

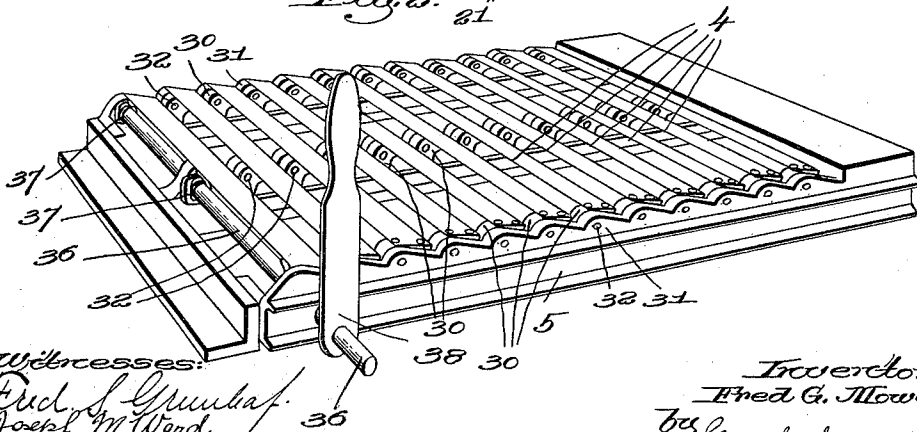
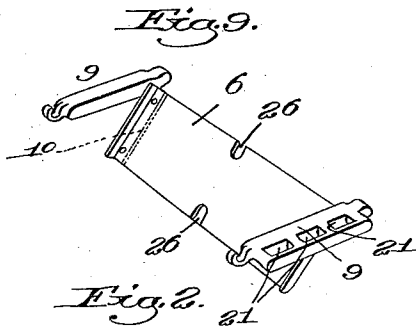
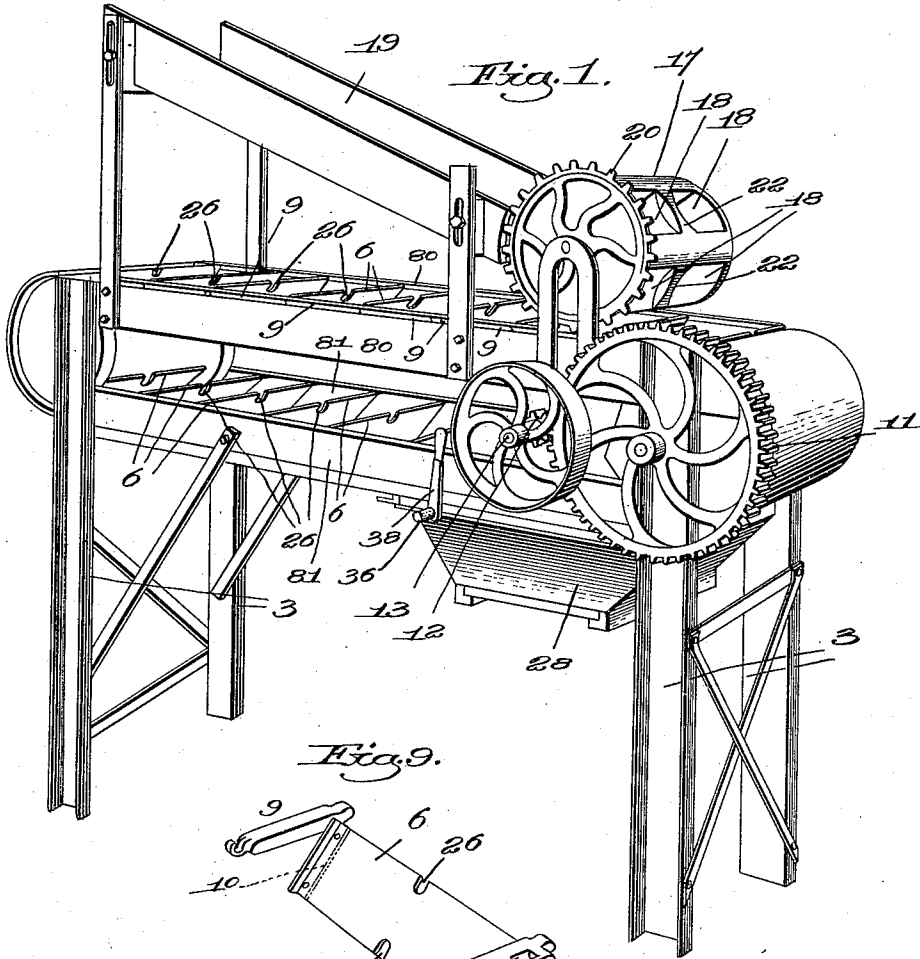
F. G. MOWER.
FRUIT SLICER.

APPLICATION FILED DEC. 23, 1907.

1,044,070.

Patented Nov. 12, 1912.

2 SHEETS-SHEET 1.



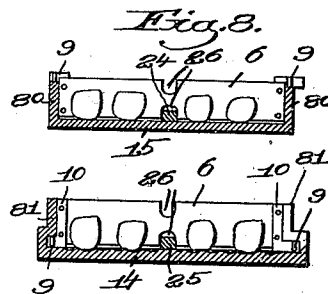
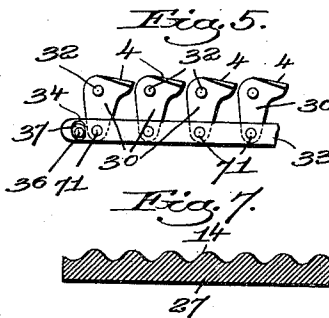
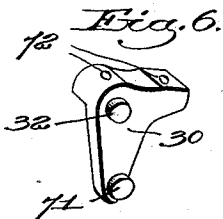
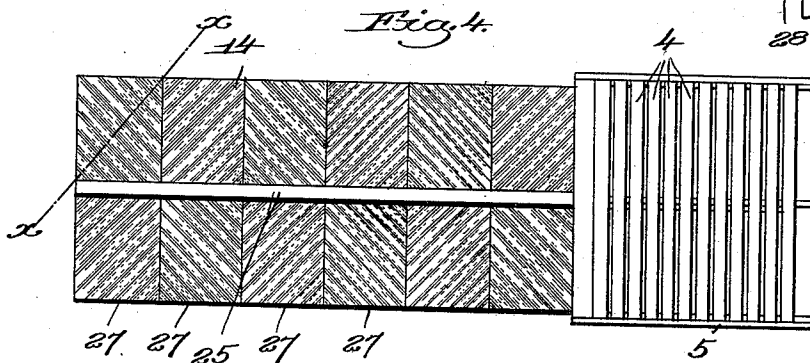
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APPLICATION FILED DEC. 23, 1907.

Patented Nov. 12, 1912.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

FRED G. MOWER, OF ANTRIM, NEW HAMPSHIRE, ASSIGNOR TO GOODELL COMPANY, OF ANTRIM, NEW HAMPSHIRE, A CORPORATION OF NEW HAMPSHIRE.

FRUIT-SLICER.

1,044,070.

Specification of Letters Patent.

Patented Nov. 12, 1912.

Application filed December 23, 1907. Serial No. 407,636.

To all whom it may concern:

Be it known that I, FRED G. MOWER, a citizen of the United States, and resident of Antrim, county of Hillsboro, State of New Hampshire, have invented an Improvement in Fruit-Slicers, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

10 This invention relates to machines for slicing fruit, and especially to machines for slicing apples, although certain features of the invention can be used in machines for slicing other kinds of fruit than apples.

15 Most apple-slicing machines now on the market are so arranged that one apple at a time is fed across the slicing knives by the pushers or sweeps. Such machines can slice the apples only as fast as the individual apples can be handled.

20 One of the objects of my invention is to increase materially the capacity of apple-slicing machines by providing a mechanism which feeds a plurality of apples simultaneously to the sweeps and which feeds a plurality of apples simultaneously over the slicing knives. The machine herein illustrated is arranged to take four apples at a time and feed said four apples simultaneously over the slicing knives by means of a single sweep, and said machine thus has substantially four times the capacity of slicing machines as ordinarily made. My invention, however, is not limited to making

30 the machine of such a capacity that each sweep will operate four apples simultaneously, as the number of apples controlled by each sweep does not materially affect the invention.

40 My invention also includes a novel construction whereby the four apples controlled by any sweep are separated and maintained in their proper positions during their travel to and over the slicing knives, and it also includes a novel construction by which the apples are positioned on their ends during their travel to the slicing knives, so that when the apples are sliced, the slices are cut perpendicular to the length

50 of the core.

I have also provided a construction whereby the pitch of the slicing knives and

consequently the thickness of the slices into which the apples are cut can be varied.

Other features of my invention will be more fully hereinafter described and then pointed out in the appended claims.

In the drawings wherein I have illustrated one embodiment of my invention, Figure 1 is a perspective view of a machine made in accordance with my invention; Fig. 2 is a perspective view of the slicing knives and the frame on which they are supported detached from the other elements of the machine; Fig. 3 is a vertical central longitudinal section through the machine; Fig. 4 is a top plan view of the apple-positioning device and slicing knife with the sweeps or pushers removed; Fig. 5 is a detail view of the slicing knives showing the manner of changing their angular position; Fig. 6 is a perspective view of one of the rockers on which the slicing knives are supported; Fig. 7 is a section on the line $x-x$, Fig. 4; Fig. 8 is a section on the line $y-y$, Fig. 3; Fig. 9 is a detail view of one of the pushers or sweeps.

In the present embodiment of my invention the slicing knives and the pushers or sweeps for feeding the apples thereover are supported on a suitable frame 3 which may have any appropriate construction adapted to support these parts.

The slicing knives are designated by 4 and they are supported by a suitable frame 5 which in turn is suitably secured to the frame 3. These slicing knives are of the undercut variety and the apples are arranged to be forced over said knives by suitable sweeps or pushers 6. Said sweeps are connected together by an endless chain arrangement which passes around two drums 7 and 8 situated at each end of the frame 3. The links of the endless chain arrangement are of the shape shown in Fig. 9. Each link comprises the base piece 9 and the inclined arm 10 to which the sweep 6 is secured in any suitable way. The base pieces 9 are pivotally connected together so as to form an endless chain and there is such an endless chain made up of such links at each side of the machine, each endless chain running over the two drums 7 and 8. The sweeps 6 connect the inclined arms of one endless

chain to those of the other. The drums 7 and 8 may be rotated in any suitable way to give the sweeps the necessary motion to feed the apples across the slicing knives, and as
 5 herein shown, the drum 7 has fast to the shaft thereof a gear 11 which meshes with and is driven by a pinion 12 on a driving shaft 13, said driving shaft having thereon
 10 a handle or a belt pulley 14 by means of which it may be operated. These sweeps or pushers 6 pass above the slicing knives 4, as best seen in Fig. 3, and situated in front of the slicing knives is an apple-positioning
 15 floor 14 which has a particular construction which will be more fully hereinafter described. Said floor and slicing knives are situated underneath the lower run of the endless chain arrangement. Underneath the
 20 upper run thereof is arranged a floor or platform 15 which forms with the pushers 6 apple-receiving compartments 16 into which apples are deposited by means of an apple-delivery drum 17. This floor 15 is preferably provided with the curved extension 84
 25 which encircles the shaft 85 of the drum 8 and terminates immediately above the lower run of the endless chain arrangement. The drum 8 is inclosed in a casing 83, and said casing and the curved extension 84 serve to
 30 prevent the apples from rolling out from the compartments formed between the sweeps as said sweeps are passing around the drum 8. The floor 15 is also preferably provided with side walls 80 and the positioning floor
 35 14 with other side walls 81 which prevent the apples from rolling laterally out from the compartments.

The apples which are delivered to the compartments 16 are carried along by the
 40 sweeps as the latter move in the direction of the arrows Fig. 3 until said apples are carried around the drum 8 and on to the apple-positioning floor 14 where they are positioned on end, as will be presently described, and
 45 from which they are fed to the slicing knives by the sweeps. The apple-delivering drum 17 is provided with a plurality of apple-receiving pockets 18 and it rotates adjacent to a hopper or chute 19 into which apples
 50 may be fed from any suitable source. The apple-delivering drum is rotated in the direction of the arrow shown in Fig. 3, and as it rotates, apples from the chute 19 gravitate into the pockets 18, and said apples are
 55 delivered from the pockets into the compartments 16, as plainly seen in Fig. 3. The drum 17 is rotated in timed relation with the movement of the sweeps so that as each compartment 16 comes into proper position
 60 relative to the drum, the apple or apples in one of the pockets 18 are delivered into said compartment 16. For thus rotating the drum 17, the latter is provided with a gear 20 which meshes with and is driven by one
 65 of the chains to which one end of each sweep

is connected. For this purpose the portions 9 of said chain are in the form of a rack which meshes with the teeth of the gear 20, as seen in Figs. 3 and 9. This rack may be formed by making the portions 9 of the
 70 chain with recesses 21 to fit the teeth of the gear 20.

As stated above, one of the features of my invention is to provide a slicing machine which is to take a plurality of apples at a
 75 time and pass them simultaneously across the slicing knives, thus increasing materially the capacity of the machine. In the embodiment of the invention shown in the drawings the length of the sweeps and of the
 80 compartments between said sweeps is long enough to accommodate four large apples and each apple-receiving pocket in the drum 17 is also long enough to receive four large apples side by side. As the machine operates, therefore, each pocket 18 receives the
 85 required number of apples to fill said pocket and utilize the full capacity of the knives. These apples are delivered simultaneously into a compartment 16 in front of one of the sweeps and are carried by said sweep around
 90 over the positioning floor 14 where they are positioned on end and are then carried simultaneously across the slicing knives, and are simultaneously sliced. The result is that
 95 with my improved machine, four apples are being treated simultaneously and thus the capacity of the machine is increased to four times that of an ordinary slicing machine. In order that the four apples received in
 100 each pocket 18 and in each compartment 16 will not pile on top of each other and thus interfere with the operation of the machine, I have provided a construction for maintaining these apples separated and in proper position
 105 relative to each other while in the pocket and while in the compartment.

The pockets 18 are each shown as provided with the central partition 22 which divides the pocket into two smaller compartments, each of which is adapted to receive two apples. There is almost no likelihood of two apples piling up on each other and interfering with the operation of the machine, while three or four apples delivered into the same compartment may do so. By thus dividing said pocket 18 into
 110 small compartments each adapted to receive two apples, the four apples in each pocket are separated into pairs. This separation of the apples is preserved while they are in the compartments 16 and while they are being carried over the positioning floor and the slicing knives. For this purpose the platform 15 is provided with a separating
 115 rib 24, see Fig. 8, which maintains the apples separated into pairs while they are being carried over said platform, and similarly the positioning floor 14 is provided with the central rib or partition 25, see Fig. 9, which
 120
 125
 130

maintains the separation of the apples into pairs as they are passing over the positioning floor. Each sweep is provided at each edge with a recess or notch 26 in which the separating partitions 24 and 25 are received.

Apples are universally cored and pared before they are sliced and in slicing them, it is desirable that they should be so positioned that the slices will be cut at right angles to the aperture formed by the removal of the core. The pared and cored apples are usually flat at their ends, that is, at the ends of the core opening, and my improved positioning floor is arranged so that as the apples are passed thereover by the operation of the sweeps they are positioned on their flat ends with the result that when they pass over the slicing knives, the slices are cut at right angles to the aperture formed by the removal of the core and are in the form of rings. The proper positioning of the apples to secure this result is attained by the coöperation of the sweeps and the positioning floor 14. These elements are so arranged that as the apples are moved over the positioning floor each apple will be turned about both a horizontal and a vertical axis, and by this peculiar motion, it will invariably be brought onto its flattened end before the slicing knives are reached. It will be noted that the sweeps are arranged at an inclination to the floor, and by reason of this position, they have engagement with the apples slightly above the horizontal axis. The positioning floor is also arranged so that it will tend to give the apple a turning movement about a vertical axis, and this is secured by making the floor with grooves which extend in a direction at an angle to the direction of movement of the sweeps. The grooves are comparatively near together so that when the apple finally comes onto its flattened end the flattened portion of the apple will span two or more grooves. These grooves may have various shapes without departing from the invention, and I have herein shown them as being rounded in cross section and the ribs between the grooves are also shown as rounded. This makes a corrugated floor which secures the desired end. As the apples pass over the floor, the inclined or diagonal direction of the grooves and ribs cause the apple to tend to turn about an axis perpendicular to the floor, while the action of the sweeps tends to cause the apple to turn about a horizontal axis parallel to the sweep. The combined operations of the sweep and the positioning floor roll the apples in such a way that each apple invariably comes into position with its flattened end resting on the floor, and when this occurs the apple will maintain such position because the flat surface thereof extends from one rib to another. I have found that best results can be secured by

giving the grooves or corrugations a zig-zag shape, as shown in Fig. 4, that is, by making each groove or corrugation inclined in first one direction and then in the other because with this construction the apples will be rolled first in one direction and then in another, depending on the direction of the grooves or corrugations. I find it convenient to provide these zig-zag corrugations in the floor by making the floor from a plurality of separate blocks 27 which are suitably supported in the frame 3. Each block has its upper surface corrugated and the corrugations of adjacent blocks extend in opposite directions, as plainly seen in Fig. 4, thus giving corrugations of the zig-zag shape. As the apples are passed over the slicing knives, the slices into which said apples are cut fall into and are collected in a suitable hopper 28 situated beneath the slicing knives. The thickness to which the slices are cut depends upon the angular position of the slicing knives. It is customary to firmly fix the slicing knives in the desired angular position, in which case the slices can be cut of only one thickness.

I have provided a slicing device which is adapted for cutting slices of any desired thickness and this is provided for in my present invention by arranging the slicing knives so that the angular position thereof can be readily adjusted, and in securing such adjustment I have provided a construction wherein the adjustment may be effected without moving the cutting edges of the blades out of the plane in which they operate. As herein shown, each slicing knife is supported on a plurality of rockers 30 which are pivotally mounted on the frame 5. Fig. 6 shows one convenient form of rocker, and it is provided with the top surface 72 to which the knife may be screwed, and it is also provided with a trunnion 32 by which it may be pivotally mounted in the sides 31 of the frame. I have herein shown three such rockers for each knife, one rocker being situated at each end of the knife and the other rocker at the central portion of the knife. All of the rockers on each side of the frame and also all of the rockers situated centrally of the frame are pivotally connected together, and this may conveniently be done by providing each rocker with a trunnion 71 which has pivotal connection with a bar or link 33, there being one such bar for each series of rockers. Each bar 33 is shown as having a slot 34 in the end thereof in which slot is received a cam 37 mounted on a rock-shaft 36 that extends across the frame 5 and is journaled therein. This rock-shaft has the handle 38 thereon by which it may be turned. The turning of the rock-shaft and the consequent turning of the cams in the slots will obviously move the links 33 backward or forward, and such mo-

tion will give sufficient rocking movement to the rockers to change the angular position of the knives, as will be obvious. It will be noted that the cutting edge of each blade is situated over the axis of the rocker supporting said blade. With this construction the swinging of the rockers does not carry the cutting edges of the blades up and down or out of the plane in which they operate, for the changing of the angular position is secured by raising and lowering the back edges of the blades rather than the cutting edges thereof. The slots 34 and cams 37 operate to hold the knives firmly in any adjusted position, but the angular position of said knives can be readily changed by simply turning the lever 38 slightly. This provides a very simple means for controlling the thickness of the slices.

In order to prevent the apples from becoming clogged in the chute 19, I have provided said chute with a false bottom 39 which is adapted to be moved longitudinally of the chute. Said false bottom is provided at its lower end with a roll 40 which rests on the drum 17 centrally thereof and which moves against the edge of the partitions 22 as the drum rotates. These partitions preferably have flat ends so that as the drum rotates the false bottom 39 is vibrated slightly, such vibration being sufficient to prevent the apples from becoming clogged.

In order to prevent the apples from being discharged from the pockets 18 before the drum 17 is turned into a proper position to deliver the apples to the compartments 16, I propose to form the pockets 18 with parallel sides, as shown. By means of this construction the apples in any pocket will be held therein until said pocket is turned below the horizontal position and there will then be no danger of the apples being discharged from the pockets before the compartments 16 are suitably positioned.

I have not attempted to illustrate and describe all embodiments of my invention, but have merely selected the preferred embodiment as illustrative of the principle of the invention.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a fruit-slicing machine, the combination with a plurality of sweeps and an endless-chain arrangement connecting said sweeps, of means to deliver apples to the compartments between the sweeps at the upper run of said endless-chain arrangement, means to retain the apples in said compartment while passing into the under run, means to position the apples on their flat ends while moving through the under run, and means to slice the apples also while passing along the under run.

2. In a fruit-slicing machine, the com-

bination with a plurality of sweeps and an endless chain arrangement connecting said sweeps, of a plurality of undercut slicing knives situated in substantially the same horizontal plane beneath the lower run of said endless chain arrangement, and an apple-delivery device to deliver apples to the compartments between the sweeps at the upper run of said endless chain arrangement at stated intervals.

3. In a fruit-slicing machine, the combination with a plurality of sweeps and an endless chain arrangement connecting said sweeps, of a plurality of undercut slicing knives situated beneath the lower run of said endless chain arrangement, a floor or platform situated beneath the upper run of said endless chain arrangement, means to deliver apples to the compartments between the sweeps at the upper run of said endless chain arrangement, and means to maintain the apples in said compartments while passing to the lower run of said endless chain arrangement.

4. In a fruit-slicing machine, the combination with a plurality of sweeps and an endless chain arrangement connecting said sweeps, of a plurality of undercut slicing knives situated beneath the lower run of said endless chain arrangement, and means to deliver apples to the compartments between the sweeps at the upper run of said endless chain arrangement.

5. In a fruit-slicing machine, the combination with slicing knives, of an endless-chain arrangement, means to sustain the same so that the lower run thereof passes over said knives, sweeps carried by said endless-chain arrangement, the sweeps on the lower run being directed upwardly and those on the upper run being directed downwardly, means to deliver apples to the compartments between the sweeps on the upper run of the endless-chain arrangement, and means to retain the apples in the compartments while passing from the upper to the lower run.

6. In a fruit-slicing machine, the combination with a plurality of sweeps and an endless chain arrangement connecting said sweeps, of a plurality of slicing knives situated beneath the under run of said endless chain arrangement, an apple-delivery device to deliver a plurality of apples to each compartment between each two adjacent sweeps, and means to maintain the apples in each compartment separated in small groups.

7. In a fruit-slicing machine, the combination with a plurality of sweeps forming compartments between them and an endless chain arrangement connecting said sweeps, of slicing knives beneath the lower run of said endless chain arrangement, means to deliver a plurality of apples to each com-

partment at the upper run of said endless chain arrangement, means to retain the apples in said compartment while passing from the upper to the lower run and means to maintain the apples in each compartment separated in pairs.

8. In a fruit-slicing machine, the combination with a plurality of sweeps forming compartments between them and an endless chain arrangement connecting said sweeps, of slicing knives beneath the lower run of said endless chain arrangement, means to deliver a plurality of apples side by side to each compartment in the upper run of said endless chain arrangement and means to retain the apples in said compartments while passing from the upper to the lower run.

9. In a fruit-slicing machine, the combination with a plurality of sweeps forming compartments between them, each of which is of a size to receive a plurality of apples, and an endless chain arrangement connecting said sweeps, of slicing knives beneath the lower run of said endless chain arrangement, an apple-delivering drum to deliver apples to the compartments in the upper run of said endless chain arrangement, said drum having apple-receiving pockets of a size to receive a plurality of apples, means to operate said drum in timed relation with the endless chain arrangement and means to retain the apples in the compartments while passing from the upper to the lower run.

10. In a fruit-slicing machine, the combination with a plurality of sweeps forming compartments between them, each of which is of a size to receive a plurality of apples side by side, and an endless chain arrangement connecting said sweeps, of slicing knives beneath the lower run of said endless chain arrangement, an apple-delivering drum to deliver apples to the compartments in the upper run of said endless chain arrangement, said drum having apple-receiving pockets of a size to receive a plurality of apples side by side, means to operate said drum in timed relation with the endless chain arrangement, each pocket being divided into compartments and means to retain the apples in the compartments while passing from the upper to the lower run.

11. In a fruit-slicing machine, the combination with a plurality of sweeps forming compartments between them, each of which is of a size to receive a plurality of apples side by side, and an endless chain arrangement connecting said sweeps, of slicing knives beneath the lower run of said endless chain arrangement, an apple-delivering drum to deliver apples to the compartments in the upper run of said endless chain arrangement, said drum having apple-receiving pockets of a size to receive a similar number of apples side by side, means to op-

erate said drum in timed relation with the endless chain arrangement, each pocket being divided into compartments, whereby the apples in the pockets are separated, means to maintain such separation while the apples are in the compartments between the sweeps and means to retain the apples in the compartments while passing from the upper to the lower runs.

12. In a fruit-slicing machine, the combination with slicing knives, of connected sweeps to feed apples across said knives, an apple-delivering drum to deliver apples to the compartments between the sweeps, said drum being provided with pockets each having parallel opposed sides, and means to rotate said drum in timed relation to the movement of the sweeps.

13. In a fruit-slicing machine, the combination with slicing mechanism, of an apple-delivering drum to deliver apples to the slicing mechanism, a chute leading to said drum and provided with a false bottom reciprocable in the direction of its length, and means to reciprocate said false bottom by the rotation of the drum.

14. In a fruit-slicing machine, the combination with slicing mechanism, of an apple-delivery drum to deliver apples thereto and provided with a non-circular portion, a chute leading to the drum and provided with a false bottom movable in the direction of its length, said false bottom engaging the non-circular portion of the drum whereby rotation of the drum will vibrate said bottom.

15. In a fruit-slicing machine, the combination with slicing knives and means to feed apples thereover, of means to pivotally sustain each knife to turn about an axis situated in a plane extending through the cutting edge of the knife substantially perpendicular to the direction of movement of the apples in passing thereover, and means to raise or lower the rear edge of the knife whereby the angular position thereof may be changed without changing the horizontal plane which the cutting edge occupies.

16. In a fruit-slicing machine, the combination with slicing knives, of pivoted rockers for sustaining each knife, the cutting edge of each knife being situated in the vertical plane of the axis of the rockers therefor, and means to turn said rockers thereby to change the angular position of the knives.

17. In a fruit-slicing machine, the combination with sweeps and an endless chain arrangement connecting said sweeps, of means to deliver apples to the compartments between the sweeps at the upper run of said endless-chain arrangement, means to maintain the apples in the compartments while passing into the lower run of said endless-chain arrangement, a plurality of slicing

knives beneath said lower run, and means to vary the angular position of the knives without changing the horizontal plane in which the cutting edges thereof are situated.

18. In a fruit-slicing machine, the combination with slicing knives, of sweeps which incline forwardly and upwardly, means for feeding said sweeps across said knives, and a positioning floor situated in front of said knives and provided with a grooved surface, the grooves of which extend in a direction having an angle to the direction of movement of the sweeps.

19. In a fruit-slicing machine, the combination with slicing knives, of inclined sweeps for feeding the apples to said knives, and a positioning floor in front of said knives over which said sweeps move, said floor being made of a plurality of blocks having grooved or corrugated surfaces, the grooves or corrugations in one block diagonally opposed to those in the adjacent block.

20. In a fruit-slicing machine, the combination with a plurality of sweeps, of an endless chain arrangement connecting said sweeps, slicing knives situated beneath the under run of said endless chain arrangement, a positioning floor also beneath said under run and in front of the slicing knives, and means to deliver apples to the compartments between said sweeps at the upper run of said endless chain arrangement.

21. In a machine of the class described, the combination with inclined sweeps for feeding apples forward, of a positioning floor having grooves therein extending at an angle to the direction of movement of the sweeps.

22. In a fruit-slicing machine, the combination with a floor and means for feeding apples thereover, of means to cause each apple to have a turning movement about an axis perpendicular to the floor while the apple is being fed thereover.

23. In a fruit-slicing machine, the combination with a floor and means for feeding apples thereover, of means to cause each apple to have a turning movement about both an axis at right angles to the floor and parallel thereto during the forward feeding movement thereof.

24. In a fruit-slicing machine, the combination with slicing mechanism comprising movable compartments into which apples

are delivered for slicing, of an apple-delivering drum to deliver apples to said compartments, said drum being provided with a plurality of pockets, each having parallel opposed sides, and means to rotate the drum in timed relation with the movement of the compartments.

25. In a fruit-slicing machine, the combination with a plurality of connected sweeps forming compartments between them, each of a size to contain a plurality of apples side by side, of slicing knives over which said sweeps pass, and means to deliver a plurality of apples side by side and simultaneously to each compartment.

26. In a fruit-slicing machine, the combination with a plurality of connected sweeps forming compartments between them, each of a size and shape to receive a plurality of apples side by side in a row, of slicing knives over which said sweeps pass, a drum having pockets of a size and shape to receive a plurality of apples side by side in a row, and means to rotate said drum in timed relation to the sweeps thereby to deposit a plurality of apples in a row to each compartment.

27. In a fruit-slicing machine, the combination with a plurality of sweeps and an endless chain arrangement connecting said sweeps, of a plurality of undercut slicing knives situated in substantially the same horizontal plane beneath one run of said endless chain, and an apple-delivery device to deliver apples to the compartments between the sweeps at the upper run of said endless chain arrangement at stated intervals.

28. In a machine of the class described, the combination with a plurality of sweeps for feeding apples and means to move said sweeps, of a positioning floor over which the sweeps move, said floor having means which tends to cause the apple to move in a horizontal direction at an angle to the direction of movement of the sweeps.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

FRED G. MOWER.

Witnesses:

F. JENNIE SANBORN,
CHAS. W. PRENTISS.