No. 820,762. PATENTED MAY 15, 1906.

W. H. BOUTELL.

FRUIT SLICER.

APPLICATION FILED MAY 9, 1901.

4 SHEETS—SHEET 1.

Fig. 2.

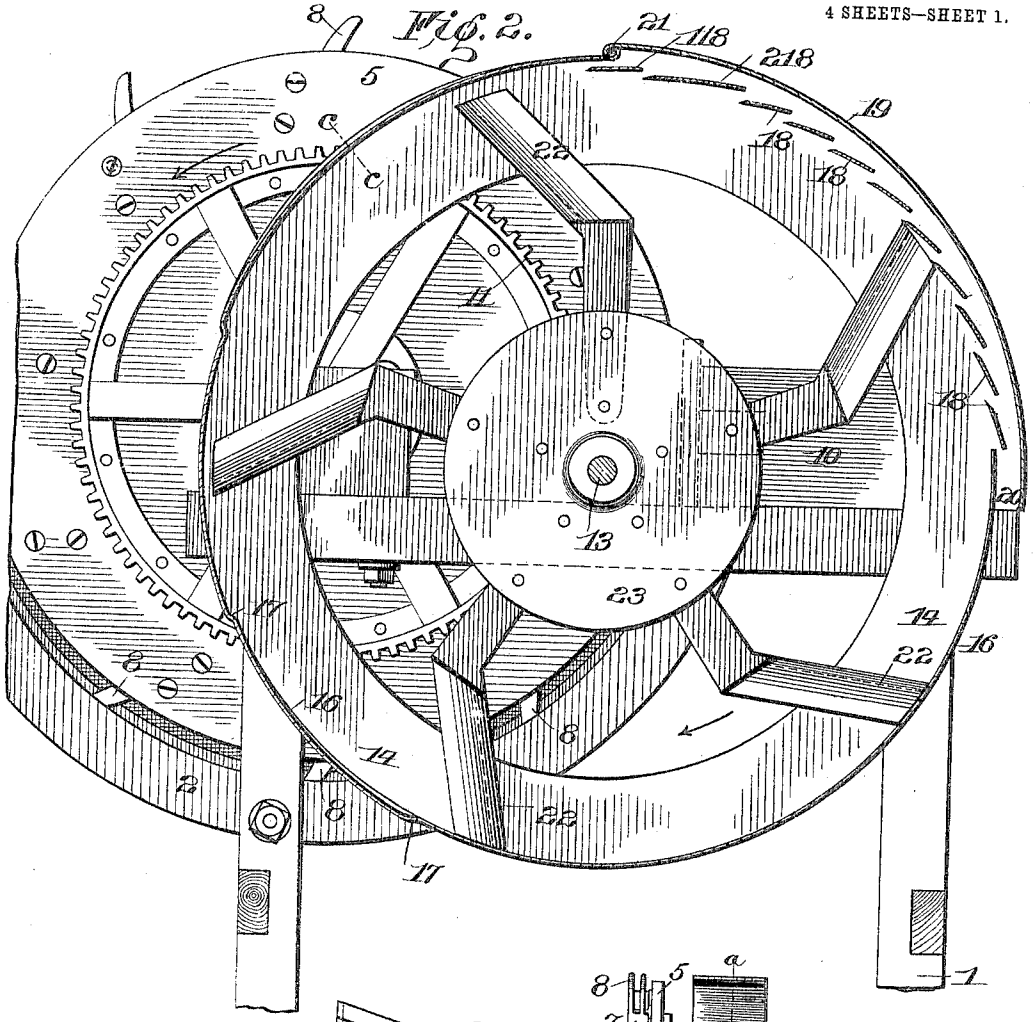
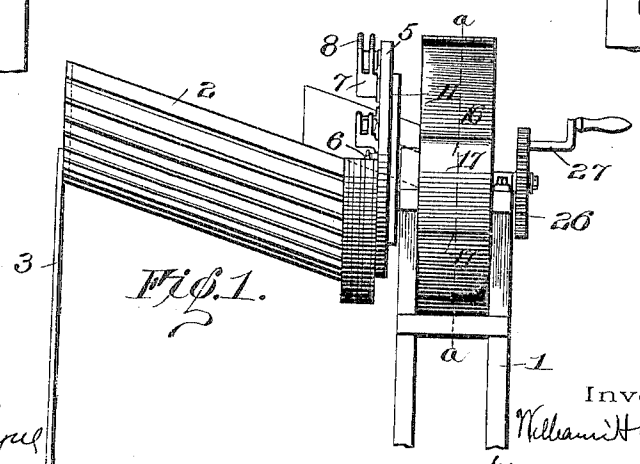


Fig. 1.



Witnesses.

Walter B. Payne

G. Willard Rich.

Inventor.

William H. Boutell

by Frederick H. Church

his Attorney

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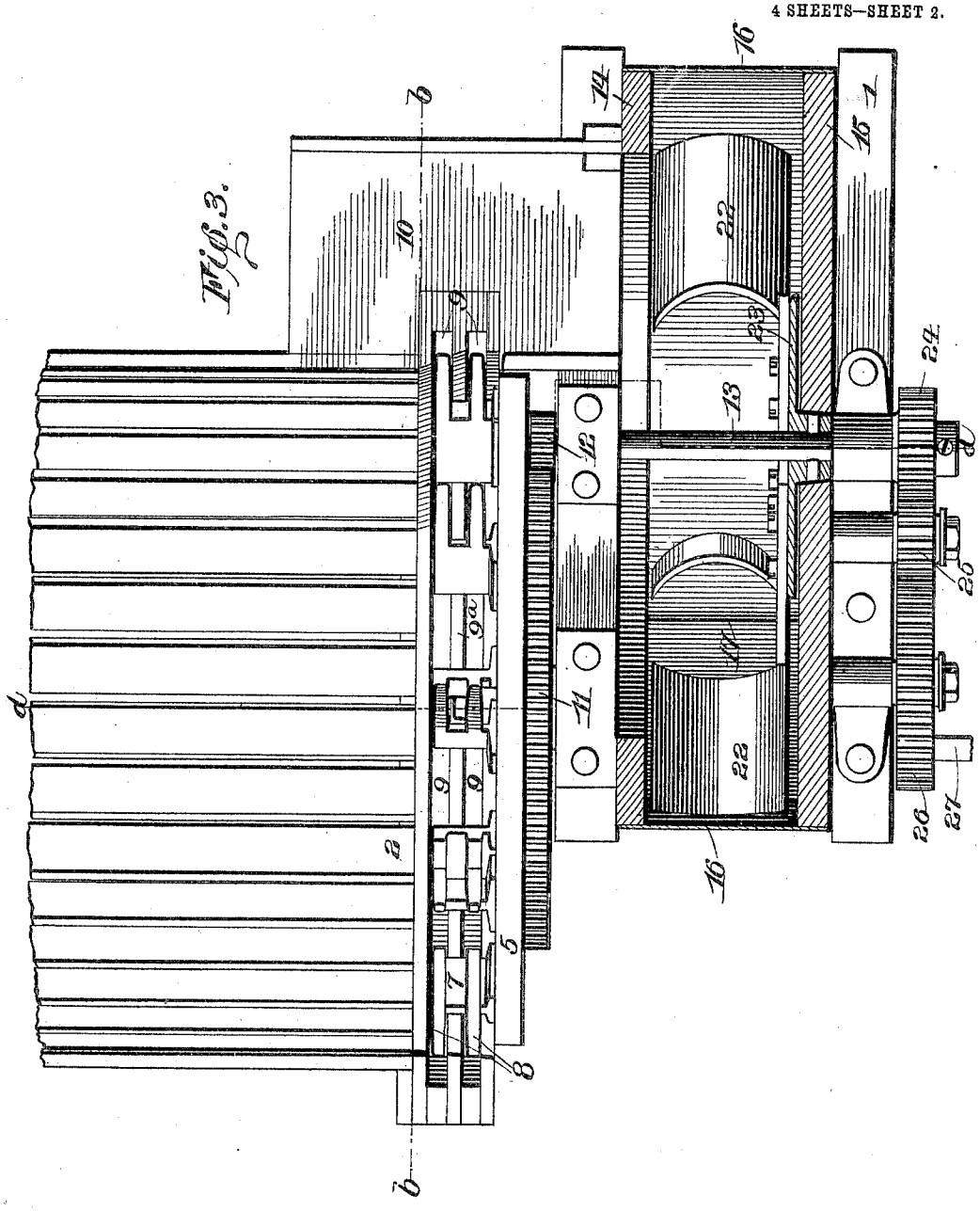
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4 SHEETS—SHEET 2.

Fig. 3.



Witnesses.

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4 SHEETS—SHEET 3.

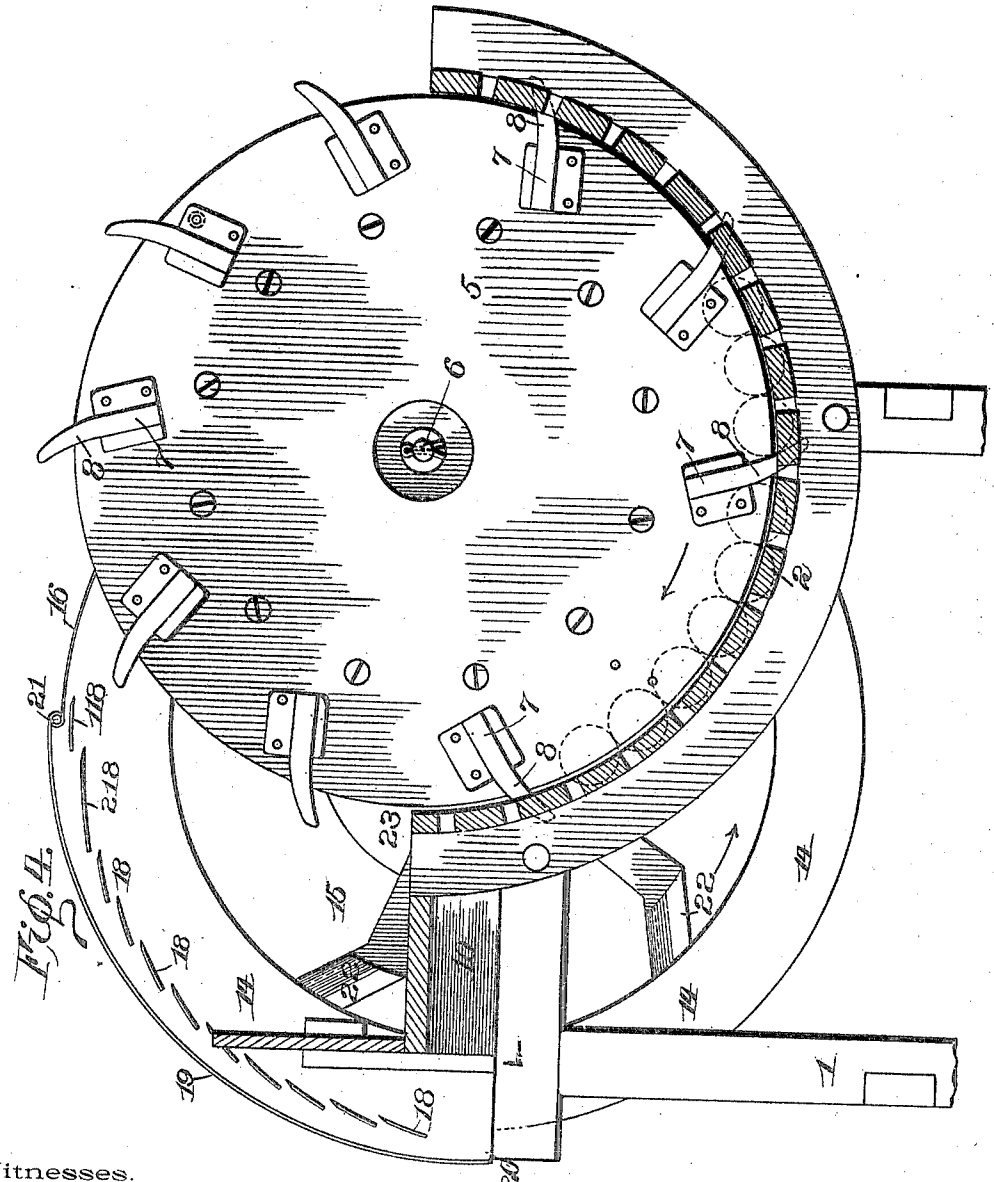


Fig. 4.

Witnesses.

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4 SHEETS—SHEET 4.

Fig. 6.

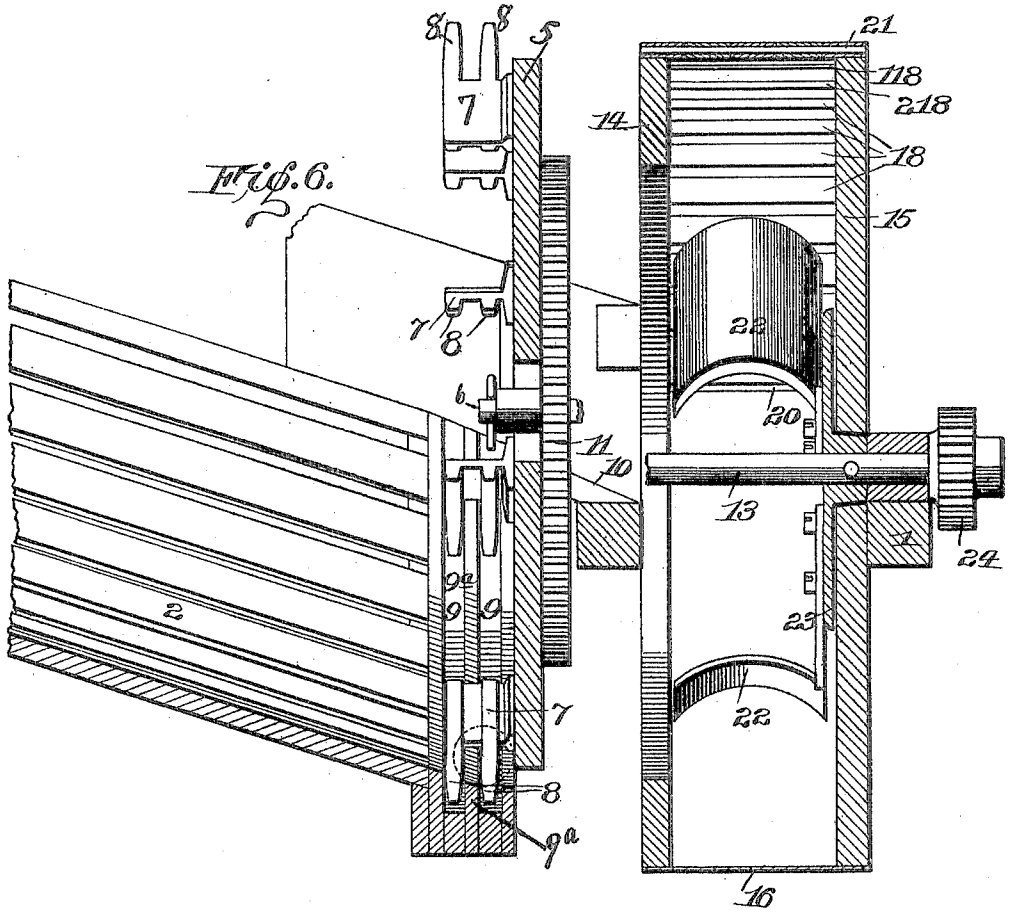
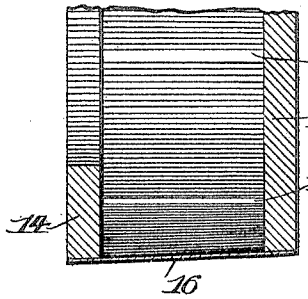


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

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FRUIT-SLICER.

No. 820,762. Specification of Letters Patent. Patented May 15, 1906.

Application filed May 9, 1901. Serial No. 59,498.

To all whom it may concern:

Be it known that I, WILLIAM H. BOUTELL, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Fruit-Slicers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to machines for slicing fruits, vegetables, or similar articles, and particularly for operating upon cored apples, and has for its object to provide a machine which will feed the apples or pieces of fruit or similar material to the slicing mechanism from a hopper or receptacle in which they are placed promiscuously, and in case cored fruit is operated upon the slices will be cut in a plane intersecting the aperture formed by the removal of the core; and it further consists in certain improvements, all as hereinafter fully described, the novel features being pointed out in the claims at the end of this specification.

In the drawings, Figure 1 is a side elevation of a machine constructed in accordance with my invention; Fig. 2, a vertical sectional view, on an enlarged scale, taken on the line *a a* of Fig. 1; Fig. 3, a plan view with the upper side or portion of the casing of the slicer removed; Fig. 4, a sectional view on the line *b b* of Fig. 3; Fig. 5, a section on the line *c c* of Fig. 2; Fig. 6, a section on the line *d d* of Fig. 3.

Similar reference-numerals in the several figures indicate similar parts.

The machine embodies generally a main supporting-frame (indicated by 1) of any suitable description and at one side a fruit receptacle or hopper 2 semicircular in cross-section, as shown in Fig. 4, and inclined toward the main frame of the machine, the said hopper or receptacle being supported upon the latter and also having at its outer end a leg or support 3. At the inner end of the hopper or receptacle is located a disk or support 5, preferably journaled to rotate about an axis substantially concentric with the curve of the end of the hopper or receptacle, the axis, however, being inclined relatively to that of the hopper and in the present instance upon an arbor 6. Secured to the inner side of the disk or support are lifters 7, preferably formed of brackets having two projecting fingers 8 8 extending into grooves 9 9, formed near the ends of the hopper on opposite sides of a rib 9^a, as shown in Figs. 3 and 5, these brackets being bolted to the disk or cover 5 and the ends of said fingers during the rotation of the disk extending slightly below the surface of the hopper or receptacle, so that they will carry up to one side thereof the fruit deposited in the hopper and which by reason of the inclination thereof will gravitate toward the disk or support. The lower end of the hopper containing the grooves 9 9 is beveled slightly on the side over which the fruit is carried, said bevel extending toward the inclined table and the disk 5, as shown at 91, to cause the fruit to be held in contact therewith, and the angularity of the hopper assists the fruit to keep its place in case more than one piece thereof is being elevated by a single pusher. The lifters are preferably inclined rearwardly relatively to the direction of movement of the lifter-disk, so that the pieces of fruit carried up may drop off or be discharged upon the inclined table or receiver 10, arranged at the upper edge and one side of the hopper, from where they are discharged into the slicer. The lifter disk or wheel 5 is rotated in the direction of the arrow in Fig. 4 by any suitable means, such as a gear 11, secured to the outside, as shown, and meshing with a pinion 12 upon a shaft or arbor 13, mounted in suitable bearings in the main frame.

The casing of the slicer proper is substantially annular in form and is preferably composed of the inner ring or board 14, having an opening in line with the chute or support 10. The outer board or head 15 and the periphery or curb 16 of the casing is preferably formed of sheet metal, such as zinc or galvanized iron, which is not liable to be affected by fruit-juices and is substantially concentric with the axle or arbor 13, as will be described, and in the present instance constitutes the surface over or upon which the fruit is moved before being brought into contact with the slicing-knives arranged about the periphery of the casing. The curb or casing 16 is pro-

vided at two or more places with shoulders or irregularities (indicated by 17) extending substantially in the direction of the axis of the arbor and operating to jog or jar the fruit as it is moved upon the surface and permit the fruit to assume a position with the core-aperture extending substantially radially or at right angles to said surface. The surface of the curb or casing is further preferably inclined slightly to the axis of the casing 16, as shown in Fig. 5, so that there will also be a tendency to move or roll the fruit slightly toward one end of the casing until it is arrested upon its flat surface, core end up, in contact with the curb 16 and in front of one of the pushers.

18 indicates the slicing-knives with their cutting edges separated, as shown in Fig. 2, a distance corresponding to the thickness of the slices desired and arranged at an angle to the pushers or fruit-carrying devices.

In order to insure the proper slicing of the fruit at the commencement of the operation, I arrange the first knife 118 in a substantially horizontal plane and at a distance below the periphery 16 equal to the thickness desired for the first slice and also the same distance above the path described by the ends of the fruit-pushers. The succeeding knife 218 is located tangentially to the path of the ends of the pushers and is double the width of the preceeding blade. By this arrangement it will be seen that as the fruit is carried around in contact with the periphery or curb 16 the fruit-slice will be removed by the knife 118, while the core-aperture is in a vertical position, and before this operation is completed the knife 218 has begun to remove the second slice. The fruit having now been considerably flattened by the removal of the two slices therefrom is firmly held against the broadened surface of said knife and its edge presented to the succeeding knives 18 in the proper position to sever the remaining slices into rings. This arrangement insures the proper removal of the smaller rings from the upper end of the fruit. The larger rings at the center guiding the fruit always insures the lower end thereof being properly sliced. Instead of making these knives perfectly flat or straight I prefer to curve them slightly, as shown in Fig. 2, and thereby insure a more even cutting action as the fruit is moved past and pressed upon them, thereby preventing the breaking of the slices, as is liable to be the case when perfectly straight knives are used. While I prefer to arrange the edges of the knives in a plane parallel with the axis of the arbor 16, the term "substantially" is employed to designate the general direction merely.

A hood or cover 19 is provided beyond the knives and preferably substantially concentric with the arbor 16 for the purpose of receiving the sliced fruit and conducting it to a single point of discharge—as, for instance, at 20—this head or casing being preferably hinged at 21, so that it may be swung back and access had to the knives when desired.

Arranged within the casing of the slicer and secured to the arbor 16 are pushers or sweeps 22, in the present instance consisting of arms or castings secured at their inner ends to a disk 23, mounted on the arbor 13 and having their outer faces or operating portions recessed or concaved and arranged tangentially of the arbor 13, so that their operating-faces will present an angle relatively to the support or casing 16 and to the plane of the cutting edges of the knives. Any suitable means may be provided for rotating the arbor 13—such, for instance, as a train of gears 24 25 26, to any one of which (preferably the gear 26) an operating-handle 27 may be applied—or, if desired, a belt-pulley operated by any suitable prime mover may be used.

The operation of the machine will now be understood. The power being applied directly or indirectly to the arbor 13, the latter is rotated rapidly in the direction indicated by the arrow in Fig. 2, and the cored fruit deposited in the hopper or receptacle will gravitate toward the support or disk having the lifters thereon. The lifters will carry up the separate pieces of fruit to the receiver or table 10, from which they will drop into the casing 16 and will be carried around by the pushers or sweeps 22, the shape of the latter being such as to press the fruit against the outer periphery of the curb or casing holding it centrally thereon and causing, it to slide over the latter and to be jarred or agitated by the projections or shoulders 17, so that before the fruit is brought into contact with the knives and sliced thereby the core-aperture will extend substantially at right angles to the plane of the cutting edges of the knives, whereby the fruit will be sliced into rings, and the slices will be delivered from the discharge-aperture 20 into any suitable receptacle provided for them and separated so that they may be readily operated upon by the sulfur fumes used to bleach them instead of sticking together, the manner of their delivery from the knives and the cover assisting in accomplishing this.

As the fruit carriers or pushers operating over the support 16 are rotated very rapidly, the machine being operated at high speed, the centrifugal force will contribute, if not entirely cause, the fruit to be pressed into contact with the knives; but I prefer to incline the surface of the pushers or beaters relatively to the edges of the knives, as this insures the proper operation at all speeds. The lifters operating in the hopper are adapted to carry as many pieces of fruit as may fall in their path; but as the inclined table is arranged nearly level with the axis of the disk 5 the fruit is elevated to such a height

that only one row or such pieces of fruit as are in contact with the bevel-face 91 will be elevated, the fruit rolling onto the inclined table and passing successively into the slicer as the lifters revolve upwardly. The pushers or sweeps in the slicer-casing are preferably timed by the gearing employed between them, so that the lifters or feeding devices operate relatively slower than the pushers or sweeps, which operate directly upon the fruit and press it into contact with the knives, and no matter how rapidly the fruit is fed from the receptacle the slicer will always be able to operate upon it and prevent choking or improper operation of the latter. This relative timing of the parts is arranged to equalize the work so that the power expended will be the same whether or not large or small fruit is being sliced, and this is accomplished by speeding the pushers or sweeps 22 to move a distance across the knives 18 sufficient to slice the smallest-sized fruit while the disk 5 and lifters 7 are moving a relative distance to feed the same. Therefore if only small fruit is being operated upon one piece will be deposited for each pusher; but if the larger fruit is fed the pieces will be received by the alternate pushers, thereby operating under the same power. From this it will be seen that the device is capable of operating upon large and small sized fruit promiscuously without affecting the operation of the machine.

I claim as my invention—

1. In a slicing-machine, the combination with an annular casing or curb having the irregular interior surface, and slicing-knives therein, of a rotary fruit-carrier for moving the fruit into contact with the knives and also into contact with the irregular surface.

2. In a slicing-machine, the combination with an annular casing or curb having the irregular interior surface and slicing-knives therein, of a rotary fruit-carrier having a rearwardly-extending face for moving the fruit into contact with the knives and also into engagement with the irregular surface by centrifugal action.

3. In a slicing-machine the combination with an annular curb having a substantially horizontal axis and interiorly-extending knives, of a horizontal shaft arranged concentrically of the curb having rigid arms thereon each provided with recessed operating-faces arranged tangentially of the shaft and having their outer ends extending rearwardly with relation to the direction of rotation of the shaft.

4. In a slicing-machine the combination with an annular casing or curb having the slicing-knives at the periphery thereof, of a series of rigid arms having rearwardly-extending faces constituting rotary fruit-carriers, operating in the casing to force the fruit outwardly against the knives, said faces being recessed in their forward sides to hold the fruit centrally on the curb.

5. In a slicing-machine, the combination with a casing having slicing-knives therein, over which the fruit is moved, and an irregular surface over which the fruit is also moved before engaging the knives to cause it to rest upon one of its flattened ends and fruit-carrying devices comprising rigid arms having rearwardly-extending recessed faces operating to center the separate pieces of fruit and move them over the irregular surface and into contact with the knives.

6. In a slicing-machine, the combination with a casing having slicing-knives therein and an irregular surface at the periphery upon which the fruit is moved before engaging the knives to cause it to rest upon one of its flattened ends, of a plurality of arms having faces curved transversely and extending rearwardly toward tneir outer ends for carrying pieces of fruit over said surface and into contact with the cutting edges of the knives.

7. In a slicing-machine, the combination with an annular casing or curb having slicing-knives arranged at its periphery with their cutting edges extending substantially in the direction of the length thereof, of a plurality of fruit-carrying arms comprising members having their ends extending rearwardly, the faces of said rearwardly-extending ends being disposed at an angle to the surface of the curb and recessed to hold a fruit centrally thereof when moving over the edges of the cutting-knives.

8. In a slicing-machine, the combination with an annular casing or curb having a horizontal axis and slicing-knives arranged at its periphery above the axis of the casing with the cutting edges extending substantially in the direction of the length thereof, of arms for carrying fruit around into engagement with the knife-edges having concaved faces arranged at an angle to the plane of the knives and extending rearwardly toward their outer ends.

9. In a slicing-machine, the combination with an annular casing or curb, a plurality of knives arranged at the periphery thereof, and a feeding-aperture in the casing in rear of the knives, of a rotary wheel having rigid arms thereon provided with rearwardly-extending ends the faces of which are recessed and disposed at an acute angle to the surface of the casing and operate upon fruit placed in the feeding-aperture to move it outwardly and support it centrally on the curb.

10. In a slicing-machine the combination with an annular casing or curb having an irregular interior surface, a plurality of knives arranged with their cutting edges beyond the surface, and a feeding-aperture beyond the knives, of a rotary wheel and rigid arms thereon extending rearwardly toward their outer ends, said ends forming pockets operating to

receive fruit from the aperture and carry it over said irregular surface and into engagement with the knives.

11. In a slicing-machine, the combination with an annular casing or curb having a horizontal axis, and a plurality of cutting-knives therein having their cutting edges at the periphery thereof above the axis of the curb, of a rotary wheel, a plurality of fruit-carrying arms thereon having their operating-faces concaved and disposed at an angle to the plane of the knife-edges and having their outer ends lying in rear of their inner ends.

12. In a slicing-machine, the combination with an annular casing or curb, and a plurality of curved cutting-knives arranged successively therein having their cutting edges at the periphery of the curb, of a plurality of movable arms for carrying the fruit against the cutting edges of the knives.

13. The combination with a rotary slicer embodying an annular casing or curb, a plurality of knives arranged therein and a plurality of rotary arms for moving the fruit over the knives, of a fruit-feeding mechanism having pockets adapted to feed single pieces of fruit into the casing beyond the knives, driving devices for the arms and feeding mechanism and timing mechanism between said feeding mechanism and arms for operating the latter at a speed greater than that of the former.

14. The combination with a slicing-machine embodying knives and rotary arms for moving the pieces of fruit over the knives, of a feeding mechanism embodying a hopper or receptacle, and a rotary support at the end thereof, having lifting-fingers inclined backwardly relatively to the direction of movement of the support.

15. The combination with a slicing-machine adapted to operate upon single pieces of fruit, of a feeding mechanism therefor embodying a hopper or receptacle, a rotary support at the end thereof, and the lifters thereon, each embodying the two separated fingers.

16. The combination with a slicing-machine adapted to operate upon single pieces of fruit, of a feeding mechanism connected thereto embodying a hopper or receptacle, a rotary support at the end thereof, and the lifters thereon, each embodying the two separated fingers and the stationary rib in the hopper-bottom arranged between the fingers.

17. In a feeding device for slicers, the combination with the hopper having the rounded inclined bottom, and the rib at the end thereof, of the rotary support at the end of the hopper provided with the lifters thereon each embodying the two fingers extending on opposite sides of the rib.

18. In a slicing-machine, the combination with the annular casing or curb, the inner periphery thereof being slightly inclined on one side thereof relatively to the axis and having a plurality of ribs or shoulders thereon, and a plurality of slicing-knives arranged beyond said inclined and shouldered surface, of a rotary support embodying a plurality of arms movable over the surfaces and knives.

19. In a slicing-machine, the combination with a plurality of slicing-knives and means for forcing the fruit in contact with their cutting edges and between them, of a guard or deflector hinged to the casing and extending over the knives with which the slices contact to separate them.

20. In a slicing-machine, the combination with an annular casing or curb, a plurality of slicing-knives arranged successively in the curb, and means for pressing the fruit in contact with and between them, of a deflector extending over the knives to separate the slices and means for removably attaching it to the casing.

21. In a slicing-machine, the combination with an annular casing or curb having a substantially horizontal axis, and a plurality of slicing-knives, of a plurality of rotary pushers or sweeps operating in the casing, and a deflector removably attached to the casing and extending over the knives at the outer side thereof to discharge the slices downwardly.

22. In a fruit-slicing machine, the combination with a support, a slicing-knife arranged out of line with said support and substantially parallel therewith, a second knife broader than the first, of a pusher moving over the support and knives, a series of slicing-knives arranged in rear of the second knife and at an angle to the path of the pusher.

23. In a fruit-slicing machine, the combination with a support, a slicing-knife arranged substantially parallel with and out of line of the support, and a series of slicing-knives arranged at an angle to the support, of a knife-blade located between the first-mentioned blade and the series of blades, and arranged at an angle intermediate to that of the preceding and succeeding blades, and a pusher moving over the support and blades.

24. In a fruit-slicing machine, the combination with a support, a pusher movable above the support, and a slicing-knife arranged between the path of the pusher and the support and parallel to the latter, of slicing-knives arranged at an angle to the support, and a broad knife-blade located between the first and second mentioned knives and at an angle to the support intermediate that of the preceding and succeeding blades.

25. In a fruit-slicing machine, the combination with an annular curb or casing, a rotary pusher carrying the fruit around in contact with the curb, and a slicing-knife arranged substantially parallel with the curb and between the latter and the path of the pusher, of slicing-knives arranged in rear of

the first knife and at an angle to the path of the pusher, and a knife-blade arranged between the first and second mentioned knives and located at an angle to the path of the pusher intermediate the angle of the preceding and succeeding knives.

26. In a fruit-slicing machine the combination with a hopper thereon containing the fruit and having a head and a fruit-receiver leading from the hopper, of a carrier arranged within the hopper and operating in line with the receiver and engaging the line of fruit lying against the head to move the several pieces along the side of the hopper to deposit them singly in the receiver.

27. The combination with a fruit-slicing machine, a hopper thereon containing the fruit, a guide in the hopper against which the fruit lies whereby several pieces thereof will be supported in line, and a receiver for the fruit leading from the hopper and in line with the guide, of a fruit-carrier adapted to engage the line of fruit against the guide to move it thereon and deposit the several pieces singly in the receiver.

28. The combination with a fruit-slicing machine, a hopper containing the fruit, means for arranging the fruit in line, and a receiver leading from the hopper, of a carrier operating through the hopper to move the line of fruit and deposit the several pieces thereof successively in the receiver.

29. In a fruit-slicing machine, the combination with a hopper containing the fruit, a rotary head at the end of the hopper forming a guide against which the fruit in the bottom of the hopper lies and a receiver leading from the hopper, of lifters on the head projecting into the hopper and adapted to engage a line of fruit resting against the head and deposit the several pieces thereof successively in the receiver.

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