March 5, 1957 K. G. WECKEL ET AL 2,783,803

CRANBERRY PUNCTURING MACHINE

Filed June 27, 1955 3 Sheets-Sheet 1

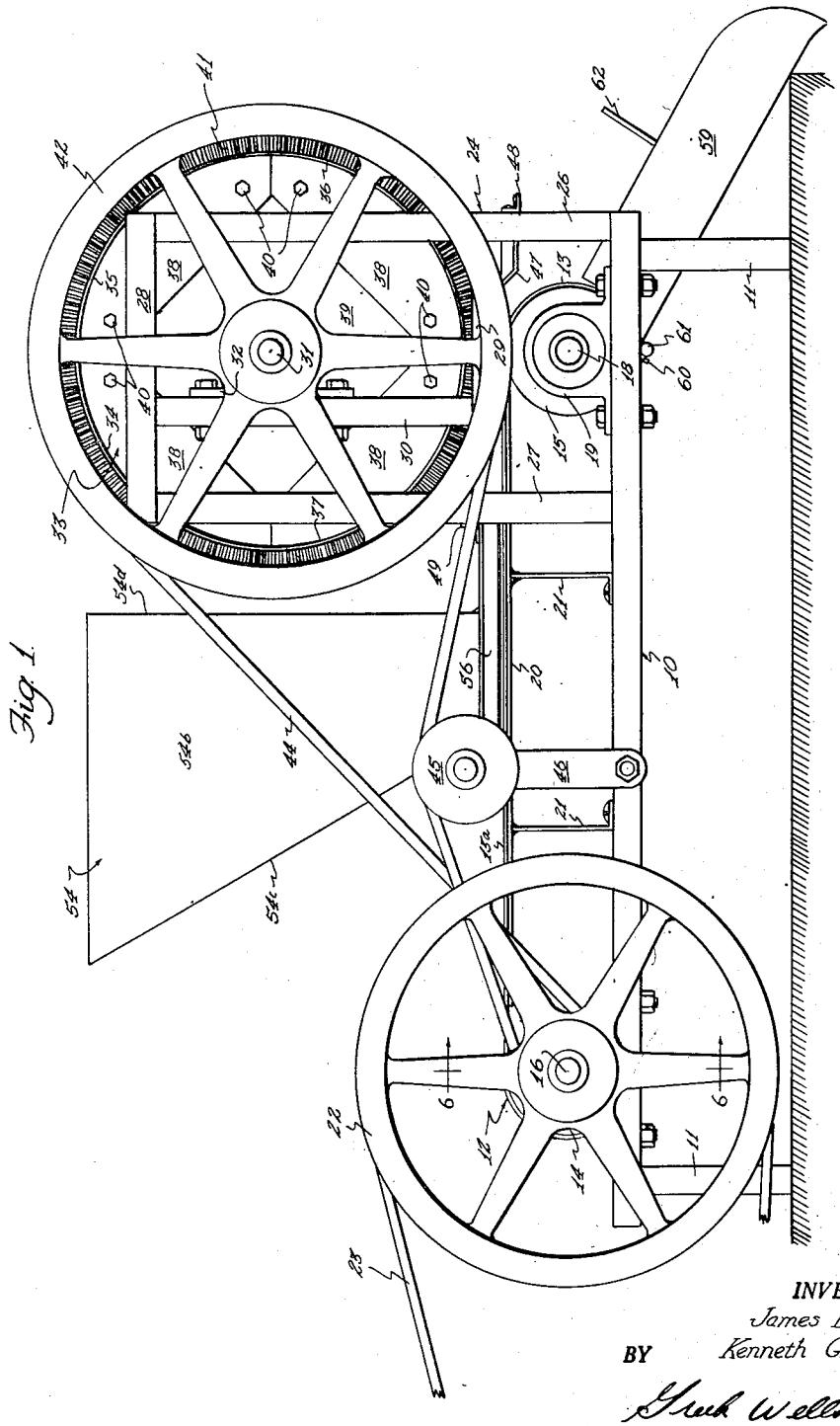

Fig. 1.

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Filed June 27, 1955 3 Sheets-Sheet 2

Fig. 2.

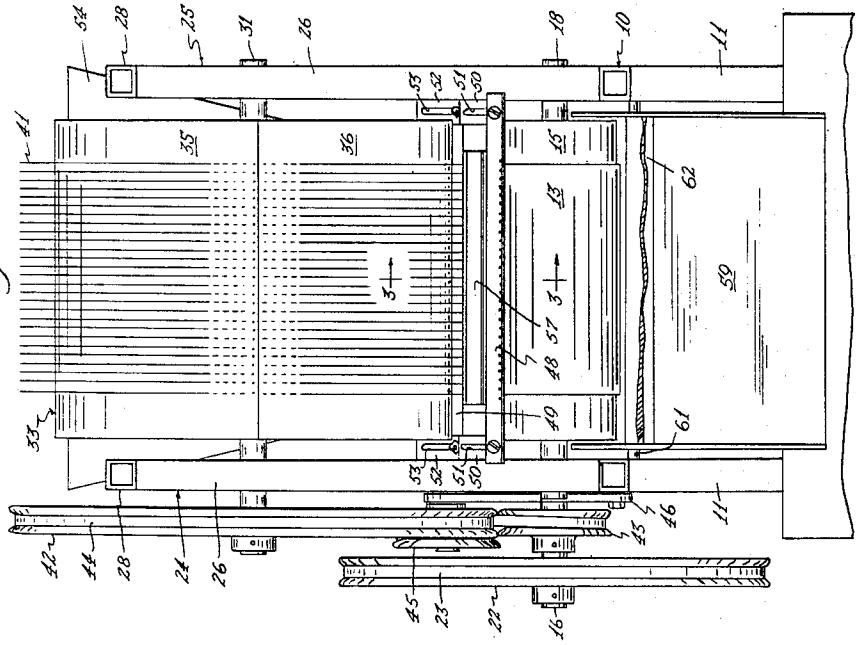


Fig. 5.

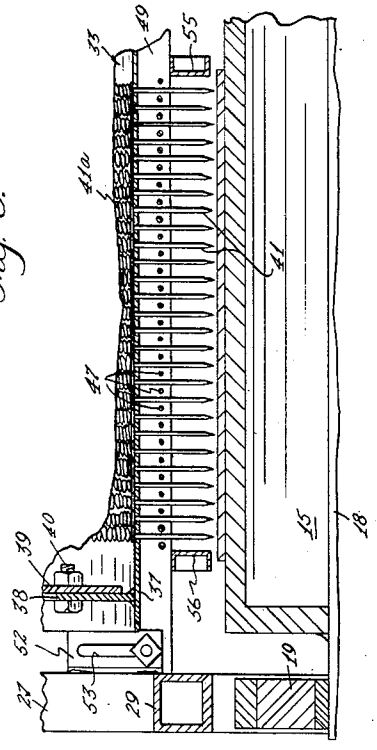
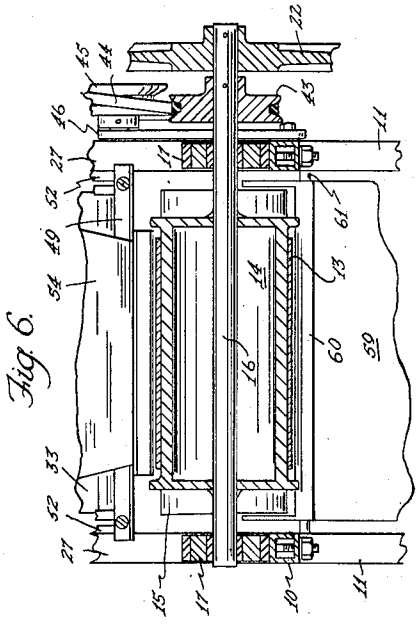


Fig. 6.



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Filed June 27, 1955 3 Sheets-Sheet 3

Fig. 3.

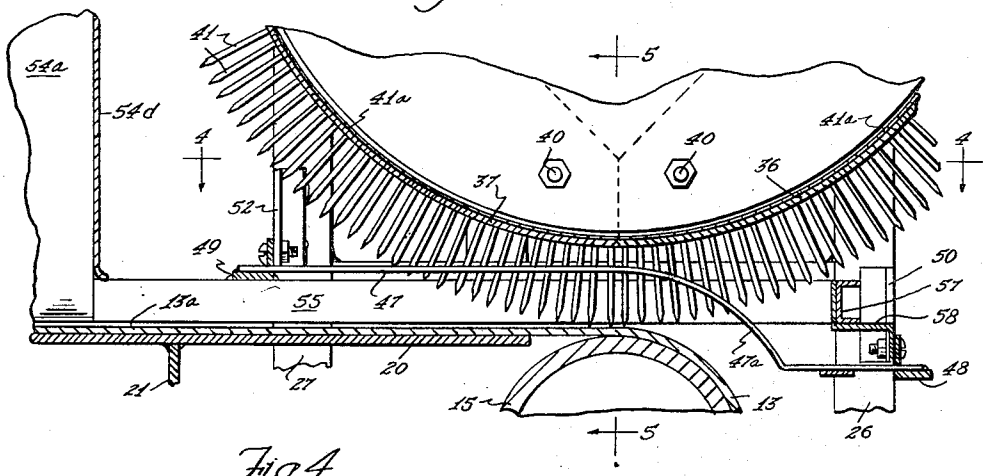
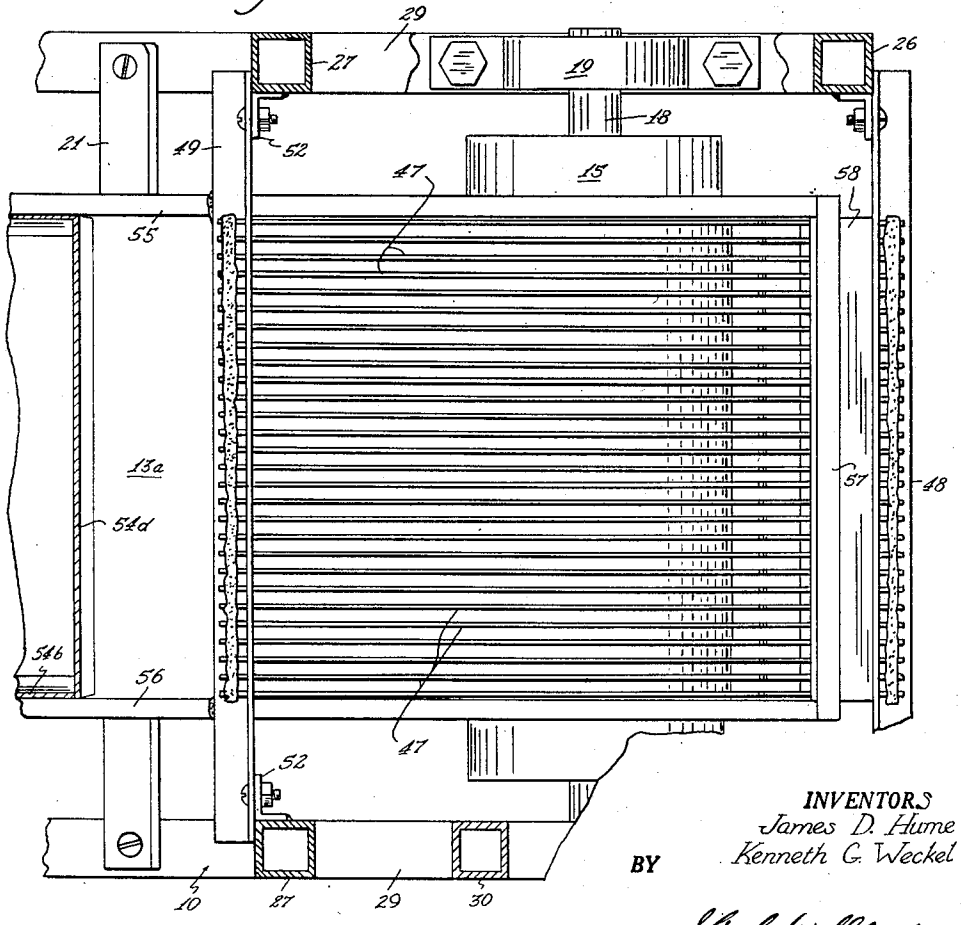


Fig. 4.



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CRANBERRY PUNCTURING MACHINE

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Application June 27, 1955, Serial No. 518,098

1 Claim. (Cl. 146—56)

The present invention relates to improvements in a machine adapted for puncturing cranberries.

Cranberries have come into extensive use as food, both in the fresh berry form and as a processed food. One of such processed forms is the maraschino type cranberry in which the berry is so processed as to contain a substantial percentage of sugar in its tissue. In processing cranberries to produce such maraschino type berries, it has been found that unless the berries are punctured before they are processed, they are apt to burst upon heating and thus be spoiled. The puncturing provides passages through the tissues of the berry through which gases may escape during the heating, and also provides passages by which syrup osmosis may rapidly take place so that the required sugar concentration may be most effectively obtained.

The purpose of this invention is to provide a machine which will receive berries, puncture them, and pass them on for further processing.

To accomplish this purpose the machine is provided with an endless berry conveyor, a berry hopper, and a piercing drum. The hoppr is mounted over a portion of the upper flight of the conveyor and deposits berries thereon in a single layer. The moving conveyor carries the berries into engagement with the piercing drum which is also mounted above the upper flight. The drum is rotated so that its tangential velocity is substantially matched with that of the conveyor. Radially extended piercing pins are provided on the periphery of the drum to engage and puncture the berries as they pass beneath the drum. A plurality of stripping wires are provided immediately beneath the drum and spaced above the conveyor. These wires are so positioned as to allow the piercing pins to pass between them, but to restrict the passage of the barries. Thus when the piercing pins move upward and away from the conveyor after puncturing the berries, the stripping wires prevent the berries from moving up with the pins and strip the berries from the pins, so that they may be passed on to a receiving container for further processing.

The nature and advantages of the invention will appear more fully from the following description and the accompanying drawings wherein a preferred form of the invention is shown. It should be understood, however, that the drawings and description are illustrative only and are not intended to limit the invention except insofar as it is limited by the claim.

In the drawings:

Figure 1 is a side elevational view of a machine embodying the invention;

Figure 2 is an end elevational view of the machine looking at the end whereon the piercing drum is mounted;

Figure 3 is an enlarged fragmentary sectional view of the puncturing mechanism taken on the line 3—3 of Figure 2;

Figure 4 is a fragmentary sectional view taken on the line 4—4 of Figure 3 except with the drum removed;

Figure 5 is a fragmentary sectional view taken on the line 5—5 of Figure 3; and

Figure 6 is a fragmentary sectional view taken on the line 6—6 of Figure 1.

Referring now to the drawings and to Figures 1 and 2 in particular, the invention is shown as comprising a main horizontal frame 10, supported on legs 11. A longitudinal berry conveyor 12 is supported on the frame 10. The conveyor 12 consists of an endless belt 13 which extends around a pair of conveyor rollers 14 and 15. The roller 14 is secured on a transverse drive shaft 16 which is positioned near one end of the frame 10. The drive shaft 16 is rotatably mounted on the frame 10 by a pair of bearings 17. The conveyor roller 15 is secured on an idler shaft 18 which is rotatably mounted in bearings 19 secured to the opposite end of the frame 10. The upper flight 13*a* of the belt 13 is arranged in a horizontal position, and is supported between the rollers 14 and 15 by a supporting plate 20 which is mounted on braces 21 extending upwardly from the frame 10. In order to rotate the drive shaft 16 to cause the conveyor 12 to move, a pulley 22 is secured to the shaft 16. A belt 23 transmits rotational power to the pulley 22 from a power source (not shown). The shaft 16 is driven in such a direction that the upper flight 13*a* of the belt 13 is caused to move from the roller 14 to the roller 15.

At the end of the frame 10 adjacent the roller 15, that is the out feed end, a pair of transversely spaced upright frames 24 and 25 are fixed. Each of the frames 24 and 25 is made up of two upright members 26 and 27 connected to their tops by a horizontal member 28. A second horizontal member 29 extends between the members 26 and 27 near their lower ends, and an intermediate upright 30, positioned intermediate the members 26 and 27, is secured between the members 28 and 29. The two upright frames 24 and 25 just described are positioned on either side of the conveyor 12. A transverse drum shaft 31 is supported between the two frames 24 and 25 by bearings 32 fixed to the members 30 of each frame 24 and 25. The frame members 30 are so positioned that the shaft 31 is positioned in vertical alignment with the idler shaft 18.

The shaft 31 supports a piercing drum 33, best shown in Figures 1 and 3. The drum 33 is comprised of four curved plates 34, 35, 36 and 37, each of which constitutes a quarter of the cylindrical surface of the drum 33. The plates 34–37 each have an inwardly extending flange 38 at each end thereof. The flanges 38 are secured by bolts 40 to circular end plates 39 which are fixed on the shaft 31. The drum 33 has on its cylindrical surface a plurality of radial pointed piercing pins 41. The pins 41 are shown in the form of nails which are secured to the drum 33 by extending them through holes in the curved plates 34–37 so that their heads 41*a* rest against the inner surfaces of the curved plates 34–37. The pins 41 are secured by soldering the heads 41*a* to the inner surface of the plates 34–37. The pins 41 are arranged in circumferential rows on the drum surface, the distances between pins 41 in each row being substantially equal to the distance between rows. Only that portion of the surface of the drum 33 which is above the belt 13 is provided with pins 41. The drum is positioned above the belt 13 such a distance that the points of the pins 41 just fail to engage the belt 13.

The drum 33 is driven in a direction opposite to that of the conveyor, so that the pins 41 on the lower portion of the drum move in the same direction as the upper flight 13*a* of the belt 13. To drive the drum 33, its shaft 31 is provided with a pulley 42. A small drive pulley 43, best shown in Figures 2 and 6, is secured to the shaft 16 adjacent the pulley 22, and receives a belt 44 which is connected to the pulley 42. As shown in Figure 1, the

belt 44 is twisted 180 degrees to reverse the direction of the drum pulley 42. An idler pulley 45, rotatably mounted on an arm 46 which is bolted to the frame 10, serves to tighten and guide the belt 44. The pulley 42 drives the drum 33 at such a speed that the tangential velocity of the pins 41 is substantially equal to that of the belt 13.

With this construction, berries placed on the upper flight 13*a* of the drum 13 will be carried under the drum 33. The pins 41 will engage the berries, and as the drum rotates, pierce them, at least one pin 41, penetrating entirely through each berry, and generally several pins 41 penetrating each berry. Now since the berries are impaled on the pins 41, it is necessary to provide some means to strip them off so that they will not be carried completely around by the drum. This is accomplished by providing a plurality of longitudinal stripping wires 47 which extend over the belt 13 and under the drum 33. The stripping wires 47 are positioned between the circumferential rows of pins 41 on the drum, and are spaced above the belt 13 to allow the berries carried on the belt 13 to pass beneath them. With the wires 47 so positioned, the pins 41 pass down between them to engage the berries, and then as the drum rotates, pass back up between the wires 47. The berries impaled on the pins 41 are too large to pass between the wires 47, and are halted and stripped from the pins 41. The wires 47 are supported at their ends by two transverse angle irons 48 and 49. The angle iron 48 extends between the members 26 of the upright frames 24 and 25, and is bolted to ears 50 fixed thereon. As shown in Figure 2, the ears 50 have vertical slots 51 therein to provide for limited vertical adjustment of the member 48 and wires 47. The other angle iron 49 extends between the upright members 27 of the frames 24 and 25 and is adjustably secured to ears 52 fixed thereon. The ears 52, like the ears 50, have vertical slots therein as indicated at 53 in Figures 2 and 5.

As shown in the drawings, the angle iron 48 is positioned somewhat below the level of the angle iron 49, and the wires 47 have a downwardly directed curved portion 47*a* therein. This curved portion 47*a* is positioned slightly beyond the conveyor roller 15, so that the berries as they are stripped, are directed downwardly.

To feed berries onto the conveyor belt 13, a hopper 54 is positioned over the upper flight 13*a* and behind the drum. The hopper 54 has side walls 54*a* and 54*b*, a sloping rear wall 54*c*, and a front wall 54*d*. The front wall 54*d* terminates a distance above the bottom of the other walls to provide an outlet through which the berries may pass in a single layer onto the moving upper flight 13*a* of the belt 13. The hopper 54 is supported by two longitudinally extending channel members 55 and 56 which attach to the side walls 54*a* and 54*b* of the hopper. The channels 55 and 56 extend forwardly under the angle iron 49 and are welded thereto, as shown in Figures 3 and 4. The channels 55 and 56 extend forwardly beyond the conveyor roller 15 and have a cross channel 57 connected to their forward ends. The cross channel 57 has a strap 58 attached thereto which extends forwardly and downwardly connecting the channels 51 to the angle iron 48. With this construction, the hopper 54 and the stripping wires 47 are supported on a common framework which may be adjusted up or down with respect to the drum 33 and conveyor 12 to provide for berries of different proportions. The channels 55 and 56 which support the hopper on the angle irons 48 and 49 also act as side guides to confine the berries on the upper flight 13*a* of the conveyor belt 13.

At the outfeed end of the frame 10, adjacent the drum 33, a receiving chute 59 is provided to catch the berries as they are stripped from the pins 41 and direct them into containers for further processing. The chute 59 has a curled lip 60 at its upper end which hooks over a cross rod 61 on the frame 10 to support the chute. A baffle plate 62 is positioned on the chute 59 to catch berries which may be flipped from the stripping wires and direct them into the chute 59.

As may be seen, the invention provides an extremely efficient berry puncturing machine. When the size of the berries to be punctured is determined, the stripping wires 47 may be adjusted to the proper height above the belt 13 by moving the angle irons 48 and 49 up or down on the ears 50 and 52. This also moves the hopper 54 up or down accordingly and adjusts the height of the opening at the bottom of the wall 54*d* so that berries may be admitted to the belt 13 in a single layer. The hopper 54 is then filled with berries and power applied to the drive belt 23. The belt 23 rotates the pulley 22 to rotate the drive shaft 16 and drive the conveyor 12 and the drum 33. As the upper flight 13*a* of the belt 13 moves under the hopper 54, the berries in the hopper 54 are deposited in a single layer on the upper flight 13*a*. These berries are carried forward between the channels 55 and 56 under the angle iron 48, and under the stripping wires 49. The piercing drum 33, rotating above the stripping wires 49 carries the pins 41 down to engage and puncture the berries. As the berries reach the conveyor roller 15, the stripping wires 47 strip them from the pins 41 and drop them onto the chute 59 which directs them into containers. Each berry received by the chute 59 has been punctured completely through by at least one of the pins 41, so that a passage, or several passages are opened in its tissue.

It is believed that the nature and advantages of the invention appear clearly from the foregoing description.

The invention having been described, what is claimed as new is the following:

A device for piercing cranberries comprising a main supporting frame, a transverse conveyor roller rotatably mounted at each end of said frame, a conveyor belt extending around said rollers and having a horizontal upper flight, a transverse drum shaft rotatably mounted on the frame above one of said rollers, a cylindrical piercing drum secured to said shaft, a plurality of radial piercing pins secured to the cylindrical surface of said drum, said pins being arranged in spaced apart circumferential rows on said drum, a plurality of horizontal stripping wires positioned below said drum, said stripping wires extending perpendicular to the axis of rotation of the drum and being spaced between the circumferential rows of pins, transverse angle irons secured to each end of said wires, said transverse angle irons being secured to the main frame for limited vertical adjustment, a longitudinal channel member secured to said angle irons at each side of the stripping wires and extending over the upper flight of the conveyor belt, a hopper secured to said channel members, said hopper being positioned above the conveyor belt intermediate the conveyor rollers, said hopper having an opening adjacent its lower end whereby to deposit cranberries on said upper flight, means to move the upper flight of the conveyor belt from the hopper toward the drum whereby to carry the cranberries under the drum, and means to rotate the drum in a direction such that the pins thereon adjacent the upper flight of the belt move in the same direction as the belt.

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