

July 30, 1957

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2,800,938

SLICER FOR BERRIES AND THE LIKE

Filed Sept. 1, 1955

3 Sheets-Sheet 1

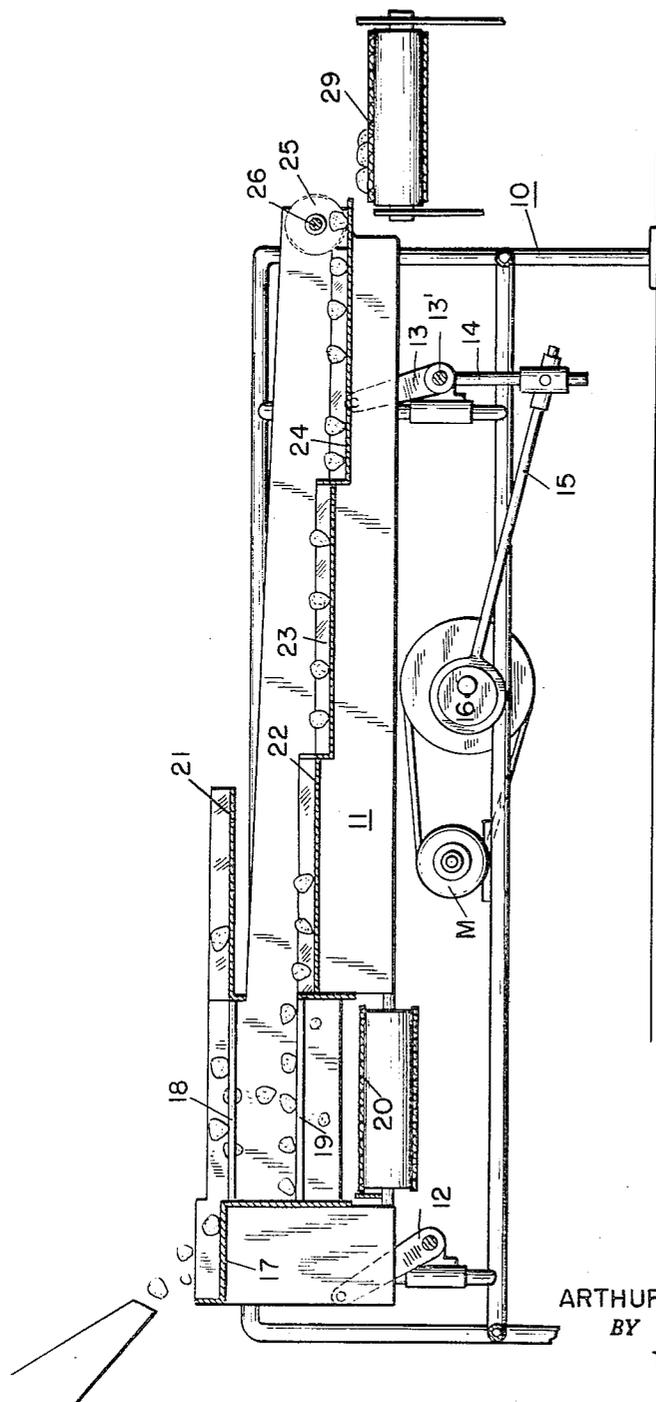


Fig. 1

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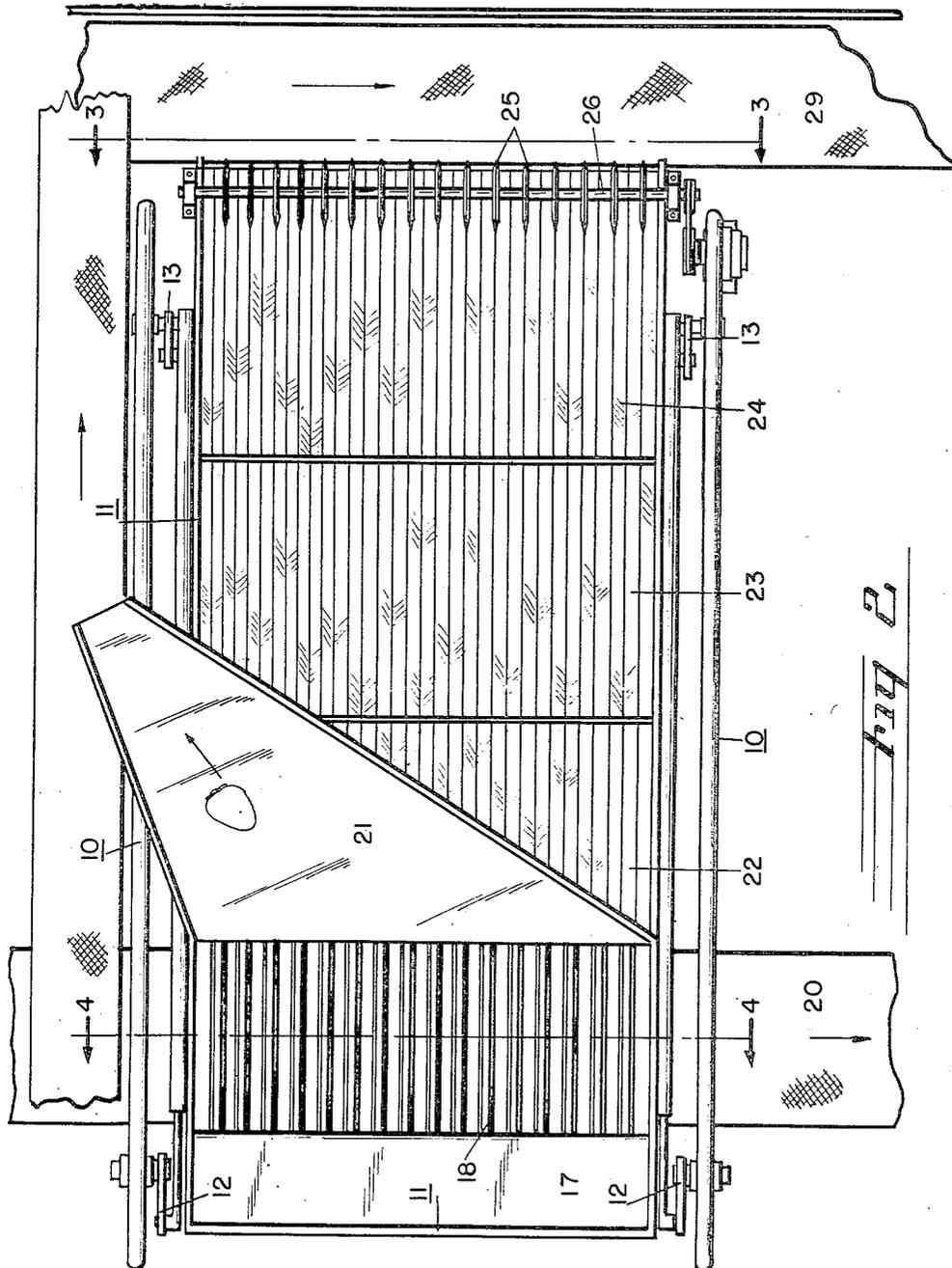
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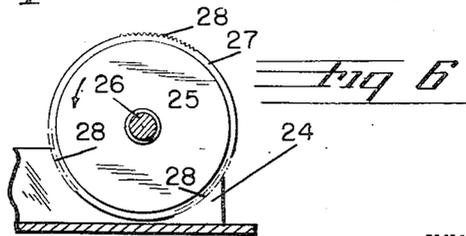
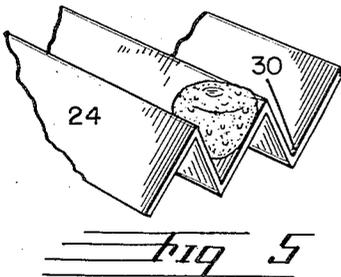
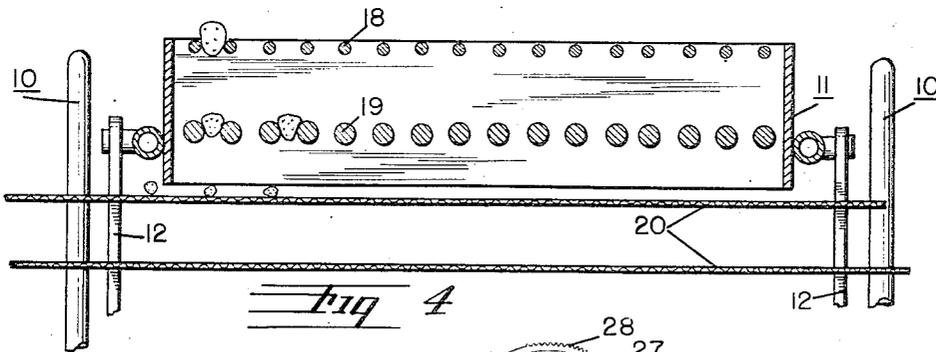
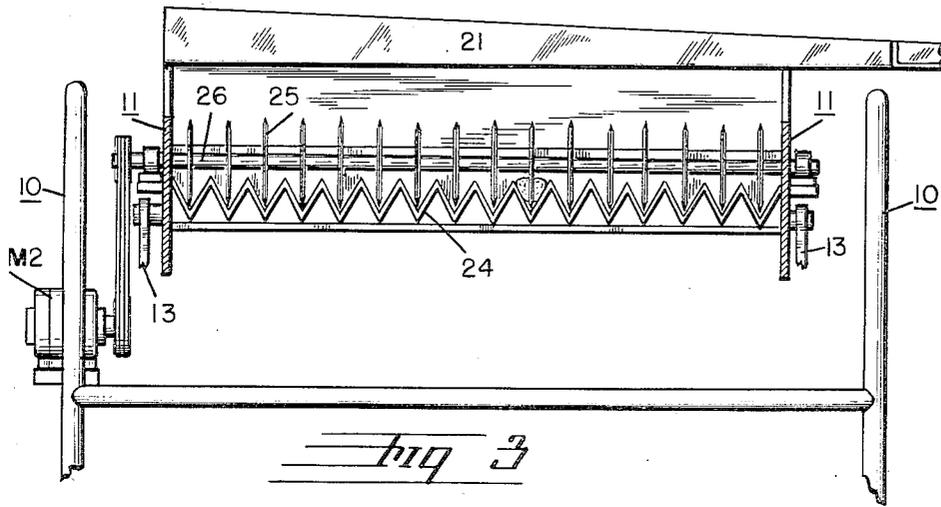
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SLICER FOR BERRIES AND THE LIKE

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Application September 1, 1955, Serial No. 532,070

2 Claims. (Cl. 146—73)

The present invention relates to the slicing of berries, particularly strawberries, into halves, and more specifically, relates to means for slicing strawberries along the center line of the hull.

The invention is concerned especially with the slicing of strawberries of varieties which are more or less pear-shaped, as distinguished from varieties which have a more spherical shape, although this invention may be used for berries of any shape.

There is a considerable demand in the market at present for frozen strawberries which are sliced in half, since such halved berries are desired for use in fancy desserts, fruit cocktail mixtures, etc. But, in the case of the more pear-shaped varieties of strawberries, if the berries are not sliced in half through the center line of the hull the resulting berry halves will be different in size and will not meet the requirements of the particular market for the same. This will be readily understood, for, when a pear-shaped berry is sliced in two transversely with respect to the center line of the hull the lower half is much smaller than the upper or hull half, and different in shape, and as a result the two berry halves are less attractive in appearance than would be the case if the slicing had taken place along the center line of the hull.

With the mechanical slicers used heretofore for strawberries it has not been possible to hold the individual berry in any pre-determined position for slicing the berry in half. Consequently, the slicing of berries in half for the special market above referred to, has been generally restricted to the more spherically shaped varieties of strawberries. On the other hand, some of the pear-shaped varieties, when sliced in half along the centerline of the hull, present an even more attractive appearance than the rounder berries, and such pear-shaped varieties may be also more desirable for reasons of taste, firmness, etc.

A special object of the present invention accordingly, is to provide an improved mechanical slicer, suitable for slicing strawberries in half, which will slice pear-shaped berries uniformly down along the center line of the hull.

One of the difficulties of slicing strawberries, particularly ripe and juicy berries, is to make the straight cut through the berry without crushing or mutilating the berry. Another object of the present invention is to provide an improved mechanical slicer for strawberries in which the desired slicing will take place without any crushing or appreciable squeezing of the berries.

A further object of the invention is to provide a practical machine for handling and slicing strawberries which will automatically grade the berries by sorting out both oversize and undersize berries, then slicing the remaining berries in half after properly positioning them for slicing, and will perform these successive functions without requiring any special care or attention on the part of the operator.

An additional object of the invention is to provide an improved machine, capable of operating as above indicated, which will be simple in construction and which will not involve any particular maintenance or operating problems.

These objects and additional advantages are achieved in a manner which will be explained in the course of the

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following brief description with reference to the accompanying drawings.

In the drawings:

Figure 1 is a side elevation of the entire device;

Figure 2 is a top plan view of the same;

Figure 3 is a fragmentary end elevation of the device taken at the discharging end on the line indicated at 3—3 in Figure 2;

Figure 4 is a sectional elevation on line 4—4 of Figure 2;

Figure 5 is a fragmentary perspective end view of a portion of the troughs or channels along which the berries are caused to travel to the slicing knives and by which the berries are positioned for slicing; and

Figure 6 is a side elevation of one of the slicing knives.

Referring first to Figure 1, a vibrating or oscillating frame assembly, indicated in general by the reference character 11, is mounted on a skeleton supporting structure 10 by means of two pairs of arms which are pivotally and adjustably mounted for oscillation in vertical planes, the arms of each pair being located respectively at opposite sides. Both pairs of arms extend upwardly and are set to slope slightly rearwardly (thus towards the left as viewed in Figure 1), the rear pair of arms 12 being set to slope further from the vertical than the forward pair of arms 13. The arms of the forward pair 13 are secured to a transversely-extending shaft 13'. A downwardly-extending actuating arm 14 is also secured to the shaft 13' and in turn is pivotally connected with a pitman rod 15, actuated by an eccentric mechanism 16 driven by a motor M. Thus operation of the motor M causes oscillation of the entire frame assembly 11.

This mounting for the frame assembly 11, for the express purpose of producing a special rapid oscillatory vibration, is similar to the oscillatory mounting and mechanism described and illustrated in more detail in my U. S. Patent No. 2,601,411, issued under date of June 24, 1952, entitled "Vegetable and Fruit Washer." Due to the fact that the two pairs of rockable arms 12 and 13 are not parallel and to the fact that the rear pairs of arms 12 are inclined at a greater angle from the vertical than the forward pair of arms 13, a composite oscillatory movement will be imparted to the frame assembly 11 which oscillatory movement will be referred to later.

The strawberries are hulled before their delivery to the machine, but it is assumed that the berries will not previously have been sorted as to size. Since, in order to meet the requirements for the particular market for first quality sliced strawberries, it is necessary to have these berries fairly uniform in size, the device is provided with means first for eliminating undersize as well as oversize berries before any berries reach the slicing knives.

A receiving pan or shelf 17 for the berries is located at the top in the rear of the frame assembly 11. This receiving pan 17 discharges onto a grating 18 (see also Figure 2), the longitudinally-extending parallel bars of which grating are set far enough apart to let all but the oversize berries drop down through the grating 18 to a second lower grating 19. The second lower grating 19 is similar to the upper grating 18 except that the bars are spaced closer together in order to retain the berries desired for slicing while permitting berries which would be regarded as too small for the particular desired run of sliced berries to be separated out. These undersize berries drop through the lower grating 19 onto a suitable conveyor 20 or endless belt, which is located below the lower grating 19 and below the vibrating frame assembly 11 and which conveyor moves transversely with respect to the machine.

The rotation of the eccentric 16 causes the pairs of arms 12 and 13 to oscillate in comparatively small arcs.

Since both pairs of arms are positioned at angularity with the vertical and swing towards and from the vertical, and since the rear pair of arms 12 are sloped at a greater angle from the vertical than the forward pair of arms 13, the frame assembly 11 moves up and down as well as forward and back with each rotation of the eccentric 16, and the up and down travel of the rear end of the frame assembly 11 is greater than the up and down travel of the forward end. As a result, the strawberries which are supported in the frame assembly receive a pulsating impetus causing them to travel towards the right (as viewed in Figures 1 and 2) and thus towards the discharging end of the assembly.

The oversize berries, which have been retained by the top grating 18, move along this grating until they reach a discharging pan 21 which leads them off to one side and from which they drop away from the frame assembly into a collecting receptacle (not shown) or onto a suitable conveyor located at the side of the frame assembly. The berries which remain in the frame assembly, thus the berries retained on the lower grating 19, will be the ones desired for slicing in half.

A series of ridged pans (there being three in the device as illustrated), which pans are illustrated by the reference characters 22, 23, and 24, are mounted on the frame assembly beginning at the termination of the lower grating 19. These pans 22, 23 and 24 are all similarly formed with parallel V-shaped longitudinally-extending identical troughs 30 (Figures 3 and 5). While a single ridged pan could be substituted in place of the several pans shown, the use of a series of shorter pans is preferable as a convenience in the removing of the pans for cleaning or for replacement.

The size, that is to say, the width and depth of the individual troughs 30 and the angle at which the walls of the trough are inclined, will be governed to some extent by the average size of the berries to be sliced. Thus, as indicated in Figure 3, the width of the trough at the top will preferably correspond more or less to the upper or maximum diameter of the pear-shaped strawberries.

The berries to be sliced move along the grating 19 until they reach the first ridged pan 22 and are deposited in the troughs of this pan. Then they proceed to move along the troughs of the pans under the impetus received from the composite oscillatory motion of the frame assembly in which the gratings and the pans are mounted. Regardless of the position of the individual berries at the moment they are first deposited in the troughs of the pan 22, they will almost immediately assume a uniform position with the large or hull end uppermost. Once having assumed this position, each berry will maintain the same position while continuing its travel along the corresponding troughs of the successive pans. The pulsating impetus under which the berries travel causes them to slide along the troughs while maintaining their same position, and there is no tendency for the berries to roll over or change in position as they are moved or slid along. This is an important factor and feature in the invention.

The slicing knives are positioned in the discharging end of the last ridged pan 24. The knives 25 are circular and identical, each knife being located in one of the troughs. The knives are mounted vertically and are secured in position on a common shaft 26, each knife extending in the same plane as the bottom line of the trough in which it is located. The knives are driven rapidly in counter-clockwise direction, as viewed in Figure 1 and as indicated by the arrows, by means of a motor M2.

In the slicer illustrated the bottom edges of the rotating knives (Figures 3 and 6) are spaced a short distance above the bottom line of the respective trough. However, for some types, grades or sizes of berries, the bottom tips of which might extend substantially to the bottoms of the troughs, it may be desirable to have longi-

tudinal slits in the bottoms of the troughs and to lower the knives so that the knives extend down slightly into the slits.

While the slicing of the berries can be accomplished by rotating knives having a continuous knife-like edge on their peripheries, I have found that even uniformly better slicing can be done when portions of each knife periphery are serrated, as illustrated in Figure 6. Serrating portions of the peripheries of the knives will prevent the possibility of there being any "feather edge" in the cut which is made through the berry and also any possibility that the cut will be slightly concave. Even though the berries to be sliced may be somewhat soft the knives with serrated portions will produce the smooth straight cut as required in perfect slicing.

The fact that the berries are caused to move against the knives and that they continue such movement when engaged by the knives is also an important factor in enabling the slicing action to take place without the employment of any additional means for holding the berries in proper position while being sliced, and without any possibility of crushing or mutilating the berries during the slicing operation. As previously mentioned, the inclination of the trough walls corresponds more or less to the sloping sides of the berries being processed, and it is to be understood that pans with troughs having walls differently inclined may be more suitable for a particular type of berry. A conveyor 29, located at the discharging end of said assembly, receives the berries after the slicing.

Although the invention has been described for use in slicing strawberries, and especially the somewhat pear-shaped berries, it can, of course, be used for other fruits such as pitted cherries, etc. However, its main use is in the slicing of strawberries in half since the slicing of strawberries presents particular problem to the solution of which the present invention has been specially directed.

I claim:

1. In a berry slicer of the character described, a rigid pan formed with a plurality of identical, parallel, V-shaped troughs extending from one end of the pan to the other, the depth of each trough being greater than the average center line length, from the stem end to the opposite end, of the berries to be sliced, the two walls of each trough forming a dihedral angle of such size that the spacing between said walls at their top edges will slightly exceed the maximum diameter of the berries to be sliced, whereby pear-shaped berries, deposited on said pan and in said troughs, will be supported spaced above the bottom vertex lines of the troughs and will tend to arrange themselves with said center lines lying substantially in vertical planes bisecting said dihedral angles of the respective troughs, means connected with said pan for imparting a special oscillatory motion thereto so as to cause berries in said troughs to move along said troughs to the discharging end of said pan, and a rotating cutter knife in each trough near the discharging end positioned in said vertical bisecting plane of the trough, the bottom of said knife located close to the vertex in the bottom of the trough, whereby berries deposited in the receiving end of said pan and trough will, upon reaching said knives, be sliced in half substantially along said center lines of said berries.

2. The combination set forth in claim 1 with the addition of means for depositing berries of selected size in the receiving end of said troughs, and with serrated slicing edges on said rotating knives.

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