July 13, 1937. J. D. FERRY 2,086,708

VEGETABLE SLICING MACHINE

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Fig. 1.

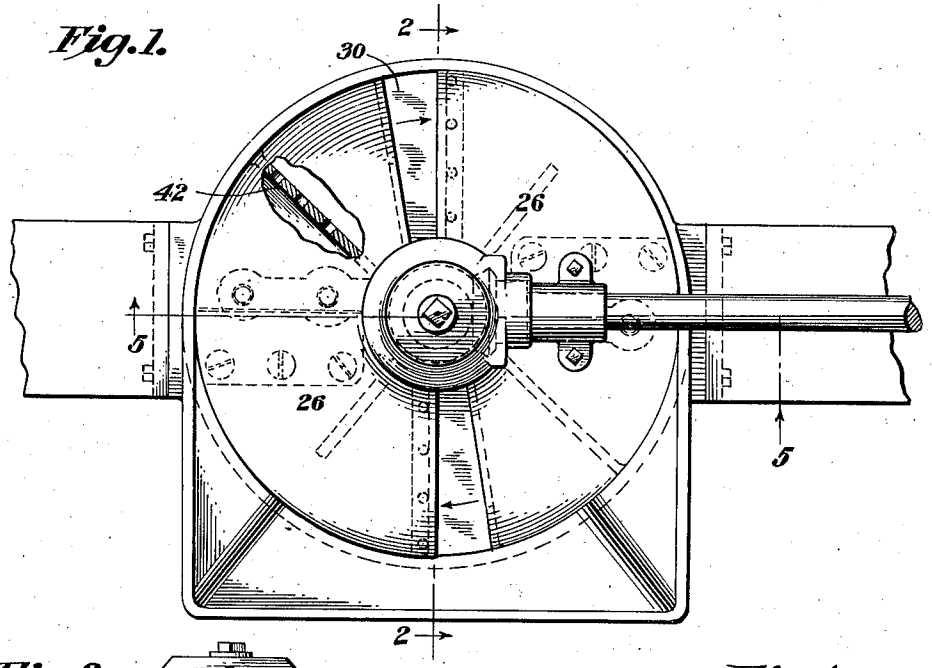


Fig. 2.

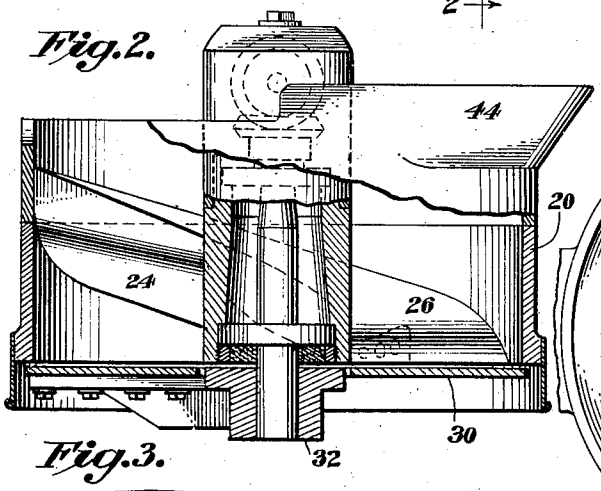


Fig. 3.

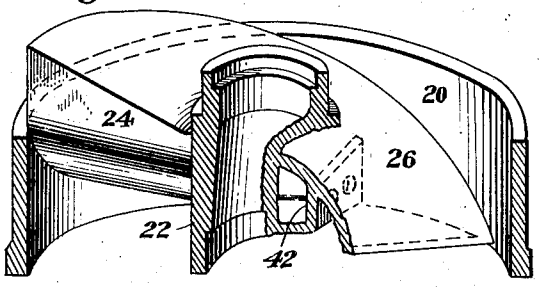
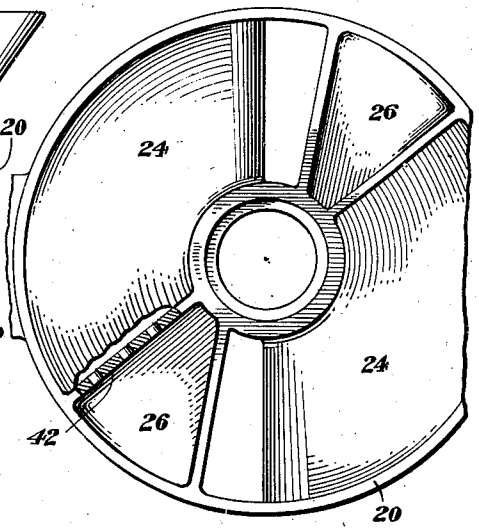


Fig. 4.



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Fig.5.

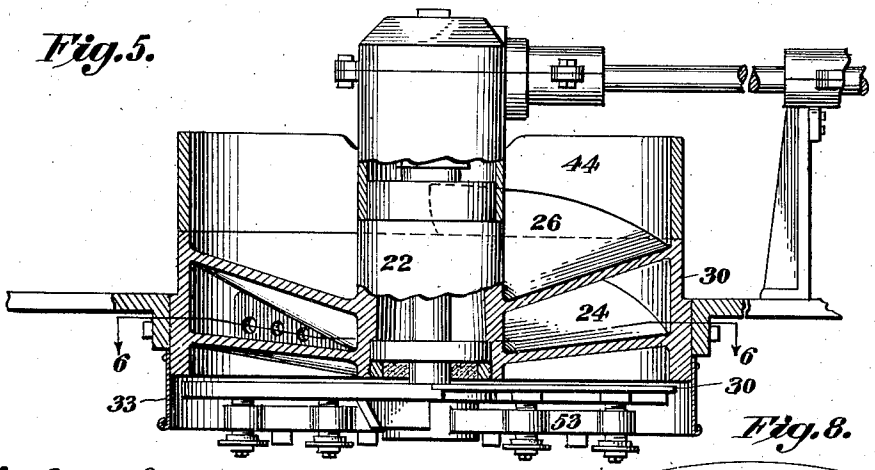


Fig.8.

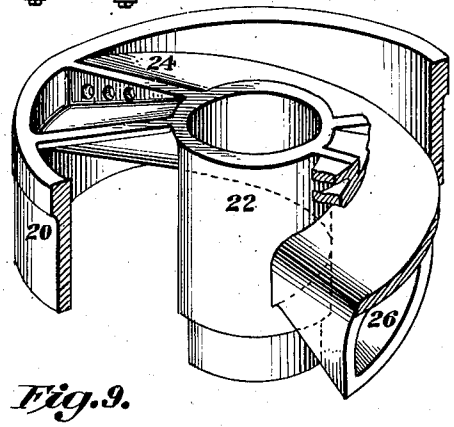


Fig.6.

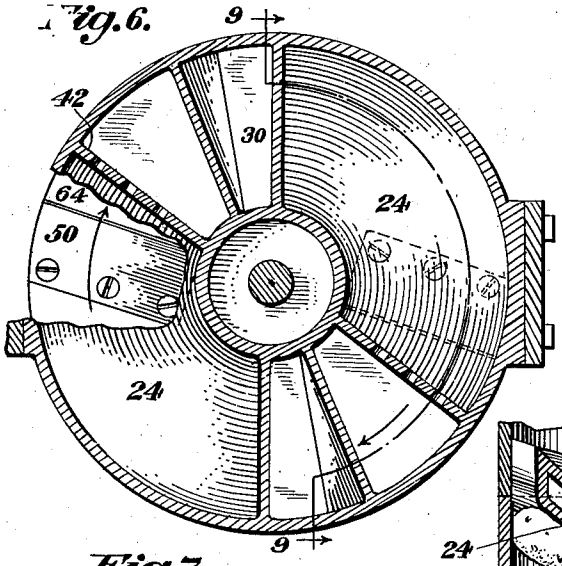


Fig.9.

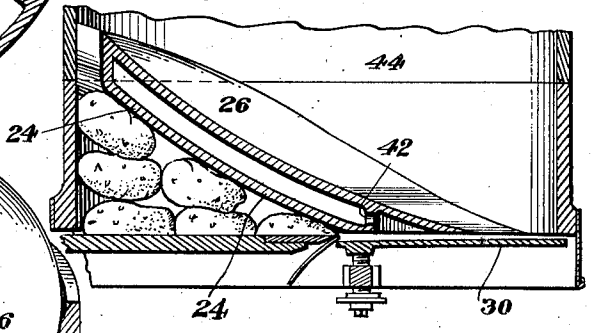
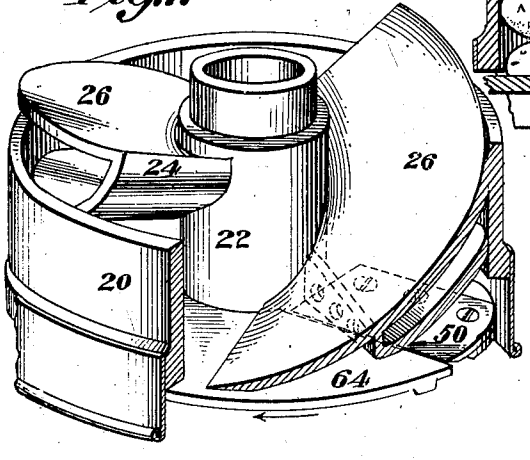


Fig.7.



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Fig. 10.

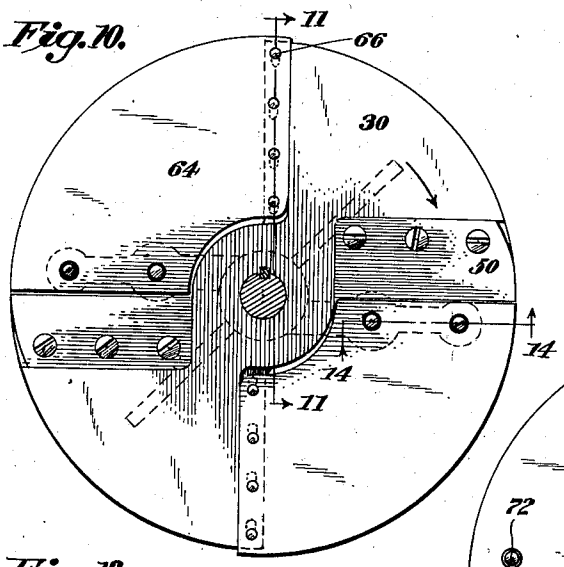


Fig. 11.

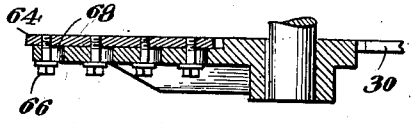


Fig. 13.

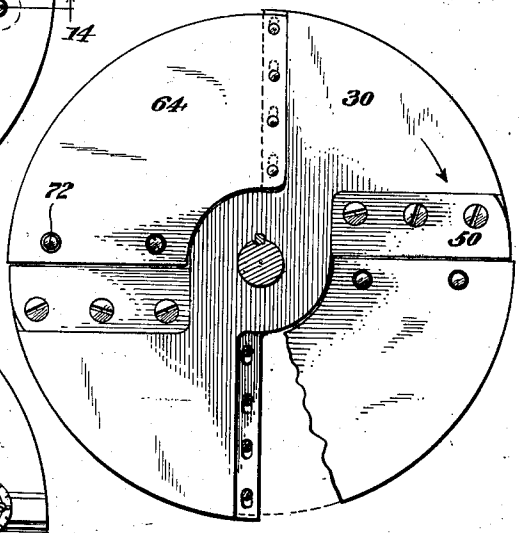


Fig. 12.

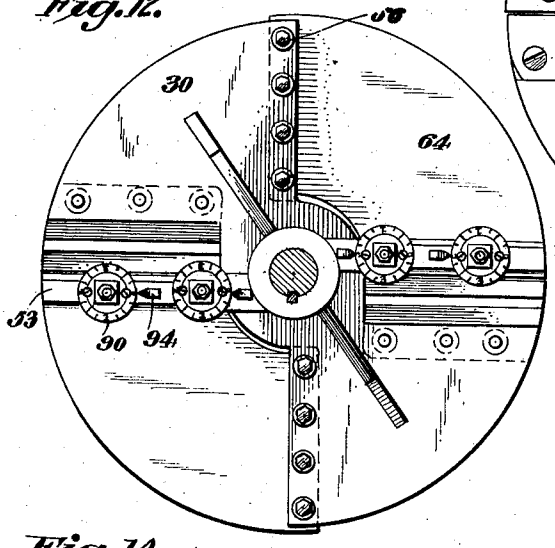


Fig. 15.

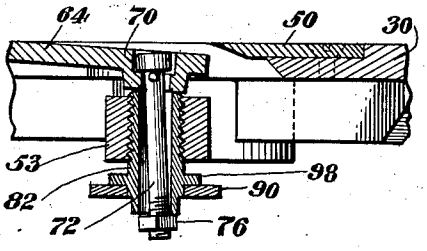
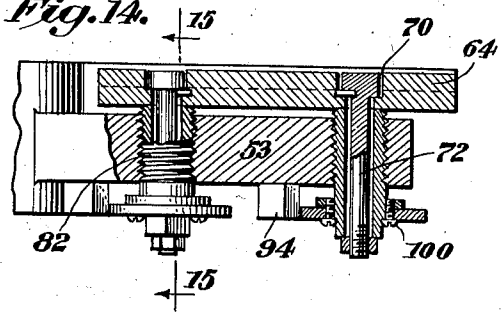


Fig. 14.



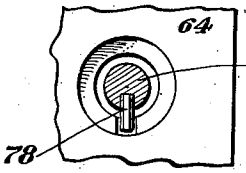


Fig. 16.

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Patented July 13, 1937

2,086,708

UNITED STATES PATENT OFFICE

2,086,708

VEGETABLE SLICING MACHINE

Joseph D. Ferry, Harrisburg, Pa.

Application December 7, 1935, Serial No. 53,415

12 Claims. (Cl. 146—124)

This invention relates to a slicing machine especially adapted for use in connection with vegetables and is an improvement on the subject of my patent of April 17, 1934, and numbered 1,955,360.

One of the advances marked by this invention over the subject of my prior slicer patent will be found to reside in the presence of feed plates in superposed relation to the pressure plates featured in my prior patent and having the leading or lower ends thereof projecting sufficiently far beyond the pressure plates immediately below to approach or possibly underlie the rear portions of the pressure plates in advance thereof and in this way maintain the incoming potatoes or other vegetables out of the range of the slicing knives until the vegetables have advanced to positions where they are placed under the pressure that is so necessary to hold them against shifting while being sliced, with the result that the slices cut from the vegetables while thus held against shifting will be characterized by a uniform thickness throughout.

The invention also contemplates a simple means by which the cutting blades of the rotary cutting unit are caused to have a shearing effect working outward from the longitudinally central portion of the slicer so that nails, stones, wrapping cord, and other foreign objects which find their way into the slicer, as well as the small unusable last cuts of the potatoes that remain above the rotor, are thrown outward by centrifugal force away from the cutting blades into the space around the rotor, in addition to which there is to be considered the fact that the shearing effect also aids in the slicing operation.

My prior slicer patent discloses a slicing rotor having arcuate approach plates in advance of the cutting blades and in association with means by which the portions of such plates immediately adjacent to the blades may be raised or lowered to regulate the cutting depth of the blades; and the matter herein disclosed will be found to represent an improvement over this arrangement in the provision of a second adjustment by which the arcuate approach plates may also be adjusted radially to compensate for wear on the blades while preserving the efficiency of the means for regulating the thickness of the slices, which leads to the statement that the arcuate approach plates are capable of a compound adjustment, first, to provide for cutting slices of the desired thickness, and, second, to compensate for wear on the cutting edges of the blades.

It is further shown in my prior patent that calibrating disks are employed in association with fixed markers to indicate the relative positions of the inner and outer peripheral portions of the approach plates with respect to the associated blades. It has been found that as a result of the relatively greater wear on the outer portion of the vegetable engaging surface of the approach plates, the calibrating disks cease to give accurate readings so that another improvement herein disclosed will be found to reside in the provision of expeditious means by which the calibrating disks may be changed in position from time to time to compensate for the uneven wear that occurs on the vegetable engaging surface of the approach plates, to the end that subsequent adjustment to provide the desired cutting depth is simplified.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a fragmentary plan view, partly in section, of a slicer embodied in the invention,

Figure 2 is a vertical transverse sectional view taken on line 2—2 of Figure 1,

Figure 3 is a fragmentary sectional perspective of the body of the slicer, the view featuring one of the feed plates and an immediately associated pressure plate,

Figure 4 is a fragmentary bottom plan view, partly in section, of the body of the rotor,

Figure 5 is a vertical transverse sectional view taken on line 5—5 of Figure 1,

Figure 6 is a horizontal sectional view taken on line 6—6 of Figure 5,

Figure 7 is a perspective of the body of the rotor, partly in section, and disclosing the relation of each feed plate to the pressure plate in advance thereof,

Figure 8 is a fragmentary sectional view of the body of the rotor, the view being taken from the bottom of the rotor,

Figure 9 is a sectional view taken on line 9—9 of Figure 6,

Figure 10 is a top plan view of a cutting or slicing rotor embodied in the invention,

Figure 11 is a detail sectional view taken on line 11—11 of Figure 10,

Figure 12 is a bottom plan view of the slicing rotor,

Figure 13 is a view similar to Figure 10 with the parts adjusted to compensate for wear on the slicing blades,

Figure 14 is a detail sectional view taken on line 14—14 of Figure 10,

Figure 15 is a detail vertical sectional view taken on line 15—15 of Figure 14,

Figure 16 is a detail horizontal sectional view illustrating the connection between one of the approach plates and the adjusting means therefor.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the invention, the numeral 20 designates an annular body or rim within which there is located a hub 22. The hub, of course, is located at the longitudinally central portion of the rim and is connected to the rim through the intervention of pressure and feed plates 24 and 26, respectively.

As in the case of the disclosure in my prior slicing machine patent herein identified, there are two of the pressure plates 24 and these are of arcuate form, extending circumferentially from a point adjacent to or above the upper edge of the rim 20 to a point approximately flush with the lower edge of such rim. Thus, the pressure plates 24 cooperate with a slicing rotor 30 immediately below in the formation of circumferentially extending arcuate pockets for the reception of potatoes or other vegetables and such pockets, of course, decline in height in the direction of rotation of the rotor.

Also, as in the case of the disclosure in my prior slicer patent, each individual pressure plate extends for substantially less than 180 degrees and the rate of decline thereof is such as to avoid the formation of potato receiving pockets of excessively long tapers because where the pockets do have excessively long tapers, the potatoes are wedged therein and are likely to crack. It has been found that the disclosed rate of decline of the pressure plates 24 is suited to a wide range of operating conditions and, of course, the rate of decline may be varied without departing from the scope of the invention.

As best illustrated in Figures 5, 7 and 9, the feed plates 26 are in superposed spaced relation to the pressure plates 24 and extend circumferentially from points approximately in line with the rear or upper ends of the pressure plates to points well in advance of the lower ends of the pressure plates. More particularly, the leading or lower ends of the feed plates 26 project beyond the pressure plates immediately below to points approaching or possibly underlying the rear portions of the feed plates 26 immediately in advance thereof.

In this way, the projecting portions of the feed plates 26 protect the potatoes from engagement by the cutting knives until the potatoes have advanced to positions where the same are placed under pressure by the pressure plates. Until the potatoes actually come under the restraining influence of the pressure plates, the same are likely to shift or roll in the hopper, particularly if engaged by the blades of the slicer and where the same are engaged by the blades prior to the time that the potatoes are held firmly in place, slices of an uneven thickness throughout will be produced.

The production of slices of uniform thickness throughout requires that the potatoes be held firmly in place while being sliced and it has been found that the projection of the feed plates to points approaching or entering the potato receiving pockets provides a reliable means by which the potatoes remain unsliced until they come under the restraining and steadying influence of the pressure plates. Of course, after each slice is cut from a given potato, that potato advances a distance made possible by the previous slice cut therefrom or, as might otherwise be expressed, the potatoes are advanced in a step-by-step manner until the same have been consumed by slices cut successively therefrom.

In Figure 9, it is shown that the decline of the feed plates 26 is approximately the same as that of the pressure plates 24, with the ends of the pressure plates joined with the rear and forward portions of such plates. The rear portions of the feed plates 26 extend above the top edge of the rim or body 20 thus leaving openings by which particles of potatoes or quantities of water may enter the spaces between the parts 24 and 26. Hence, the webs or walls 42, which join the lower portions of the pressure plates with the intermediate portions of the feed plates, are formed with openings for drainage and ventilating purposes.

Incidentally, the rim or body 20 is shown in Figures 2 and 5 to be provided with a suitable extension 44 increasing the capacity of the body. One side of this extension may be provided with an inclined inlet portion for the introduction of potatoes or other vegetables.

As brought out in the opening paragraphs of this specification, another feature of the invention has to do with the shearing effect of the slicing rotor. In this connection, attention is invited to Figures 6 and 7 in which it is illustrated that the cutting blades 50 of the rotor are positioned with the cutting edges thereof radially while the straight forward ends of the pressure plates 24 are positioned angularly with respect to the radius of the slicer and with the outer peripheral portions of such forward ends of the pressure plates advanced with respect to the inner peripheral portions of such ends.

By reason of the arrangement of the lower ends of the pressure plates with respect to the cutting blades, nails, strings, stones and other foreign objects, as well as those small unusable cuts of potatoes remaining above the rotor, are thrown outwardly by the centrifugal force generated through rotation of the member 30. In Figure 5, the rotor 30 is shown to underlie the rim 20 and to be spaced a sufficient distance below this rim and inward of the surrounding band 33 to allow of the free escape of the matter thrown outward by centrifugal force. In this way, the blades of the rotor are protected against damage by metal and other foreign objects and at the same time the small unusable cuts of the potatoes are separated to some extent, at least, from the larger slices.

Referring now to the construction of the slicing rotor 30, it will be seen that, in general appearance, the body itself is not unlike the disclosure of the corresponding part in my prior slicer patent, consisting of two oppositely located more or less segmental sections preferably cast in a single piece along with the hub of the rotor and a pair of arms 53.

One radial edge portion of each of the segmental sections of the rotor body is shown to be abruptly depressed or rabbeted to form seats for the blades 50. Each cutting blade 50 is rigidly though detachably held in place by such appropriate fastening devices as machine screws and the upper surface of each blade is flush with the vegetable supporting surface of the rotor.

The other radial edge of each segmental section of the rotor body is also rabbeted to form seats for the attaching portions of arcuate approach

plates 64. The approach plates are of circumferential dimensions to fit between the segmental sections of the rotor body with slight spaces between the approach plates and the blades. As will be described, these spaces are variable in several ways, first, to regulate the thickness of the slices and, second, to compensate for wear on the vegetable engaging surface of the rotor.

By reference to Figures 10 and 11, it will be seen that the approach plates 64 are secured in the seats therefor through the medium of cap screws or other fastening devices 66. These fastening devices extend through radial rows of substantially radial slots 68 in the underlying portion of the body of the rotor and are threaded into openings in the approach plates.

At this point, it is sufficient to say that the fastening devices 66 provide for the rigid connection of the circumferentially leading portions of the approach plates and that the inner and outer peripheral portions of the approach plates are free so that the approach plates may be twisted slightly to provide for the required uniform depression of the trailing edges of the approach plates in a way that makes possible uniform spaces between the blades and the approach plates for the full radial extent of such blades. The hub 22 overlies the arcuate spaces between the approach plates and the hub of the rotor so as to prevent potatoes from wedging therein.

As shown in Figures 14 and 15, the trailing edge portions of the approach plates 64 are formed with openings 70 that are counterbored to define shoulders against which the heads of stud bolts 72 are seated. That is to say, the heads of the bolts 72 are positioned entirely within the counterbored portions of the openings 70 and, as is important to observe, the heads of the bolts 72 are not closely positioned in the counterbored portions of the openings 70. On the contrary, such heads of the bolts 72 are allowed a limited universal pivotal or rocking movement so that when they are drawn down by the associated nuts 76, the bolts are allowed an easy change in angular position with respect to the associated approach plates. In this way, the tightening of the nuts 76 does not tend to bend and possibly break the bolts 72.

It is shown in Figure 16 that the stud bolts 72 carry radial pins 78 that are fitted in keyways in the surrounding walls of the openings 70 so as to hold the bolts against turning during fastening of the nuts 76.

As in the case of my prior slicer patent, the supporting arms 53 project in opposite directions from the hub of the rotor and are provided with radially spaced axial openings threaded for the reception of adjusting elements in the form of sleeve nuts 82. By reference to Figure 15, it will be seen that in the adjustment of the rotor, the adjusting members 82 are advanced or retracted to the extent necessary to effect the required uniform slice cutting depth of the adjacent blades 50.

For example, if the cutting depth of the blades 50 is to be increased, the nuts 76 are loosened and the sleeve nuts 82 are retracted. This is followed by the re-tightening of the nuts 76 so that the adjacent portions of the approach plates 64 will be depressed into firm pressure engagement with the adjacent ends of the members 82. On the other hand, if the cutting depth is to be decreased, the nuts 76 are loosened and the sleeve nuts 82 are advanced or raised to the required points. After this, the nuts 76 are re-tightened to establish a firm lock of the approach plates to the newly raised members 82. From the foregoing, it is clear that, in the absence of uneven wear on the vegetable engaging surface of the rotor, the members 82 should be adjusted coextensively.

Figures 12, 14 and 15 illustrate that annuli or dials 90 are mounted on the adjusting sleeves or bearing members 82 and provide a simple means by which the extent of turning of the several members 82 is visually indicated. That is to say, the dials 90 are provided with radial calibrations cooperating with marking fingers 94 in providing a means by which the operator may know the extent to which the members 82 have been advanced or retracted. Of course, the sleeves 82 and associated parts are arranged in pairs, one pair for each approach plate, so that the indicating dials 90 provide a means by which each adjusting sleeve 82 may be adjusted to correspond to the other adjusting sleeve in the same pair. In this way, the operator is relieved of the necessity of employing a micrometer or other gaging means to determine the cutting depth resulting from a particular adjustment.

However, it has been found that the greatest wear on the vegetable engaging surfaces of the approach plates is at the outer peripheral portions thereof. For this reason, it will be seen that after uneven wear has deprived the approach plates of the initially uniform thickness thereof, the dials 90 cease to give accurate readings. To overcome this, the dials 90 are not formed integral with the sleeves 82 but are adjustably mounted about the bodies of the members 82 and are seated on annular flanges 98.

The flanges 98 are in the nature of integral radial projections of the bodies 82 and are provided with threaded openings for the reception of screw bolts 100 by which the dials 90 are fastened in place. More particularly, the heads of the screw bolts 100 bear against the dials or disks 90 and hold the same in predetermined adjusted positions. Thus, when uneven wear occurs on the potato engaging surfaces of the approach plates 64, the disks 90 may be turned sufficiently to compensate for this so that the disks will continue to read alike.

From the description of the matter featured in Figures 14, 15 and 16, and a knowledge of the matter disclosed in my prior slicer patent, it will be seen that the members 82 are adjustable independently of each other and yet in consonance with each other so as to give the associated approach plates the slight helical twist necessary to the establishment of uniform spaces between the approach plates and the associated cutting blades for the full radial extent of such blades.

Closely allied with the means for adjusting the approach plates for the production of potato slices of the required thickness, there is a second adjustment by which the approach plates may be adjusted to compensate for wear on the cutting blades 50.

In explaining the means by which the approach plates may be adjusted to compensate for wear on the blades, attention is invited to Figures 10 and 11. In these figures, it is shown that the fastening devices 66 and the slots 68 through which the same pass are arranged in radial rows and provide for the rigid connection of the approach plates to the body of the rotor. More specifically, the slots 68 are located in radial rows in the body of the rotor while the fastening devices 66 pass therethrough and are threaded into the leading portions of the approach plates, all of which

looks to the radial adjustment of the leading portions of the approach plates.

Each approach plate is in the nature of a quadrant or extends for approximately 90 degrees about the circumference of the rotor so that radial adjustment of the leading portion of each approach plate results in movement of the trailing portion of that approach plate toward and away from the associated blade. That is to say, adjustment of the approach plates or quadrants **64** radially along the lines of fastening elements **66** results in lateral movement of the trailing ends of the approach plates with respect to the blades while maintaining these parts parallel, a factor of major importance.

Thus, as wear causes the edges of the blades to recede, the trailing portions of the quadrants **64** are moved radially inward so as to move the trailing portions of such quadrants laterally toward the blades. For example, in Figure 10, the several quadrants or approach plates **64** are in the initially occupied positions thereof while in Figure 13, the quadrants **64** are shown to have been moved inward along the radial rows of fastening elements **66** so as to compensate for previous wear on the blades. For the purpose of further illustration, in Figure 10, the blades **50** are shown to be possessed of the full widths thereof, while in Figure 13, the blades are shown to have reduced widths caused by wear.

By reference to Figure 15, it will be seen that the bores of the sleeve nuts **82** are substantially greater than the diameters of the shanks of the bolts **72** so that such shanks may partake of substantial lateral movement in response to the adjustment of the quadrants **64** to compensate for wear. In this way, the quadrants **64** may be adjusted to compensate for wear without interference with or by the thickness regulating means for the slices.

Thus, the approach plates are capable of a compound adjustment, with the parts for effecting one adjustment closely associated with and dependent upon the parts for effecting the other adjustment, all in a way looking to the prolonged use of the rotor and increased production because in providing for quick and simple rotor adjustment, the periods of non-productive shut-downs for rotor adjustment are reduced to the minimum.

Having thus described the invention, what is claimed is:

1. In a vegetable slicer, a cutting rotor for vegetables, a body having a plurality of segmental pressure plates declining circumferentially in the direction of rotation of the rotor to points where the leading portions thereof closely overlie the rotor, and vegetable feeding plates overlying the pressure plates and declining circumferentially in the same direction as the pressure plates and having leading terminal portions projecting beyond the said leading portions of the pressure plates.

2. In a vegetable slicer, a cutting rotor for vegetables, a body having a plurality of segmental pressure plates declining circumferentially in the direction of rotation of the rotor to points where the leading portions thereof closely overlie the rotor, and vegetable feeding plates overlying the pressure plates and declining circumferentially in the same direction as the pressure plates and having leading terminal portions projecting beyond the said leading portions of the pressure plates to points approaching positions in longitudinal alignment with the rear ends of the pressure plates in advance thereof so that the vegetables are held out of the range of the cutting rotor until the same come within the effective range of the pressure plates.

3. In a vegetable slicer, a rotor having radial blades for slicing engagement with vegetables, a body having a plurality of segmental pressure plates extending and declining circumferentially in the direction of rotation of the rotor to points where the leading portions thereof closely overlie the rotor, and vegetable feeding plates overlying the pressure plates and extending and declining circumferentially in the same direction as the pressure plates and having leading portions projecting beyond the leading portions of the pressure plates, the lower leading edges of the pressure plates having the outer peripheral portions thereof extending circumferentially beyond the inner peripheral portions of such edges so that these edges are disposed at acute angles to the axis of the blades to cause foreign objects caught between such edges and the blades to be moved outward by centrifugal force, and a band surrounding said body and spaced radially outward of said rotor to cooperate with the rotor in forming a passage for objects directed outward by centrifugal force.

4. In a vegetable slicer, a rotor having blades for cutting vegetables, a body having a hub and a surrounding rim and upper and lower feed and pressure plates, respectively, formed integral with the hub and rim and declining circumferentially to points closely overlying the rotor, said feed plates being extended above the rim of said body and having the outer peripheral portions thereof spaced from and free from the adjacent portions of the pressure plates to define openings to the spaces between the plates, there being means adjacent the lower portions of the pressure plates for the ventilation and drainage of the spaces between the plates.

5. In a vegetable slicer, a rotor having radial blades for slicing engagement with vegetables, a body having a plurality of segmental pressure plates extending and declining circumferentially in the direction of rotation of the rotor to points where the leading portions thereof closely overlie the rotor, and vegetable feeding plates overlying the pressure plates and extending and declining circumferentially in the same direction as the pressure plates and having leading portions projecting beyond the leading portions of the pressure plates, the lower leading edges of the pressure plates having the outer peripheral portions thereof extending circumferentially beyond the inner peripheral portions of such edges so that these edges are disposed at acute angles to the axis of the blades to cause foreign objects caught between such edges and the blades to be moved outward by centrifugal force.

6. In a vegetable slicer, a rotor having radial blades for slicing engagement with vegetables, a body having a plurality of segmental pressure plates extending and declining circumferentially in the direction of rotation of the rotor to points where the leading portions thereof closely overlie the rotor, and vegetable feeding plates overlying the pressure plates and extending and declining circumferentially in the same direction as the pressure plates and having leading portions projecting beyond the leading portions of the pressure plates, the lower leading edges of the pressure plates having the outer peripheral portions thereof extending circumferentially beyond the inner peripheral portions of such edges so

that these edges are disposed at acute angles to the axis of the blades to cause foreign objects caught between such edges and the blades to be moved outward by centrifugal force, said body being provided with a rim joined to the pressure plates and positioned in overlapping and spaced relation to said rotor to provide for the free passage of said foreign objects caught between the pressure plates and the blades.

7. In a vegetable slicer, a rotor having a blade rigidly secured thereto, said rotor being provided immediately in advance of the blade with a flexible, arcuate, circumferentially extending approach plate, supports beneath said approach plate, adjusting sleeves carried by said supports, and fastening elements having universal pivotal connection with said approach plate and extending through said adjusting sleeves.

8. In a vegetable slicer, a rotor having a blade rigidly secured thereto, said rotor being provided immediately in advance of the blade with a flexible, arcuate, circumferentially extending approach plate having a plurality of openings that are counterbored to define seats, fastening elements passing through said openings and having heads positioned therein and engaging said seats, said fastening elements and the heads thereof being substantially less in diameter than the portions of the openings within which the same are located for universal pivotal movement of the fastening elements, sleeve nuts located at substantially right angles to the plane of the rotor and having bores of diameters to freely receive said fastening elements, said fastening elements being provided with fastening nuts for pressure relation with said sleeve nuts.

9. In a vegetable slicer, a rotor having a radial cutting blade secured thereto, said rotor being provided immediately in advance of the radial cutting blade with an approach plate in the form of a quadrant, means for the radial adjustment of the edge of the approach plate farthest removed from the blade to effect lateral bodily adjustment of the approach plate with respect to the blade, and a second adjusting device associated with said approach plate and embodying a fastening element having universal pivotal connection with the portion of the approach plate adjacent the cutting blade.

10. In a vegetable slicer, a rotor having a radial blade secured thereto, said rotor being provided immediately in advance of the radial blade with an approach plate in the form of a quadrant, means for the radial adjustment of the edge of the approach plate farthest removed from the blade to effect lateral bodily adjustment of the approach plate with respect to the blade, and a second adjusting device associated with said approach plate and embodying a fastening element having universal pivotal connection with the portion of the approach plate adjacent the blade and also embodying an adjusting sleeve having a bore substantially greater in diameter than said fastening element and freely receiving said fastening element for lateral movement of the fastening element coincident with the bodily shifting of the approach plate.

11. In a vegetable slicer, a rotor having a blade fixed thereto, said rotor being provided immediately in advance of the blade with a flexible approach plate in the form of a quadrant, fastening devices for securing said approach plate to said rotor and having means whereby the edge portion of said approach plate farthest removed from the blade may be adjusted radially to effect lateral bodily adjustment of the approach plate with respect to the blade, and a second adjusting mechanism for twisting and depressing the approach plate with respect to the blade and embodying a plurality of fastening elements having universal pivotal connection with the edge portion of the approach plate closest to the blade.

12. In a vegetable slicer, a rotor having a blade fixed thereto, said rotor being provided immediately in advance of the blade with a flexible approach plate in the form of a quadrant, fastening devices for securing said approach plate to said rotor and having means whereby the edge portion of said approach plate farthest removed from the blade may be adjusted radially to effect lateral bodily adjustment of the approach plate with respect to the blade, and a second adjusting mechanism for twisting and depressing the approach plate with respect to the blade and embodying a plurality of fastening elements having universal pivotal connection with the edge portion of the approach plate closest to the blade and also embodying sleeve nuts having bores substantially greater in diameter than said fastening elements and freely receiving the same for lateral movement of the fastening elements coincident with the bodily shifting of the approach plate.

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