W. M. LUTHER.

CUBING MACHINE.

APPLICATION FILED JULY 17, 1918.

1,297,373.

Patented Mar. 18, 1919.

5 SHEETS—SHEET 1.

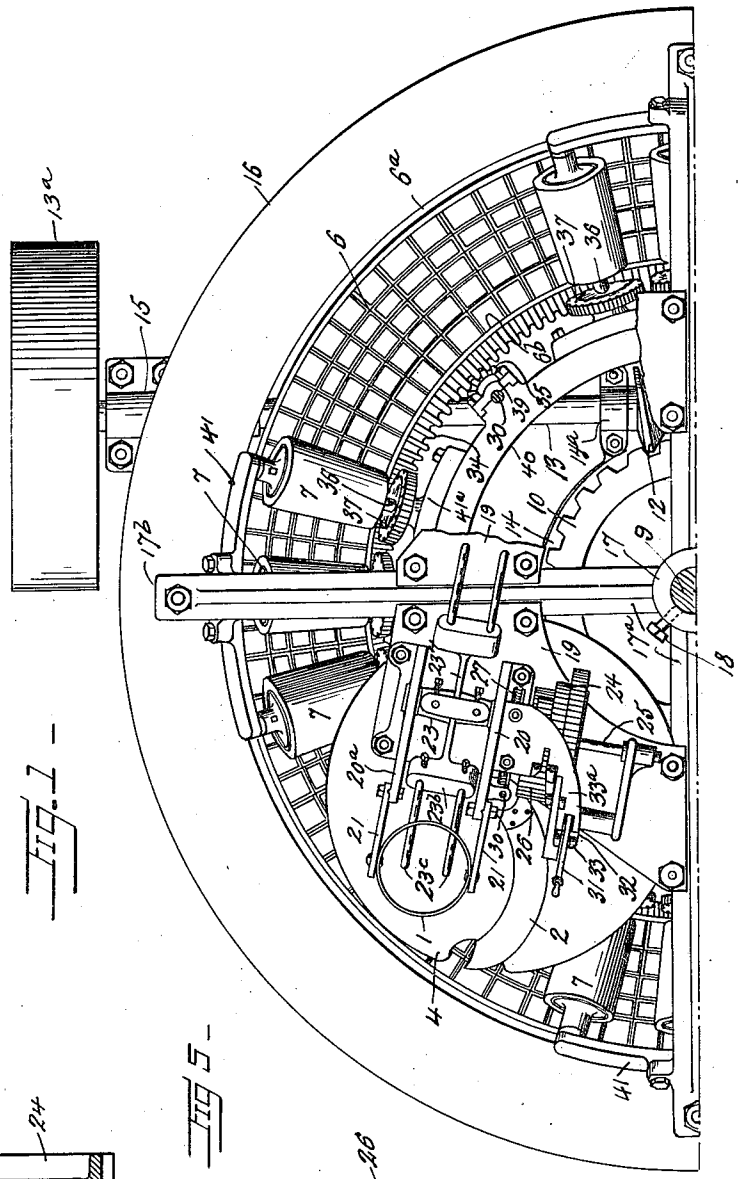


Fig. 1.

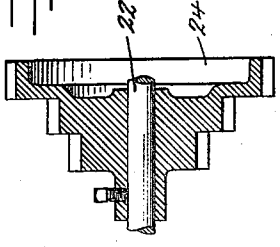


Fig. 4.

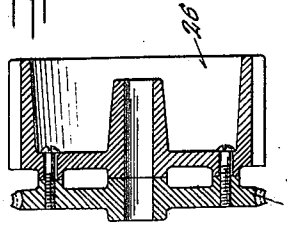


Fig. 5.

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Fig. 3.

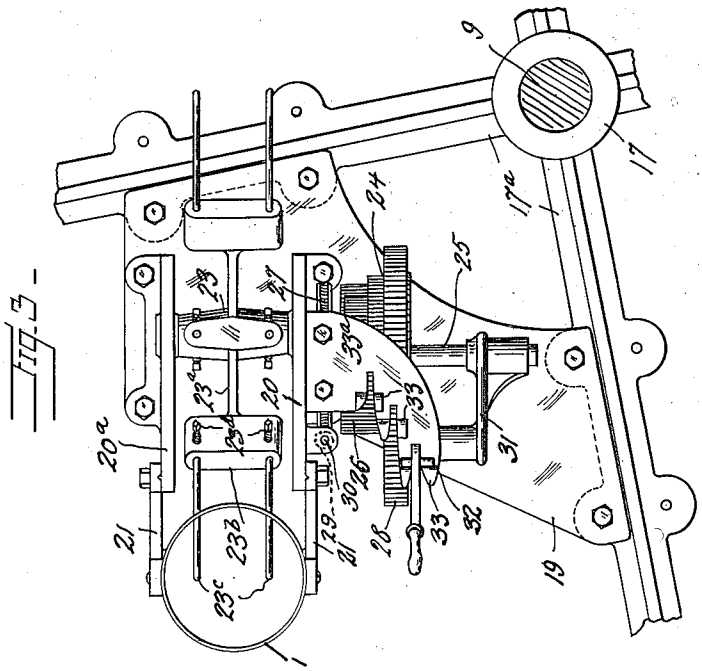
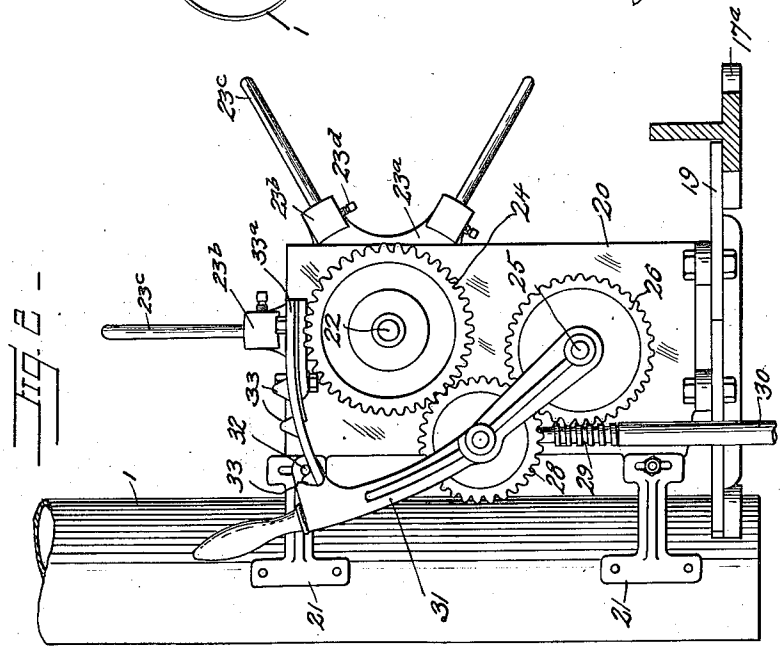


Fig. 2.



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5 SHEETS—SHEET 3.

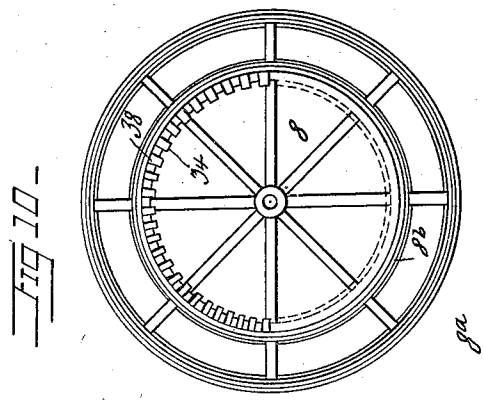


Fig 10.

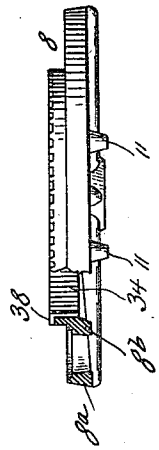


Fig 11.

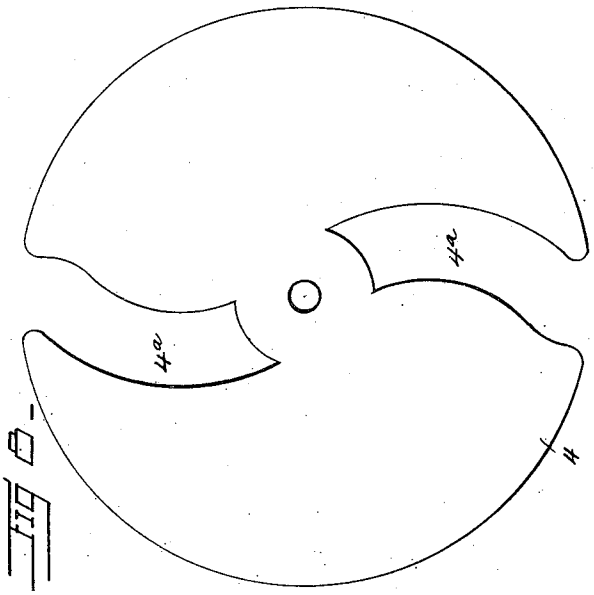


Fig 8.

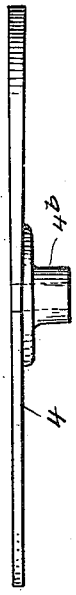


Fig 9.

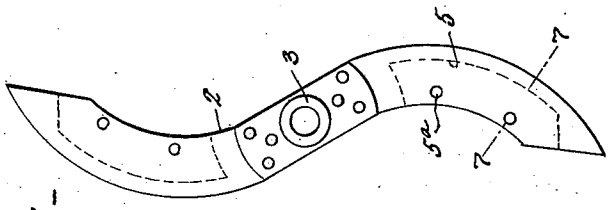


Fig 6.

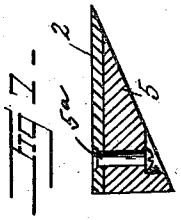


Fig 7.

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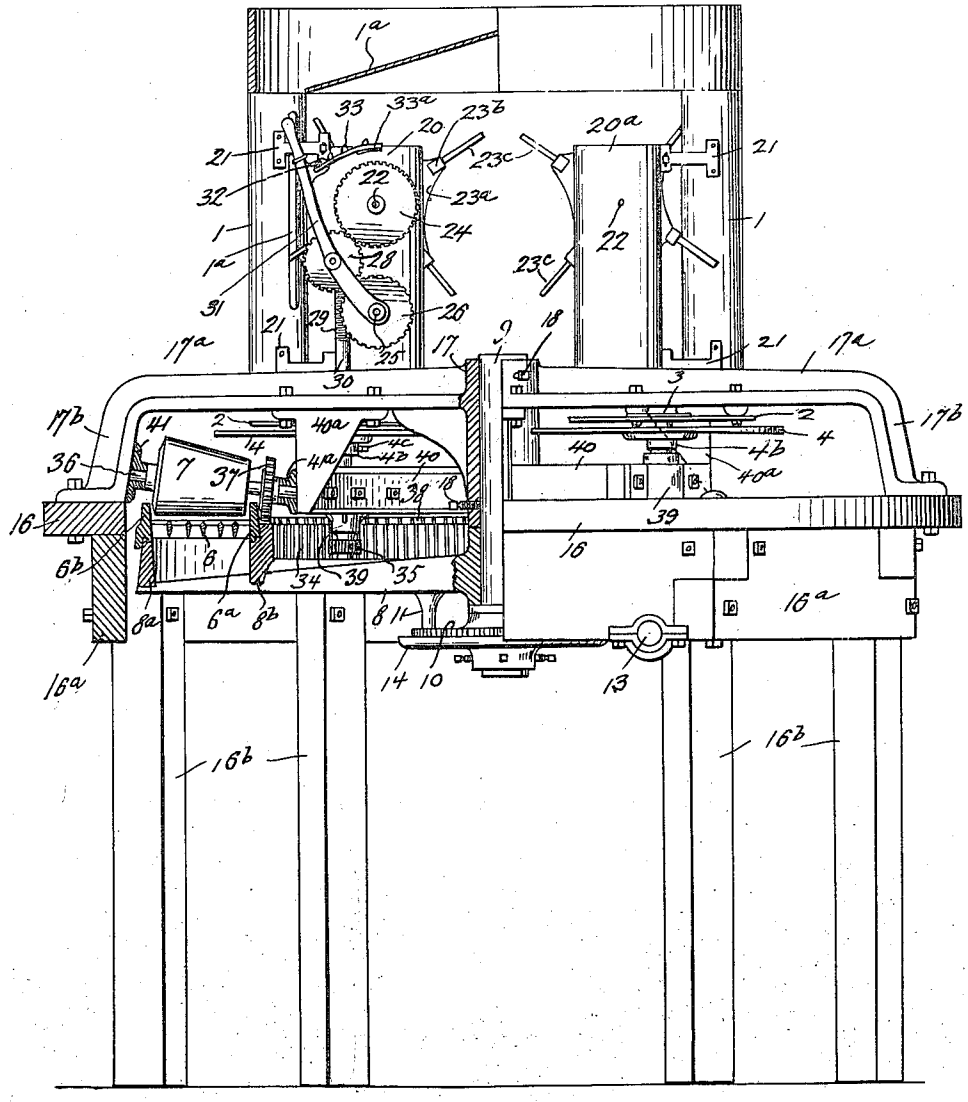
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5 SHEETS—SHEET 4.

Fig 12.



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5 SHEETS—SHEET 5.

FIG 13.

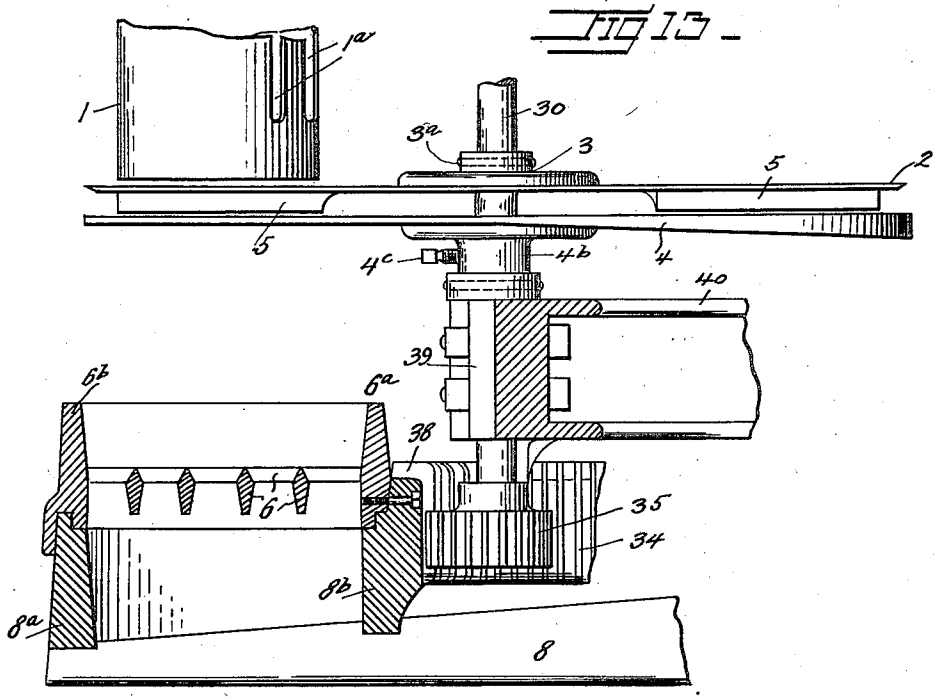


FIG 17.

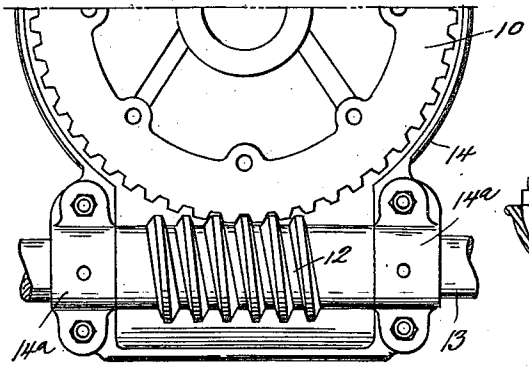
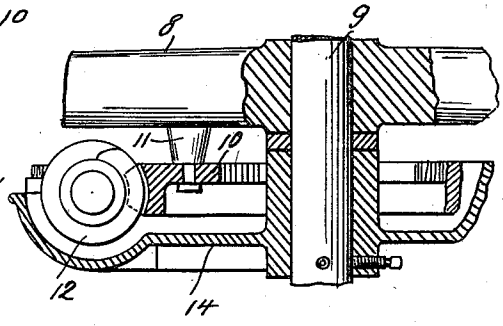


FIG 15.



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UNITED STATES PATENT OFFICE.

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CUBING-MACHINE.

1,297,373. Specification of Letters Patent. Patented Mar. 18, 1919.

Application filed July 17, 1918. Serial No. 245,289.

To all whom it may concern:

Be it known that I, WILLIAM M. LUTHER, a citizen of the United States, residing at Walla Walla, in the county of Walla Walla and State of Washington, have invented certain new and useful Improvements in Cubing-Machines, of which the following is a specification.

This invention relates to apparatus for cutting fruits, vegetables and other products or material, and more particularly an apparatus which fashions the material into pieces or particles of uniform size and shape, the stuff being first sliced and then shaped.

The apparatus illustrated is designed to fashion the material into cubes, but other shapes may be produced by giving the fashioning element corresponding shapes. It will also be understood that, while the preferred embodiment of the invention has been shown, various changes and modifications in the structural details may be resorted to without a departure from the spirit and scope of the invention as claimed hereinafter.

It is the object of the invention to provide an apparatus of the kind stated which is highly efficient in operation, compact in form, and capable of rapidly handling a large amount of material, and to this end, it consists in a novel combination and arrangement of parts to be hereinafter described and claimed.

In order that the invention may be better understood, reference is had to the accompanying drawings, forming a part of this specification, and in said drawings,

Figure 1 is a plan view of one half of the machine, with parts broken away;

Fig. 2 is an elevation of a feeder mechanism;

Fig. 3 is a plan view of the feeder mechanism;

Figs. 4 and 5 are cross sections of certain gears;

Fig. 6 is a plan view of a slicer knife;

Fig. 7 is an enlarged cross section on the line 7—7 of Fig. 6;

Fig. 8 is a plan view of a plate associated with the slicer knife;

Fig. 9 is an edge view of said plate;

Fig. 10 is a plan view of a cuber wheel;

Fig. 11 is an elevation of said wheel, partly in section;

Fig. 12 is an elevation of the machine, partly in section;

Fig. 13 is an enlarged elevation of the slicer mechanism;

Fig. 14 is a plan view of certain drive gears, and

Fig. 15 is a sectional detail of said gears.

Referring specifically to the drawings 1 denotes a feed tube through which the fruit or vegetables are fed to the machine. Associated with this tube is a feeder for forcing the stuff through the same to the cutting mechanism. The feeder will be presently described in detail.

The cutting mechanism comprises a rotary, sigmoidal curved blade 2 provided with a hub 3 by which it is made fast to a shaft, to be presently described. This blade is positioned above and in suitably spaced relation to a plate 4 which is circular and has diametrically opposite recesses 4^a extending inwardly from its periphery, and located directly beneath the blade 2, through which recesses the sliced stuff drops. Each wing of the cutting or slicing blade 2 carries a deflector 5, the same being on the under side of the blade so as to guide the stuff through the recesses 4^a. Each deflector is composed of a block of suitable length and of a width to extend from the back of the blade 2 to within a short distance of the cutting edge thereof, the block being beveled on top to come flush with the beveled cutting edge of the blade. Rivets or other suitable fasteners 5^a secure the deflector blocks to the blade.

Beneath the plate 4 is a cuber through which the stuff is forced and thus cut into cubes, and after passing through the cuber, the stuff drops on a conveyer or into a box as desired (not shown), for disposal.

The cuber consists of an annular grille forming a series of crossed knives, the bars 6 of the grille being sharp at the top to cut the stuff. Above the grille are located rollers 7 which force the stuff through the grille. The grille bars are carried by spaced and concentric inner and outer rings 6^a and 6^b, respectively, below the top of which latter they are positioned so that a trough is formed, the bottom of which is the grille bars, to prevent the stuff from escaping over the rings. The rollers 7 extend into this trough and work close to the grille bars to force the stuff down through the spaces between the same. The grille is rotatable, and the forcing rollers 7 are stationary with respect to the same.

At 8 is shown a rotatable carrier for the grille, the same being a wheel which is horizontally positioned. This wheel has two spaced, concentric rims 8[a] and 8[b], respectively, on which the grille rings 6[a] and 6[b] seat and are secured. The wheel 8 is loosely mounted on a stationary vertical shaft 9, and it is made fast to a worm wheel 10. The spokes of the wheel 8 have depending lugs 11 for attachment to the worm wheel, the latter being in the form of an annulus. A worm 12 is in mesh with the worm wheel 10, this worm being on a shaft 13 obtaining power through a pulley 13[a] or other means from a suitable source. Hence it will be seen that when the shaft 13 is in motion the wheel 8 will be driven through the worm gearing. The shaft 9 also supports a drip pan 14 located beneath the worm gears, and provided with bearings 14[a] for the worm shaft 13. The outer end of this shaft is supported in a bearing 15.

At 16 is shown an annular table mounted on a frame 16[a] carried on legs 16[b]. This table supports certain parts to be presently described. The frame 16[a] supports the bearing 15 hereinbefore described.

The feeding mechanism involves the following structural details:

On the upper end of the stationary central shaft 9 is mounted a spider composed of a hub 17 and four arms 17[a] extending radially outward therefrom. The outer ends of the spider arms drop downward as shown at 17[b] and are bolted or otherwise secured to the top of the table 16. The spider hub is made fast to the shaft 9 by set screws or other suitable means 18. Between two adjacent spider arms, and bolted or otherwise fastened thereto, extends a base plate 19 on which are mounted two laterally spaced bearing plates 20 and 20[a] respectively carrying outstanding bracket arms 21 which support the feed tube 1.

Between the plates 20 and 20[a], and mounted on a shaft 22 extending therebetween and supported thereby, is located a rotatable feeder for forcing the fruit or vegetables down the feed tube 1. This feeder comprises a wheel composed of a hub 23, and a web 23[a] having socketed, and uniformly spaced enlargements 23[b] at its outer edge, which carry feeder fingers 23[c], each part 23[b] carrying a pair of such fingers arranged in laterally spaced relation and held in the sockets by set screws or other suitable means 23[d]. The feeder is so located with respect to the tube 1, that the fingers pass through the same with a downward stroke, the tube having side slots 1[a] through which the fingers pass. Thus it will be seen that when the feeder is in motion, the fingers force the stuff down the tube 1, the latter being open at its lower end and terminating a short distance above the slicer blade 2.

The following means are provided for driving the feeder.

On the outside of the feeder supporting plate 20, the feeder shaft 22 is provided with a cone gear 24. The plate 20 also carries an outstanding stub shaft 25 on which is loosely mounted a broad-faced spur gear 26 carrying a worm wheel 27. At 28 is shown an idler pinion which is in mesh at all times with the gear 26 and is shiftable laterally to come in mesh with either one of the gears of the cone 24, whereby a variable speed drive is had for the feeder shaft 22, the gear 26 being driven by a worm 29 meshing with the worm wheel 27. This worm is on a shaft 30 which also carries the slicing blade 2 and the plate 4.

The idler pinion 28 is carried by a shiftable hand lever 31 fulcrumed and slidably mounted on the shaft 25. The lever 31, is held in position by a pin 32 engageable with the stepped teeth 33 of a locking plate 33[a] carried by the plate 20.

The shaft 30 obtains motion from the cuber wheel, the inner rim 8[b] of which is toothed to form an internal gear or rack 34 with which meshes a pinion 35 on the lower end of the shaft 30.

The slicer blade 2 is carried by a hub 3 which is fastened to the shaft 30 by a pin 3[a] or other suitable means. The plate 4 has a hub 4[b] which is fastened to the shaft 30 by a set screw or other suitable means 4[c]. The distance between the blade 2 and the plate 4 determines the thickness of the slices to be cut, and as the parts are adjustably connected to the shaft 30, the distance therebetween may be changed to obtain slices of different thickness.

After being cut into slices, the stuff falls on the grille bars 6 and is forced through the same, and thus cut into cubes, by the rollers 7. These rollers are hardwood blocks covered with rubber or other soft material, and fixed each on a shaft 36 having a pinion 37 fast on one end. This pinion is in mesh with a rack 38 on top of the inner rim 8[b] of the cuber wheel 8. The rollers 7 are stationary with respect to the cuber wheel, and hence when the latter is in motion rotating the cuber, the rollers are rotated through the gearing just described. The sliced stuff on the grille bars 6 is forced therebetween and fashioned into cubes or other shapes according to the particular arrangement of the grille bars, which may be varied as desired. This forcing of the stuff through the grille bars is effected by the rollers 7 as the stuff upon being carried around on the bars comes beneath the rollers, the latter being set sufficiently close to the grille bars to force the stuff through. It will be noted that three forcing rollers 7 are employed, these being of different diameters, the same increasing in diameter in the direction the

stuff is traveling as it is being carried around by the cuber, so that it is gradually forced through the grille bars 6, the largest roller just touching the latter.

The shaft 30 is supported in bearings 39 carried by an annular supporting member 40 having upstanding lugs 40^a which are bolted or otherwise secured to the spider arms 17^a on the under side thereof. The downturned ends 17^b of the spider arms also carry bearing brackets 41 for one end of the shafts 36 of the rollers 7, the other ends of said shafts being supported by bearing brackets 41^a carried by the member 40.

Fig. 1 illustrates only one half of the machine and also only one slicing or cutting mechanism. However, the complete machine will be equipped with a set of four slicing cutters with a feeding apparatus and a set of three forcing rollers for each. The machine therefore has a large capacity and it is rapid in operation. The four feed tubes 1 are supplied from a hopper 1^a beneath which they are positioned. This hopper is not shown in Fig. 1 in order not to obscure the parts beneath the same.

I claim:

1. An apparatus of the kind stated comprising a rotatable shaping cutter having crossed knives, a slicer discharging on the cutter, and means for forcing the sliced product through the spaces between the knives of the cutter.

2. An apparatus of the kind stated comprising a shaping cutter having crossed knives, a slicer discharging on the cutter, and rollers for forcing the sliced product through the spaces between the knives of the cutter.

3. An apparatus of the kind stated comprising a rotatable shaping cutter having crossed knives, a slicer discharging on the cutter, and rollers for forcing the sliced product through the spaces between the knives of the cutter.

4. An apparatus of the kind stated comprising a rotatable shaping cutter having crossed knives, a slicer discharging on the cutter, and rollers for forcing the sliced product through the spaces between the knives of the cutter, said rollers being stationary relative to the cutter, and the latter traveling past the rollers in proximity thereto.

5. An apparatus of the kind stated comprising a shaping cutter member having crossed knives, a slicer discharging on said member, and a forcing member located in proximity to the cutter member, one of said members being rotatable with respect to the other member for forcing the sliced product through the spaces between the knives of the cutter member.

6. An apparatus of the kind stated comprising a shaping cutter member having crossed knives, a slicer discharging on said member, and a forcing member located in proximity to the cutter member, one of said members being rotatable with respect to the other member for forcing the sliced product through the spaces between the knives of the cutter member, and means for rotating said other member about its axis.

7. An apparatus of the kind stated comprising a rotatable shaping cutter having crossed knives, a slicer discharging on the cutter, and rollers for forcing the sliced product through the spaces between the knives of the cutter, said rollers being stationary relative to the cutter, and the latter traveling past the rollers in proximity thereto, and means for rotating the rollers about their axes.

8. An apparatus of the kind stated comprising a shaping cutter having crossed knives, a slicer discharging on the cutter, and rollers for forcing the sliced product through the spaces between the knives of the cutter, said rollers being arranged in a series with the distances between the rollers and the cutter graduated.

9. An apparatus of the kind stated comprising a shaping cutter member having crossed knives, a slicer discharging on said member, and a forcing member located in proximity to the cutter member, one of said members being rotatable with respect to the other member for forcing the sliced product through the spaces between the knives of the cutter member, the forcing member being composed of a series of rollers with the distances between the same and the cutter member graduated.

10. An apparatus of the kind stated comprising a shaping cutter member having crossed knives, a slicer discharging on said member, and a forcing member located in proximity to the cutter member, one of said members being rotatable with respect to the other member for forcing the sliced product through the spaces between the knives of the cutter member, the forcing member being composed of a series of rollers with the distances between the same and the cutter member graduated, and means for rotating said rollers about their axes.

11. An apparatus of the kind stated comprising a shaping cutter having crossed knives and upstanding walls between which the knives are located, a slicer discharging on the knives, and rollers for forcing the sliced product through the spaces between the knives, said rollers being positioned between the aforesaid walls.

12. An apparatus of the kind stated comprising a shaping cutter having crossed knives, a rotatable carrier for the cutter, said carrier being provided with circular racks, driving means for the carrier, a rotatable slicer discharging on the knives, a shaft carrying the slicer, rollers for forc-

ing the sliced product through the spaces between the knives, a drive gearing between the rollers and one of the aforesaid racks, and a drive gearing between the other rack and the slicer shaft.

13. An apparatus of the kind stated comprising a shaping cutter having crossed knives, a rotatable carrier for the cutter, said carrier being provided with circular racks, driving means for the carrier, a rotatable slicer discharging on the knives, a shaft carrying the slicer, rollers for forcing the sliced product through the spaces between the knives, a drive gearing between the rollers and one of the aforesaid racks, and a drive gearing between the other rack and the slicer shaft, the rollers being stationary with respect to the shaping cutter.

14. An apparatus of the kind stated comprising a shaping cutter having crossed knives, a rotatable carrier for the cutter, said carrier being provided with circular racks, driving means for the carrier, a rotatable slicer discharging on the knives, a shaft carrying the slicer, rollers for forcing the sliced product through the spaces between the knives, a drive gearing between the rollers and one of the aforesaid racks, a drive gearing between the other rack and the slicer shaft, and a feeder for the slicer driven by the slicer shaft.

15. An apparatus of the kind stated comprising a shaping cutter having crossed knives, a rotatable carrier for the cutter, said carrier being provided with circular racks, driving means for the carrier, a rotatable slicer discharging on the knives, a shaft carrying the slicer, rollers for forcing the sliced product through the spaces between the knives, a drive gearing between the rollers and one of the aforesaid racks, a drive gearing between the other rack and the slicer shaft, a feeder for the slicer shaft, and a variable-speed drive gearing between the slicer shaft and the feeder.

16. An apparatus of the kind stated comprising a shaping cutter having crossed knives, a slicer discharging on the cutter and composed of a blade and a recessed plate between the blade and the shaping cutter, the blade and plate being spaced, and the blade being alined with the recess, means for rotating the blade and the plate together, and means for forcing the sliced product through the spaces between the knives of the cutter.

17. An apparatus of the kind stated comprising a shaping cutter having crossed knives, a slicer discharging on the cutter and composed of a blade and a recessed plate between the blade and the shaping cutter, the blade and plate being spaced, and the blade being alined with the recess, means for rotating the blade and the plate together, a deflector between the blade and the plate, and means for forcing the sliced product through the spaces between the knives of the cutter.

In testimony whereof I affix my signature.

WILLIAM M. LUTHER.