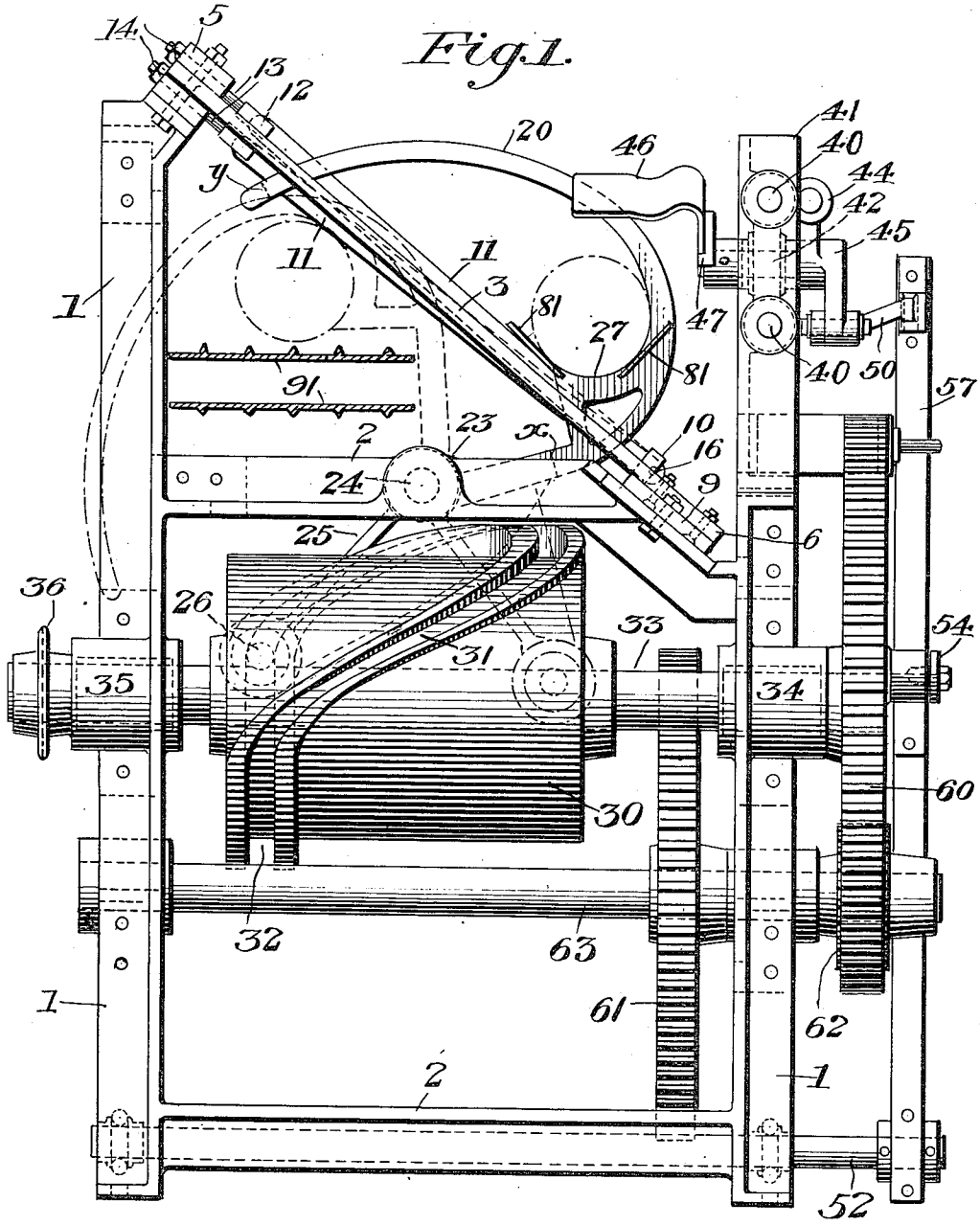
Nov. 6, 1923. 1,472,838

S. T. HOYT

SLICING MACHINE

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Fig. 1.



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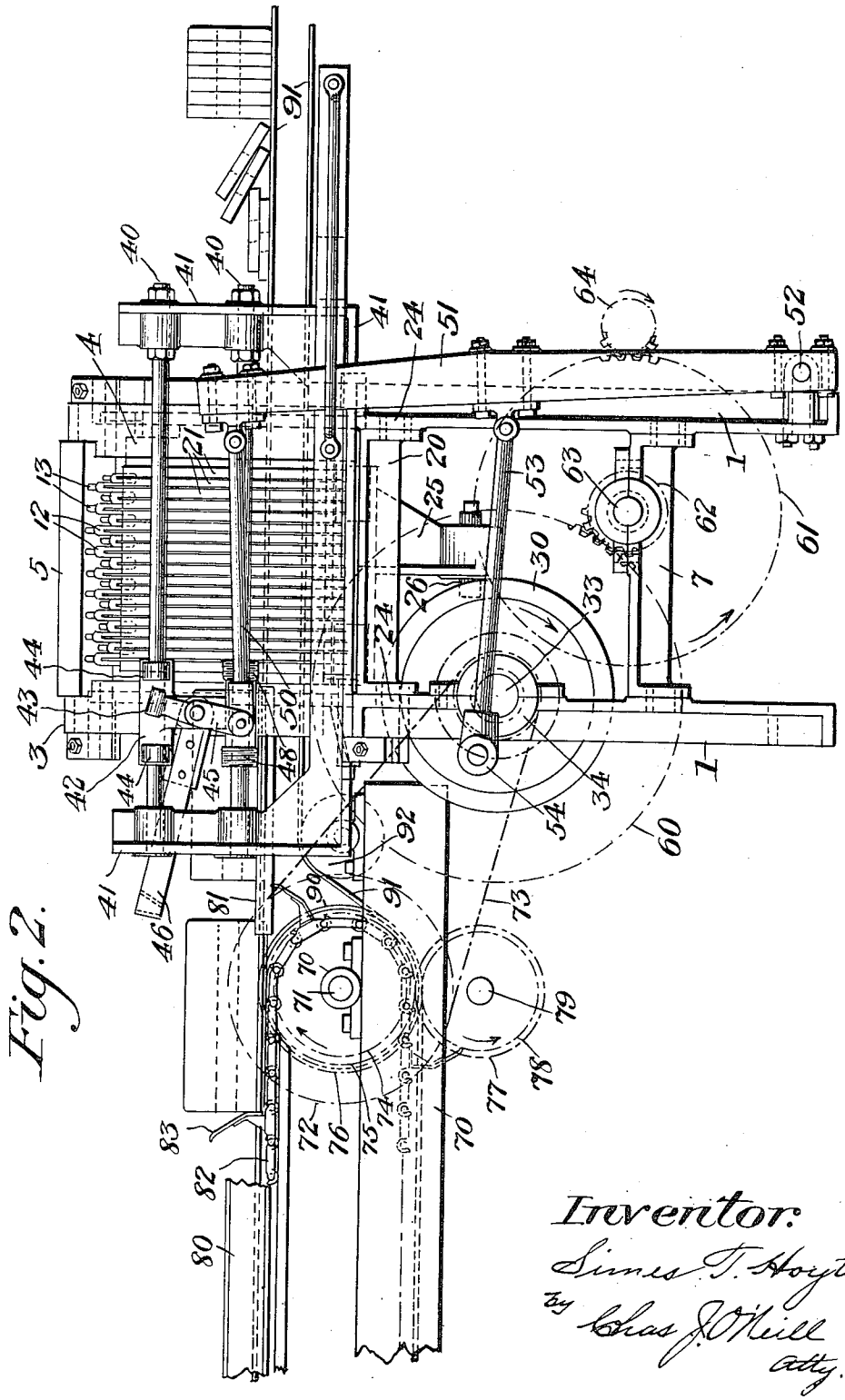


Fig. 2.

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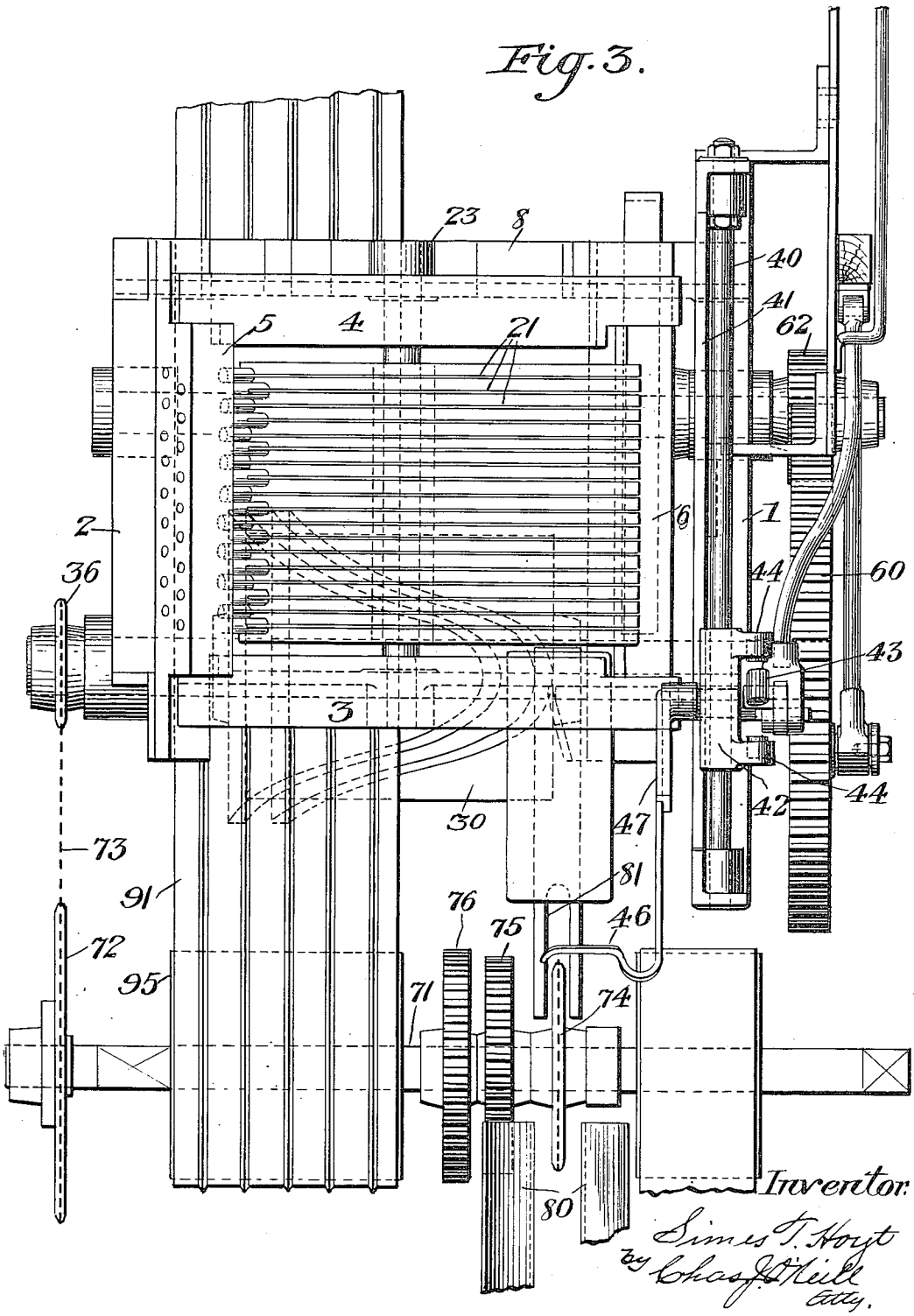
Nov. 6, 1923. 1,472,838

S. T. HOYT

SLICING MACHINE

Filed Feb. 3, 1923 3 Sheets-Sheet 3

Fig. 3.



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Patented Nov. 6, 1923. 1,472,838

UNITED STATES PATENT OFFICE.

SIMES T. HOYT, OF HONOLULU, TERRITORY OF HAWAII, ASSIGNOR TO HAWAIIAN PINEAPPLE COMPANY, LIMITED, OF HONOLULU, HAWAII, A CORPORATION OF HAWAII.

SLICING MACHINE.

Application filed February 3, 1923. Serial No. 616,787.

To all whom it may concern:

Be it known that I, SIMES T. HOYT, a citizen of the United States, residing at the city of Honolulu, in the Territory of Hawaii, have invented certain new and useful Improvements in Slicing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to a machine for slicing articles, such as fruits, vegetables, and other foodstuffs, and has for its object to provide a simple, efficient, and economical apparatus adapted to receive the articles in succession, feed them individually to a head having a hollow or arcuate face intersected by a series of slots, which slots receive a series of parallel spaced knives which intersect the arcuate face of the head in chord-like arrangement, said head being pivoted at one transverse edge and being provided with a seat adjacent the pivoted edge to receive the articles to be sliced and to force the articles against the knives and cut said articles into slices of uniform thickness, when the head is moved toward the knives, the machine being provided with means for oscillating the head, retaining the head in stationary position during the feeding operation, and means for feeding the articles to be sliced successively to the head, as will be more particularly pointed out in the annexed specification, predicated on the accompanying drawings, in which,—

Fig. 1 is an end elevation of the apparatus, certain parts being omitted for the purpose of clearness;

Fig. 2 is a side elevation;

Fig. 3 is a plan view.

Referring to the drawings, 1, 1, represent the side members of a suitable frame or support for the apparatus, provided with suitable cross-connecting members 2, 2. Disposed transversely of the frame in a plane at an angle to the horizontal is a knife holding frame comprising side members 3 and 4, and end members 5 and 6, the latter of which are bolted to inclined seats or flanges formed on the main frame, as indicated in Fig. 1. Extending between the bars 5 and 6 of the knife frame, is a series of thin bladed knives 11 having their cutting edges uppermost. The individual knives 11 are held rigidly in position by special tensioning devices including pins 16 engaging holes in the lower ends of the knives and resting in slots on the rear faces of lugs 10 projecting from the frame member 6, the upper end of each knife being secured in a clevis 12 having a screw-threaded stem 13 extending through an opening in the cross-bar 5, each of the screw threaded stems being provided with a nut 14 by means of which the proper tension may be applied to the corresponding knife. Inasmuch as the knives are spaced at relatively close intervals, and the several clevises 13 must be made sufficiently strong to endure relatively heavy strains, provision is made for allowing relatively large clevises by disposing the openings in the cross bar 5 in staggered relation, as clearly indicated in the several figures of the drawings. This also admits of a ready and accurate adjustment of the tension of the knives, as it allows sufficient space between the adjusting nuts 14 to admit of the application of a wrench to any individual nut. As thus constructed, the series of knives and their supporting frame constitutes a unitary device which may be quickly applied to and removed from the frame of the machine, thereby facilitating adjustment, replacement, or repair of the parts.

Co-operating with the knives 11 is a head 20, which is preferably formed as a casting, substantially arc-shaped in longitudinal cross-section, and provided with a series of spaced slots 21 extending longitudinally of the head between the points marked x and y in Fig. 1, each of said slots 21 receiving one of the knives 11, each knife occupying the co-operating slot in the relation particularly illustrated in Fig. 1, the knife constituting, in effect, the chord of the arc upon which the curved head 20 is formed. It will be noted that each of the knives lies within the corresponding slot in the head at all times, so that the slotted surface acts as a means for preventing twisting of the knives during the cutting operation, and enables the knives to be made comparatively thin. The head 20 is pivoted in bearings 23 on the cross bars 2, by means of pintles 24, to permit the head to be rocked or oscillated toward and from the knives. Adjacent the pivotal edge

of the head 20, the inner face of the latter is provided with a concave seat 27 adapted to receive the articles to be sliced. This seat extends entirely across the head, and is, of course, intersected by the slots 21 in the head, said seat in the position of rest on the head, when the articles are fed into the latter, being above the plane of the knives 11, as indicated in Fig. 1. When the head has been turned to its other extreme position, it will be noted that the seat 27 lies entirely below the plane of the knives 11, so that any articles carried on the seat 27 will be moved bodily over the cutting edges of the knives, and the knives will be forced completely through the article, dividing the same into slices of practically uniform thickness, all of the slices being ultimately cleared of the knives when the head is rotated to the position shown in dotted lines in Fig. 1.

It will be understood, of course, that the head moves first toward, and then away from, the knives, with an oscillatory movement to effect the slicing of the articles and the return of the head to charging position, which latter must be retained for a sufficient time to enable the next article to be fed into proper position on the seat 27. To effect each complete oscillation and the following period of rest of the head 20, any suitable operating means may be provided, and a simple and effective device for this purpose is in the form of a cylinder 30 fixed to a shaft 33 journalled in bearings 34 and 35 in the frame members 1, 1, said cylinder being provided on its peripheral face with a reverse cam groove 31 extending through 180° of the cylindrical surface, which is connected by a groove section 32 parallel with the end of the cylinder. Engaging the continuous cam groove constituted by the members 31 and 32 is a pin 26, secured to the end of an arm 25, which constitutes an extension of the head 20. The shaft 33 carrying the cam member 30 is provided with a relatively large pinion 60, which meshes with the small pinion 62 mounted upon the cross shaft 63 journalled in bearings on cross members 7 of the main frame. Said shaft 63 also carries a large pinion 61 which is in mesh with a pinion 64, which may be driven by any suitable means.

The machine as thus described is preferably provided with means for automatically feeding articles to be sliced in proper sequential order and timed relation to the seat 27 of the head 20. To effect this object, the machine is provided with a suitable support to receive an individual article, which is located adjacent and in substantial alignment with the seat 27 when the head 20 is in a position of rest, as illustrated in Fig. 1. Preferably this support is in the form of a short trough 81, which is provided with an open bottom near its forward end. Mounted on the side frame 1 and laterally of the head 20, is an auxiliary frame 41 carrying two parallel guide bars 40, 40, upon which is slidably mounted a cross head 42. The lower sleeve of the cross head engaging the lower guide bar 40 is preferably provided with stuffing boxes or the like 48, carrying suitable packing by means of which the amount of friction between the cross head and the guide bars may be accurately regulated and adjusted for a purpose hereinafter described. Journalled in a transverse bearing in the cross head 42 is a crank 45 provided with an upward extension 43 adapted to engage spaced abutments 44, 44, on the upper member of the cross head. The end of the crank 45 on the inside of the frame 41 is provided with a feed arm 47 having a lateral extension 46, which overlies the support or trough 81, to which the articles to be sliced are delivered one at a time. The lower end of the crank 45 is pivotally connected to a pitman 50, which in turn is connected to the upper end of a rock lever 51 pivoted at 52 to the lower end of the adjacent side frame. Motion is imparted to the rock lever 51 by means of a pitman 53 connected at one end to the mid-section of the rock lever, and at the other end to a crank pin 54 mounted in the face of pinion 60.

It will be noted that as the rock lever 51 is moved outward from the position shown in Fig. 2, the first operation will be to rock crank 45 until the extension 43 engages the left-hand abutment 44 on the cross head. This will cause the feed arm 47 to be depressed until the angular arm 46 thereof drops behind the article resting in the trough or support 81. The continued outward movement of the rock lever 51 will move the cross head and the crank and feed arm carried thereby, to the right, until the article in trough 81 is moved wholly within the head 20 and rests on the table 27 therein. This operation is effected during the period of rest of the head 20 and while the pin 26 occupies the section 32 of the cam groove. In order to ensure the downward movement of the feed arm 47, prior to the initiation of the sliding movement of the cross head 42, an amount of friction is imposed between the cross head and the lower guide rod 40 by adjusting stuffing boxes 48 so as to require more power to move the cross head than to swing the crank 45. When the rock lever 51 has been moved to its outer position and begins its return movement, the first effect of the latter is to swing the crank 45 to the left until the extension 43 engages the right-hand abutment 44 on the cross head, thereby elevating the feed arm, so that the lateral extension 46 thereof will clear any article carried by the trough or support 81, and at

the end of the reverse movement of the cross head, the lateral member 46 of the feed arm will lie above and to the rear of the next article to be fed into the head.

The machine is also preferably provided with automatic means for delivering the articles to the trough or support 81 in proper position to be fed by the feed arm onto the table 28 within the head 20. To effect this object, there is provided near the front of the machine an auxiliary frame 70, upon which is mounted a suitable conveyor, comprising a chain flight 82 running over a sprocket wheel 74 loosely mounted on the shaft 71, which latter is driven by a chain engaging a sprocket 72 on said shaft, said chain also being engaged with a sprocket wheel 36 on the cam shaft 33 of the main machine. The upper reach of the chain flight 82 operates in an open bottom trough 80, adapted to receive the articles to be sliced from any suitable source, and said chain is provided at intervals with dogs 83, which engage the articles and move the same along the trough and ultimately push the articles successively onto the trough or support 81 in position to be fed into the head, as hereinbefore described. It will be understood that the feed chain 82 must be operated in a properly timed relation to the operation of the feed arm 47, so that the articles will be delivered to the support or trough 81 in proper sequence and at the proper time intervals to be acted upon by said feed arm. A suitable means for timing the operation of the conveyor is illustrated in the drawings, and comprises a gear wheel 75 rigidly attached to the sprocket wheel 74, a gear 76 keyed to the shaft 71 upon which said gear 75 and the sprocket 74 are loosely mounted, the gear 75 being of somewhat less diameter than gear 76. The gears 75 and 76 mesh with two gears 77 and 78 respectively, rigidly connected together and mounted upon the countershaft 79, the diameter of the gear 77 being somewhat greater than that of 78. This arrangement of gearing ensures the driving of the sprocket 74 at a speed slightly greater than that of the shaft 71, the speed of which latter is directly proportional to that of the cam shaft 33 which operates the head 20, thereby causing the dogs 83 on the chain 82 to move at a proper rate in time with the strokes of the slicer and the feeding device.

Also mounted on the shaft 71 is a drum 95 which operates a belt conveyor 91, the two reaches of which pass below the knives 11, the lower reach being guided over a pulley 92, as shown in Fig. 2, to cause the said lower reach to clear the mechanism of the machine. The upper reach of the conveyor belt is adapted to receive the slices of the articles and to convey them to any suitable point of disposal.

In the figures of the drawings, the machine is shown in the position in which an article to be sliced has been delivered to the support 81, and is ready to be fed on to the table 27 of the head 20. The shaft 33 and gear 60 rotating in a clockwise direction cause pitman 53 to swing rock lever 51 to the right, as illustrated in Fig. 2, thereby causing pitman 50 to rock crank 45 until the extension 43 thereon engages the left hand abutment 44 on the cross head 42. This causes the feed arm 47 to move downward until the angular arm 46 thereof passes behind the article on support 81. The continued movement of the rock lever pulls the cross head 42 to the right, and with it the feed arm 47, which forces the article completely within the head 20 and onto the table 27 therein. When the shaft 33 has made a half-revolution, the rock arm 51 begins its return movement, the first effect of which is to swing crank 45 until the extension 43 engages the right-hand abutment 44, thereby again elevating the outer end 46 of the feed arm 47. The continued movement of the rock arm moves the cross head to the position shown in Fig. 2, and the feed arm is again in position to engage the next succeeding article, which has been fed onto the support 81 by the feed chain 82. At or about the time the rock arm begins its return movement, and when the article has been properly positioned within the head 20, the pin 26 on arm 25 of the head passes into the inclined section 31 of the cam 30 and the head is swung on its pivot 24 toward the left, as shown in Fig. 1, thereby causing the article carried by the head to be pressed against the knives and moved along the latter to effect a clean draw cut, the knives ultimately passing entirely through the article and the latter being cleared of the knives and dropped, in the form of slices of uniform width, on to the upper reach of the conveyor 91, whence the slices are delivered to the place desired. This slicing operation is effected during a quarter-revolution of the shaft 33 and cam 30, and during the succeeding quarter-revolution, the head is returned to its initial position by the reverse curved portion of the cam section 31, and the head is ready to receive another article to be sliced. During the next one-half revolution of the cam 30, the head 20 is held stationary, as hereinbefore explained, which affords ample time for the succeeding article to be fed onto the table 27 within the head.

As illustrated is the drawings, the machine is employed for slicing pineapples which have been previously cored, sized and trimmed, so that each fruit is in the form of a cylinder having a longitudinal perforation therethrough. It will be understood, however, that the machine is

adapted for slicing various other types of article that are more or less regular in shape, and capable of being delivered to the slicing machine in regular sequence.

What I claim is:

1. A slicing machine comprising a series of parallel spaced knives, a head having a hollow face and slots through which the knives extend longitudinally, means for feeding articles to be sliced endwise into and transversely of the head, and means for moving the head toward and from the knives to first receive and then to force the articles against the knives to slice said articles into multiple sections and clear the sections from the knives.

2. A slicing machine comprising a series of parallel spaced knives, an arc shaped head having slots therein through which the knives extend longitudinally, means for feeding articles to be sliced endwise into and transversely of the head, and means for moving the head toward and from the knives to first receive and then to force the articles against the knives to slice said articles into multiple sections and clear the sections from the knives.

3. A slicing machine comprising a series of parallel spaced knives, an arc shaped head pivoted below said knives and having slots therein through which said knives extend longitudinally, means for feeding articles to be sliced endwise into and transversely of the head, and means for moving the head toward and from the knives to first receive and then to force the articles against the knives to slice said articles into multiple sections and clear the sections from the knives.

4. A slicing machine comprising a series of parallel spaced knives, a head having an arc shaped face an article receiving seat thereon and longitudinal slots through which the knives extend, means for oscillating the head toward and from the knives to force the articles against the knives to slice said articles into multiple sections and clear the sections from the knives, and means for feeding articles endwise onto the seat in the head.

5. A slicing machine comprising a series of parallel spaced knives, a head having a hollow face and slots through which the knives extend longitudinally, means for feeding articles to be sliced endwise into and transversely of the head, means for oscillating the head relatively to the knives to first receive and then to force the articles against the knives to slice said articles into multiple sections and clear the sections from the knives, and a conveyor below the knives to receive the slices.

6. A slicing machine comprising a series of parallel spaced knives, an arc shaped head pivoted below said knives and having slots through which the knives extend longitudinally, a rotary cam engaging said head to oscillate the latter toward and from the knives, and hold said head stationary during the feeding operation, means for feeding articles into said head, and means for operating the cam and the feeding means in properly timed relation.

7. A slicing machine comprising a series of parallel spaced knives, an arc shaped head pivoted below said knives and having slots through which the knives extend longitudinally, a rotary cam engaging said head to oscillate the latter toward and from the knives and hold said head stationary during the feeding operation, means for feeding articles into said head, means for operating the cam and the feeding means in properly timed relation, and a conveyor below the knives to receive the slices.

8. A slicing machine comprising a series of parallel spaced knives disposed at an angle to the horizontal, an arc shaped head pivoted below said knives, said head having a series of slots therein embracing the knives and a transverse article receiving seat, a rotary cam engaging said head to oscillate the latter toward and from the knives, and hold said head stationary during the feeding operation, means for feeding articles into said head, and means for operating the cam and the feeding means in properly timed relation.

9. A slicing machine comprising a series of parallel spaced knives, an arc shaped head having an article receiving seat and a series of slots through which said knives extend longitudinally, a pivotal support for said head below the said knives, a rotary cam for oscillating said head transversely of the plane of said knives and maintaining said head stationary during part of the rotation of the cam, an article receiving support opposite the position of rest of the seat in the head, and means for feeding articles from said support to said seat including a horizontally reciprocating and vertically oscillating pusher arm and mechanism for effecting properly timed operation between the cam and the pusher arm.

10. A slicing machine comprising a series of parallel spaced knives, an arc shaped head having an article receiving seat and a series of slots through which said knives extend longitudinally, a pivotal support for said head below the said knives, a rotary cam for oscillating said head transversely of the plane of said knives and maintaining said head stationary during part of the rotation of the cam, an article receiving support opposite the position of rest of the seat in the head, a cross head slidably mounted at one side of the machine, an angular pusher arm pivoted to said cross head and overlying said support, a crank arm fixed to the pivot of

said pusher arm, stops on the cross head to limit the movement of the crank arm in either direction, and means for first rocking the crank arm and pusher arm and then sliding the cross head.

11. A slicing machine comprising a series of parallel spaced knives, an arc shaped head pivoted below the knives and having slots through which the knives extend longitudinally, means for moving said head back and forth transversely of the plane of the knives and holding the head stationary during the feeding period, and means for feeding articles into the head above the knives.

12. A slicing machine comprising a series of parallel spaced knives, an arc shaped head pivoted below the knives and having slots through which the knives extend longitudinally, means for moving said head back and forth transversely of the plane of the knives and holding the head stationary during the feeding period, a support adjacent the feeding position of the head, and means co-operating with said support for moving articles from the support into the head.

13. A slicing machine comprising a series of parallel spaced knives, an arc shaped head pivoted below the knives and having slots continuously engaged by the knives, means for feeding articles to be sliced between the inner face of the head and the knives, and means for oscillating the head transversely of the plane of the knives.

14. A slicing machine comprising a series of parallel spaced knives, an arc shaped head pivoted below the knives and having slots continuously engaged by the knives, means for feeding articles to be sliced between the inner face of the head and the knives, means for oscillating the head transversely of the plane of the knives, and means below the knives for receiving and conveying the sliced articles.

15. A slicing machine comprising a series of parallel spaced knives, a pivoted arc shaped head having a seat normally above the plane of the knives, said head having a series of slots continuously engaged by the knives, means for feeding articles to the seat, and means for oscillating said head transversely of the plane of the knives.

In testimony whereof I affix my signature.

SIMES T. HOYT.