Feb. 17, 1953 F. A. WOOL 2,628,649

METHOD OF AND APPARATUS FOR SLICING DRUPE HALVES

Filed Sept. 16, 1949 2 SHEETS--SHEET 1

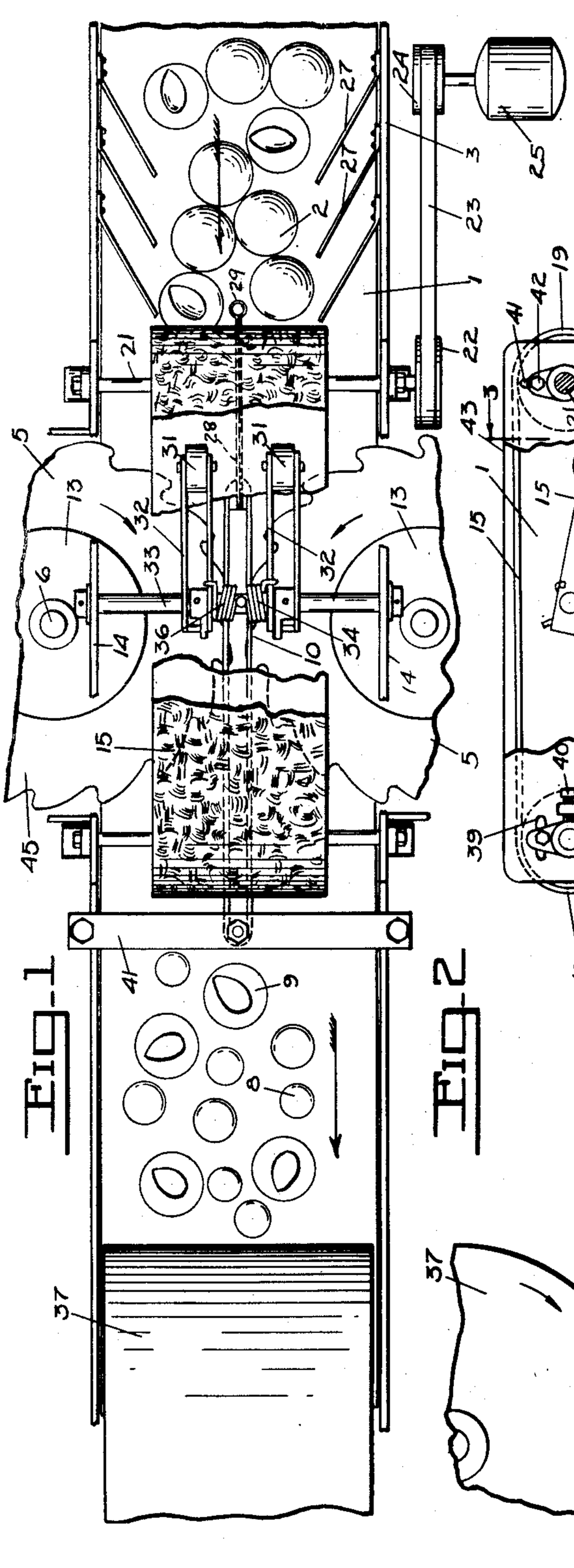

Fig-1

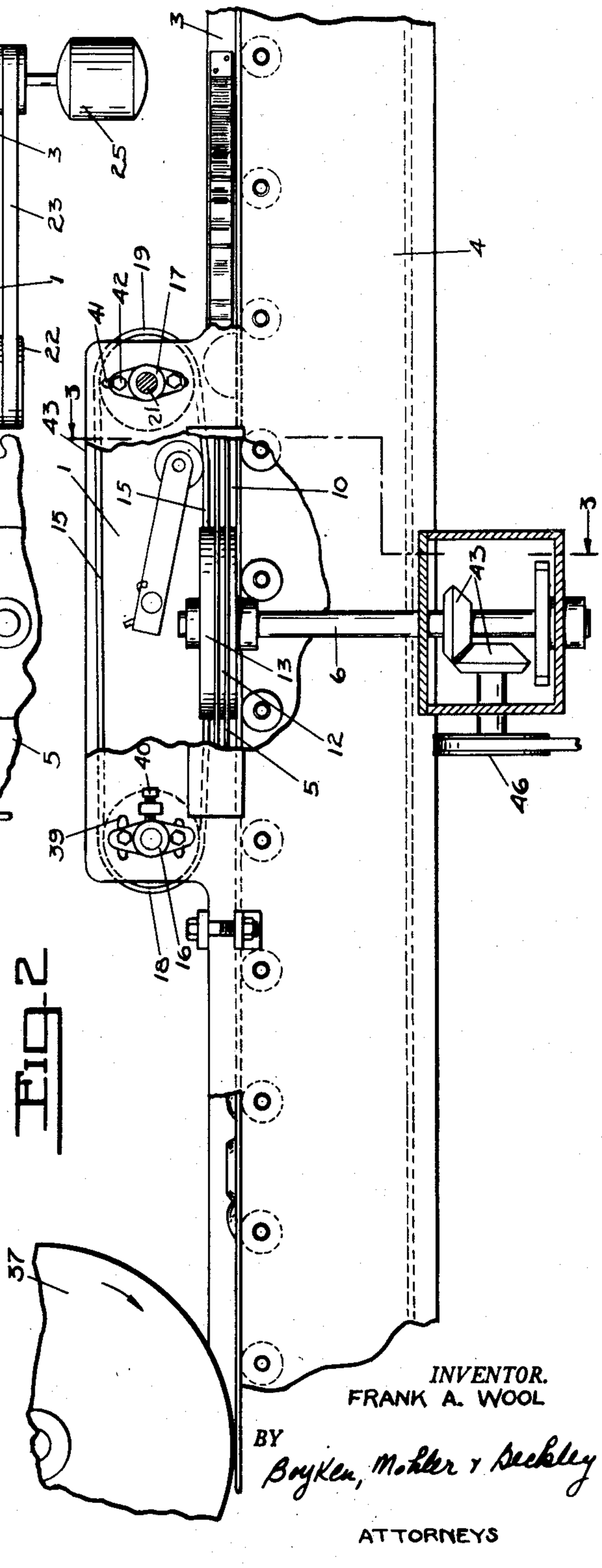

Fig-2

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Fig. 3

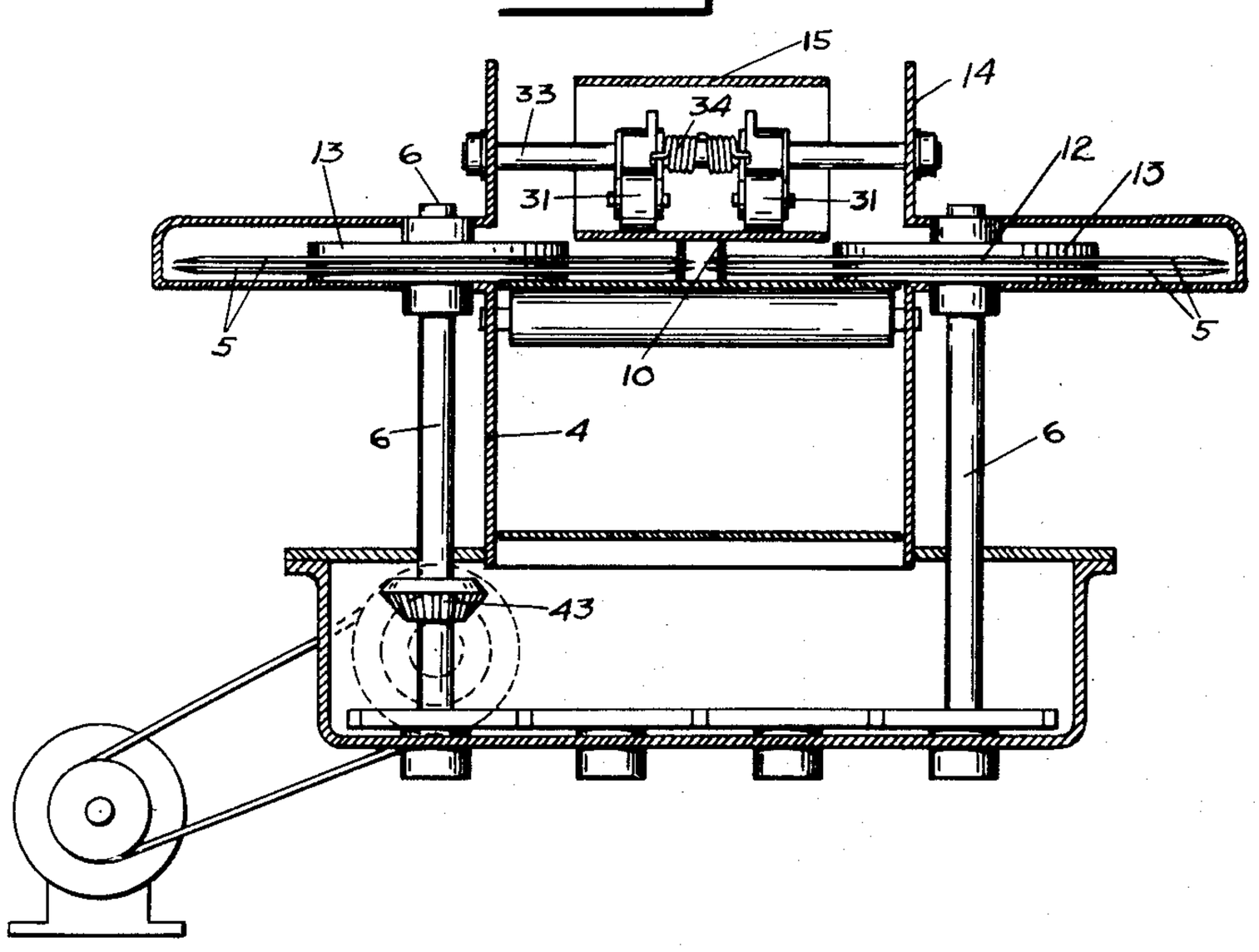


Fig. 4

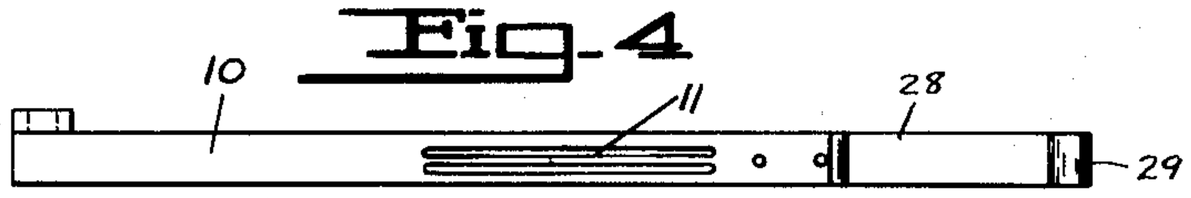


Fig. 5

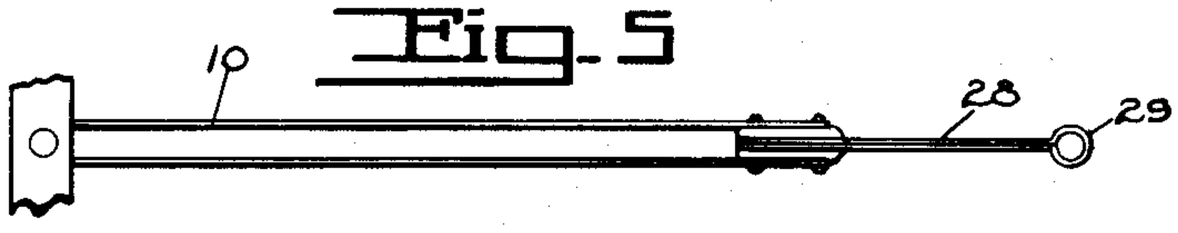
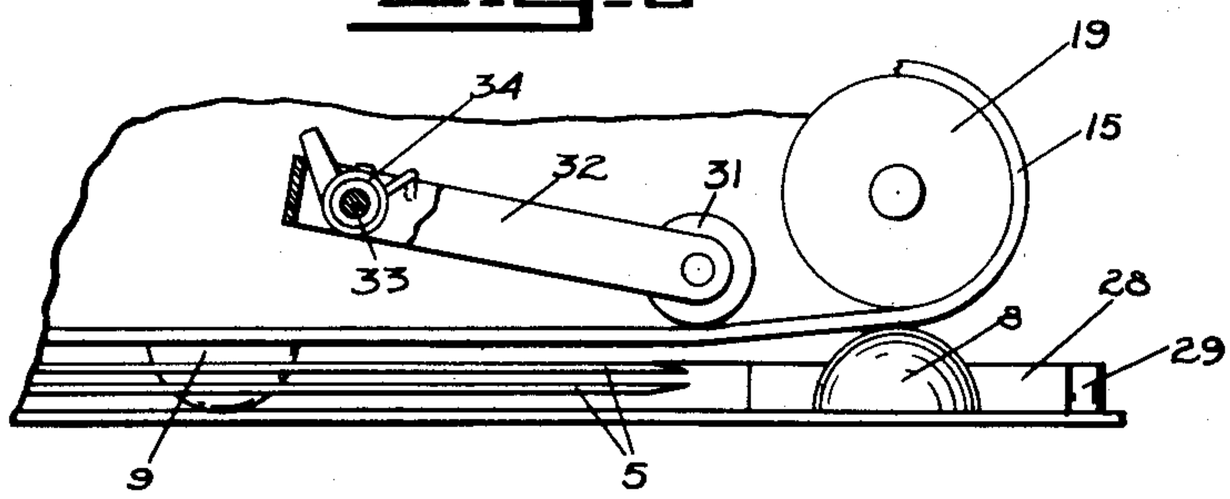


Fig. 6



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METHOD OF AND APPARATUS FOR SLICING DRUPE HALVES

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8 Claims. (Cl. 146—241)

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This invention relates generally to a slicer for drupe halves, of the type shown in my United States Letters Patent No. 2,232,089, dated February 18, 1941.

One of the objects of this invention is the provision of a slicer for drupe halves that is adapted to slice the halves in planes parallel with their cut faces faster than heretofore, and more efficiently.

Another object of the invention is the provision of means for slicing drupe halves in planes parallel with their cut faces irrespective of whether their cut faces are directed downwardly or upwardly.

A sitll further object of this invention is the provision of means for delivering drupe halves to a slicing device for slicing by the latter in planes parallel with their cut faces without crowding of the halves adjacent the point where the first is sliced and in which the halves are held with their cut faces in planes parallel with each other during slicing.

An additional object is the provision of an improved method of slicing drupe halves preparatory to forming the slices into dice.

Heretofore, one of the problems in slicing drupe halves, such as peach halves for dicing, has been the fact that the dicing machine, such as shown in United States Letters Patent No. 2,211,919 of August 20, 1940, has been adapted to dice the halves, after said slicing step, at a much faster rate of speed than the halves could be delivered with their cut faces all facing in one direction, which direction heretofore has been downwardly only. While devices, such as shown in my United States Letters Patent No. 2,277,940 of March 31, 1942 have been relatively satisfactory for turning the halves over with their cut faces directed downwardly, the speed at which this inversion of upwardly facing halves has been possible is not fast enough to take advantage of the speed of the dicing machine. With the present invention it is not necessary to turn the fruit halves over, since provision is made for holding the halves with their cut faces in parallel planes during cutting, irrespective of whether the halves face upwardly or downwardly.

Another feature of the present invention is the provision for speeding up the travel of the halves during the slicing operation, which act tends to not only speed up the capacity of the slicer, but it also results in more uniformly distributing the cut slices on the conveyor for dicing.

Other objects and advantages will be seen from the description and drawings.

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In the drawings,

Fig. 1 is a top plan view of the slicing device over the conveyor belt for the drupe halves, parts of the device being broken away to show structure. Also a fragment of the dicer is indicated so as to show its relation to the slicer.

Fig. 2 is a side view of the device of Fig. 1 with certain parts broken away and in section.

Fig. 3 is a vertical cross sectional view taken substantially along line 3—3 of Fig. 2.

Fig. 4 is an enlarged side elevational view of the central block and tongue over the conveyor belt in which the adjacent edges of the cutters extend, which member is separate from the machine.

Fig. 5 is a top plan view of the block and tongue shown in Fig. 4.

Fig. 6 is a fragmentary enlarged part sectional and part elevational view of the device for yieldably holding the hold-down belt down.

In detail, a horizontally extending endless belt conveyor 1 is adapted to support fruit halves 2 thereon for movement of said halves therewith in the direction indicated by the arrows in Fig. 1. This belt conveyor is preferably rubber surfaced so as to present a smooth upwardly facing supporting surface on its upper run for the fruit halves. The usual means is provided for actuating the belt, such as a power driven pulley (not shown) at one end of said conveyor and over which it extends.

Along opposite edges of said conveyor are upstanding strips 3 that may be secured rigid to the supporting frame 4 for the conveyor (Fig. 2).

The means for slicing the halves 2 are pairs of spaced superposed circular peripherally toothed cutting knives 5. These are supported on a pair of power driven shafts 6 that extend upwardly past opposite edges of the conveyor 1 at a point along the same, in substantially the same manner as in said Patent No. 2,232,089.

In the present instance each shaft has a pair of said knives 5 secured thereto. The lower knives on shafts 6 are coplanar, and extend horizontally over the horizontal upper run of conveyor 1 a distance spaced equal to the thickness of the dice to be cut from the fruit after slicing. The upper knives on shafts 6 are likewise coplanar and are spaced above the lower knives a distance equal to the spacing between the lower knives and the conveyor.

It has been found that a pair of superposed knives on each shaft 6 is usually adequate for cutting the drupe halves into three slices of substantially uniform maximum thickness. The

upper slices 8 (Fig. 1) will, of course, be convex on one side and may or may not be used, as desired. The other two slices 9, however, resemble circular slabs of uniform thickness, and cubes are readily cut therefrom.

Centrally above conveyor 1 and extending longitudinally thereof is an elongated block or member 10 (Figs. 4, 5) formed with laterally opening recesses or slots 11 therein for receiving the toothed peripheral edges of the knives 5. A circular spacer 12 on each shaft 6 spaces the knives on said shaft apart and circular clamping discs 13 of the same diameter as spacer 12 are above the upper knife and below the lower knife on each shaft. The edges of said discs and spacers nearest the member 10 cooperate with said member for defining the closest points between passageways at opposite sides of said member between which the fruit halves must pass on their way past the knives, hence each fruit half will be completely sliced during said movement past said knives.

Positioned over the member 10 and extending longitudinally of belt 1 is a hold-down belt 15. The frame 4 or strips 3 may extend upwardly at 14 at points along said conveyor 1 and opposite knives 5 for supporting bearings 16, 17 for the end pulleys 18, 19 of said belt 15. The pulley 19 is secured on a shaft 21 and said shaft extends through bearings 17 to outside the frame 14. The outwardly projecting end of shaft 21 may have a pulley 22 secured thereto for a belt 23. Belt 23 may extend over a pulley 24 that may be driven by any suitable source of power, such as a motor 25, or by a connection between the means for driving the conveyor 1. The upper run of the conveyor 1 and the lower run of the hold-down belt 15 are driven in the same direction and it is desirable that the lower run of said hold-down belt move at a faster rate of speed than that of the conveyor, as will later be explained more in detail.

Adjacent the end of the hold-down belt that faces toward oncoming fruit on conveyor 1, the strips 3 are provided with spring strips 27 that extend convergently toward the center of conveyor 1 and over the latter. The adjacent ends of these strips are spaced apart a distance slightly less than the width of the hold-down belt for directing fruit halves 2 on said conveyor toward said hold-down belt.

The hold-down belt extends at its ends about equal distances from the adjacent edges of the cutting knives 5, and may practically slidably engage the central member 10.

At the forward end of said member 10 is a forwardly projecting elongated spring arm 28 that may be in the form of a spring strip folded on itself at a point intermediate its ends to define a rounded and relatively blunt end portion 29 where so folded (Fig. 4). The free ends of said strip may be secured to the member 10. This forward end 29 of said arm 28 projects from below the hold-down belt and faces the oncoming fruit halves. Some of said halves will strike the end 29, and when this occurs the arm 28 will flex to one side or the other until the fruit halves slip past the same. This flexing is important because it prevents the tendency of fruit to pile up at the forward end of member 10, as occurs where said member or any forward extension thereon is rigid. The words "forwardly" or "forward" used with respect to the member 10, hold-down belt 15 or arm 28 refers to the end facing toward oncoming fruit on conveyor 1. The arm 27 virtually comprises a flexible extension of

member 10 for dividing the flow of oncoming fruit to one side or the other of member 10.

The pulley 19 at the forward end of the hold-down belt is so supported by bearing 17 as to space the forward end of said belt above conveyor 1 a slightly greater distance than half of the maximum diameter of fruit halves to be sliced. Thus the fruit halves will be readily carried past the pulley 19 and forward end of belt 15 to between said belt and conveyor 1. However, adjacent pulley 19 and at each of the opposite sides of member 10 adjacent its forward end, a hold-down roller 31 is provided.

Each hold-down roller 31 is independent of the other and each is rotatably supported between the forward ends of a pair of arms 32 that are pivotally secured at their opposite ends on a cross shaft or rod 33, which shaft is secured at its ends on frame portions 14. A torsion spring 34 reacts between each pair of arms 32 and a lug 35 secured to said arms for yieldably urging the rollers 31 downwardly against the upper side of the lower run of belt 15. As above mentioned, each roller 31 is independent of the other, hence one may be moved upwardly or downwardly without affecting the other.

The rollers 34 insure the lower run of belt 15 engaging either the flat or the convex sides of fruit halves 2 that are carried between the hold-down belt and the conveyor 1. Once the halves are between the conveyor 1 and belt 15 they cannot tilt, but will be held with their cut flat faces in planes parallel with the plane of conveyor 1 or the planes of the knives 5.

The outer surface of belt 15 is quite rough, although of rubber or the like, so as to substantially preclude slippage between the belt 15 and the halves 2. The belt 1 is smooth and is always kept wet, hence the halves will be positively driven past the knives 5 by belt 15, and not by conveyor 1. This being the case, and as belt 15 travels faster than belt 1, it will be seen that the halves will be slipped on belt 1 past the knives 5. Once the halves are sliced by the knives and move past the latter, this differential in the speed of the belts tends to displace the upper slices relative to the lower ones for distributing the slices on the belt 1 for subsequent movement to the dicer 37. If desired, however, any suitable added means may be provided for distributing the slices on belt 1, such, for instance, as shown in my said Patent No. 2,232,089.

The rear bearing 16 carrying pulley 18 is adjustable longitudinally of the belt by means of slots 39 in frame 14 and adjusting screw 40 that is carved by said frame and in engagement with said bearing 16. Upon tightening screws 40 the belt 15 is tightened to any desired degree. The bearing 17 is vertically adjustable by reason of slots 41 in frame 4 for the bolts 42 that secure the bearing to said frame. Obviously bearing 16 may also be vertically adjustable by reason of slots 41 in frame 4 for the bolts 42 that secure the bearing to said frame. Obviously, bearing 16 may also be vertically adjustable if desired.

The member 10 is secured by a cross bar 41 to the frame 4 as best seen in Figs. 1, 2, said bar being at the rear end of the hold-down belt 15.

Shafts 6 that carry cutting knives 5 are power driven by any suitable means, such as the bevel gear connection 43 between said shafts 6 and a power driven pulley 44 (Fig. 2). The cutting knives are formed with cutting teeth having rounded points 45 pointed generally in the direction of travel of the knives. The upper sides of

the teeth on the upper knives are beveled to prevent cutting belt 15 if the belt should engage the upper surfaces of the upper knives, as frequently happens when relatively small halves may pass the knives, or when there are no halves between the conveyor 1 and the hold-down belt.

The spacing between the upper discs 13 on shafts 6 is slightly greater, or substantially the same as the width of the hold-down belt, so the belt will pass between said discs.

In operation, halves 2 are fed onto the upper run of conveyor 1 by any suitable means. These halves are indiscriminately arranged with their convex sides or flat sides facing upwardly. As they are carried on conveyor 1 toward the hold-down belt 15, they are urged toward the central section of belt 1 by spring arms 27. When they reach the spring divider tongue or arm 28, the flow of halves is divided so that the halves will pass to opposite sides of member 10. Immediately thereafter the halves will be engaged tightly by the lower run of the hold-down belt and are swiftly slipped past the knives 5 that will cut them into slabs. After cutting by the knives 5, and after being ejected from below the hold-down belt, the slabs 8, 9 will be carried to the dicer 37 for dicing.

I claim:

1. The method of slicing drupe halves that comprises the steps of, supporting a plurality of said halves for movement along a horizontally extending path of travel with some of said halves having their cut faces directed upwardly and the remainder having their cut faces directed downwardly, cutting said halves into a plurality of slices in spaced planes parallel with said cut faces during said movement, and holding said halves against movement out of positions in which their cut faces are in planes parallel with said path at all times during said cutting of said halves.

2. The method of slicing drupe halves that comprises the steps of, supporting a plurality of said halves for movement along a horizontally extending path of travel with some of said halves having their cut faces directed upwardly and the remainder having their cut faces directed downwardly, cutting said halves into a plurality of slices in spaced planes parallel with said cut faces during said movement, causing said halves to move at an accelerated rate of speed along said path during said cutting, and holding said halves against movement out of positions in which their cut faces are in planes parallel with said path at all times during said cutting.

3. The method of slicing drupe halves that comprises the steps of, supporting a plurality of said halves on a relatively slippery surface for movement with said surface in a path of travel in one direction, holding said fruit against said surface at a point along said path and slipping the said halves on said surface in said direction at a faster rate of movement than that of said surface and simultaneously slicing said halves during said slipping in a plane parallel with said surface.

4. In a fruit slicing device for slicing drupe halves into slices of uniform thickness including a horizontally extending conveyor for supporting such halves in a single layer thereon with their cut faces directed upwardly and downwardly for movement of said halves in a generally horizontally extending direction, a horizontally extending hold-down belt spaced over said conveyor a distance substantially equal to the radius of said halves respectively, means for actuating said conveyor and said hold-down belt for movement of their adjacent runs in the same direction whereby said halves will be moved in said direction and will be positively held with their cut faces parallel with said conveyor, cutters intermediate the ends of the lower run of said hold-down belt with their cutting edges extending horizontally between said conveyor and said belt for slicing said halves into slices of uniform thickness.

5. In a fruit slicing device for slicing drupe halves into slices of uniform thickness including a horizontally extending conveyor for supporting such halves in a single layer thereon with their cut faces directed upwardly and downwardly for movement of said halves in a generally horizontally extending direction, a horizontally extending hold-down belt spaced over said conveyor a distance substantially equal to the radius of said halves respectively, means for actuating said conveyor and said hold-down belt for movement of their adjacent runs in the same direction whereby said halves will be moved in said direction and will be positively held with their cut faces parallel with said conveyor, cutters intermediate the ends of the lower run of said hold-down belt with their cutting edges extending horizontally between said conveyor and said belt for slicing said halves into slices of uniform thickness, the surface of said hold-down belt adapted to engage said drupes being substantially rougher than the fruit engaging surface of said conveyor.

6. In a fruit slicing device for slicing drupe halves into slices of uniform thickness including a horizontally extending conveyor for supporting such halves in a single layer thereon with their cut faces directed upwardly and downwardly for movement of said halves in a generally horizontally extending direction, a horizontally extending hold-down belt spaced over said conveyor a distance substantially equal to the radius of said halves respectively, means for actuating said conveyor and said hold-down belt for movement of their adjacent runs in the same direction with said belt moving at a rate of speed greater than that of said conveyor, said belt having a roughened friction surface in engagement with said drupes and said conveyor being smooth whereby said drupes will be moved faster than the movement of said belt over the latter when said drupes are between said belt and said conveyor, and cutting means having cutting edges extending horizontally between said belt and said conveyor and intermediate the ends of said belt for cutting said halves into slices of uniform thickness during their movement by said belt.

7. In a fruit slicing device for slicing drupe halves into slices of uniform thickness including a horizontally extending conveyor belt for supporting such halves thereon with their cut faces directed upwardly and downwardly for movement of said halves in a horizontally extending path, a horizontally extending hold-down belt over said conveyor belt and generally parallel therewith, means for actuating said conveyor and said hold-down belt for movement of said conveyor belt and the lower run of said hold-down belt in the same direction, cutters intermediate the ends of said hold-down belt and having cutting edges extending horizontally between said conveyor and said hold-down belt for cutting said halves into slices, the lower run of said hold-down belt being spaced from said conveyor a distance substantially equal to the radius of said

halves, and means engageable with said run at a point intermediate its ends and horizontally spaced cutters for yieldably holding said run at said distance whereby said lower run will be adapted to be yieldably urged in direction away from said conveyor under the influence of drupes having radii above normal.

8. In a fruit slicing device for slicing drupe halves into slices of uniform thickness including a horizontally extending conveyor belt for supporting such halves thereon with their cut faces directed upwardly and downwardly for movement of said halves in a horizontally extending path, a horizontally extending hold-down belt over said conveyor belt and generally parallel therewith, means for actuating said conveyor and said hold-down belt for movement of said conveyor belt and the lower run of said hold-down belt in the same direction, cutters intermediate the ends of said hold-down belt and having cutting edges extending horizontally between said conveyor and said hold-down belt for cutting said halves into slices, the lower run of said hold-down belt being spaced from said conveyor a distance substantially equal to the radius of said halves, and means engageable with said run at a point intermediate its ends and horizontally spaced cutters for yieldably holding said run at said distance whereby said lower run will be adapted to be yieldably urged in direction away from said conveyor under the influence of drupes having radii above normal, said last mentioned means comprising rollers disposed over said lower run of said hold-down belt, and springs yieldably urging said rollers downwardly against the upper side of said lower run.

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