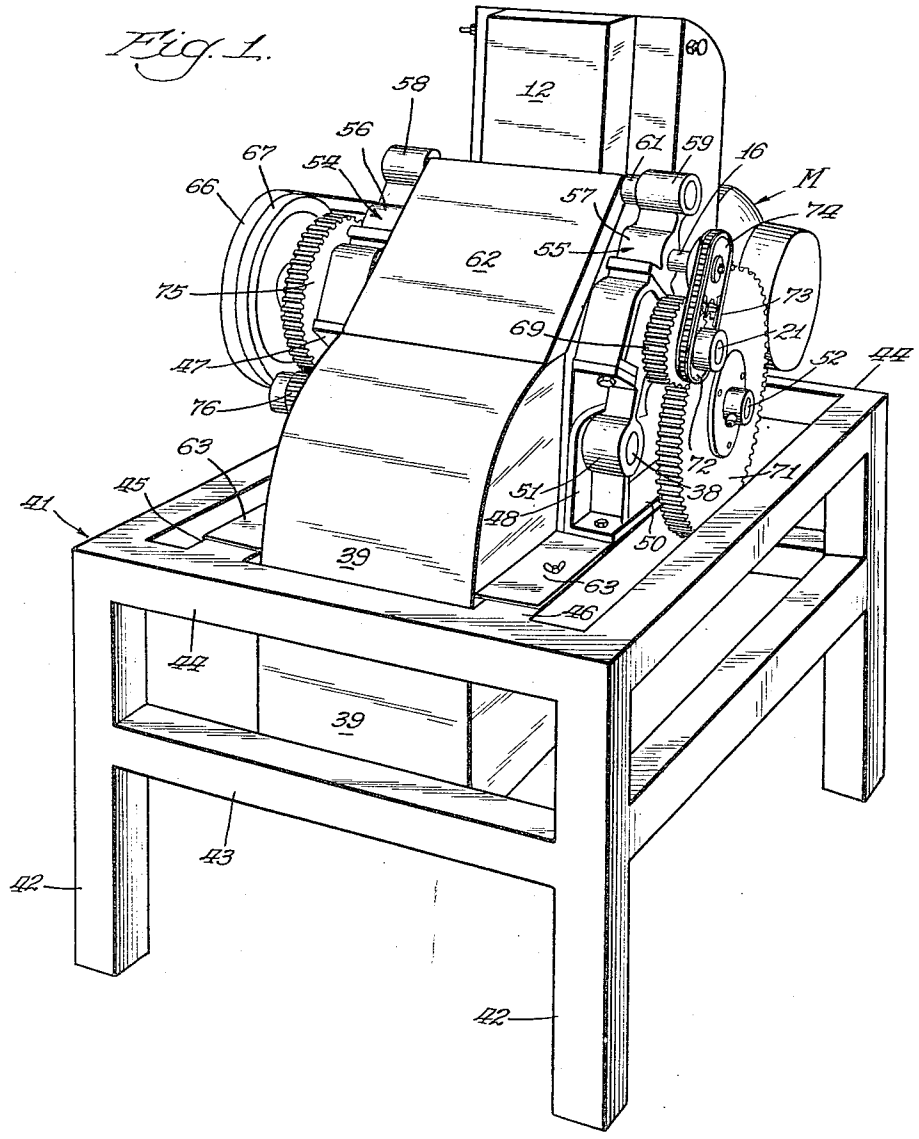
July 15, 1952 W. E. URSCHEL ET AL 2,603,262

SECTIONALIZING CUTTING MACHINE

Filed Jan. 29, 1948 3 Sheets-Sheet 1

Fig. 1.



INVENTORS
William E. Urschel
Joe R. Urschel
Gerald W. Urschel

By Noel S. Nathan
Atty.

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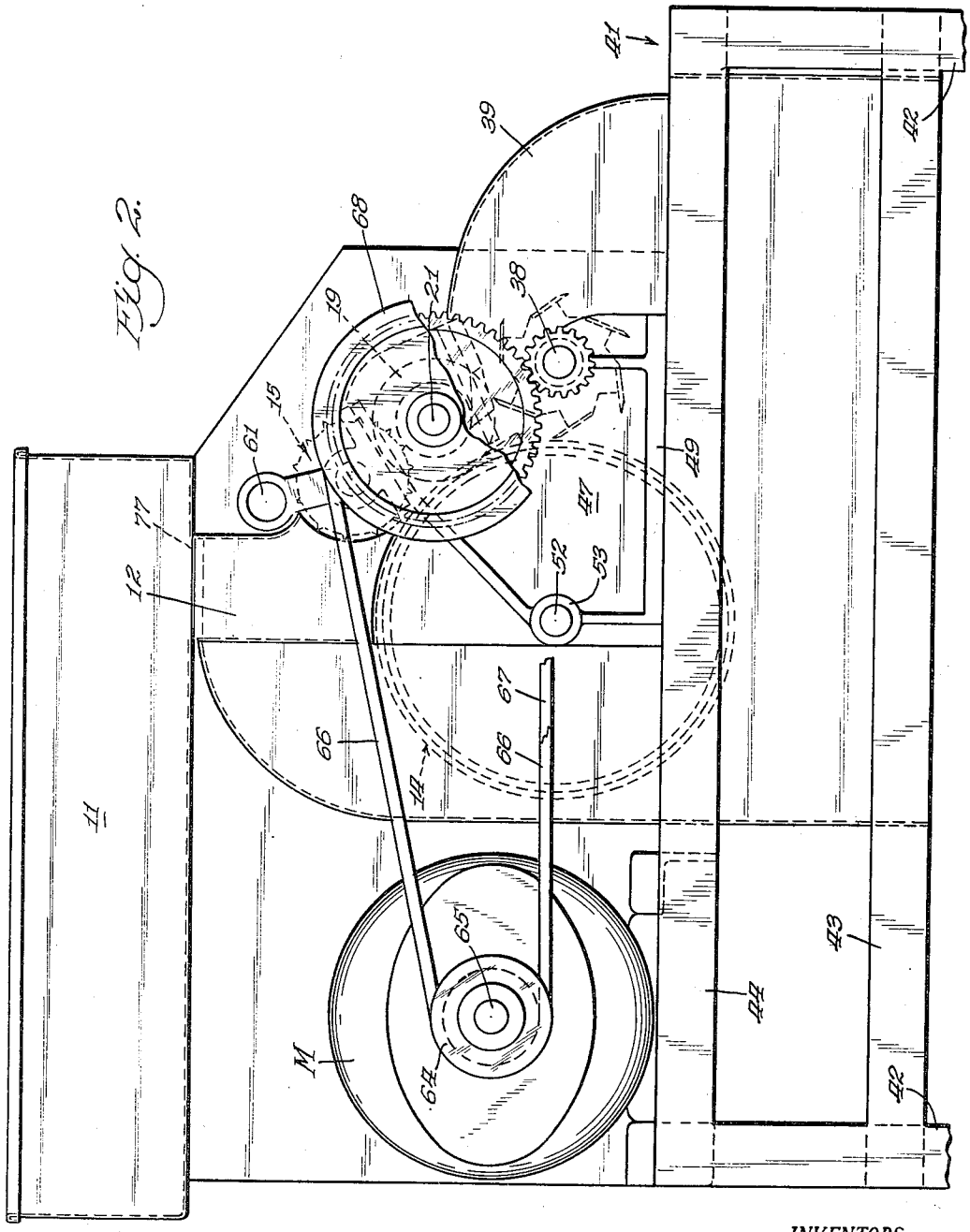
Filed Jan. 29, 1948 3 Sheets-Sheet 2

Fig. 2.



INVENTORS
William E. Urschel
Joe R. Urschel
Gerald W. Urschel

By [illegible]

Atty.

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Filed Jan. 29, 1948 3 Sheets-Sheet 3

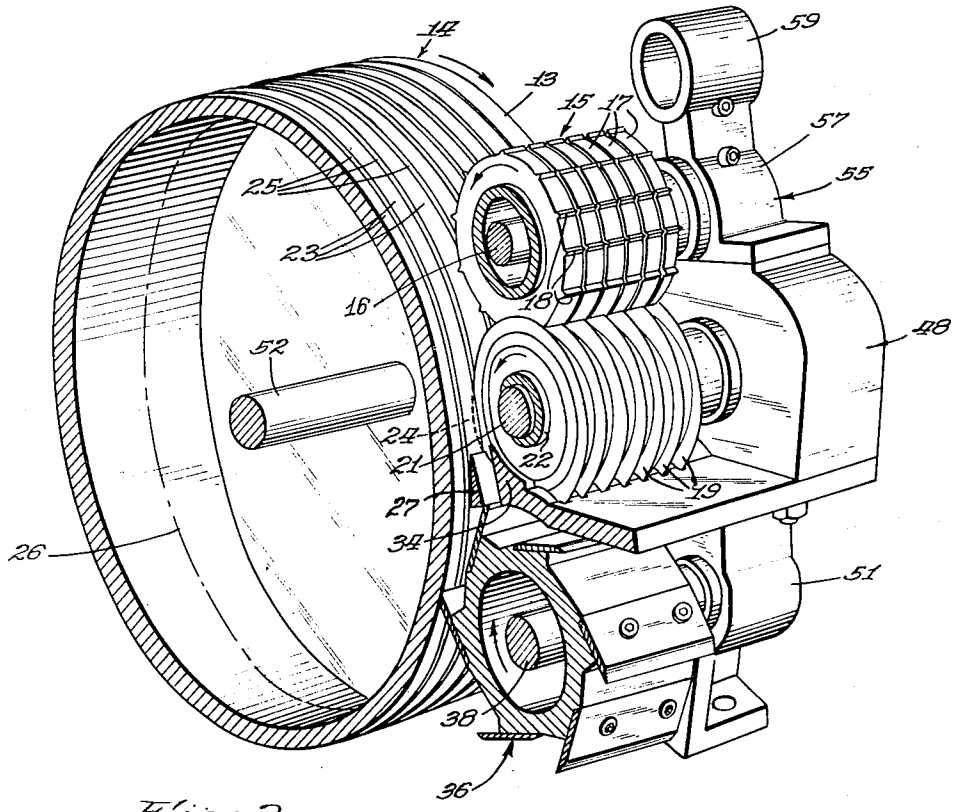

Fig. 3.

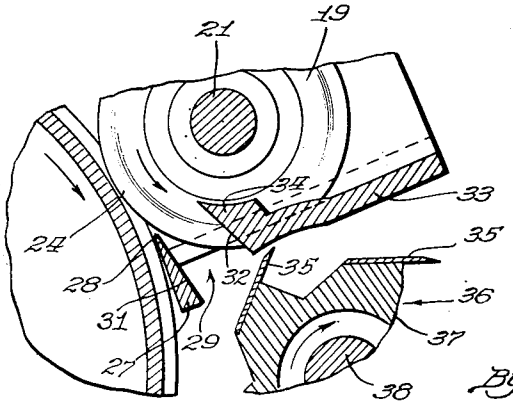

Fig. 4.

INVENTORS,
William E. Urschel
Joe R. Urschel
Gerald W. Urschel
By Wm. L. Adams
Atty.

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SECTIONALIZING CUTTING MACHINE

William E. Urschel, Joe R. Urschel, and Gerald W. Urschel, Valparaiso, Ind.; Joe R. Urschel administrator of said William E. Urschel, deceased

Application January 29, 1948, Serial No. 5,002

1 Claim. (Cl. 146—98)

1

This invention concerns machines for cutting material into discrete pieces and has to do more particularly with a machine adapted to operate upon a body of material consisting of small flat pieces such as peppers, the peel of citrus fruit, boned chicken and the like, for cutting these thin larger fragments into smaller fragments.

The general object of this invention is the provision of a sectionalizing cutting machine of simplified form wherein a movable feeding structure has a feeding surface for carrying the material to be operated upon into position for being operated upon by juxtaposed knives while the material is advanced through a bight formed between the knives and such surface. By utilizing such feeding surface in direct cooperation with the knives it is possible to eliminate an intermediate supporting means which has been heretofore employed for direct cooperation with the knives.

A further object is the provision of a feeding surface as aforesaid advanceable lengthwise of a median line thereof and comprising laterally spaced sections extending in parallelism with such line, the spaces between the laterally spaced sections being in respective registry with the knives of a slitting-knife bank for receiving cusp-like edge portions thereof to facilitate precise complete cutting of the material and to further facilitate advancement of the material with the feeding surface.

A further object is the provision of a sectionalizing cutting machine employing a feeding surface together with a bank of slitting knives as aforesaid and wherein there is also a compressing roller structure cooperating with the feeding surface at a position immediately preceding the position at which the knives are cooperative with the feeding surface. The compressing roller structure is cooperable with the feeding surface for forming a mat of the bulk material and thereby increasing the speed and positiveness with which the material is introduced into the bight between the feeding surface and the knife edges in the slitting-knife bank. This function of the compressing roller structure is accomplished more effectively when such structure is placed closely to the slitting-knife bank, and it is a further contemplation of this invention to construct said roller structure with a plurality of circumferential ribs meshed with the knives in the knife bank as an expedient for decreasing the distance of the spacing of the roller structure and of the knives lengthwise of the feeding surface.

2

Still another object is the provision of a stripper bar extending transversely of and adjacently to the slitting-knife bank for cleaning the surface of any material tending to cling thereto as the material passes from between the knives and the feeding surface.

The invention further contemplates and has as one of its objects the provision of a rigid cylindrical feeding surface containing circumferential grooves for receiving the knives of the slitting-knife bank. Preferably this cylinder is rotated about a horizontal axis as is the bank of slitting knives and these knives are stationed at a position for cooperating with a downwardly moving portion of the surface. This arrangement so positions the cylindrical feeding surface and the bank of slitting knives that they are adapted to receive the material to be operated upon from a downwardly discharging hopper disposed above the common locus of the slitting-knife bank and the portion of the feeding surface cooperating therewith.

An additional object is the provision of a sectionalizing cutting machine according to the next preceding object wherein the slitting knives are of the disk type and the rigid cylindrical surface is of considerably larger diameter than the diameter of said knives, whereby an appreciable area of the feeding surface faces upwardly at a position immediately ahead of the knives for registration with the bottom of a downwardly discharging hopper.

These and other desirable objects inherent in and encompassed by the invention will be fully understood from the ensuing description and the annexed drawings wherein:

Fig. 1 is a perspective view looking downwardly toward two sides of a machine constituting a preferred embodiment of the invention.

Fig. 2 is a side elevational view of the machine but with the legs of the supporting bench therefor broken away.

Fig. 3 is a fragmentary perspective view illustrating the relative positions of those instrumentalities of the machine which cooperate in operating directly upon the material to be processed.

Fig. 4 is a fragmentary sectional view showing details of the arrangement of the feeding surface, of the slitting knives cooperable with such surface, a cleaning bar for the surface and a dicing knife assembly for cutting strips of the material into short pieces as they are discharged from between the feeding surface and the slitting knives.

The general purpose of the machine can be understood by reference to Figs. 2, 3 and 4. The machine is particularly adapted for so-called dicing of thin pieces of material fed thereto in bulk mass. Bulk material such as peppers and orange peels which are to be cut up into small squares for use in the canning industry are readily handled by the present machine. Bulk material of this character is loaded into a hopper 11, Fig. 2, from which it is fed directly through a chute 12 onto a portion of a feeding surface 13 of a cylindrical feeding structure 14 at a position immediately ahead of a compressing roller structure 15 with respect to the direction of rotation of the structure 14 as indicated by the arrows in Figs. 3 and 4.

The compressing roller structure 15 is supported upon and rotated in the direction indicated by the arrow in Fig. 3 by a shaft 16. Said structure comprises a plurality of axially spaced circumscribing ribs 17 which have axially-extending circumferentially-spaced projections 18. The compressing roller structure is spaced slightly from the cylindrical feeding surface 13 to form a bight therewith through which the bulk material is advanceable with said surface 13 incident to being compressed into a flat mat. This mat of the bulk material as it is discharged from between the compressing roller structure 15 and the feed surface 13 is fed downwardly between a bank of disk slitting knives 19. These knives 19 are carried upon and rotatable with a shaft 21 in the direction indicated by the arrows in Figs. 3 and 4. A plurality of spacing collars 22 are disposed between the slitting knives 19 for spacing these knives apart in a rigid structure wherein the knives respectively register with the grooves between the ribs 17 of the compressing roller structure. Such spacing of the knives 19 also corresponds to the spacing of laterally spaced feeding surface portions 23 of the feeding structure 14, and the diameters of the knives are such that cusp-like peripheral portions 24 project into grooves 25 between the feeding surface portions 23. The reference character 26 designates an imaginary median line extending circumferentially about the cylindrical feeding structure 14 with respect to which the laterally spaced feeding surface portions 23 extend lengthwise. Since the median line 26 extends circumferentially of the cylindrical feeding structure, said laterally spaced feeding surface portions 23 are advanced lengthwise of this line during operation of the machine.

As the compressed mat of material is passed between the feeding structure 14 and the bank of slitting knives 19, such mat of material is cut into strips having a width corresponding to the axial spacing of the knives. A stripper bar 27, suitably anchored at its ends, is disposed in wiping relation with the feeding surface 13 of the feeding structure so that an upwardly directed sharpened edge 28 is effective for peeling the strips of the slit material from the feeding surface 13 into a throat 29 between a face 31 of such bar and an opposed face 32 on a plate 33 having stripping fingers 34 projecting into spaces between the slitting knives. Stripping fingers 34 prevent the strips of slit material from following around with the knives and thereby complement the stripper bar 27 in directing the strips endwise into the throat 29.

As the strips of material issue endwise downwardly through the throat 29 they are cut into short pieces by the cutting edges of blades 35 of a dicing knife assembly 36 which comprises a blade carrier 37 mounted upon and constrained for rotation with a shaft 38. The rotating speed of the dicing knife structure 36 is predetermined with respect to the peripheral speed of the feeding structure 14 and the corresponding endwise speed of the strips issuing through the throat 29 so that the strips are cut into short pieces of desired length which is ordinarily equal to the width of the strips so that a portion of the ultimately cut pieces will be cubes or flat squares depending upon the thickness of the discrete pieces within the mat of bulk material. The so-called "diced" material resulting from the operation of the dicing knife assembly 36 is discharged into a spout 39 which has a downwardly facing discharge opening (not shown) through which the material passed into a receptacle (not shown) which may be slid into place under the bench of the machine.

Considering now the environment for the above-described parts which operate directly upon the material to be cut into pieces, the machine rests upon a bench 41 having legs 42 joined together by crossbars 43 and 44. A pair of parallel bars 45 and 46 extend between a pair of oppositely disposed top crossbars 44 as illustrated in Fig. 1. These bars 45 and 46 provide respective support for side frame members 47 and 48 which have flanges 49 and 50 respectively along their lower edges for resting upon the upper sides of the parallel bars 45 and 46. Bearings (not shown) respectively in the frame members 47 and 48 rotatively support opposite end portions of the shaft 21 which extends through and carries the disk slitting knives. Additional bearings respectively in the frame members 47 and 48 carry respective end portions of the dicing assembly shaft 38, one of these bearings being designated 51 in Figs. 1 and 3. A third pair of axially aligned bearings respectively in the frame members 47 and 48 rotatively carry a shaft 52 upon which the rotatable feeding structure 14 is mounted and with which it is constrained for rotation. One of the bearings for the shaft 52 is designated 53 in Fig. 2.

A pair of bearing brackets 54 and 55 are superposed on the frame members 47 and 48. Bearings 56 and 57 respectively at the bearing brackets 54 and 55 rotatively carry opposite end portions of the compressing roller shaft 16. Bores in cylindrical projections 58 and 59 on the brackets 54 and 55 are rigidly assembled with opposite end portions of a brace rod 61. This brace rod 61 supports the upper end of a hood 62 which shields the compressing roller structure and the slitting-knife bank. The lower end of the hood 62 rests upon the upper edge of the discharge chute 39, and outwardly turned flanges 63 on the side walls of the chute rest upon the parallel bars 45 and 46 of the bench.

Power for driving the machine is derived from a double groove sheave 64 constrained for rotation with the armature shaft 65 of an electric motor M which is suitably anchored upon the top of the bench 41. A pair of V-belts 66 and 67 which respectively fit in the grooves of the sheave 64 are also trained about double groove sheave 68 which is constrained for rotation with the slitting-knife shaft 21. The slitting-knife shaft 21 thus driven by the sheave 68 drives a gear 69 carried by this shaft at the opposite side of the machine as shown in Fig. 1. Gear 69 meshes with a larger gear 71 which is mounted upon and constrained for rotation with the cross

shaft 52 of the material feeding structure 14. A sprocket 72, Fig. 1, is also constrained for rotation with the slitting-knife shaft 21 and through a chain 73 drives a sprocket 74 which is mounted upon and drives the compressing roller structure shaft 16. Drive for the dicing knife structure 36 is provided by a gear 75 on the slitting-knife shaft 21 and a companion pinion 76 on an end portion of the dicing knife shaft 38.

Material to be operated upon by the machine is placed in a hopper 11 having a bottom opening 77 through which the material is fed downwardly into the vertical chute portion 12 of the hopper. The lower end of this chute 12 is open and, as can be seen in Fig. 2, is in vertical registry with the upwardly facing portion of the feeding surface 13 immediately ahead of the compressing roller structure 15 with reference to the direction of rotation of the feeding structure 14.

Having thus described a single preferred form of the invention with the view of clearly and concisely illustrating the same, we claim:

In a sectionalizing cutting machine, a feeding drum disposed for rotation about a horizontal axis and having its cylindrical surface divided into laterally spaced circumferential feeding sections, a bank of circular axially spaced knives rotatable about a horizontal axis in parallelism with and substantially within a horizontal plane common to the drum axis, the knife bank being disposed exteriorly of the drum surface, said knives being meshed with said laterally spaced sections and being of substantially less diameter than the drum surface to provide for an upwardly facing portion of the drum surface that slopes downwardly from the uppermost part of the drum to the section meshed with the knives, a circumferentially ribbed pressure roller structure rotatable about a horizontal axis spaced upwardly circumferentially of the drum from the knife bank and rotatable about an axis in parallelism with the drum axis, said pressure roller structure being in close proximity with a part of the upwardly facing portion of the drum adjacently to the knife bank and the ribs of such structure being meshed with the knives, and hopper means disposed above said upwardly facing portion of the drum for depositing compressible bulk material thereon upwardly thereof from the pressure roller structure to cause feeding of the material downwardly between the pressure roller structure and the drum.

WILLIAM E. URSCHEL.
JOE R. URSCHEL.
GERALD W. URSCHEL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
414,766	Fischer	Nov. 12, 1889
453,859	Flickinger et al.	June 9, 1891
913,485	Farquer	Feb. 23, 1909
1,316,026	Gamage	Sept. 16, 1919
2,065,239	Mills	Dec. 22, 1936
2,131,851	Anstice	Oct. 4, 1938
2,223,542	Bauer	Dec. 3, 1940
2,242,557	Urschel et al.	May 20, 1941
2,349,212	Urschel et al.	May 16, 1944
2,465,670	Urschel et al.	Mar. 29, 1949

FOREIGN PATENTS

Number	Country	Date
308,895	Germany	Nov. 4, 1918
762,132	France	Jan. 18, 1934
595,005	Germany	Mar. 27, 1934