

Oct. 14, 1958

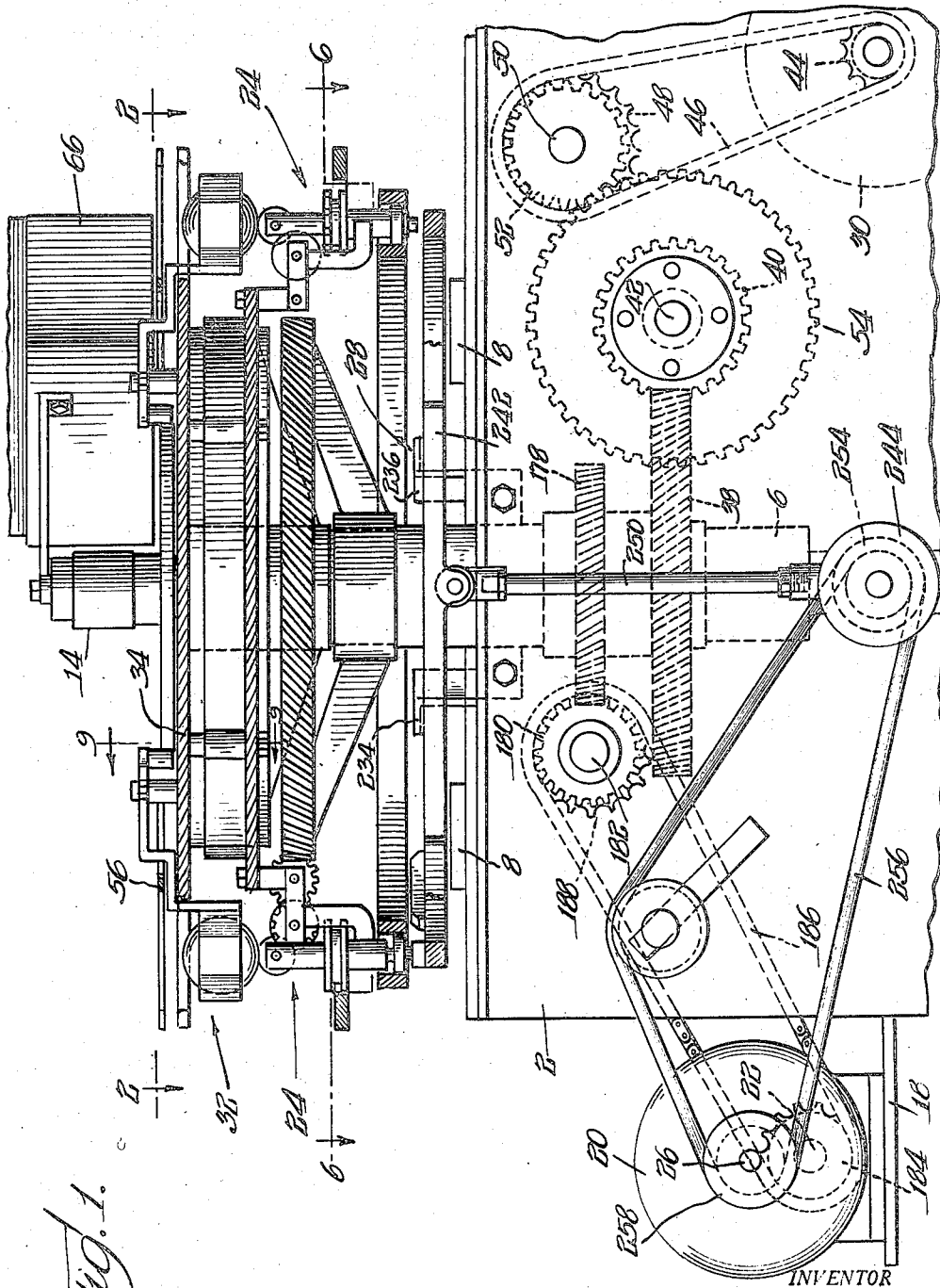
H. A. SKOG

2,856,057

FRUIT ORIENTING MACHINE

Original Filed Sept. 2, 1948

8 Sheets-Sheet 1



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By *[Signature]*

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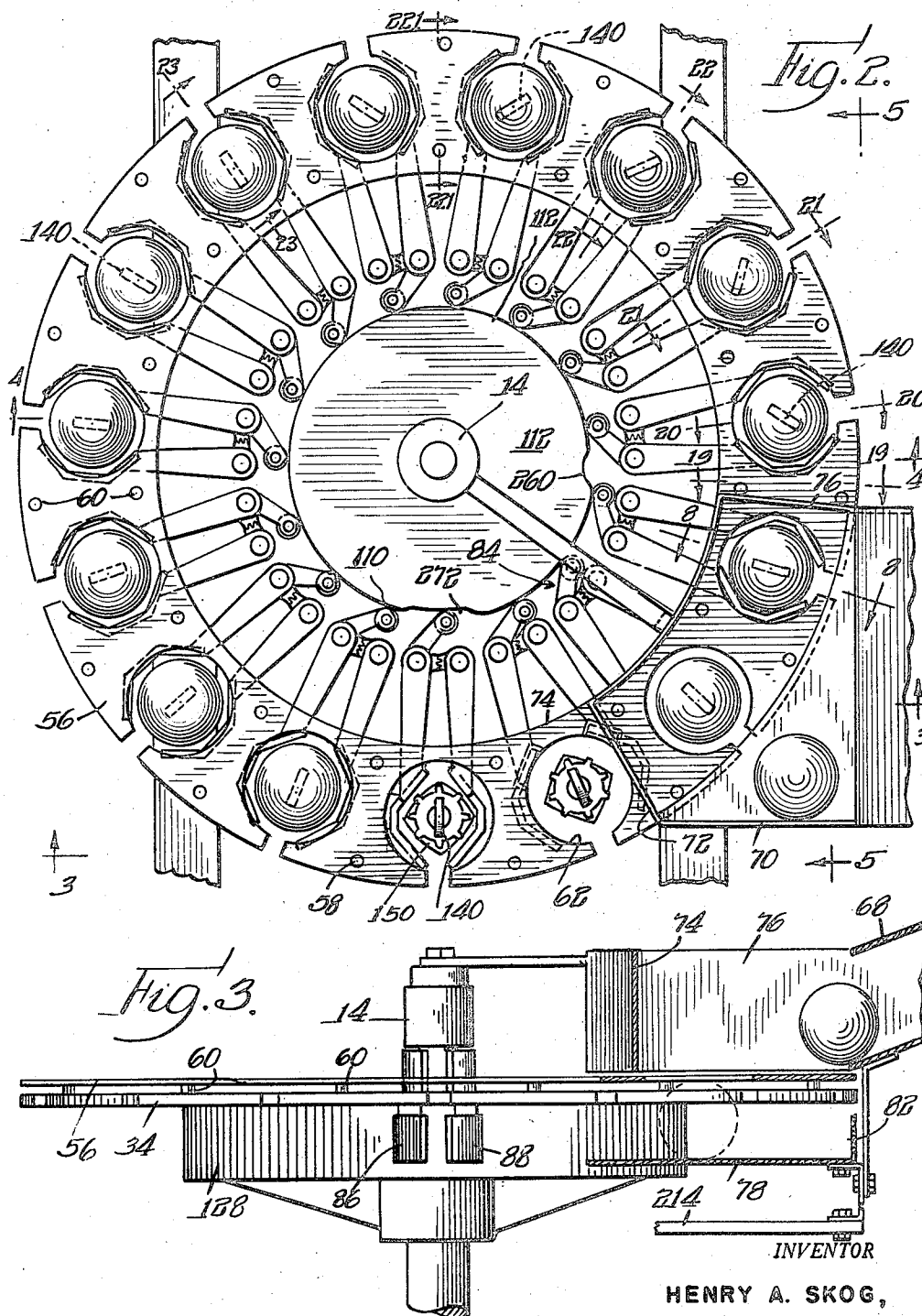
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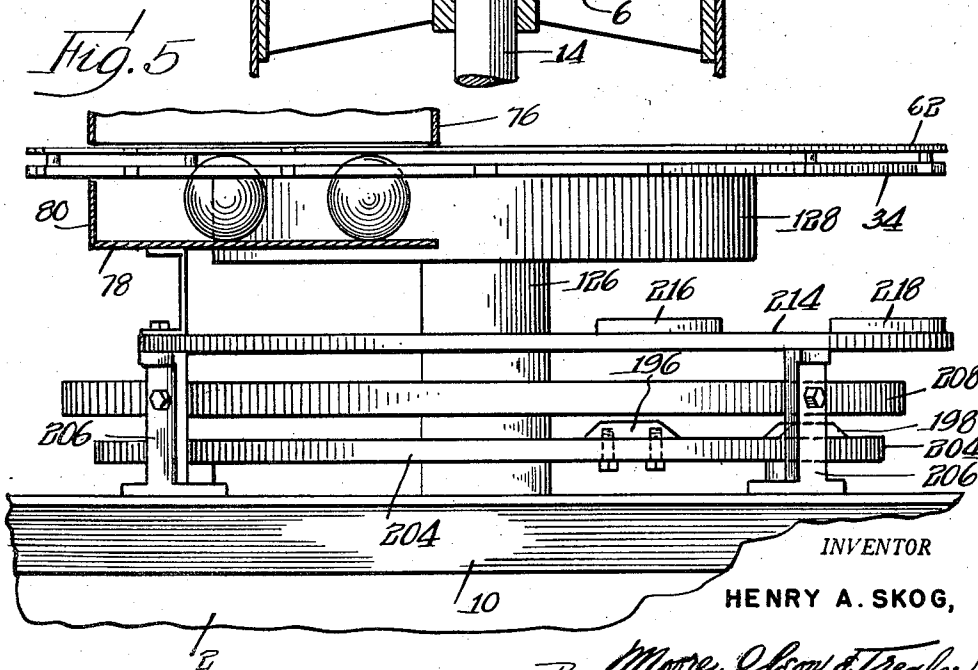
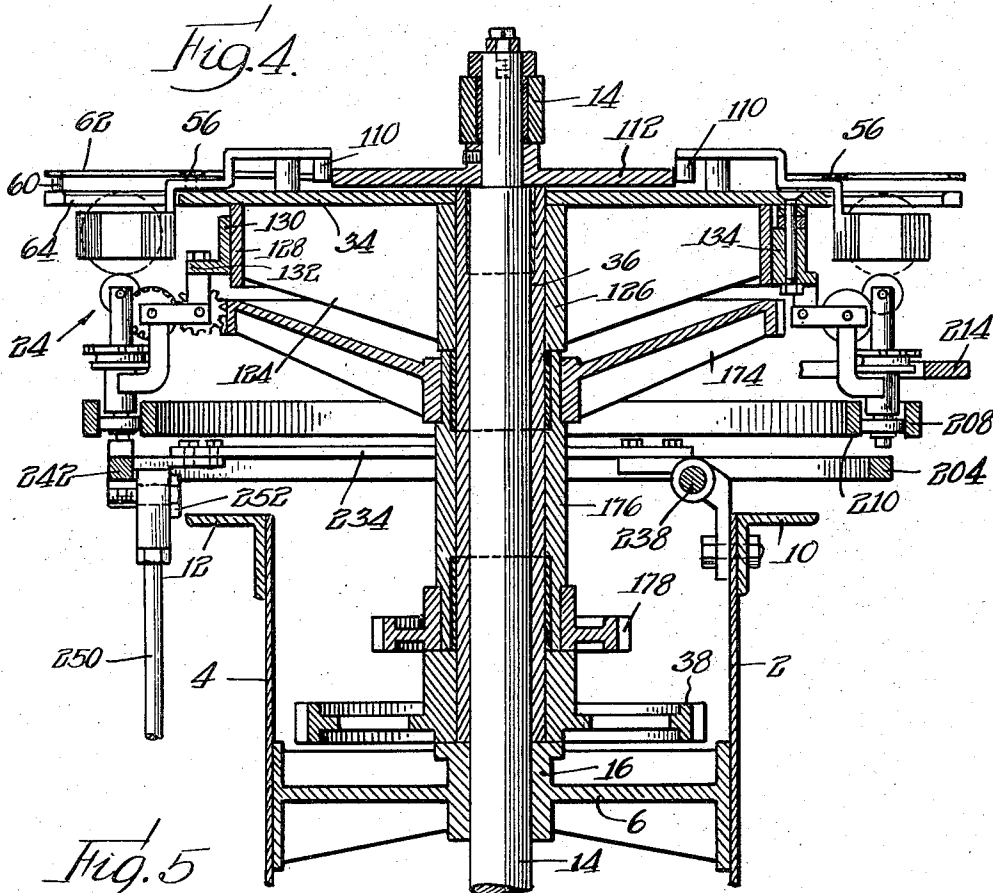
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8 Sheets-Sheet 3



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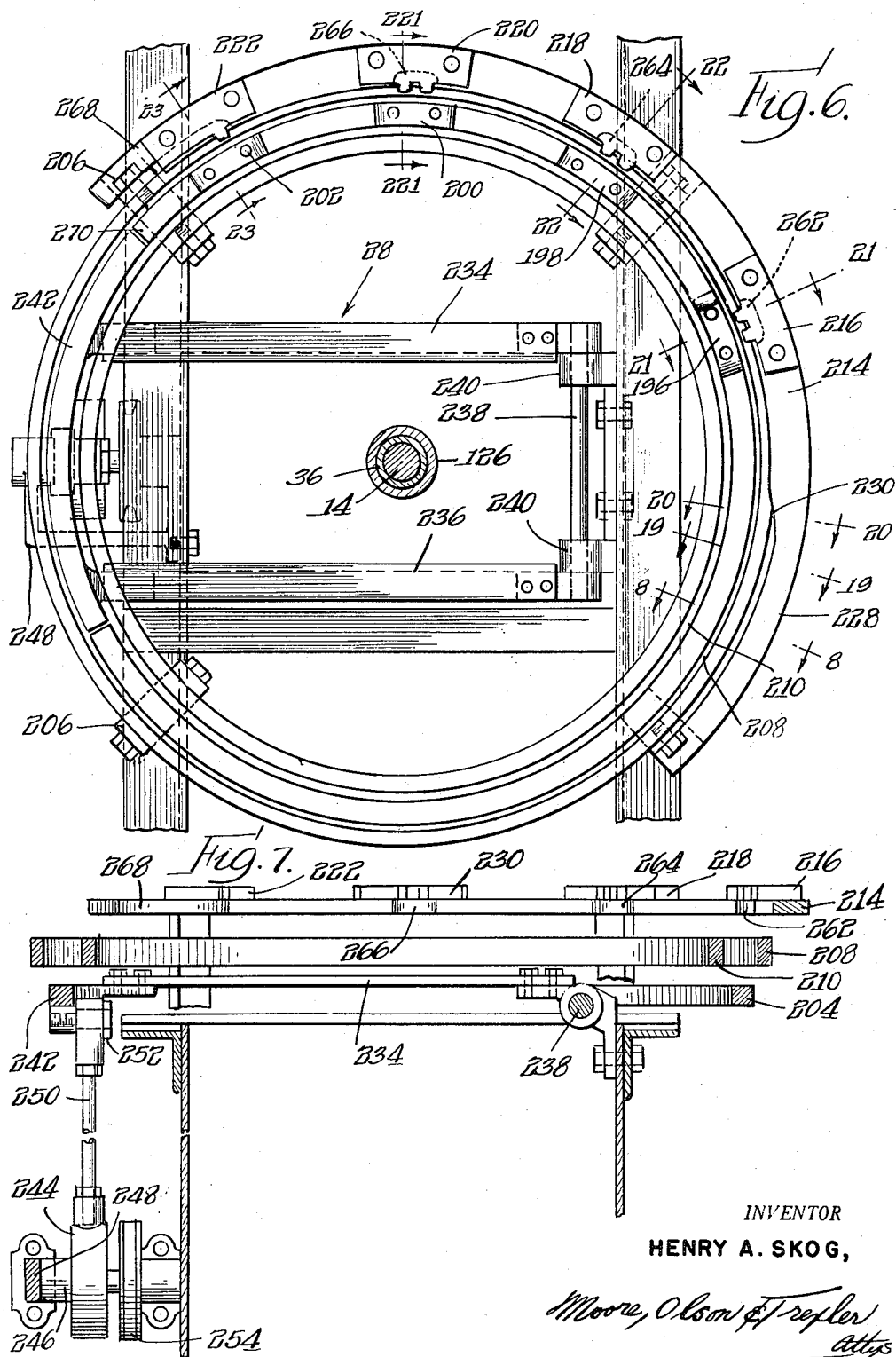
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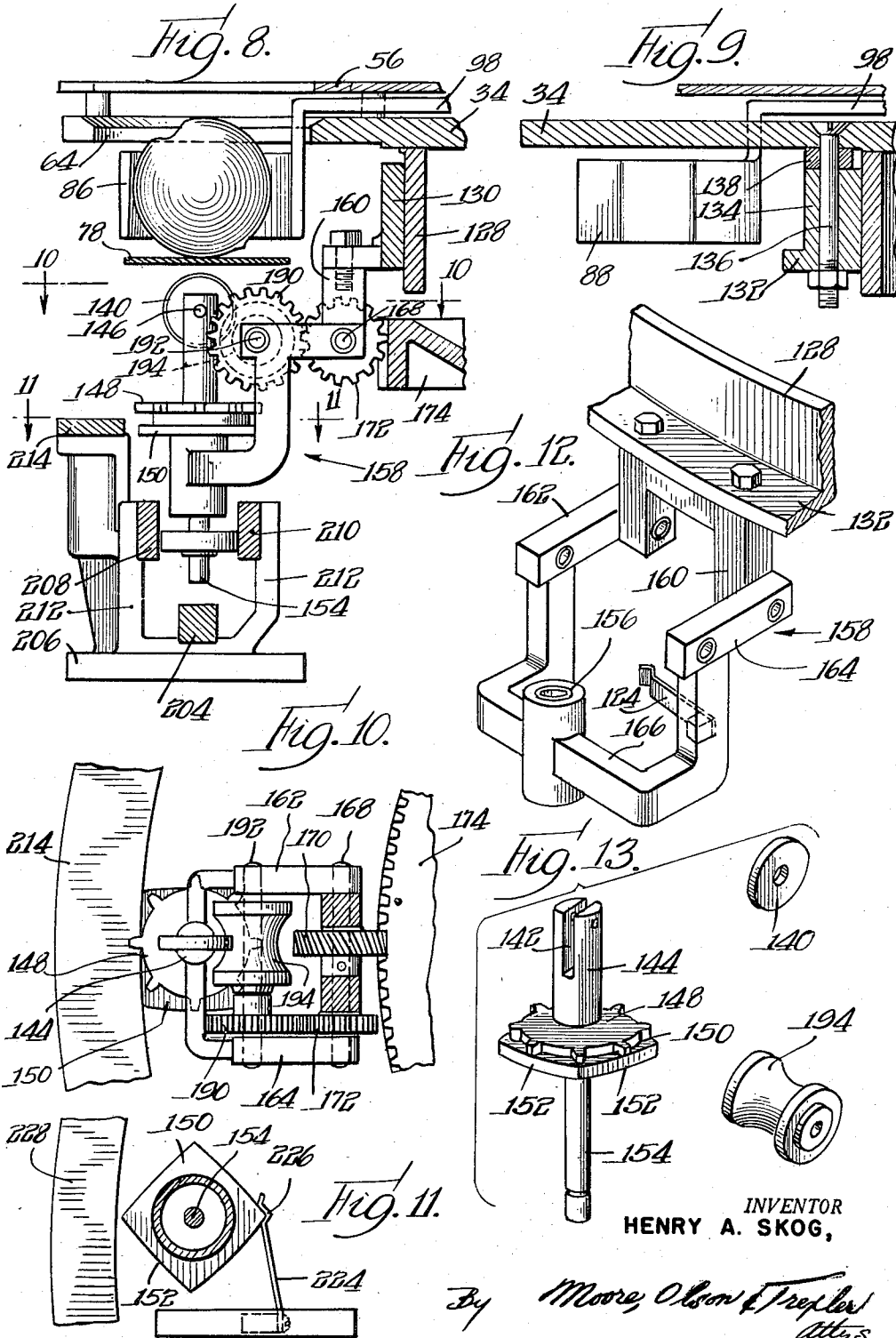
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FRUIT ORIENTING MACHINE

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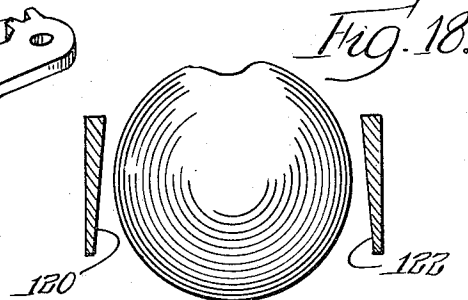
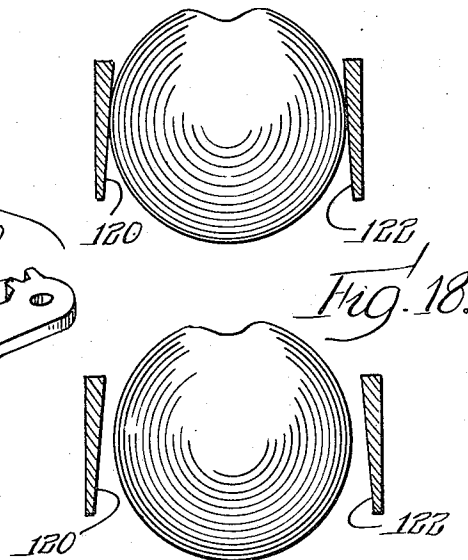
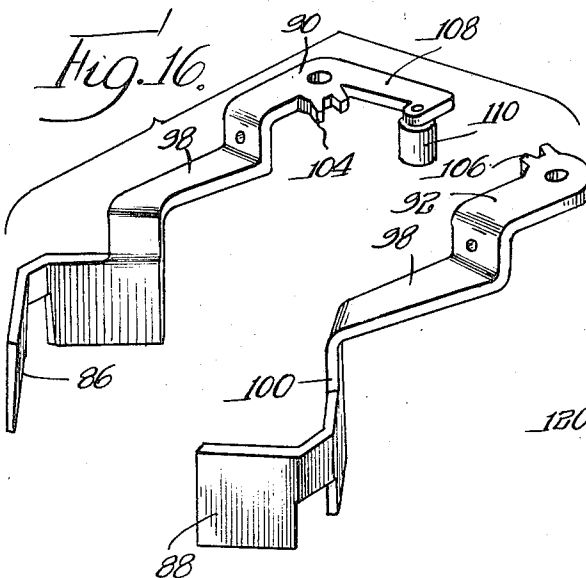
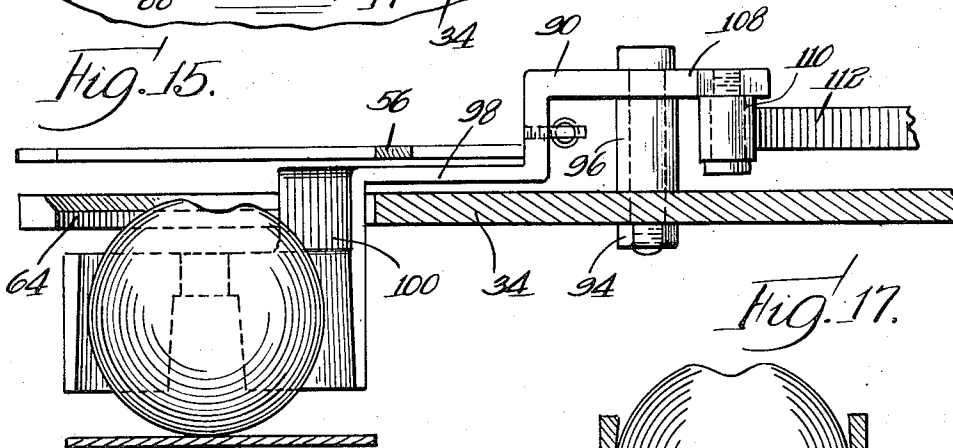
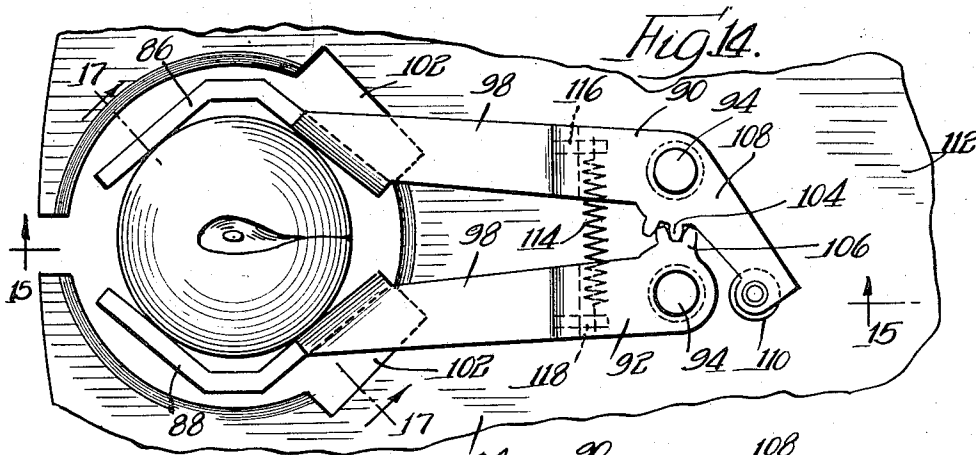
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FRUIT ORIENTING MACHINE

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8 Sheets-Sheet 6



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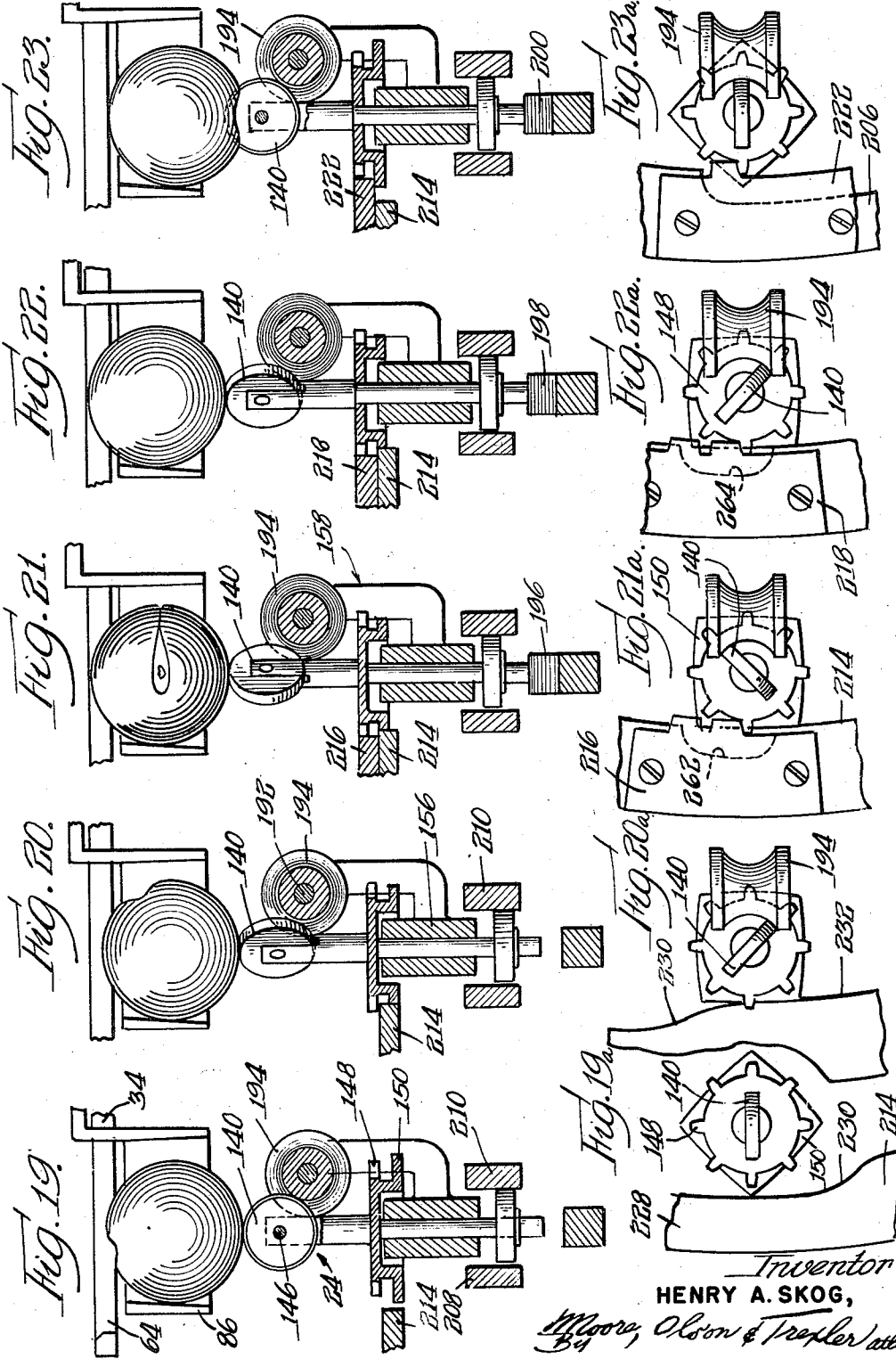
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8 Sheets-Sheet 7



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FRUIT ORIENTING MACHINE

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Fig. 24.

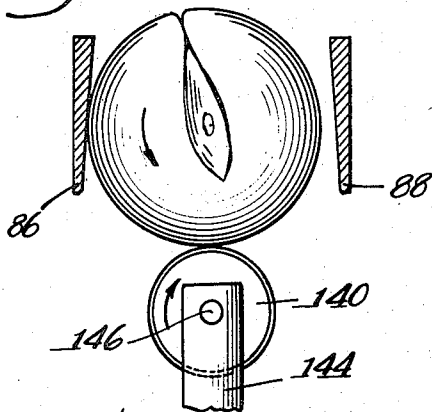


Fig. 25.

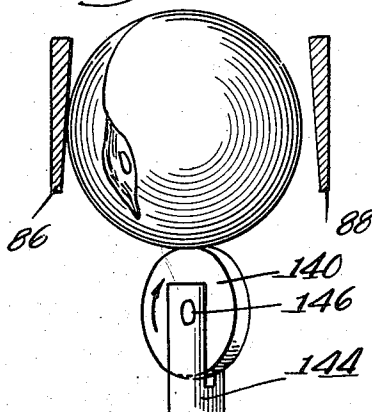


Fig. 26.

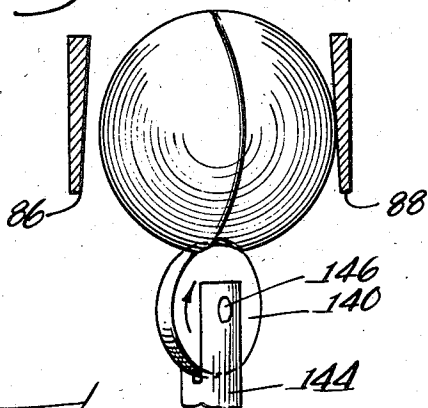


Fig. 27.

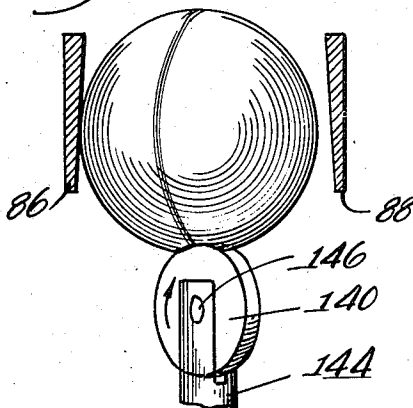


Fig. 28.

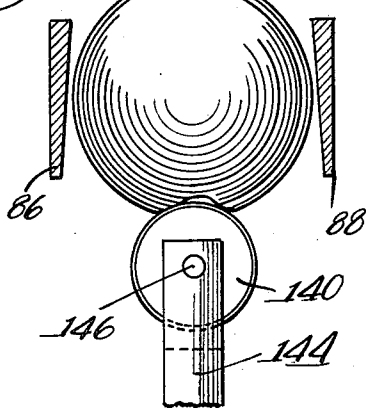
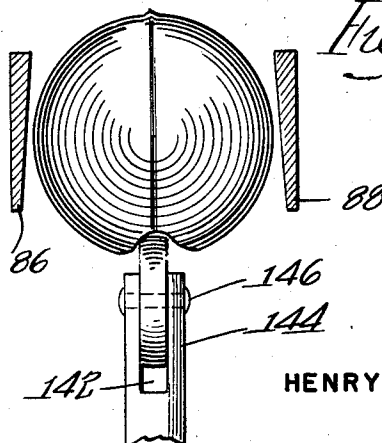


Fig. 29.



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FRUIT ORIENTING MACHINE

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Original application September 2, 1948, Serial No. 47,464. Divided and this application April 19, 1951, Serial No. 221,795

3 Claims. (Cl. 198—33)

This invention relates to a fruit orienter machine, and more particularly to a machine for orienting peaches or like fruit.

It is a principal object of the present invention to provide a machine for orienting fruit, particularly peaches and like fruit, both as to its stem indent and as to its suture plane.

Various devices have heretofore been proposed for orienting cherries as to stem indent and various suggestions have heretofore been made as to the use of such or similar devices for orienting peaches and like fruit as to stem indent. However, such devices have not been satisfactory for the orienting of peaches and like fruit as to stem indent because of the high percentages of failures, i. e., unoriented fruit, delivered by the orienting device to the subsequent processing means. It has heretofore been thought that in order to orient the fruit as to stem indent it was necessary to impose some restriction on the rotation or turning of the fruit with the orienting member or wheel in order that the fruit would be stopped and its further rotation prevented when the fruit was aligned with its indent facing the orienting member or wheel, or, alternatively, to provide some form of fruit supporting member or plate capable of stably supporting the fruit when the indent was thus aligned with the orienting member so that such support or plate could hold the fruit out of engagement with the orienting member or wheel once it was thus aligned or faced in such direction. Applicant has found, however, that fruits such as peaches can successfully be oriented, and the number of orienting failures reduced or eliminated, by eliminating or reducing to a minimum the restrictions imposed on the free turning or rotation of the fruit by the orienting member and by shaping and sizing the orienting member or wheel in proper relation to the shape and size of the fruit, particularly peaches, which it is desired to orient.

More specifically, applicant has found that substantially one hundred percent orientation of heterogeneously fed peaches may be secured by the substantially free rotation of each peach by an orienting member or wheel shaped to penetrate deeply into the stem indent and that continued movement of such orienting member, or rotation of the orienting wheel, will not disturb the orientation of the peach even though no substantial restriction is imposed on the free rotation of the peach.

It is accordingly a further object of the invention to provide a peach orienting mechanism so constructed that the free movement of the peach during the orienting operation is restricted only to the extent necessary to prevent the fruit from being displaced out of engagement with the orienting member or wheel and that the free rotation of the peach during the orienting operation is insured.

A further and more specific object of the invention is to provide, with each orienting mechanism employing an orienting member or wheel as substantially the entire support for a peach during the turning of the peach by said member or wheel to orient the stem indent of the

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peach, fruit containing means, arms, or jaws forming fruit receiving openings or fruit confining members so spaced as to prevent the peach from being tilted, or falling, out of driving engagement with the orienting member or wheel during the orienting operation and to impose substantially no restriction on the free turning of the peach during such orienting operation.

Accordingly, it is another object of applicant's invention to provide a fruit orienting machine in which the fruit is delivered directly to the orienting mechanisms from a suitable hopper or other bulk container.

Other objects of the invention are to provide in a fruit orienter new and improved means, receptacle, grippers or the like completely open at the bottom to receive and confine the fruit in the proper position on an orienting member or wheel without imposing any substantial restriction on the free turning or rotation of the fruit by the orienting wheel; to provide a fruit orienting device by which each article of fruit may be rotated about a plurality of relatively angularly disposed axes by the same orienting member to aid the orienting member in finding the stem indent; to provide an orienting device for peaches and like fruit capable not only of locating and orienting the stem indent but also locating and orienting the peach as to its suture plane or the long axis of its stem indent; to provide a fruit orienting machine or mechanism wherein the orienting member or wheel is spaced vertically below the fruit receiving or holding means or grippers so that such means or grippers will impose substantially no restrictions on the turning of the fruit by the orienting member or wheel and the fruit will not be jammed or forced against such means or grippers by the turning force applied to the fruit by the orienting member or wheel; to provide in an orienting machine or mechanism normally spaced relatively movable means for centralizing the fruit on the orienting member or wheel and to straighten the fruit after it has been oriented as to stem indent and suture plane so that the suture plane extends vertically or coincides with the plane of the orienting member or wheel; to provide in an orienter for peaches and like fruit, an orienting member or wheel capable of entering the stem indent of the fruit to the fullest possible extent so that continued movement or rotation of the member or wheel, or vibration thereof, will not cause fruit already oriented to be moved therefrom to an unoriented position; to provide an apparatus for orienting fruit by utilizing the force of gravity, or the weight of the fruit, to hold it in oriented position once it has been oriented even though the orienting wheel continues its movement or rotation; to provide a new and improved orienting mechanism including an orienting wheel rotatable about one axis to turn the fruit and turnable about an axis transverse to the first axis so that unoriented fruit may be rotated successively about different axes to effect the most rapid location of the stem indent, or stem indent and suture plane, by the orienting wheel; to provide an orienting apparatus comprising a rotating wheel proportioned to fit the average size and shape of stem indent and forming the sole bottom support for the fruit during its orientation, together with laterally positioned fruit holding means positioned well above the wheel, to limit the tilting of the fruit while on the wheel, to prevent the fruit from falling out of engagement with the wheel and to centralize the fruit over the wheel.

Other and further objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings wherein:

Fig. 1 is a view in side elevation of the machine embodying the present invention with certain parts broken away;

Fig. 2 is a top plan view of the machine of Fig. 1;

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Fig. 3 is a fragmentary view in vertical section taken substantially along the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary view in vertical section taken substantially along the line 4—4 of Fig. 2;

Fig. 5 is a fragmentary view partly in elevation and partly in section taken along the line 5—5 of Fig. 2;

Fig. 6 is a fragmentary view in horizontal section taken substantially along the line 6—6 of Fig. 1;

Fig. 7 is a fragmentary view in vertical section taken substantially along the line 7—7 of Fig. 6;

Fig. 8 is an enlarged view in vertical section taken along the line 8—8 of Fig. 2;

Fig. 9 is a fragmentary view in vertical section taken substantially along the line 9—9 of Fig. 1;

Fig. 10 is a fragmentary view in horizontal section taken substantially along the line 10—10 of Fig. 8;

Fig. 11 is a fragmentary view in horizontal section taken along the line 11—11 of Fig. 8;

Fig. 12 is a fragmentary view in perspective of the mounting support for the orienting wheel and a portion of its drive mechanism;

Fig. 13 is an exploded perspective view showing the orienting wheel, spindle and wheel drive;

Fig. 14 is a fragmentary, enlarged plan view of the peach receiving and holding means;

Fig. 15 is a fragmentary view in vertical section taken along the line 15—15 of Fig. 14;

Fig. 16 is an exploded perspective view of the fruit receiving and holding mechanism of Figs. 14 and 15;

Fig. 17 is a view in section taken substantially along the line 17—17 of Fig. 14;

Fig. 18 is a view similar to Fig. 17 showing the proposed grippers and fruit receiving holding means in open position;

Figs. 19 to 23 are operation illustrating diagrams taken along position lines at stations 19—19 to 23—23 inclusive of Figs. 2 and 6;

Figs. 19A to 23A are operation diagrams corresponding to the operation diagrams of Figs. 19 to 23 respectively, and

Figs. 24 to 29 inclusive are diagrammatic illustrations exemplary of the manner in which an orienting wheel may operate to orient a peach or like fruit in the machine of Figs. 1 to 23A and the cooperative functioning of the fruit receiving and holding means.

A preferred embodiment of the machine as disclosed in the drawings comprises a machine frame, Figs. 1 to 7, having side plates 2 and 4 spaced apart by a plurality of cross members such as the cross members 6 and 8, and others not shown. Angle irons 10 and 12 extend longitudinally of the side plates 2 and 4 at the upper ends thereof and like angle irons (not shown) extend longitudinally of the side plates at the bottom thereof to form supporting feet for the machine frame. A stationary, supporting column or shaft 14 is secured in a boss 16 in the cross member 6 and also in a like boss of a similar cross member (not shown) positioned near the bottom of the machine frame.

A platform 18 mounted in any convenient manner upon the side plates supports a combined motor and speed reducer 20 which has a slow speed shaft 22 which drives a plurality of orienting mechanisms 24 and a high speed shaft 26 which drives a fruit vibrator mechanism 28.

A second motor 30 which may if desired be mounted in any convenient manner upon a platform (not shown) secured to one or both of the side plates drives the fruit conveying means or turret 32 and simultaneously causes the orienting mechanisms 24 to travel with the fruit conveying means or turret 32.

The fruit conveying means 32 comprises a ring turret or disk 34, Figs. 1 and 3 to 5, keyed to a sleeve 36, Fig. 4, journaled on the column or shaft 14, the sleeve being keyed at its lower end to a spiral gear 38 driven by a spiral pinion 40, Fig. 1, secured to a cross shaft 42 journaled in suitable brackets (not shown) fastened to the

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side plates 2 and 4. The shaft 42 is driven by the motor 30 through a sprocket 44 on the motor 30, chain 46, a sprocket 48 mounted on the cross shaft 50 carrying a gear 52 meshing with a gear 54 on the shaft 42. A ring 56 is mounted in vertically spaced relation on the main turret disk 34 as by screws 58 and spacing sleeves 60.

The ring 56 overlies the rim of the main turret disk 34, as illustrated in Figs. 1 to 5, and is provided with a plurality, namely fifteen, of apertures 62 preferably circular and of a diameter sufficient to permit ready passage of peaches of the largest size which it is desired to orient by means of the machine. The openings or apertures 62 are equally and arcuately spaced around the ring 56. The main turret disk 34 is provided with a similar series of openings or apertures 64 also equally and arcuately spaced around the disk and vertically aligned with the apertures 62 in the ring 36. Fruit is fed to the ring 56 and the turret disk 34 from a hopper 66 or other bulk container, or from a suitable bulk conveyor, from which the peaches roll down chute 68 having above the ring 56 and the turret disk 34 an open bottom or arcuate slot and sidewalls 70, 72, 74 and 76. The open bottom or arcuate slot in the bottom of the chute allows the peach to roll from the chute 68 onto the surface of the ring 56 and hence to fall through an opening 62 as it passes between the sidewalls 72 and 76 and therefrom to pass through an opening 64 in the main turret disk onto an arcuate plate 78 having an outer arcuate wall 82 and into fruit receiving or holding means or grippers of which there is a plurality of sets corresponding to the number of openings in the ring 56 and the main turret disk 34.

Each fruit receiving or holding means or grippers comprise a pair of generally V-shaped clamps 86 and 88, best seen in Figs. 14 to 18. The grippers 86 and 88 are formed integrally with arms 90 and 92 mounted by pivot bolts 94 and spacing sleeves 96 on the main turret disk 34. The arms 90 and 92 form the offset portions 98 which pass between the ring 56 and the turret disk 34 and are also formed with dependent portions 100 joining the V-shaped clamps 86 and 88 to the arms 90 and 92 and passing through an opening 64 in the turret disk. It should be noted that the openings 64 in the turret disk are formed with slots 102 to receive the dependent portion 100 when the clamps 86 and 88 are moved to fully opened positions. Arms 90 and 92 are formed with interengaging teeth or gear segments 104 and 106 to cause the arm 92 to move simultaneously in the opposite direction when the arm 90 is actuated.

The arm 90 is provided with an integral arm portion 108 extending inwardly from the mounting of pivot bolt 94 and provided at its inner end with the cam follower or roller 110 riding upon the surface of a circular cam 112 pinned to the stationary column or shaft 14. The arms 90 and 92 are interconnected and urged toward each other by a spring 114 secured at one end to a pin 116 carried by the arm 90 and the other end to a pin 118 carried by the arm 92. The spring 114 therefore urges the clamps or fruit grippers 86 and 88 to closed position and they are moved to open position by the stationary cam 112 as the grippers move about their circular path with the turret disk 34. The inner surfaces 120 and 122 of the opposed clamps or grippers 86 and 88 are inclined or tapered, as best seen in Figs. 17 and 18, for purposes which will presently appear. The V-shaped character or formation of the grippers or clamps enables the fruit grippers or clamps to centralize each peach radially of the turret.

A wheel-like member 124, Fig. 4, has a central hub portion 126 surrounding the sleeve 36 and has a ring flange 128 abutting and depending from the turret disk 34. The wheel-like member 124 is secured to the sleeve 36 or to the disk 34 for rotation therewith. A ring 130 having an annular flange 132 at its lower end is mounted on the ring flange 128 and forms a mounting for the

orienting mechanisms 24, which are equal in number to the number of openings, namely 15, in the ring 56 and the main turret disk 34. Ring 130 is provided with annularly spaced axially extending bosses 134, Figs. 4 and 9, receiving mounting bolts 136 by which the ring is adjustably secured to the turret disk 34. A spacing member or members 138 are interposed between the disk 34 and the bosses 134 to adjust the orienting mechanisms vertically with respect to the turret disks 34 and the fruit receiving means or grippers 84, the adjustment being accomplished by substituting for the spacing member or members 138 a like member or members of different thickness.

Each orienting mechanism 24 comprises an orienting member or wheel 140, Figs. 8 to 13, which is relatively small in diameter, for example, from one and three-eighths inches to one and three-quarters inches, in relation to the size of the peach, or other like fruit, as illustrated in Figs. 24 to 29.

The wheel 140 is positioned within a slot 142 of a spindle 144 and journaled on a cross pin 146 press fitted or otherwise secured to the spindle 144. A Geneva gear 148 and a Geneva lock plate 150 are secured to the spindle 144, the Geneva lock plate 150 having four equal arcuate lock surfaces 152. The reduced lower portion 154 of the spindle 144 is journaled in an apertured boss 156 of a supporting unit 158, best seen in Fig. 12. This supporting unit may comprise a U-shaped bracket 160 bolted to the annular flange 132 of the annular ring 130, bracket 160 having secured to it spaced arms or bars 162 and 164 to which is secured or with which is integrally formed a bracket 166 providing the vertical spindle journaling boss 156. The depending arms of the bracket 160 also form the mounting support and journals for a shaft 168 to which is secured a spiral pinion 170 and a gear 172.

The spiral pinion 170 meshes with and is rotated by a large spiral gear 174, keyed to sleeve 176 concentric with the column or shaft 14. Sleeve 176 has keyed to its lower end a spiral gear 178 driven by a spiral pinion 180 on a shaft 182 journaled in suitable bearing brackets (not shown) secured to the side plates 2 and 4. The shaft 182 is driven by the slow speed shaft 22 of the combined motor and speed reducer 18 as by means of a sprocket 184 on the shaft 22, a chain 186 and a sprocket 188 on the shaft 182.

Gear 172, Fig. 10, meshes with a gear 190 secured to a shaft 192 journaled in the forward ends of the arms 162 and 164. A drive spool 194 of "hour glass" form is secured to the shaft 192 for rotation thereby and its concave surface, which is concentric to the axis of rotation of the orienting wheel 140 when the wheel contacts the driving spool, is adapted frictionally to rotate the orienting wheel. It should be noted that the horizontal distance between the vertical planes through the axis of rotation of the orienting wheel and the axis of rotation of the driving spool is less than the sum of the radius of the wheel and the spool when the wheel is perpendicular to the spool axis and that the horizontal planes through the respective axes are vertically spaced so that the orienting wheel engages the surface of the driving spool at the point above the horizontal plane through the spool axis. The orienting wheel is periodically raised out of driving engagement with the drive spool 194 and while out of engagement is revolved or rotated about the axis of the spindle 144, i. e., about a vertical axis. This disengagement of the wheel or spool is accomplished by suitable wheel raising mechanism or means, in the form of cam blocks 196, 198, 200 and 202, best seen in Figs. 5 and 6, with the blocks having inclined beveled end portions and being bolted to mounting ring 204 fastened to and supported upon brackets such as 206 fastened to the longitudinal frame bars 10 and 12.

The spindle 144 of the orienting mechanism is of such length that the bottom end of its reduced portion 154

terminates above the mounting ring 204, as illustrated in Fig. 8. When the spindle is carried, by the turning of the turret, to one of the cam blocks, the lever end of the spindle engages the leading beveled end of the cam block and is thereby raised, as illustrated in Figs. 2 and 23. Circular guide means for the spindles of the plurality of orienting mechanisms as they are revolved by the turret about the axis of the column or shaft 14 is provided by a pair of circular tracks or rings 208 or 210, best seen in Figs. 1, 4, or 6 and 8. These rings are mounted on the spaced vertical arms 212 of the brackets 206, Fig. 8. The outer arm of the brackets 206 also supports, in vertically spaced relation to the track 208, a Geneva lock ring 214, best seen in Figs. 6 and 8. Geneva movement actuating or driving gear sectors 216, 218, 220 and 222 are supported in angularly spaced relation on the Geneva lock ring 214, Fig. 6. The sectors 216, 218 and 220 are each provided with two teeth on its inner surface to engage the teeth of each Geneva gear 148 as the orienting mechanisms are brought thereby to the rotation of the turret.

The two teeth of each Geneva drive sector cause the spindle of each orienting mechanism to be rotated through an angle of ninety degrees. The Geneva drive sector 222 is provided, however, with only one tooth, as shown in Fig. 6, and this sector therefore rotates the spindle of each orienting mechanism only through an angle of forty-five degrees for purposes which will presently appear.

Means is provided for holding each spindle from accidental rotation around its vertical axis when the orienting wheel extends radially of the turret. This means preferably comprises a flat spring 224, Figs. 11 and 12, secured to an upstanding arm of the bracket 166 and provided with a V-shaped hook 226 at its outer end to engage a corner of the Geneva lock plate 150 and thereby prevent accidental rotation of the spindle 144.

The spindles of the orienting mechanisms are turned about the vertical axis not only by the Geneva drive sectors 216 to 222 but are initially turned to position as shown at station 20—20 in Figure 2 and as illustrated in Figure 20, by the Geneva locking ring 214. For that purpose the Geneva locking ring is formed at its leading end with a radially reduced or narrower portion 228, Figure 6, going to the thicker portion by a curved camming surface or portion 230 which is adapted to engage a corner of the Geneva lock plate 150 of each orienting mechanism as will be evident from Figures 19a and 20a to cause the lock plate, and hence the spindle, to turn about a vertical axis to the position as shown in Figure 20a in which the curved locking surface 152 of the lock plate glides along the inner vertical edge 232 of the locking ring so that the ring holds the lock plates, and hence the spindles, against accidental rotation. It will of course be evident that the locking surface 152 of the locking plates have the same radius of curvature as the locking edge 232 of the locking ring.

As the turret rotates the peach is carried in succession through positions or stations 19—19, 20—20, 21—21, 22—22, 221—221 and 23—23 as illustrated in Figures 2 and 6. While the fruit is being conveyed through this series of positions or stations, it is, as will hereinafter be described more particularly, oriented as to stem indent and as to suture plane or the long axis of the stem indent.

After the fruit has been carried past position or station 23—23, the orienting wheel may, for one reason or another, not be fully seated to its maximum depth in the stem indent, or in some few instances, the wheel may be slightly cocked with respect to the long axis of the stem indent. In order to cause the wheel to enter into the deepest portion of the cavity, applicant has provided the vibrating mechanism 28. This vibrating mechanism 28, best shown in Figures 1, 6 and 7, comprises a pair of frame bars 234 and 236 pivoted at their inner ends

on a common shaft 238 held in brackets 240 bolted to the side frame plate 2. The track or ring 204 which supports the spindle raising blocks 196, 198, 200 and 202 is cut away between a pair of the brackets 206 and an arcuate ring 242 of the same radius as the ring 204 is bolted to the outer ends of the arms 234 and 236 of the vibrating mechanism and bridges the gap between the ends of the ring 204. The arcuate ring 242 is vibrated, substantially vertically, by an eccentric 244 secured to a shaft 246 mounted on a suitable bracket 248 bolted to the side frame plate 4. A connecting rod 250 connects the eccentric 244 to a pivoted stud 252 bolted to the ring sector 242. The shaft 246 is provided with a speed adjustable pulley 254, driven by belt 256, in turn driven by a pulley 258 on high speed shaft 26.

The operation of the machine to accomplish rotation of peaches, or like indented and seamed fruit, as to indent and suture plane, is as follows: The peaches are dumped or delivered into the hopper or chute 68 and roll down the chute, passing from the chute onto the surface of the continuously rotating ring 56, the peaches being confined against any substantial arcuate movement by the up-standing side walls 70, 72, 74 and 76 of the chute or hopper. As each opening 62 in the ring 56 passes beneath the open bottom of the chute, a peach will fall through the opening and through the aligned opening 64 in the continuously rotating main turret disk 34 to a position as shown in Figure 8 on the stationary arcuate plate 78, the fruit being received between a pair of the open clamps or grippers 86 and 88. The peach rolls or slides along arcuate plate 78 until it reaches the end thereof and rolls therefrom onto an orienting wheel 140 which, at that time, is positioned radially of the turret and is in driving engagement with its driving spool 194. At this time the peach passes position 19—19, as illustrated in Figures 2 and 6, and the parts of the orienting mechanism operate as is illustrated in Figures 19 and 19A.

Just prior to the arrival of the orienting mechanism at position 19—19, the cam roller 110 passes a short cut-out section 260 in the surface of the stationary control cam 112, as shown in Figure 2, and the clamps or grippers are momentarily closed to centralize the peach with respect to the orienting wheel and are then opened as the cam passes out of the notch 260 so that the peach is allowed freely to roll under the action of the orienting wheel, the clamps or grippers being spaced apart or opened sufficiently so that they impose no substantial restriction on the free turning of the peach with the orienting wheel and the peach is maintained substantially entirely supported only by the orienting wheel. The clamps or grippers thereafter serve during the orienting operation merely to limit the tilting of the peach on the wheel and to prevent displacement of the peach out of driving engagement with the wheel. The V shape of the opposed clamps or grippers insures this correct centralizing of the peach on the orienting wheel.

The rotating orienting wheel causes the peach to rotate and if the indent is in the plane of the wheel, the indent will very quickly reach the wheel and the peach will therefore drop down on the wheel to the extent that the wheel penetrates into the stem indent. If the indent not only is in the plane of the wheel, but the suture plane also lies in the plane of the wheel, the peach will of course be very quickly turned so that not only does the wheel penetrate the stem indent, but is also aligned with the long axis thereof, and the wheel will accordingly penetrate farther or to its maximum extent for such peach into the stem indent. It is very important for this purpose that the wheel be relatively small in diameter as compared with the peach or like fruit to be oriented.

For orienting peaches the wheel should be approximately $1\frac{3}{8}$ inches in diameter, $\frac{1}{4}$ inch in width and with an arcuate edge surface of $\frac{11}{16}$ of an inch. Applicant has found that a wheel of that size is sufficiently large to rotate the peach and small enough so that when the wheel

enters the stem indent crosswise of the long axis of such stem indent, the steep sides of the indent crosswise of the long axis thereof will prevent further turning of the peach as the wheel continues to rotate, and furthermore, that such a wheel is the proper size to enter deeply into the indent on a line with the long axis thereof, which coincides with the suture plane of the peach, so that the peach will not be further rotated as the rotation of the wheel continues after the suture plane has been located.

The elongated edge and plane side surface of the wheel will, in cooperation with the abrupt sides of the stem indent crosswise of its long axis, tend to keep the suture properly aligned with the wheel even though the peach may tilt somewhat on the wheel. The peach may not, of course, be originally received on the orienting wheel with its indent or suture plane lying in the vertical plane of the wheel, but may fall thereon in any position. If the peach falls on the orienting wheel with the long axis of its indent in a plane normal to the wheel plane, as illustrated in Figure 24, the continued rotation of the wheel in its original position radially of the turret will not serve to orient the peach. Accordingly, as the turret continues to revolve, the peach moves to position 20—20, Figures 2, 6 and 20. As it moves to this position the Geneva lock plate 150 engages the curved camming surface 230 of the locking ring 214 and the plate and orienting spindle 144 are thereby rotated so that the wheel is disposed at an angle of 45° to the radius of the turret, as best illustrated in Figures 2 and 20A. The orienting wheel, however, continues to be driven by the drive spool 194 and the peach is now rotated about an axis which is inclined at an angle of 45° with its original axis of rotation. Due to the weight and inertia of the peach, during the turning of the orienting wheel about a vertical axis, the peach is not turned about a vertical axis.

If the peach had originally dropped on the orienting wheel with its indent in such a position that the turning of the wheel relative to the peach about a vertical axis caused the wheel to lie in the plane of the indent or transverse thereto, the continued rotation of the wheel in this new plane would of course quickly serve to locate the indent. If the peach had originally dropped on the wheel in such a position that the rotation of the wheel radially of the turret between positions 19—19 and 20—20 served to locate the indent and the wheel penetrated into the indent crosswise thereof so that the peach stopped rotating, it may and frequently does happen that the vertical turning of the wheel causes the wheel to be aligned with the long axis of the stem indent and therefore the wheel penetrates more deeply into the indent, as heretofore explained. Therefore, in those instances, the peach is fully oriented, not only as to stem indent, but also as to suture plane by the time it reaches position 20—20.

However, if the peach originally dropped on the wheel in the position shown in Figure 24, then the rotation of the peach about the second axis may cause the indent to reach the wheel and lie thereon with the wheel extending crosswise, or the peach may continue to be rotated without bringing the stem indent into registration with the wheel.

As the turret continues to revolve and the orienting mechanism approaches position 21—21, Figures 2 and 6, the bottom edge of the spindle 144 engages, and the spindle is raised by, the stationary cam block 196. This cam block raises the spindle, thereby lifting the orienting wheel out of engagement with the driving spool, and as the spindle passes over the top of the cam blocks, the Geneva gear 148 is engaged by the teeth of the Geneva gear sector 216 so that the spindle is rotated through an angle of 90° , the Geneva lock ring having a relieved portion or notch 262 below the teeth of the Geneva gear sector 216 so as to provide clearance permitting the locking plate to rotate with the spindle and to position the next curved surface 152 of the locking ring for

locking engagement with the relieved edge surface of the locking ring beyond the notch 262. The wheel spindle having been rotated through an angle of 90° to the position shown in Figures 21 and 21A, the spindle now passes beyond the cam block 196 and drops down to re-engage the orienting wheel with its drive spool. If the indent of the peach had been located prior to position 20—20, but the wheel extended crosswise of the indent, this next vertical turning of the spindle would cause the wheel to swing about a vertical axis relative to the peach and may serve to align the wheel with the long axis of the indent, permitting the peach to drop farther down onto the wheel.

If the peach had originally dropped on the wheel as shown in Figure 24 and had been rotated as indicated in Figure 25 by the wheel as it passes from position 20—20 to position 21—21, this vertical shifting or swinging of the wheel relative to the peach will then cause the wheel, rotating as in position 21—21, to locate the indent but extend crosswise thereof as shown in Figure 26. As the turret continues to revolve, the orienting mechanism approaches position 22—22, the spindle engages the next cam block 198 and the Geneva gear 148 engages the next Geneva gear sector 218 and the locking plate reaches the cut-out 264 in the locking ring 214. Hence, the gear spindle is again rotated about a vertical axis through an angle of 90° to a position shown in Figures 2, 22 and 22A. The peach, the indent of which has been located by the wheel extending crosswise of the indent, as illustrated in Figure 26, will, by this vertical rotation of the wheel spindle, bring the wheel into alignment with the long axis of the indent. If, during this vertical swinging on the wheel spindle, the suture plane is located by the wheel, the peach will, of course, turn about a vertical axis with the wheel as it goes to the position shown in Figure 21A.

As the turret continues to revolve, the orienting mechanism approaches position 221—221, Figures 2 and 6, the Geneva gear 148 engages the Geneva gear sector 220 and the Geneva locking plate 150 reaches the notch 266 in the locking plate so that the wheel spindle is again rotated through an angle of 90°, the orienting wheel duplicating the position with respect to the radial axis of the turret as illustrated in Figures 21 and 21A. If the peach has been oriented as to stem indent and the wheel lies crosswise thereof, this turning of the spindle will serve to orient it as to suture plane. If the peach has not been oriented as to stem indent, the rotation of the peach about this new axis will serve either to locate the stem indent or to locate both the stem indent and the suture plane.

As the turret continues to revolve and the orienting wheel approaches position 23—23, the Geneva gear 148 is brought into engagement with the single toothed gear sector 222 and the orienting wheel is rotated about a vertical axis through an angle of 45° so that the wheel spindle is again radially aligned with the turret as illustrated in Figures 2, 23 and 23A. As the orienting wheel approaches this position the Geneva lock plate 150 reaches the reduced final end portion 268 and a corner of the lock plate is engaged by the hook end 226 of the latch spring 224, Figure 11.

Applicant has found that practically 100 percent of the peaches are oriented before the orienting mechanism reaches position 23—23. Accordingly, the swinging of the wheel to a position in radial alignment with the turret serves to fix the suture plane of the oriented peach with respect to the radial axis of the turret as a reference plane. It may happen that because the stem indents of peaches or like fruit are not perfectly smooth, but that because of grooves left from stems or twigs that bore the fruit, or creases on the sides of the stem indents, or small bumps, the wheel has not entered the stem indent to its fullest position and therefore the suture plane has not been precisely oriented by the time the

fruit reaches and passes position 23—23. Accordingly, as the turret continues to revolve, the orienting mechanism passes onto and over the ring sector 242, Figure 6, the wheel spindle passing over the cam block section 270 at the end of the ring 204 onto the track section 242 which is elevated with respect to the ring 204. Thus, as the orienting wheel passes over the sector 242, the orienting wheel spindle is held in raised position and therefore out of driving engagement with its driving spool 194, the track section being continuously vibrated through a distance adjustable from almost nothing to 1/8 inch. The wheel spindle, orienting wheel and peach are vibrated vertically, preferably at high speed, on the order of 1300 vibrations per minute, but with rather a gentle movement and the wheel clears the bumps, creases, twigs or roughened surfaces on the indent sides of the peach, and the peach settles down onto the wheel so that the wheel penetrates the maximum possible extent into the indent of the peach and the long axis of the peach is precisely located by the wheel.

Peaches are frequently, if not usually, not perfect spheres, and, therefore, although the peach may be precisely oriented with respect to the long axis of the stem indent or the suture plane, the peach may tilt one way or the other on the wheel so that the suture plane is not truly vertical. Accordingly, after the orienting mechanism has passed the vibrating track 242, the opposed V-shaped clamps or grippers 86 and 88 are released by the cam 112 for closing movement under the action of their connecting spring 114. The surface of the cam is therefore relieved in the area 272 sufficiently to permit the clamps to close to an extent necessary to grip the smallest sized peach which the machine is intended to handle. As these clamps or grippers move to closed position, they, by reason of their V-shape, serve to re-centralize the peach with its suture plane now extending in a truly vertical plane coincident with the vertical plane through the orienting wheel and the axis of the rotating turret. The tapered inner surface 120 and 122 of the clamps or grippers 86 and 88 serve to apply to the peach, as the grippers are moved to closed position, a force exerted in a downward direction from above the center line of the greatest diameter of the peach, thereby insuring that the peach will be maintained in properly oriented position on the wheel and will not be lifted off the wheel or shifted with respect thereto.

During turning of the peach by the orienting wheel in its several and different angular positions about a vertical axis, the force applied to the peach by the rotating wheel, and the force of gravity acting on a misshapen or not strictly spherical peach may tend to tilt the peach with respect to the vertical plane through the orienting wheel and the peach will therefore impinge upon a surface of the peach receiving or holding means or grippers as illustrated in Figures 24 through 27. The peach grippers are preferably provided with chromium plated inner surfaces to reduce the friction between the peach and these gripper surfaces. As compared with semi-cylindrical grippers, the V-shaped grippers 86 and 88 serve to reduce the area of contact of the tilted peach with the grippers and therefore serve further to reduce the movement-retarding friction between the peach and the peach-receiving or holding means or grippers.

It should be noted that during orientation of the fruit, the fruit receiving or holding means or grippers 86 and 88 merely serve to maintain the fruit substantially centrally over the associated orienting wheel, so that the fruit contacting portions of the clamp members are sufficiently above the highest point of the wheel that the fruit cannot jam between the wheel and the inner surfaces of said means or grippers. This spacial relationship of the wheel to the fruit contacting surfaces of said means or grippers is further important in that it permits most ready movement of the fruit to a vertical position, with the upper edge of the wheel as a pivot point, when

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the clamp members are brought toward each other to effect the final straightening of the fruit for precisely aligning the suture plane of the fruit with the wheel plane.

After the fruit grippers have been moved to closed position to straighten the fruit on the orienting wheel as shown in Figure 29, they may be slightly opened by cams 112 and any suitable mechanism, not shown, may be used to project into or through the openings of the turret, and adduct the oriented fruit therefrom in a predetermined orientation, prior to the time that the grippers pass under the chute bottom to receive another peach therefrom.

It will be obvious that changes may be made in the form, construction and arrangement of the parts without departing from the spirit of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

The present application is a division of a joint application of applicant and Richard D. Fox, Serial No. 47,464, entitled "Fruit Orienting Method and Machine," filed September 2, 1948.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In a device for orientating peaches or like indented and sutured fruit, a rotatable orientating member adapted to engage and rotate a fruit body and enter the stem indent to maximum extent only when in alignment with the suture plane of the fruit, means arranged to maintain the fruit body supported solely upon said member and to resist displacement of the fruit body upon rotation of said member, and driving means for rotating said orientating member to turn the fruit body while so sup-

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ported solely upon said orientating member and in respect to a plurality of relatively angularly disposed axes, whereby to effect the orientating alignment of the suture plane of the fruit with said orientating member.

2. Apparatus in accordance with claim 1 wherein said orientating member is a wheel rotating in a vertical plane and having an edge thin enough to penetrate the indent to maximum extent when the wheel is aligned with the suture plane of the fruit.

3. In a machine for orientating peaches or like indented and sutured fruit, lateral fruit restraining means having side walls with a vertical extent substantially less than the diameter of said fruit and defining a space larger than the fruit to be orientated and normally unobstructed to permit free passage of said fruit there-through, wheel means shaped to enter the stem indents of said fruit to maximum extent only when in alignment with the suture plane of the fruit and rotatable in a vertical plane, said wheel means being positioned substantially centrally below said side walls and forming the sole means for supporting said fruit in said space against gravity, and means for rotating said wheel means to turn the fruit while so supported solely upon said wheel means and in respect to a plurality of relatively angularly disposed axes whereby to effect the orienting alignment of the suture plane of the fruit with said wheel means.

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