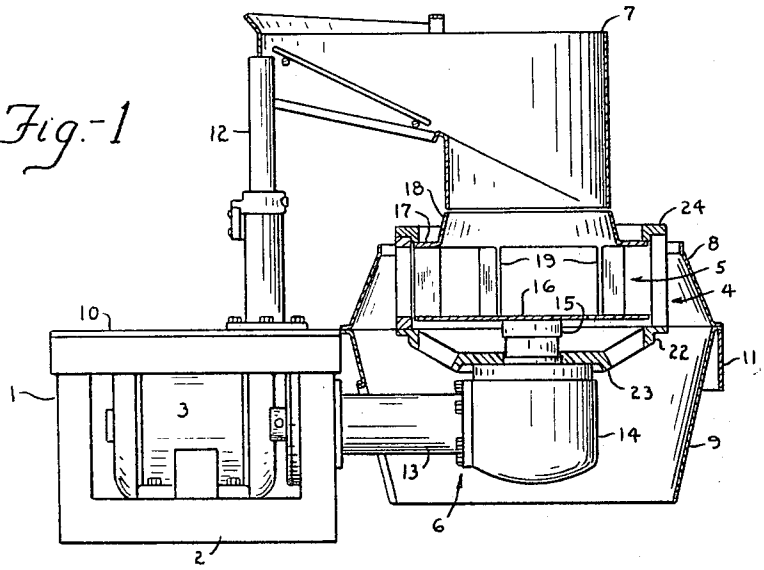
Aug. 6, 1968 E. R. SANDERS 3,395,742

KNIFE STRUCTURE

Filed April 27, 1965 3 Sheets-Sheet 1

Fig.-1



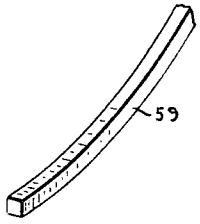


Fig.-10

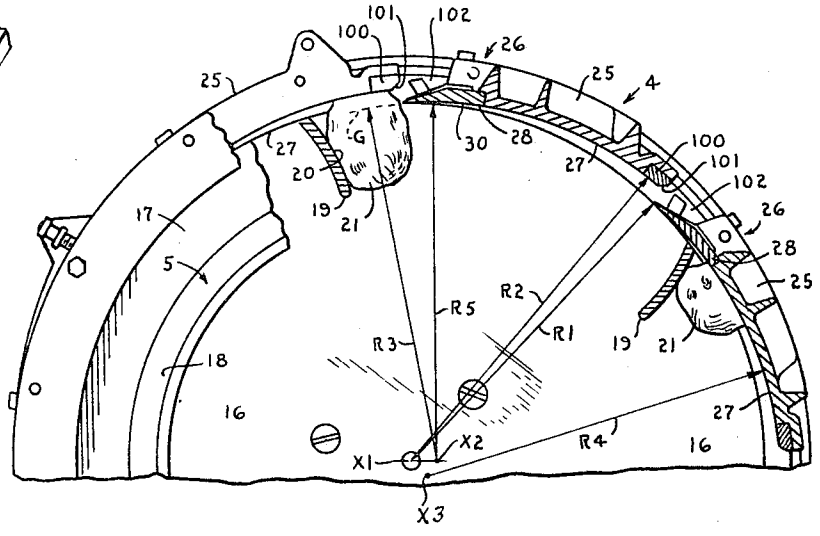


Fig.-2

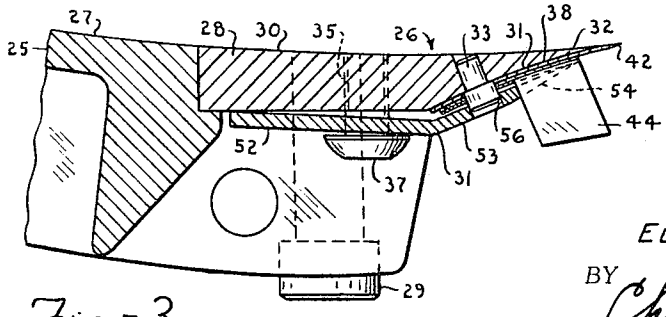


Fig.-3

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Fig.-9

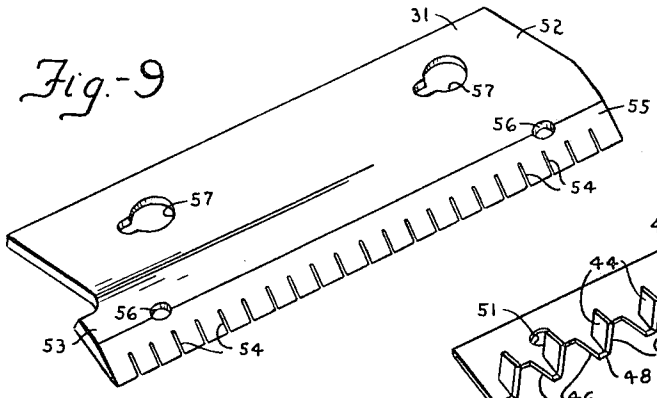


Fig.-8

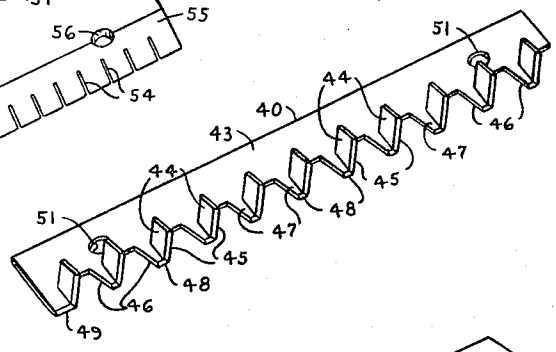
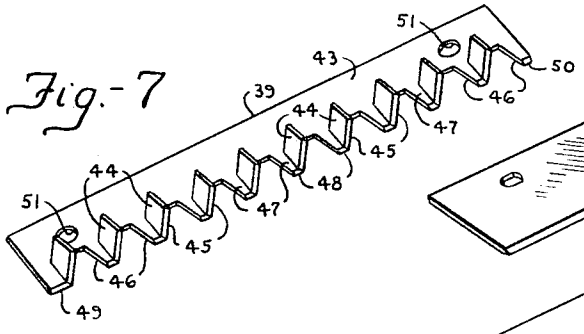


Fig.-7



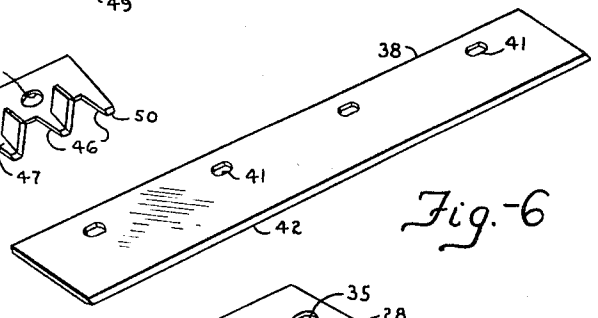


Fig.-6

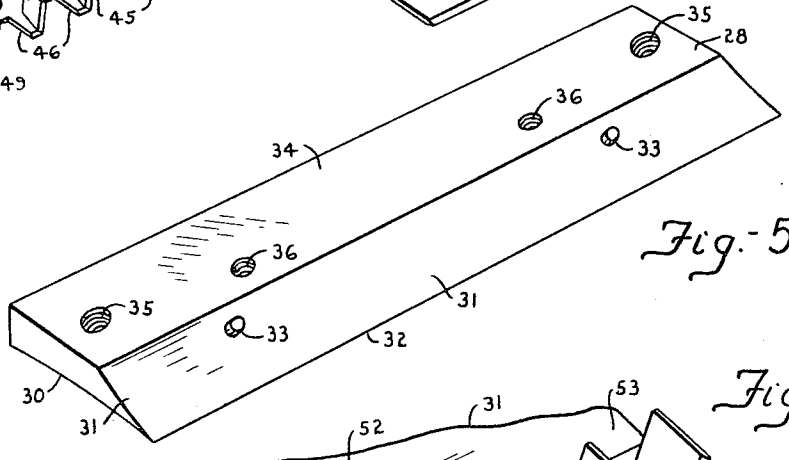
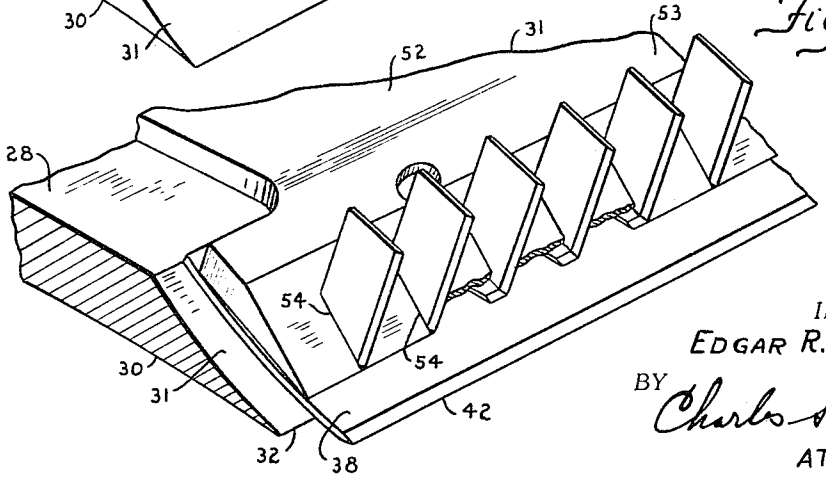


Fig.-5

Fig.-4



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KNIFE STRUCTURE

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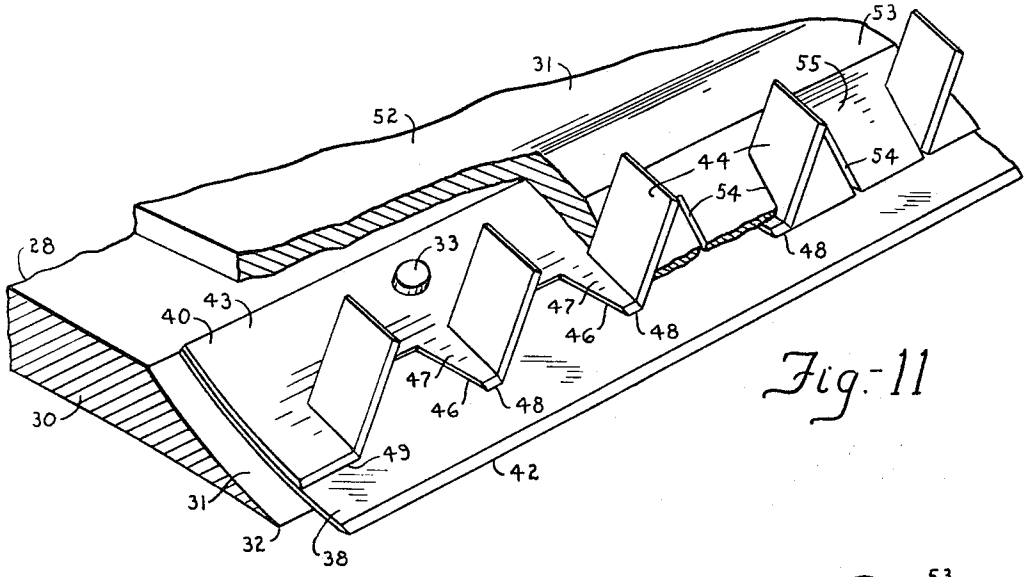

Fig.-11

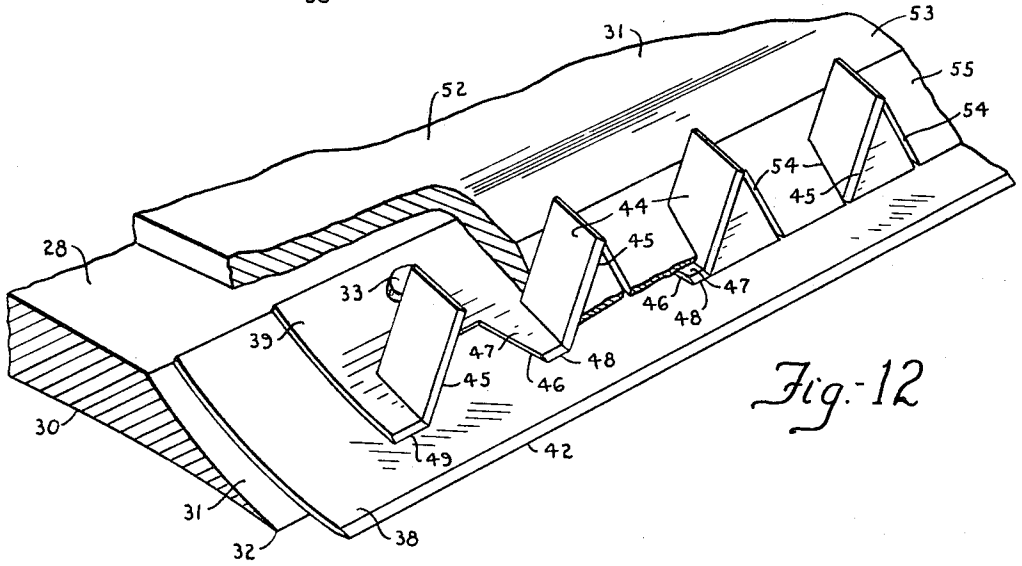

Fig.-12

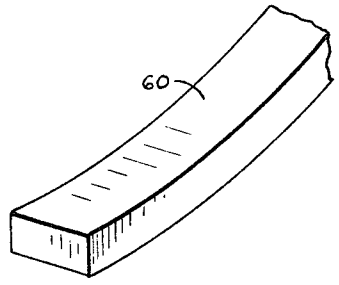

Fig.-13

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3,395,742

KNIFE STRUCTURE

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Filed Apr. 27, 1965, Ser. No. 451,142
15 Claims. (Cl. 146—78)

ABSTRACT OF THE DISCLOSURE

The invention is primarily directed to an assembly comprising a planar elongated knife provided with a longitudinal cutting edge and a knife element provided with a plurality of spaced cutting edges which are disposed in contiguous relation to the longitudinal cutting edge for cutting a product into longitudinal sections.

The subject invention relates generally to equipment for processing or conditioning a food product and more particularly is directed to a machine, assembly or device for cutting products such as potatoes, beets and the like into slices or pieces such as julienne strips.

The structure disclosed in the subject application may be considered as an accessory complementing, for example, the apparatus exemplified in the J. R. Urschel et al. Patent No. 3,139,129, dated June 30, 1964, or as a device constituting a component thereof.

One of the principal objects of the invention is to provide a machine for the above purpose which comprises, among other things, a stationary cutter assembly or slicer head and an impeller which is concentrically arranged for rotation in the cutter assembly for delivering the product to circumferentially spaced knife assemblies or devices of the cutter assembly which embody the invention.

A significant object of the invention is to provide a knife assembly or device which comprises a support or holder provided with a bevel, an elongate planar knife member, a pair of articulated knives or elements, a clamp provided with slots, and means for locking or holding the knife member and knife elements firmly in relation to the bevel, with the knife elements interlocked in the slots.

An important object of the invention is to provide an assembly of the above character in which the knife member and pair of knife elements may be attached to the support in various ways or arrangements. More specifically, the assembly may be organized so that only the knife member is utilized or, if desired, one or the other or both of the knife elements may be employed in conjunction with the knife member in a manner whereby to obtain strips having different cross-sectional dimensions or configurations.

Another object of the invention is to provide an assembly of the above described construction in which one or the other of the knife elements may be used with the knife member whereby to obtain different numbers of strips. For example, if one element is employed, nine strips may be cut and if the other element is used, ten strips may be obtained.

A specific object of the invention is to construct the knife elements in different lengths and in which each element is elongate and designed and constructed to provide a plurality of longitudinally spaced L-shaped formations or legs having accurately formed sharp cutting edges.

A further specific object of the invention is to provide a knife member and knife elements which are constructed of real thin sheet metal stock, or similar to that in manufacturing razor blades, for the purpose of promoting accuracy and smoothness of cut, expendability of the member and elements, and reduction in overall costs.

Also, an object is to provide an improved method of cutting a product into elongate pieces or strips.

Other attributes of the invention or inventions reside in providing an assembly which offers advantages with respect to uniformity in the resultant product and its flow, efficiency, and capacity or output.

Additional objects and advantages of the invention will become apparent after the description hereafter set forth is considered in conjunction with the drawings annexed hereto which exemplify a preferred construction which has proven to be very practical and efficient in operation.

In the drawings:

FIGURE 1 is an elevational view, with portions in section, of a machine embodying the invention or inventions;

FIGURE 2 is an enlarged partial top view of a cutter assembly constituting a component of the machine, and showing knife assemblies associated therewith;

FIGURE 3 is an enlarged partial transverse section showing certain details of one of the knife assemblies and the manner in which it is attached to a curved segment of the cutter assembly or head;

FIGURE 4 is an enlarged vertical perspective view, with portions in section, depicting the operative relationship of various components of one of the knife assemblies;

FIGURE 5 is a perspective view showing a support constituting one of the components of the knife assembly;

FIGURE 6 is a perspective view of a knife member constituting a component of the knife assembly;

FIGURE 7 is a perspective view of one of the articulated knife elements;

FIGURE 8 is a perspective view of one of the other articulated knife elements which is preferably somewhat longer than the element shown in FIGURE 7;

FIGURE 9 is a perspective view of a clamp provided with transverse slots for receiving the knife elements;

FIGURE 10 is a perspective view showing a strip of the product produced by the machine;

FIGURE 11 is an enlarged perspective view of a knife assembly with portions in section, illustrating the use of a knife member and the long knife element shown in FIGURE 8;

FIGURE 12 is an enlarged partial view, with portions in section, illustrating the use of the short knife element depicted in FIGURE 7; and

FIGURE 13 is an enlarged perspective view of a portion of one of a plurality of strips formed by utilizing either of the combinations exemplified in FIGURES 11 or 12.

Referring briefly to the main components or subassemblies of the machine illustrated in FIGURE 1 of the drawings, numeral **1** is a substantial frame having a base **2** which supports a power unit **3**; **4** generally designates a stationary cutter assembly supported from the frame; **5** generally designates an impeller or rotatable carriage disposed in the cutter assembly for feeding a product to the cutter assembly; **6** means operatively connecting the power unit with the impeller; **7** a hopper pivotally mounted above the carriage for delivering the product to be cut into the impeller; **8** a guide or discharge ring disposed about the cutter assembly; and **9** a funnel for directing the cut product into a container adapted for disposition therebelow.

The machine may be mounted where desired, depending on its use, and is preferably utilized to cut potatoes into slices, pieces or strips. A bucket elevator or other suitable conveyor, in combination with a chute at the delivery end of the conveyor, is preferably employed to feed the product into the hopper **7** above referred to. A pipe is preferably located above the machine for continuously delivering a small stream of water into the carriage in order to free the impeller and cutter assembly

from any accumulation of starch and promote the flow of the product therethrough. The bucket, chute, water pipe and other components are not illustrated as they are of a conventional character. The organization thus offers a setup whereby the product may be continuously fed through the cutter assembly of the machine so that the strips cut from the product will fall into a container.

The frame may be designed and constructed in various ways but, as exemplified herein, it includes the base **2**, above referred to, a platform **10** and a substantially U-shaped member **11** which extends laterally in a horizontal plane from one side of the frame and, among other things, serves to support the guide **8** and the funnel **9**. The hopper **7** is preferably supported for vertical and pivotal movement on an adjustable post or pillar **12** carried by the platform **10** so that the hopper may be readily adjusted with respect to the cutter assembly. The power unit **3** is preferably in the form of an electric motor mounted on the base **2** and the means **6** for operatively connecting this unit and the impeller **5** may be constructed as desired. The means **6** preferably includes a housing **13** having a horizontal shaft therein which is connected to the drive shaft of the motor and a housing **14** supporting a vertical shaft which is connected to the horizontal shaft and carries a head **15** which supports the impeller **5**.

The impeller or carriage **5** is annular and may be designed and constructed in various ways but the form or embodiment illustrated in FIGURES 1 and 2 includes a horizontal planar bottom wall **16**, a top wall having a horizontal planar portion **17** and conical portion **18**, and a plurality of five corresponding vertical blades or vanes **19** which join these walls. The conical portion **18** is positioned in close relation to the lower end of the hopper **7** to assist in directing the uncut product into the impeller. The blades **19** of the impeller are of a predetermined width and curvature, and have outer vertical exterior edges aligned with the peripheries of the top and the bottom wall of the impeller and inner vertical edges terminating at the inner annular marginal edge of the portion **17**. The blades are arranged substantially radially and adjacent the peripheries of the impeller so that the products will readily flow outwardly into the spaces between the blades for engagement with knives on the cutter assembly. The impeller, as shown by the arrow in FIGURE 2, is adapted for rotation in a clockwise direction and the blades, due to their curvature, present convex surfaces **25** which are engaged by the product **21** as depicted. The curvature of the blades is preferably such that the radial pressure of the blades against the product increases as the radial thrust, due to centrifugal force, decreases as the product is being sliced or cut away. In other words, the convexly curved surfaces serve to gradually cam the product into a progressively firmer bearing relationship with arcuate surfaces **27** of the segments as the product is cut away.

The cutter or slicer assembly **4** will now be described to the extent of its importance in combination with the knife assemblies, because all of its structural characteristics are clearly disclosed in the patent above referred to. As depicted in FIGURE 1, the assembly is supported in a fixed or non-rotative position on a rim **22** of a dished spider-like mounting **23**. This mounting may be carried by the housing **14** and locates the cutter assembly in a spaced concentric relation to the impeller **4**. The cutter assembly comprises, among other things, an upper annular ring **24** and a plurality of eight corresponding curved segments or supports **25** (three shown) which are pivotally adjustably connected to the ring to constitute a unitary structure which can be readily placed on the mounting **23**. The segments **25** are identical and the mode of respectively mounting knife assemblies generally designated **26** thereon will now be described. Each segment is curved and provided with an inner arcuate gauging surface **27**. These surfaces are identical and arranged in a predetermined circumferentially spaced relationship and the product is successively directed against these surfaces and to knives of the knife assemblies by the impeller. The inner side of the vertical edge portion of each segment adjacent its pivotal connection with the upper ring **24** is preferably rabbeted and an elongate support or holder **28** is detachably secured in the rabbet by a pair of screws **29** (one shown) which extend through upper and lower ends of the holder into tapped holes provided therefor in the segment as evidenced in FIGURES 3 and 5. The opposite vertical edge portion or end of each segment is also rabbeted and receives an elongate pressure member **100** having a bevel **101**. These pressure members are disposed at the trailing edges or ends of the segments in spaced relation to knife assemblies **26** and define in combination therewith circumferentially spaced openings **102** through which the cut product is discharged. The inner side of each holder, as shown in FIGURES 3 and 5, is provided with an arcuate surface **30** which constitutes a continuation of the arcuate surface **27**. It should be noted that a portion of the holder extends beyond an adjacent edge portion of the segment and that the outer side of the extended portion is bevelled and preferably provided with a concave recess or seat **31** which forms with the arcuate surface **30** a pointed edge **32**. The bevelled portion is provided with a pair of longitudinally spaced pins or lugs **33**. Each holder also includes a rectangular portion **34** which is provided with a pair of longitudinally spaced threaded apertures **35** through which the screws **29** extend and a pair of smaller longitudinally spaced threaded apertures **36** which receive screws **37** (one shown).

Each of the holders or supports **28**, as exemplified in FIGURES 3, 4, 11 and 12 may carry a planar knife member **38**, including one or two articulated elongate knife elements **39** and **40** and a clamp **31**, the latter of which is connected to the holder by the screws **37** which serve to detachably connect the clamp, the knife member **38** and either or both of the articulated knife elements in assembled relation with the holder.

Each of the knife members **38**, as clearly illustrated in FIGURES 3 and 6, is preferably made rectangular and from relatively thin resiliently flexible sheet metal stock for flexing generally into conforming relation into the concave seat **31**. Each knife member is provided with a pair of longitudinally spaced oblong holes **41** for readily accommodating the pins **33** and allow for flexing. One longitudinal edge portion of each knife is provided with a pair of converging or bevelled surfaces defining a straight cutting edge **42**.

Each of the knife elements **39** and **40** is similar in design and construction. The knife element **39** is somewhat shorter in length than the knife element **40**. More specifically in this respect, each knife element is constructed from thin resiliently flexible metal strip stock and includes a planar portion **43** and a plurality of corresponding upturned longitudinally spaced parallel wall portions **44** having bevelled portions which converge to define sharp cutting edges **45** which are disposed at right angles or perpendicular to the planar portion **43**. It will be observed that the short and long elements are respectively provided with ten and eleven wall portions. The wall portions **44** are aligned and equaly spaced apart and the same is correspondingly true of the cutting edges **45**. The wall portions **44** are actually trapezoidally shaped portions which have been struck upwardly from the stock and provide correspondingly shaped cutouts or notches **46**. It is to be observed that the wall portions **44** are integrally joined to the planar portion **43** by portions **47** which constitute lateral planar continuations of the planar portion and that the outer ends of these lateral portions are provided with bevel surfaces which converge to provide cutting edges **48** which are equally spaced apart and disposed in the plane of the portion **43**. It should also be noted that the planar portion of the

knife element **39** is provided wtih additional cutting edges, such as **49** and **50**, which are aligned with the cutting edges **48**; that the element **40** is provided with an additional cutting edge **49**; and that the upper edge of each of the wall portions **44** is preferably bevelled rearwardly and downwardly in a direction toward its planar portion **43**. Attention is directed to the fact that each of the knife elements is planar and provided with a continuous straight cutting edge prior to forming the walls **44** and the cutting edges **48**, **49** and **50** are the result of such forming and do not actually serve to cut the product because the lateral portions **47** are held in intimate engagement with the knife member. The wall portions and the adjacent lateral portions **47** form what may be termed L-shaped segments. Each of the knife elements is also preferably provided with a pair of longitudinally spaced apertures **51** which are adapted to accommodate the pins **33** on the holder **28**.

Each of the clamps **31** of the knife assemblies or devices is preferably constructed to include a rectangular planar portion **52** and an offset **53**. The free edge portion of the offset is preferably provided with a plurality of corresponding equally spaced relatively narrow slots or openings **54**. The upper surface of the free edge portion of the offset is also preferably machined as indicated at **55** in order to promote release of the strips when the product is being cut. The offset is further provided with a pair of longitudinaly spaced apertures **56** which are adapted to accommodate the pins **33** and the planar portion **52** with a pair of longitudinally spaced bayonet-type openings **57** which are adapted to accommodate the screws **37** in a conventional manner.

The slots **54** in the clamp are adapted to slidably receive the upstanding wall portions **44** of the knife elements so that the bevelled portion **53** of the clamp will particularly engage those portions, such as **47**, which are interposed between the upstanding wall portions in order to firmly anchor down one or both of the knife elements including the knife member **38** when the screws **37** are tightened. Attention is directed to the fact that when the knife elements **39** and **40** are respectively used as shown in FIGURES 11 and 12, the upstanding wall portions of the elements are disposed alternately in the slots of the clamp and that when both of the knife elements are employed, the slots alternately respectively accommodate the wall portions of the elements as depicted in FIGURES 3 and 4.

As alluded to above, the knife members and knife elements may be operatively connected to the holder or support in several different ways. For example, knife members only may be employed for cutting a product into slices, as exemplified in the patent above referred to, or if so desired, one or the other or both of the knife elements may be associated with the knife member for obtaining julienne strips. When both of the knife elements are used with each knife member, a plurality of strips like **59**, shown in FIGURE 10, is obtained whereas strips like **60** of a greater cross-sectional dimension, as shown in FIGURE 13, are obtained when either of the elements is used with the knife member. It should be observed that wall portions **44** of the knife elements are horizontally arranged and vertically spaced when the cutter assembly is correctly mounted for cutting. It should also be observed that the cutting edges of the knife elements are inset with respect to the cutting edges **42** of the knife members so that they will begin cutting the product into strips only after the product is initially cut into by the cutting edges of the knife members. In other words, it is only after a portion of product has been formed by a knife member that the knife elements being cutting such portion into strips.

Referring more particularly to the operative relationship of the segments and components associated therewith as illustrated in FIGURE 2 of the drawing, the cutting edges **42** of the knife members **38** are all respectively located exactly the same radial distance **R1** from a center point **X1** of the cutter assembly and the inner surfaces of all of the pressure members **100** on the segments are spaced the same radial distance **R2** from the center **X1**. The cutting edges of the knife elements **39** and **40** are similarly respectively located the same radial distances from the center **X1** but these radial distances are greater than the radial distances **R2** between the center **X1** and the vertical cutting edges **42** of the knife mem bers. One of the products **21**, such as a potato, is shown as engaging the inner arcuate surface of one support and the arc G shown in broken lines through the potato represents the path of the cut that the cutting edge **42** of a knife member on the adjacent segment will take when the potato rides onto the arcuate surface of this segment. The radius **R3** is the distance from this cutting arc or path G to a center **X2** and is equal to radius **R1**. The thickness of the slice is the radial distance between the arcuate surface **27** including the arcuate surface **30** of support **28** and the arc G and may be varied by adjusting the segments. The arc G also represents the outer surface of the product which will slide on the inner arcuate surfaces **27** and **30** of the adjacent segment. The radius **R4** is the distance from the inner arcuate surface of the adjacent segment to a center **X3** located concentrically with respect to center **X1** and spaced from center **X2**. The radius **R4** is also equal to **R1** plus the thickness of the slice to be cut. The radius **R5** is equal to the radius **R4** and is also the distance from the arcuate surfaces **27** and **30** and the center **X2**.

As alluded to above, the center **X1** is the center of the cutter assembly. The segments carrying the knife assemblies and pressure members are selectively adjustable in a horizontal plane about their vertical pivotal axes so that the cutting edges of the knife members and elements and pressure members will all be correctly located from the center **X1**. When the segments are properly adjusted by utilizing a suitable gauge, the centers **X2** and **X3** will all be located the same radial distance from the center **X1**. In other words, the centers **X2** and **X3** will be substantially concentric to the center **X1**. The distance between the centers **X2** and **X3** and the center **X1** will vary depending on the extent that the segments are horizontally adjusted. For example, if the segments are adjusted to obtain thick slices the centers **X2** and **X3** will be farther away from the center **X1** and if they are adjusted to obtain thinner slices the centers **X2** and **X3** will be disposed closer to the center **X1**.

In view of the foregoing, it should be manifest that the circumferentially spaced vertically disposed knife members **38** carried by the segments may be employed to produce or cut a product into slices which are suitable for example, in the manufacture of potato chips. It will also be evident that either or both of the elongate knife elements **39** and **40** may be utilized in conjunction with the knife members in a manner whereby strips of various cross-sectional dimensions or configurations may be obtained. The knife element **39** may be interposed between the element **40** and the bevel or the element **40** may be interposed between the element **39** and the bevel. More specifically in this respect, variations in the cross-sectional size of the cuts is possible by reducing the thickness of the slices and by eliminating one or the other of the elongate knife elements from each knife support. Reducing slice thickness to $\frac{3}{32}$" produces cuts measuring $\frac{3}{32}$" x $\frac{3}{16}$" in cross section. Removing one of the elongate knives from each knife support will produce cuts measuring $\frac{3}{16}$" x $\frac{3}{8}$" in cross section and a combination of slice thickness and removal of one of the elongate knives from each knife support will produce cuts measuring $\frac{3}{32}$" x $\frac{3}{8}$" in cross section. Rotation of the impeller will force a product such as potatoes **21** against the inner arcuate surfaces of the segments into engagement with the knife elements **38** which initially cut into the product to partially separate a portion therefrom so that the portions will be

subjected to the horizontal cutting edges 45 of the knife elements for producing strips such as those illustrated in FIGURES 10 and 13.

Attention is directed to the fact that the horizontal cutting edges 45 are longer than any selected slice thickness dimension in order to insure complete separation of the strips. Thus, strips of squared cross section are not practical to achieve with a single knife element having horizontal edges equal in length to the spacing between the edges.

The preferred form of knife elements shown provides for a better support for the cutting edges and substantial clamping areas for stability due to the L-shaped sections which are formed as described above.

Having thus described my invention, it is obvious that various modifications may be made in the same without departing from the spirit of the invention and, therefore, I do not wish to be understood as limiting myself to the exact forms, constructions, arrangements, and combinations of parts herein shown and described.

I claim:

1. An elongate element for the use described, said element comprising a longitudinally extending portion provided with a plurality of aligned longitudinally spaced portions disposed laterally of said extending portion and with aligned portions which are offset from said lateral portions in longitudinally spaced substantially parallel planes, said offset portions having configurations substantially corresponding to the spaces between said lateral portions and provided with cutting edges which are disposed substantially perpendicular to said lateral portions.

2. An elongate element for the use described, said element comprising a longitudinally extending substantially planar portion provided with a plurality of aligned longitudinally spaced sharpened portions disposed substantially in the plane of said planar portion and with aligned portions which are offset from said sharpened portions in longitudinally spaced parallel planes, said offset portions having configurations substantially corresponding to the spaces between said sharpened portions and provided with cutting edges which are disposed substantially perpendicular to said planar portion.

3. An assembly comprising an elongate support provided with a longitudinally extending seat, an elongate knife member having a longitudinally extending cutting edge, means including a plural slotted clamp for detachably securing said knife member against said seat with its cutting edge projecting laterally therefrom, and an elongate knife element secured between said knife member and said clamp and having a row of longitudinally spaced portions extending through at least some of said slots and provided with cutting edges disposed adjacent said first-mentioned cutting edge.

4. The assembly defined in claim 3, in which said support is provided with locating means and said knife element is provided with means registering with said locating means whereby to assist in holding the knife element against displacement.

5. The assembly defined in claim 3, in which said support is provided with locating means and said knife member is provided with means cooperating with said locating means whereby to assist in holding said member against displacement.

6. The assembly defined in claim 3, in which said clamp is provided with bayonet-like openings and said means comprises headed screws carried by said support which extend through said openings for securing the clamp to the support and said knife member and knife element between said seat and said clamp.

7. The assembly defined in claim 3, in which said cutting edges are inset from said first-mentioned cutting edge.

8. The assembly defined in claim 3, including an additional similar elongate knife element secured between said first-mentioned knife element and clamp and having its longitudinally spaced portions extending through at least some of the slots.

9. In combination: a generally annular assembly comprising a plurality of circumferentially spaced curved segments having opposed extremities, one extremity of each segment being provided with an elongate knife member having a straight cutting edge and with a plurality of spaced walls disposed perpendicular to said member in inset relation to said cutting edge and provided with cutting edges, and the other extremity of each segment being provided with means disposed in a predetermined spaced relation to the cutting edges on an adjacent segment.

10. The combination defined in claim 9, including an impeller disposed in said annular assembly for directing a product against said cutting edges for cutting the product into strips and discharging the strips outwardly through the spaces between said segments.

11. In combination: an elongate support provided with an inner arcuate surface and an outer bevelled surface, an elongate clamp connected to said support and provided with a plurality of transverse slots, a pair of elongate knife elements secured in a superimposed relation between said bevelled surface and said clamp, and said elements having portions extending substantially perpendicularly through said slots.

12. An assembly for cutting a product; said assembly comprising a support and a plurality of segments; each of said segments having an extremity provided with a seat, an opposite extremity, an inner curved surface between said extremities, knives, and clamp means securing said knives in relation to said seat; one of said knives having a continuous straight cutting edge and the other having a portion secured between said one knife and said clamp means and aligned spaced cutting edges disposed perpendicular to said straight cutting edge; means pivotally connecting said segments in relation to said support to locate said segments in a circumferentially spaced relationship to form a generally annular structure provided with openings respectively defined by said knives and adjacent opposite extremities of said segments whereby a product introduced thereto for travel against said curved surfaces will be cut into strips by said knives and discharged outwardly through said openings; means whereby to facilitate connection of said assembly in a stationary position with respect to a mounting, and means affording selective pivotal adjustment and securement of each segment relative to said support.

13. A support for the purpose described comprising an elongate curved segment having a pair of spaced apart substantially parallel edge portions with an inner curved surface between said edge portions for engaging a product to be cut, one of said edge portions being provided with an internal elongate transverse recess, an elongate holder rigidly secured in said recess and having an inner surface constituting a fixed continuation of said first-mentioned surface, said holder also having an outer elongate seat, an elongate first knife having a longitudinally extending cutting edge and an elongate second knife having cutting edges disposed substantially perpendicular to said longitudinal cutting edge, and means including a pair of locking elements extending through said knives and into said holder for rigidly securing said knives in relation to said seat.

14. An elongate curved segment constituting one of several adapted to be arranged in a circumferentially spaced relationship to form a generally cylindrical structure adapted to be mounted in a stationary position, said curved segment having an inner curved surface and one end provided with a transverse recess, a holder rigidly secured in said recess and having an inner curved portion constituting a continuation of said surface, said holder having a base portion and a beveled portion, a first knife bearing against said beveled portion and having a longitudinal cutting edge disposed therebeyond in a predeter-

mined relationship to said inner curved portion of said holder, a second knife bearing against said first knife and having cutting edges disposed transverse to said longitudinal cutting edge, and clamping means including a plate having a portion engageable with the base of said holder and an offset portion engageable with said second knife.

15. An elongate support of the character described, said support having an inner curved portion and an edge portion; a holder detachably secured in a fixed position to said edge portion and having an inner curved portion constituting a fixed continuation of the curved portion of the support, means including a clamp connected to said support, and knife means secured between said clamp and an outer portion of said holder having a longitudinally extending cutting edge and a plurality of aligned spaced cutting edges disposed transverse to said longitudinally extending cutting edge.

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