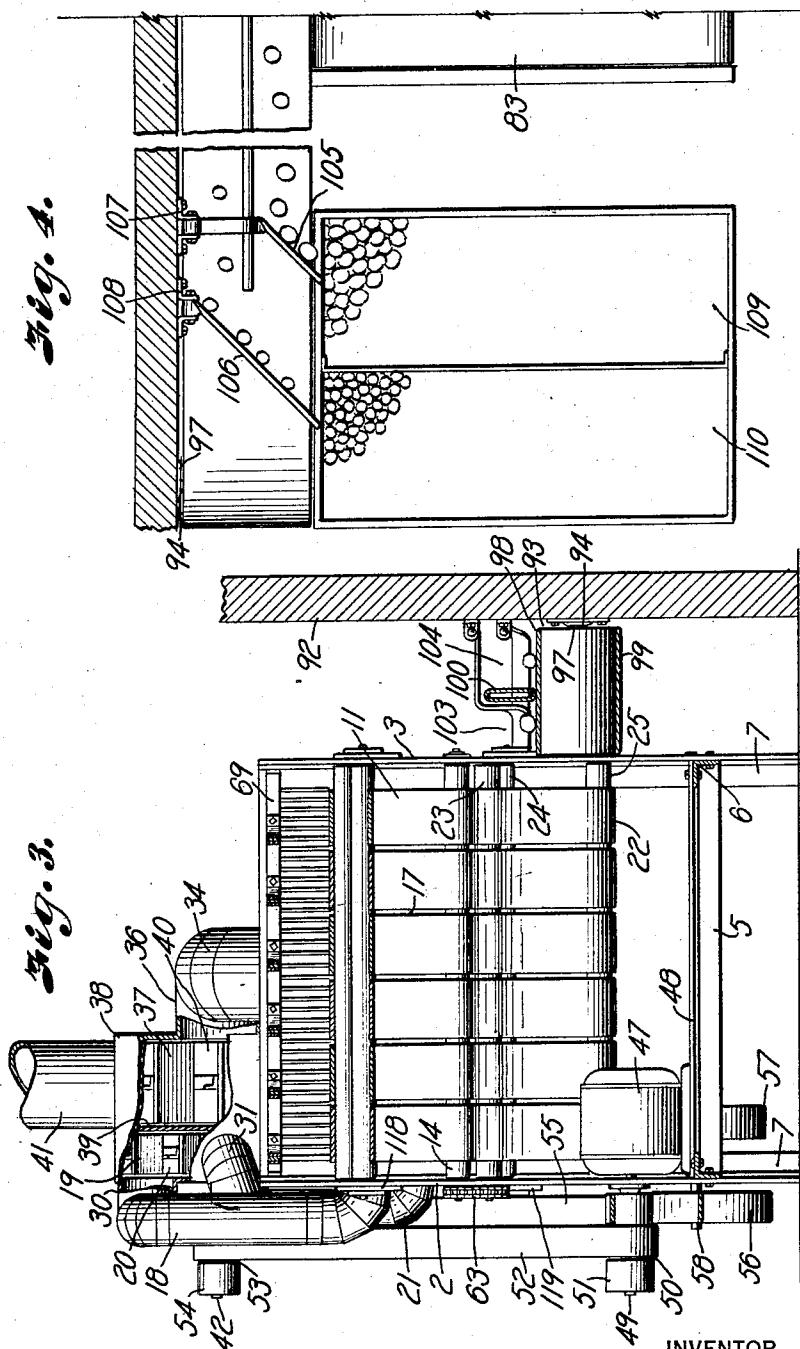
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## TOMATO UNWRAPPING MACHINE

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4 Sheets-Sheet 3



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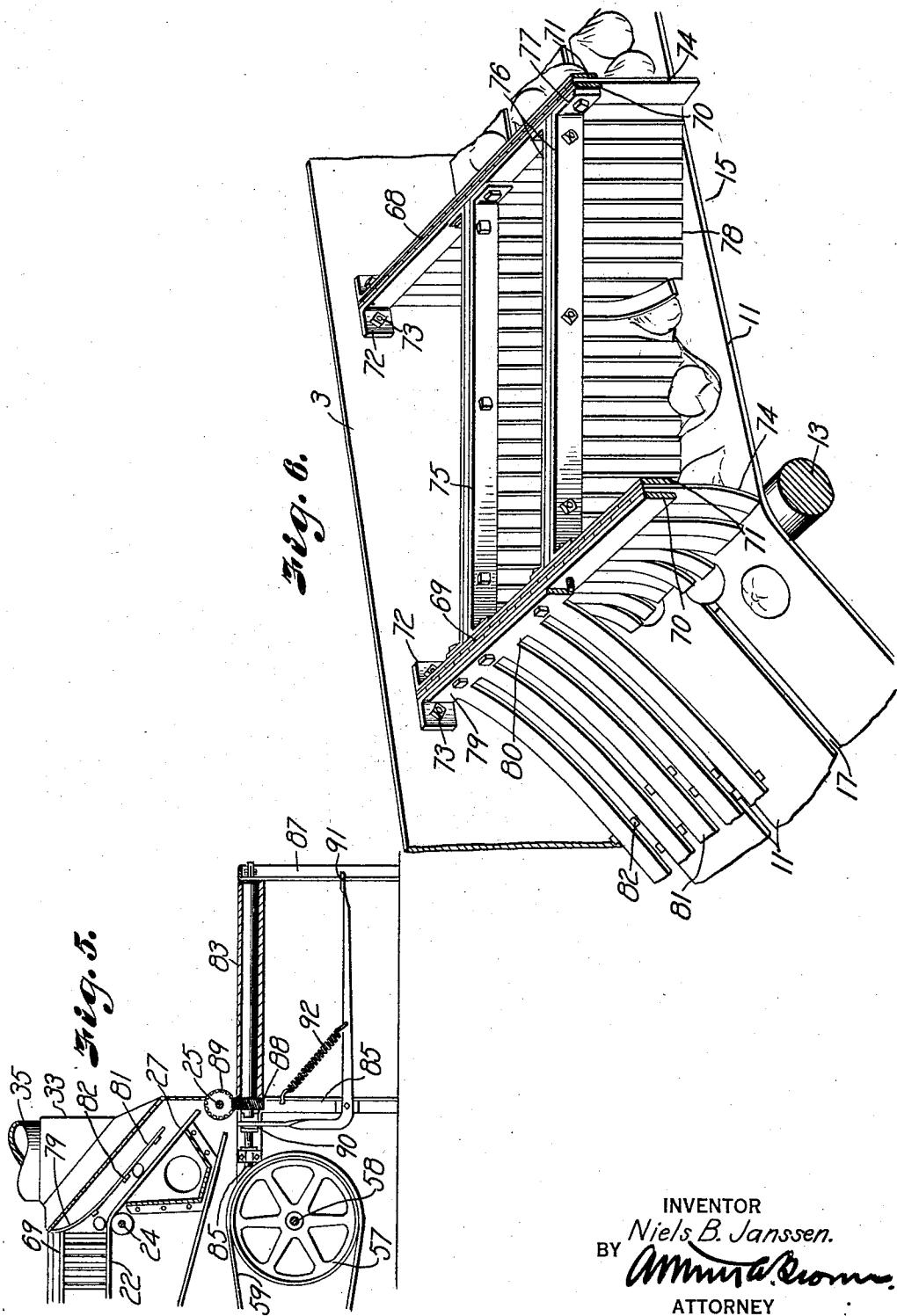
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TOMATO UNWRAPPING MACHINE

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4 Sheets-Sheet 4



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## UNITED STATES PATENT OFFICE

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## TOMATO UNWRAPPING MACHINE

Application filed February 11, 1929. Serial No. 339,163.

My invention relates to separating machines and has for its principal object to disengage and remove wrappings from small articles, for example the paper wrappers in which tomatoes are enclosed for shipment, whereby the labor, cost and time consumed in unwrapping the articles for resorting, redistribution and similar purposes may be reduced, resorting of the tomatoes may be facilitated and much of the manipulation of wrappers and tomatoes by operatives may be avoided.

In accomplishing these and other objects of my invention, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a side elevation partly in section and with part of the side wall broken away, of an unwrapping machine embodying my invention, and portions of conveying and repacking elements.

Fig. 2 is a plan view of the machine and portions of conveyors, one of the conveyors being partly broken away to disclose a lower conveyor.

Fig. 3 is a vertical transverse section on the line 3—3, Fig. 1.

Fig. 4 is a plan view of the rear end of a longitudinal conveyor and storage elements and a cross section of a wall for supporting conveyors and diverting elements.

Fig. 5 is a section of a transverse conveyor at the rear end of the machine and portions of the machine adjacent thereto.

Fig. 6 is an enlarged perspective fragmentary longitudinal view of the housing, conveyor belts, rollers, and flexible gates adapted to engage wrapped tomatoes moved by the belts.

Referring in detail to the drawings:

1 designates generally a frame including side walls 2 and 3, a front wall 4, cross members 5 and reinforcing and supporting angles such as 6 and corner posts 7. The sides and front end wall are formed of sheet metal to form enclosing walls whereby the frame may comprise a housing.

Running on spaced elongated rollers or pulleys 8 and 9 journaled in the side walls

at the front end of the housing and adjacent its top edge is an integral primary conveyor belt 10 adapted to receive wrapped tomatoes and move the same rearwardly in the housing.

Located immediately behind the primary conveyor are belts 11 running on roller shafts 12 and 13 journaled in the side walls in a horizontal plane slightly lower than the primary conveyor and a roller shaft 14 downwardly offset from said plane. The shafts support portions 15 of the upper runs of the belts in horizontal position and portions 16 of the runs in inclined position, to provide a secondary conveyor to receive tomatoes and move them rearwardly in the machine.

The belts 11 are parallel and spaced to provide openings 17. An air conduit 18 communicates with the interior of the housing below the horizontal portions of the belts and a fan 19 mounted in a chamber 20 supported by the housing and communicating with the conduit is adapted to draw a current of air downwardly between the belts and wrapped tomatoes supported thereby and through the openings between the belts into the conduit and through the chamber 20.

A conduit 21 also communicating with the fan chamber 20 conducts air drawn through the conduit 18 into the housing beneath the inclined path of the belts for discharge upwardly between the spaced belts for moving wrappers away from the tomatoes.

Located immediately behind the above described secondary conveyor is another group of parallel spaced belts 22 similar to the belts 11 and similarly movably supported on shafts 23, 24 and 25 forming a horizontal conveyor portion 26 to receive tomatoes from the lower ends of the inclined portions 16 of the belt runs 11, and having also inclined portions 27 similar to said inclined portions 16.

Conduits 28 and 29 are connected into the housing respectively below the horizontal path of the last named group of belts to draw air downwardly therethrough, and below the inclined path to blow air upwardly therethrough, and communicate with the fan chamber 20 similarly to the conduits 18 and 21, the two sets of conduits having a common

inlet 30 to the fan chamber and a common outlet 31 therefrom.

Hoods 32 and 33 are mounted over the inclined portions of the belt paths and relatively

large conduits 34 and 35 connected to the hoods have a common outlet 36 for wrapper-removing air currents moving from the housing. A suction fan 37 is mounted at the outlet 36 to draw air from the housing, and

supplement the blast from the fan 19.

A fan housing 38 is preferably provided having a dividing wall 39 to form the chamber 20 communicating with the conduits 18, 28, 21 and 29, and a chamber 40 communicat-

ing with the conduits 34 and 35 and containing the fan 37 and having a discharge stack 41. The fans 19 and 37 are mounted on a common shaft 42 journaled in the fan housing 38.

20 The blasts delivered upwardly through the inclined paths assist the suction currents in moving wrappers that are disengaged from the tomatoes during the passage of the tomatoes rearwardly in the machine, as will be more particularly described.

The air currents are confined and rendered more effective by provision of walls 43 and 44 having edges secured to the side walls of the housing and forming chambers 45 and 46 below the horizontal and inclined portions of the paths respectively.

30 The machine is operated by a motor 47 mounted on a shelf 48 within the housing 1 having a driving shaft 49 journaled in the side wall 2 and provided with a pulley 50 keyed thereto and an idler pulley 51, both exterior of the housing. A belt 52 is adapted to run on the pulley 50 and a pulley 53 on the fan shaft 42 to operate the fans, or on pulley 51 and an idler pulley 54 on the fan shaft for suspending operation of the shaft by the motor.

Motion is transmitted from the fan shaft 42 to the conveyors through a belt 55, reducing sets 56 and 57 mounted on parallel spaced shafts 58 journaled in the side walls 2 and 3, a belt 59 connecting the reducing sets, and a belt 60 running on a pulley 61 of the second set and a pulley 62 on the rear shaft 25 of the rearward conveyor.

55 The belts 22 transmit motion from the shaft 25 to the roller shafts 24 and 23. The rear pulley shaft 14 of the second conveyor is operated by a chain 63 through suitable sprockets from the shaft 23, and the belts 11 transmit motion from the roller shaft 14 to the roller shafts 13 and 12. The primary conveyor is operated at slower speed than the belts 11 and 22, by a chain 64 running on a sprocket 65 on the shaft 12 and a larger sprocket 66 on the shaft 9.

60 The roller shaft 8 of the primary conveyor is supported by a tightener 67 for adjusting the tension of the endless conveyor.

65 The two sets of spaced parallel conveying

belts are similar and auxiliary elements associated with the same are alike so that only one group of such auxiliary elements will be described.

Depending into the path of the tomatoes 70 and at right angles thereto are gates 68 and 69, one at each end of the horizontal portion of the path comprising metal strips 70 and 71 having end flanges 72 secured to the side walls of the housing by suitable means such as bolts 73, and resilient fingers 74 clamped between the strip having lower free ends substantially in contact with the belts.

There are two series of fingers in each gate, the fingers of one series overlapping the fingers of the other series, whereby the gates are substantially air tight in rest position.

Extending diagonally across the horizontal portion of the upper run of each of the parallel belts is a gate 75 comprising a pair of 85 bars 76 having flanges 77 bolted to the strips of the gates 68 and 69 and depending spaced resilient fingers 78 clamped between the bars and having free ends substantially in contact with the belts.

90 The fingers are preferably formed of soft, elastic material such as rubber whereby they may yield readily to the slight pressure of the tomatoes, and have frictional qualities so that they may tend to rub the wrappers from crimped condition and loosen them, and the tomatoes will not be bruised by contact therewith.

95 The diagonal gates further serve to shift the tomatoes laterally of the belts and thus 100 further disturb the wrappers, so that the air drawn downwardly between the belts may tend to pull the loosened edges of the wrappers away from the tomatoes and retain the wrappers in engagement with the belts 105 until the tomatoes have been released therefrom.

A resilient wrapper-engaging member 79 110 extends above the inclined path of the belts to engage tomatoes moving therealong, comprising a body 80 bolted to the supporting bars of the gates 69 and having resilient fingers 81 provided with transverse lugs 82 adapted to engage the loosened wrappers and further dislodge them from the tomatoes.

115 The tomatoes are freed from the wrappers during their travel through the housing and are delivered at the rear end of the housing to a transversely moving conveyor 83 having length substantially equal to the width of the housing and supported on shafts 84 and 85 journaled in an end member 86 of the housing, and a support 87 spaced therefrom.

120 A helically cut gear 88 loosely mounted on the shaft 85 at its end adjacent the machine is in mesh with a gear 89 on the shaft 25 and may be keyed to the shaft 85 by a clutch 90 operated by a foot lever 91 to effect operation of the transverse conveyor by the motor. The lever is retracted by a spring 92 to with-

draw the clutch and disengage the transverse conveyor from the actuating mechanism.

The machine is preferably located adjacent a wall 92 whereby the wall may form one supporting element for brackets and shafts presently described.

Extending between the machine and the wall is a wide longitudinal endless conveyor belt 93 supported on shafts 94 and 95 journaled in the wall and in brackets 96 fixed to the main machine housing, and bearings 97 extending laterally from the wall.

The upper and lower runs 98 and 99 of the belt are widely spaced to form oppositely moving conveyors, and are positioned in planes respectively above and below the surface of the transverse conveyor, whereby an operative standing at the latter may conveniently transfer unwrapped ripe tomatoes delivered thereto to the upper run, and green tomatoes may fall from the end of the transverse conveyor to the lower run.

A divider 100 formed preferably of relatively soft material such as canvas is supported above the center line of the upper run 98 by brackets 101 and 102 fixed respectively to the main housing and the wall, and divides the run into sections 103 and 104, to receive tomatoes of different sizes, and blades 105 and 106 at the rear end of the conveyor hingedly supported by brackets 107 and 108 from the wall adjacent the two sections divert the tomatoes into containers 109 and 110.

Sorting of ripe tomatoes into two lots according to size for transfer to the containers 109 and 110 is contemplated, and unripe tomatoes remaining on the conveyor will drop to the lower run of the belt and be moved toward the front end of the machine, and to any position desired forward thereof to which the conveyor may be extended. A deflecting blade 111 supported by the wall intercepts the unripe tomatoes and causes them to fall into a container 112.

45 A chain 113 meshed with a sprocket 114 on the shaft 95 and with a reducing gear set 115 on a shaft 116 rotated through a belt 117 by the driving shaft 49 operates the conveyor belt 93.

50 Incidental adjusting means may further be provided, for example belt tightening devices 118 and 119 supported by the housing.

In operating the machine, wrapped tomatoes are dumped from original shipping containers in which they have been transported, to the primary conveyor, and are moved thence onto the front ends of the spaced belts of the secondary conveyor. As the tomatoes pass the first gate, the resilient fingers yieldingly engage the wrappers and tend to loosen the same and disengage them from the tomatoes.

As the tomatoes are moved rearwardly, they come into contact with the resilient fingers of the diagonal gates, are shifted later-

ally, and bending the fingers pass through the gates. A plurality of frictional effects are thus produced to loosen and dislodge the wrappers. The tomatoes then pass through the transverse gate at the rear end of the horizontal path, where further disturbance of the wrappers occurs.

The overlapping fingers of the end gates seal the gates against passage of air currents therethrough except when tomatoes are lifting fingers, whereby air currents induced by the fan 19 are restricted to vertical movement downwardly through the open upper end of the housing, and when fingers are bent by passing tomatoes, air currents may pass through the small temporary openings and assist in dislodging the wrappers.

The tomatoes tend to roll downwardly over the inclined portions of the parallel spaced belts, the movement tending to further disturb the wrappers, which are then engaged by the lugs on the depending fingers overlying the inclined portions.

Air currents induced by the suction fan 37 and assisted by the fan 19, passing upwardly through the inclined path of the tomatoes, assist in dislodging the wrappers and move the same through the discharge conduits and deliver them through the stack. The unwrapped tomatoes are delivered to the transverse conveyor.

The operator and sorter may stop the movement of the transverse conveyor, to permit an accumulation of ripe tomatoes thereon while transferring desired lots of tomatoes to the upper run of the longitudinal conveyor. Operation of the spaced belts and primary conveyor may be stopped by shifting the belt to the idling pulleys of the motor and fan shafts, whereupon the longitudinal conveyor will be moved while no tomatoes are being moved through the machine, and the transverse conveyor is at rest.

What I claim and desire to secure by Letters Patent is:

1. A machine for removing wrappers from tomatoes and the like comprising a housing, a conveyor supported by the housing, overlapping resilient fingers supported by the housing transversely of the conveyor, and means for actuating the conveyor.

2. In a machine for removing wrappers from tomatoes and the like, a housing, a conveyor movable in a path having horizontal and inclined portions, a series of overlapping resilient fingers supported by the housing transversely of said horizontal path, and a plurality of laterally spaced resilient fingers supported by the housing longitudinally of the inclined path.

3. In a machine of the character described for removing wrappers from tomatoes and the like, a housing, a plurality of movable belts supported from the housing in parallel and spaced relation for conveying wrapped

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tomatoes, a plurality of resilient fingers supported by the housing with their free ends adjacent the belts to engage the tomatoes while being moved by the belts, and means for inducing a flow of air downwardly over the tomatoes through the spacing between the belts.

4. In a machine for removing wrappers from tomatoes and the like, a frame, a closed chamber, a conveyor including a belt movable longitudinally of the frame, a series of resilient fingers supported by the frame above said conveyor to intercept wrapped tomatoes being moved by the conveyor, and means for inducing a flow of air downwardly between the moving tomatoes to hold the wrappers to the conveyor.

5. In a machine of the character described for removing wrappers from tomatoes and the like, a housing including a plurality of chambers, tomato conveying means including a plurality of movable belts, means for disengaging wrappers from the tomatoes including a series of resilient fingers supported by the housing and having free ends extending into the paths of the tomatoes to engage the wrappers, and means including conduits communicating with said chambers for moving air among the belts to separate the wrappers from the tomatoes.

6. In a machine of the character described for removing wrappers from tomatoes and the like, a conveyor including spaced parallel movable belts, means including resilient members engageable with the wrapped tomatoes while the same are being moved for dislodging the wrappers, and means for inducing a flow of air through the spacing between the belts to separate the wrappers from the tomatoes.

7. In a machine for removing wrappers from tomatoes and the like, a conveyor, wrapper-disengaging means, and wrapper-removing means comprising a plurality of conduits and means for moving air over the conveyor into said conduits and outwardly from the machine.

8. In a machine of the character described for removing wrappers from tomatoes, a frame including a chamber having a closed top and a chamber having an open top, a series of parallel laterally spaced belts positioned in the chambers, a plurality of gates having slit edges positioned adjacent the belts for engaging wrapped tomatoes moved by the belts, an air conduit connected to the lower portions of the chambers below the belts, a fan in the conduit between the chamber, and a conduit connected to the top of the closed chamber for conducting the air therefrom.

9. In a machine of the character described for removing wrappers from tomatoes, a frame including a plurality of chambers, a conveyor having a portion in each chamber, resilient strips positioned adjacent the con-

veyor for engaging the wrappers, air conduits connected to the several chambers, one having an inlet in one chamber and another having an outlet to atmosphere, and means including a fan housing having a plurality of compartments communicating with the conduits and a fan in each compartment for inducing a flow of air from the inlet through the conduits to atmosphere.

10. In a machine of the character described for removing wrappers from tomatoes, a frame including a plurality of chambers, selected chambers having closed tops, tomato conveying means including a series of parallel laterally spaced belts moving in paths having horizontal portions and inclined portions, wrapper disengaging means including a plurality of gates having slit edges positioned adjacent the belts for engaging wrapped tomatoes moved by the belts, selected gates extending diagonally of the belts for shifting the tomatoes, elastic strips having transverse ribs overlying the inclined portions of said paths for engaging the wrappers, air conduits connected to the several chambers, suction means for dislodging wrappers from tomatoes on the horizontal portions of the paths, and means for inducing flow of air upwardly from beneath the inclined portions of the belts for carrying away dislodged wrappers.

In testimony whereof I affix my signature.

NIELS B. JANSSEN.

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