Oct. 15, 1957 H. E. BOITSCHA 2,809,681

BLADE GUIDING MEANS FOR BAND BLADE SLICING MACHINES

Filed Jan. 3, 1955 4 Sheets-Sheet 1

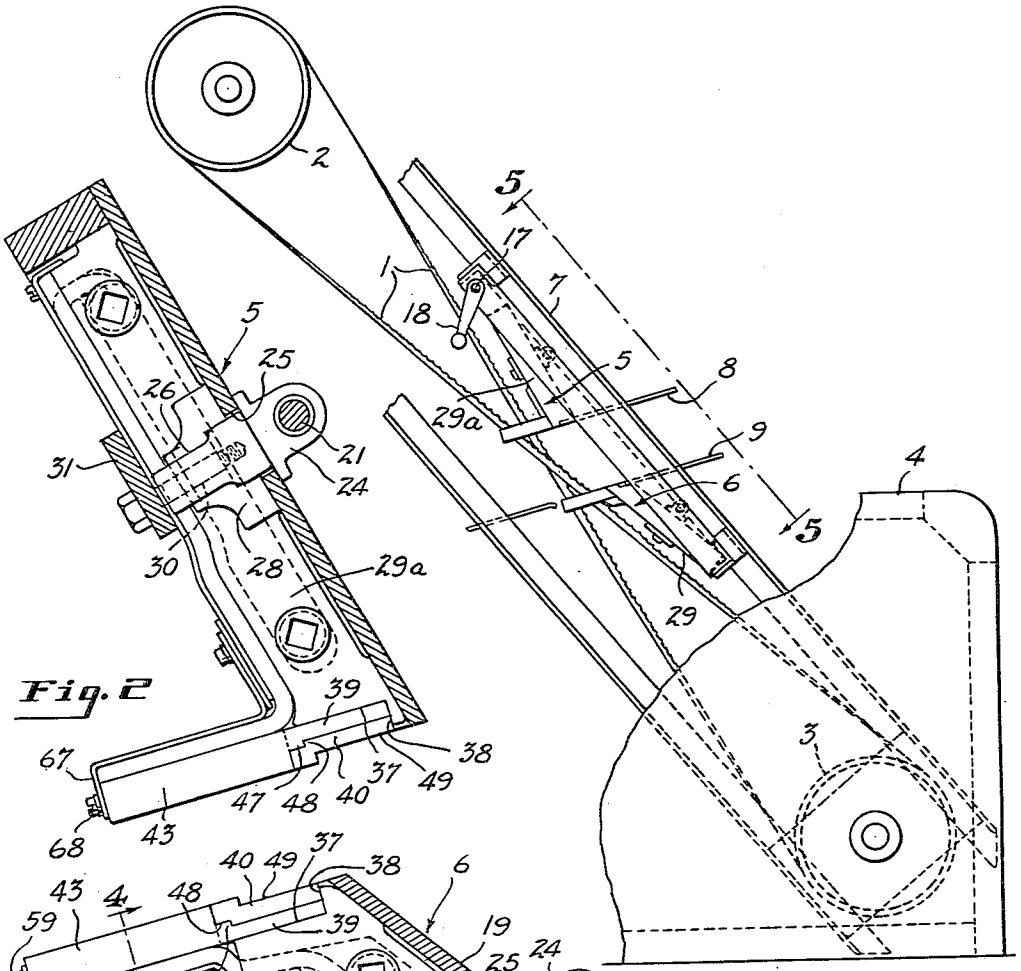


Fig. 1

Fig. 2

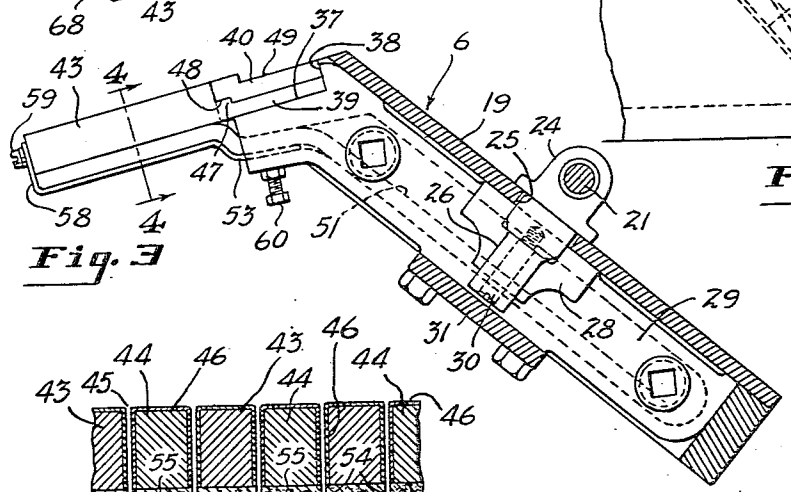


Fig. 3

Fig. 4

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BLADE GUIDING MEANS FOR BAND BLADE SLICING MACHINES

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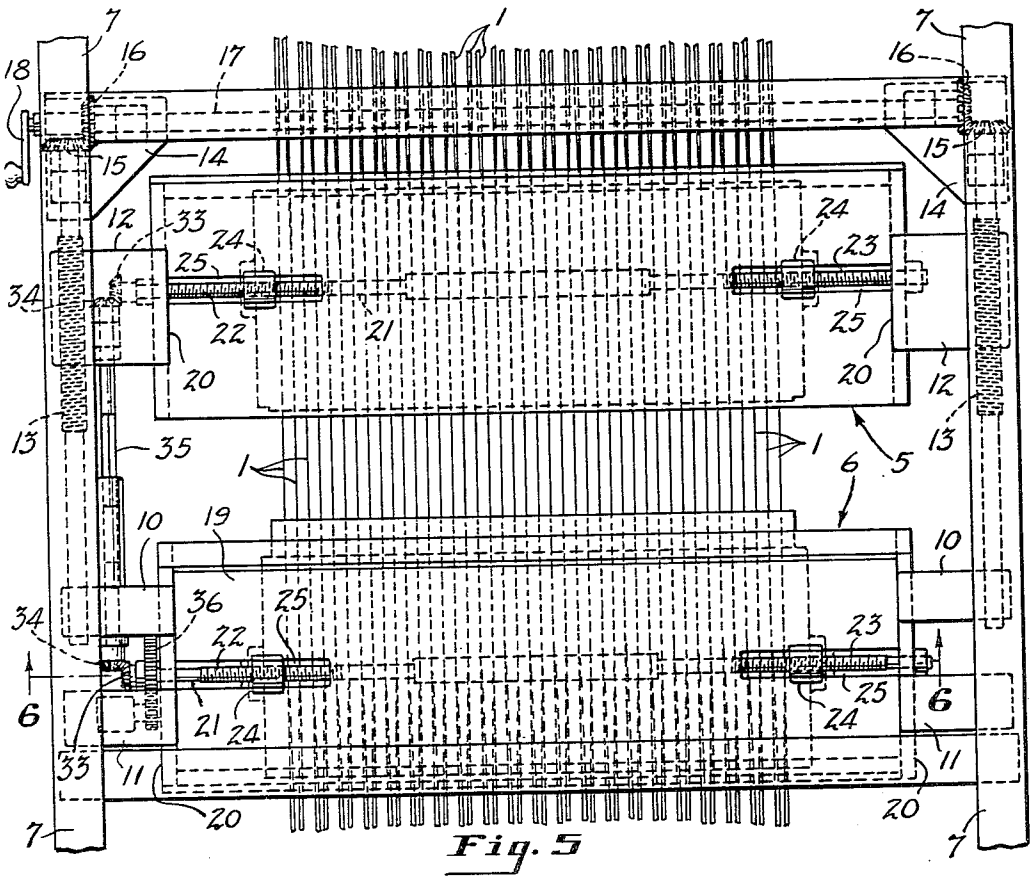


Fig. 5

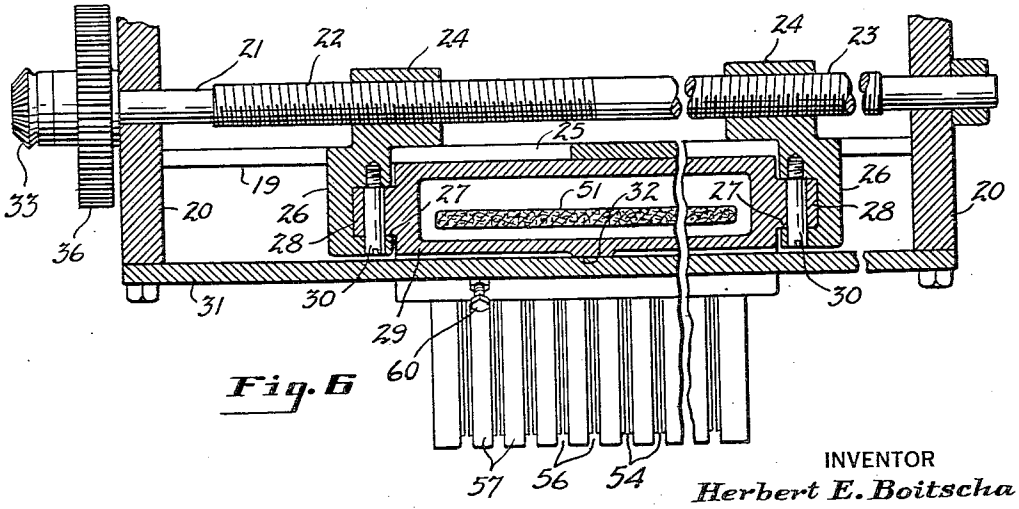


Fig. 6

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BLADE GUIDING MEANS FOR BAND BLADE SLICING MACHINES

Filed Jan. 3, 1955 4 Sheets-Sheet 3

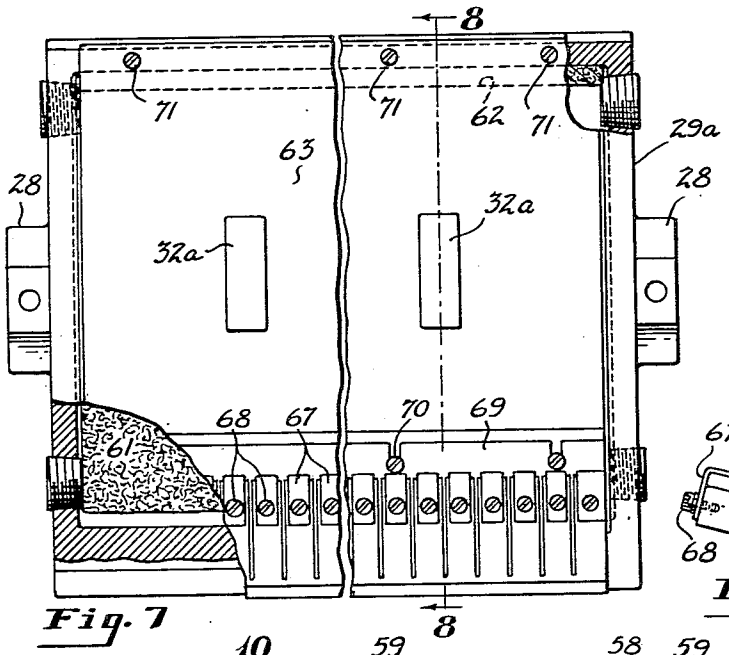


Fig. 7

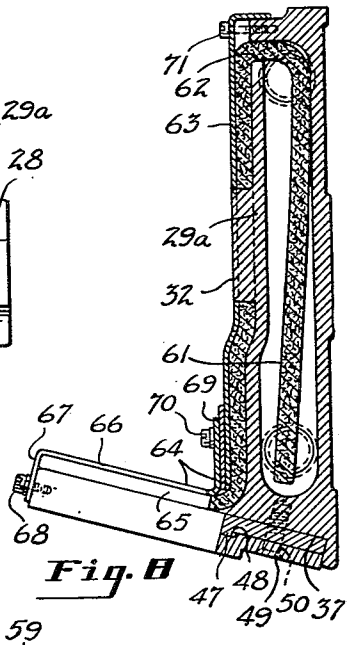


Fig. 8

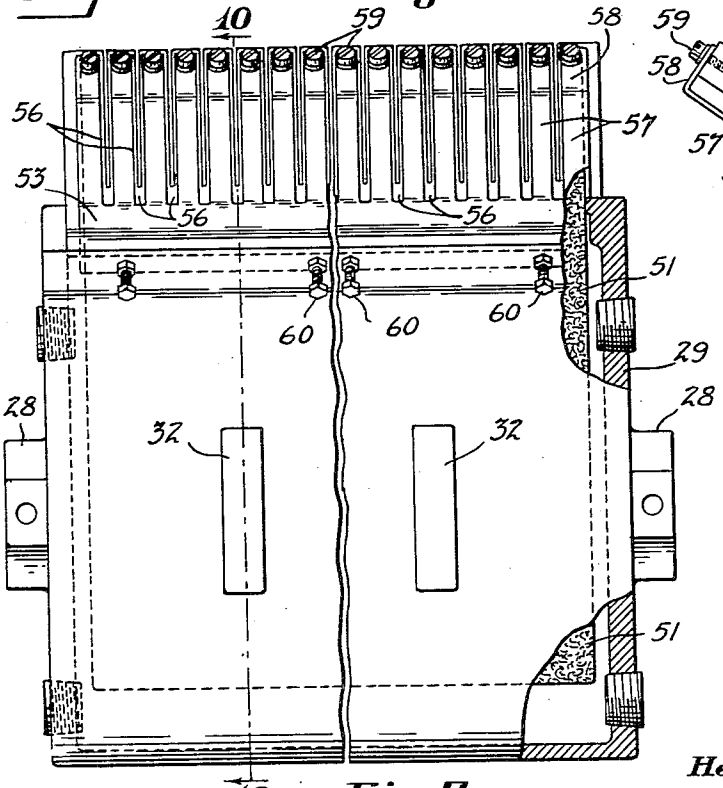


Fig. 9

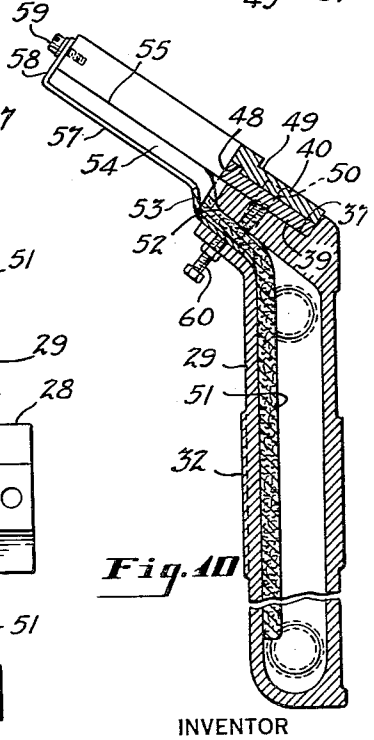


Fig. 10

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BLADE GUIDING MEANS FOR BAND BLADE SLICING MACHINES

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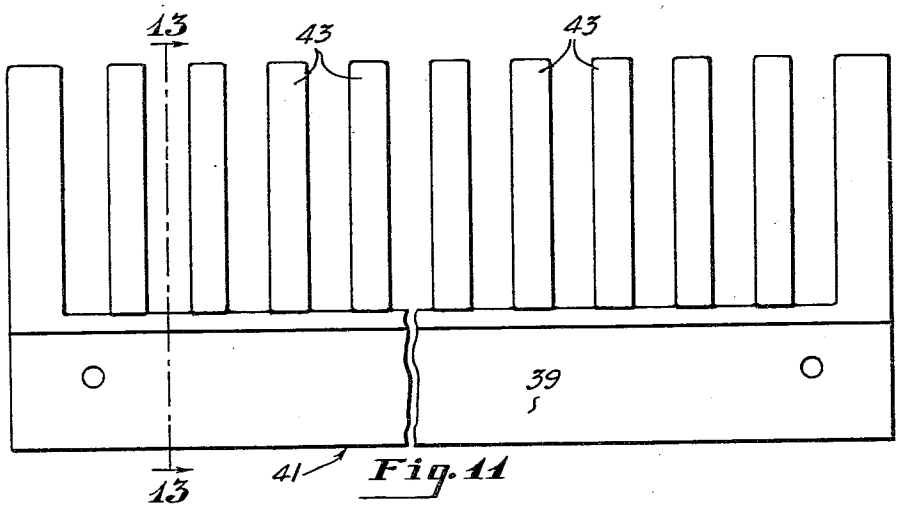


Fig. 11

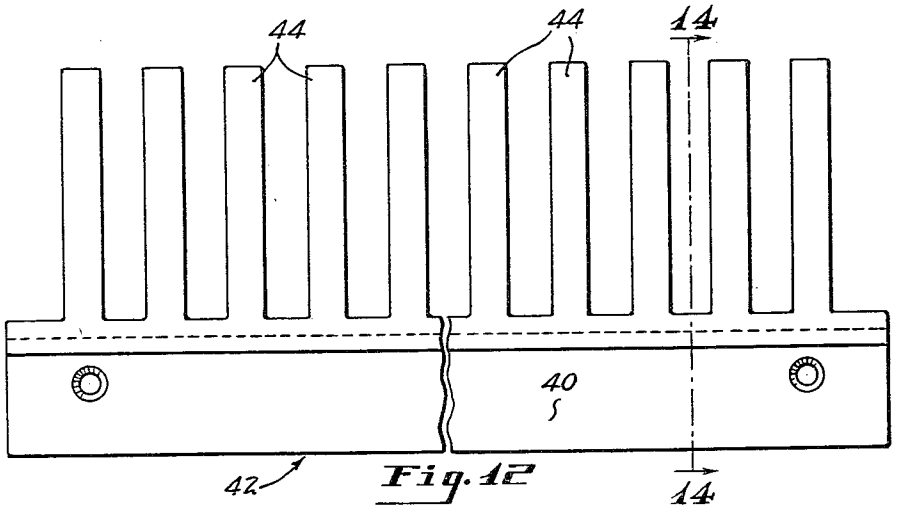


Fig. 12

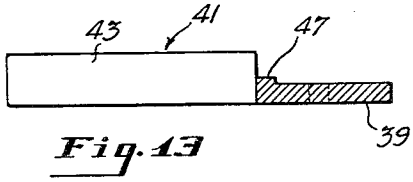


Fig. 13

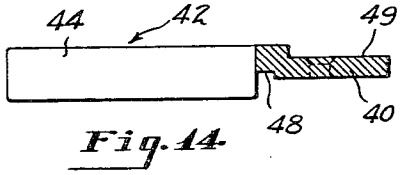


Fig. 14

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BLADE GUIDING MEANS FOR BAND BLADE SLICING MACHINES

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Application January 3, 1955, Serial No. 479,494

9 Claims. (Cl. 143—164)

This invention relates to endless band blade slicing machines and more particularly to blade guiding and blade lubricating means disposed adjacent the slicing zone.

The device of the present invention provides fixed rigid guide fingers adjacent the slicing zone which are uniformly spaced to provide narrow blade receiving slots between them, means being provided for lubricating both sides of each band blade as it passes through the slots between the fingers to reduce friction between the blades and guide fingers and to prevent adhesion of the material being sliced to the blades.

The invention is particularly applicable to endless band blade bread slicing machines of the crossed band blade type in which a series of endless blade bands run over spaced drums and are crossed between the drums and in which the loaves of bread or other articles being sliced are guided through the slicer bands at the crossing zone by band blade guides positioned above and below the crossing zone so that cuts on opposite sides of each slice are made by blades traveling in opposite directions.

The present invention provides means on both the upper and lower guides for supplying lubricant to the opposite side faces of each blade so that the side faces of all of the blades are moistened with lubricant immediately prior to their passage through the guide slots into engagement with the article being sliced, thereby reducing friction and minimizing the adherence of gummy material to the side faces of the blades.

In order to obtain smooth slices and a minimum waste of material in the form of crumbs carried through the guides by the band blades, it is desirable that the guides be provided with narrow band blade receiving slots which positively hold the blades against lateral play during their passage through the article being sliced.

In order to withstand the constant abrasion of the rapidly moving band blades, it is desirable that the guide fingers have smooth, hard, wear-resistant surfaces on the sides thereof that are contacted by the band blades. Where food products are being sliced it is essential that the guides be made of corrosion resistant metal.

It is common practice in bread slicing machines to provide guide fingers that are individually attached to relatively movable carriers in such manner that the spacing of the band blades for slices of various thicknesses may be adjusted by simultaneous adjustment of the carriers to which the individual fingers are attached. Such guide mechanisms are quite expensive and have an inherent defect in that the blade guiding slots are widened when the fingers are adjusted for thick slices. In many installations slicing machines are used continuously with the guide fingers set for slices of a given thickness and in such installations the expensive finger adjusting mechanism is of no utility. The present invention provides a guide having fixed guide fingers which are rigidly supported in closely spaced relation so as to positively hold

the blades to straight line movement during their travel through the articles being sliced.

In order to provide the fingers with blade engaging faces that are smooth and wear resistant and that are accurately formed, the present invention provides a guide which is formed by two elongated members provided with integral elongated fingers which are uniformly spaced apart a distance greater than their width, the two elongated members being superposed one upon the other in such manner that the fingers of one are located between the fingers of the other to provide narrow guide slots of uniform width and uniform spacing throughout the length of the guide. By so constructing the guides, the two parts thereof may be cast or forged and accurately machined to provide hard, wear resistant blade engaging surfaces. The fingers of each of the two parts of the guide are spaced far enough apart so that their blade engaging faces can be accurately machined and polished prior to assembly. If the blade guide members are formed of a corrosion resistant metal, the blade engaging surfaces may be hardened, ground and polished before assembly. The fingers may be plated with a hard abrasion and corrosion resistant metal such as chromium and the plated surface polished prior to assembly, so that when the two parts are assembled narrow slots are provided for the band blades which have accurately formed wear resistant surfaces for engagement with the sides of the band blades.

The guide units of the present invention are designed for mounting in the guide carriers provided in conventional band blade slicing machines so that the guide units of the present invention can be quickly and easily attached.

The present invention has for an object to provide band blade guides with efficient blade lubricating means.

A further object of the invention is to provide a guide unit which can be manufactured at low cost, which is easy to install and which is efficient in operation by reason of the provision of closely spaced rigid fingers that have smooth, accurately formed abrasion resistant blade engaging faces.

Reference should be had to the accompanying drawings forming a part of this specification, in which:

Figure 1 is a side elevation of a band blade slicing machine equipped with the blade guides of the present invention;

Fig. 2 is an end elevation of the upper guide unit with portions of the frame in section;

Fig. 3 is an end elevation of the lower guide unit with portions of the frame in section;

Fig. 4 is a fragmentary section taken on the line indicated at 4—4 in Fig. 3;

Fig. 5 is a fragmentary elevation viewed as indicated at 5—5 in Fig. 1, showing the manner in which the guide units are mounted in the slicing machine frame;

Fig. 6 is a transverse section taken on the line indicated at 6—6 in Fig. 5;

Fig. 7 is a rear elevation of the upper guide unit;

Fig. 8 is a vertical section taken on the line indicated at 8—8 in Fig. 7;

Fig. 9 is a rear elevation of the lower guide unit;

Fig. 10 is a vertical section taken on the line indicated at 10—10 in Fig. 9;

Fig. 11 is a plan view of one of the fingered guide members;

Fig. 12 is a plan view of the other fingered guide member;

Fig. 13 is a section taken on the line indicated at 13—13 in Fig. 11; and

Fig. 14 is a section taken on the line indicated at 14—14 in Fig. 12.

In Fig. 1 of the drawings the device of the present invention is shown applied to a slicing machine of the endless band blade type in which a series of endless band blades **1** run over upper and lower cylindrical drums **2** and **3** and are crossed between the drums. The machine has a frame **4** in which the drums are mounted and is provided with upper and lower guide carriers **5** and **6** that are supported on parallel side bars **7** of the machine frame. The guide carriers **5** and **6** are of the type commonly employed for supporting adjustable finger guides and are mounted on the frame above and below the crossing zone of the band blades and provide supports for upper and lower article guides **8** and **9** between which the articles are guided into engagement with the band blades.

As shown in Fig. 5, the lower guide carrier **6** is rigidly secured to the frame bars **7** by means of supporting brackets **10** and **11**. The upper carrier **5** is provided with end brackets **12** that have threaded engagement with parallel screws **13** that are rotatably mounted in the brackets **10** and in upper supporting brackets **14** attached to the bars **7**. The screws **13** have bevel gears **15** which mesh with bevel gears **16** on a cross shaft **17** to which a hand crank **18** is attached. By rotating the crank **18** the upper guide carrier **5** can be adjusted downwardly toward or upwardly away from the lower carrier **6**. The upper and lower carriers **5** and **6** are of substantially identical construction, each having a front plate **19** and end members **20**.

As shown in Figs. 5 and 6, each carrier has a horizontal shaft **21** journaled in its end members **20** and each shaft has oppositely threaded end portions **22** and **23** which extend through and have threaded engagement with blocks **24** that extend through horizontal slots **25** in the plates **19**. To the rear of the plates **19** the blocks **24** have enlarged portions **26** that are provided with oppositely facing channels **27** that receive lugs **28** on the ends of lower and upper guide supporting members **29** and **29***a*. Attaching screws **30** secure the lugs **28** to the enlarged portions **26** of the blocks and retaining bars **31** detachably secured to the end members **20**, engage bosses **32** and **32***a* on the rear faces of the supporting members **29** and **29***a* and overlie the portions **26** of the supporting blocks to which the supporting members **29** and **29***a* are attached.

Each of the cross shafts **21** has a bevel gear **33** at one end and the bevel gears **33** mesh with bevel gears **34** on an extensible shaft **35** that provides a driving connection between the two shafts **21**. The lower threaded shaft **21** may be turned by suitable means acting through a gear **36** mounted thereon to simultaneously adjust the blocks **24**. In mounting the supporting members **29** and **29***a*, the blocks **24** are moved apart far enough to permit the supporting member to be inserted between them, after which the shafts **21** may be turned to bring the blocks **24** into clamping engagement with the supporting members. The attaching screws **30** are then put in place, after which the retaining bars **31** are attached to the carriers. After the supporting members are secured in place by the screws **30**, the supporting members are held in fixed positions on the carriers.

The supporting members **29** and **29***a* carry the article guides **8** and **9** and also the blade guiding and lubricating devices. Since the upper and lower blade guides are substantially identical and attached to the supporting members in substantially the same way, the lower supporting member and the blade guides carried thereby will be described in detail and this description will apply also to corresponding parts of the upper guides to which the same reference numerals are applied.

As shown in Fig. 3, the supporting member **29** has a flat bottom recess **37** that extends across the upper end thereof, the forward end of the recess providing a shoulder **38** at right angles to the bottom of the recess. The recess **37** receives superposed attaching portions **39** and **40** of blade guide members **41** and **42** which extend the full length of the supporting member.

As shown in Fig. 11, the guide member **41** has parallel elongated fingers **43** that are uniformly spaced along the length thereof, the width of the spaces between the fingers being slightly greater than the width of the fingers.

As shown in Fig. 12, the guide member **42** has parallel elongated fingers **44** that are spaced apart a distance slightly greater than their width. The fingers **43** and **44** of the two guide members are identical in size and shape and the spaces between the fingers of the two members are of the same width so that the fingers of one of the members may be received between the fingers of the other to provide narrow blade guiding slots between the fingers. When the guide members are assembled, blade guiding slots **45** are provided between the fingers, as shown in Fig. 4, which are of a width but slightly greater than the thickness of the slicer blades.

By forming the guide fingers integrally with an attaching bar extending the full length of the guide, the fingers are rigidly supported and accurately positioned. By forming the guide in two parts, the width of the spaces between the fingers is sufficient to permit accurate machining, grinding, polishing and surface hardening of the plate engaging faces. When desired, a plating **46** of a hard, corrosion resistant metal such as chromium may be applied to the fingers, and the plating on the blade engaging sides of the fingers may be polished so that there will be a minimum of friction between the guide fingers and the band blades.

In order to enable the guide fingers **43** and **44** to be positioned with their top and bottom surfaces in parallel planes, the fingers **43** and **44** are oppositely offset with respect to their attaching portions **39** and **40**. As shown in Fig. 13, the fingers **43** are offset upwardly with respect to the attaching portion **39** and, as shown in Fig. 14, the fingers **44** are offset downwardly with respect to the attaching portion **40**. In order to properly position the superposed guide members, inter-engaging alining shoulders are provided on the attaching portions **39** and **40**. As shown in Fig. 13, the attaching portion **39** is provided with a raised portion **47** adjacent the fingers **43** and, as shown in Fig. 14, the attaching portion **40** is provided with a recess **48** to receive the raised portion **47** of the attaching member **39**. As shown in Fig. 3, the attaching portion **39** rests upon the bottom of the recess **37** with its forward edge against the shoulders **38** and the attaching portion **40** fits between the shoulder **38** and the raised portion **47** of the attaching portion **39**. The combined thickness of the attaching portions **39** and **40** adjacent the fingers **43** and **44** is the same as that of the fingers and the bottom face of the attaching portion **39** and the portion of the top face of the attaching portion **40** adjacent the fingers are in the same planes as the top and bottom faces of the fingers. The upper attaching portion **40** is provided with a recess **49** to receive the lower article guide member **9** and the upper guide member **8** fits in the recess **49** of the upper guide member.

As shown in Fig. 10, the attaching portions **39** and **40** are secured together and to the supporting member **29** by means of screws **50** which extend through holes in the guide members which are so positioned that the fingers **43** and **44** provide a series of blade guide slots which are all of the same width.

As shown in Figs. 7 to 10, the guide supporting members **29** and **29***a* are hollow and serve as reservoirs for a liquid lubricant. A wick **51** of a width corresponding to the length of the guide members has its lower end within the lubricant reservoir provided by the lower supporting member **29** and extends through an opening **52** a short distance below the blade guides. The upper end of the wick **51** is held against the under sides of the guide fingers **43** and **44** by means of a sheet metal retaining plate **53**. As best shown in Fig. 4, the upper end portion of the wick **51** has slots **54** that register with the slots **45** between the guide fingers **43** and **44**, the slots **54** providing an elongated lubricant applying pad **55**

engaging the bottom face of each of the guide fingers. The retaining plate 53 has slots 56 somewhat wider than the slots 54 that register with the slots 54 and provide the retaining plate with a retaining finger 57 for each of the lubricant applying pads 55. The outer ends of the fingers 57 have upwardly extending flanges 58 which engage the rear ends of the fingers 43 and 44 and which are attached to the fingers by means of screws 59. The forward edge of the plate 53 is clamped against the wick in the opening 52 by means of screws 60. By adjusting the screws 60, the pressure on the wick may be regulated to regulate the flow of lubricant through the wick to the applying pads 55.

Similar lubricant applying means is provided for the upper guides. As shown in Figs. 7 and 8, the upper supporting member 29a has a wick 61 which extends through an opening 62 in the upper end portion of the lubricant chamber. The wick 61 extends down the rear face of the supporting member 29a and is held against the rear face of the supporting member by means of a retaining plate 63, the wick 61 and plate 63 having openings to receive the lugs 32 on the rear face of the supporting member 29a. The lower end of the wick 61 engages the top faces of the guide fingers 43 and 44 of the upper guide unit and is held against the guide fingers by a retaining plate 64. The wick 61 has slots 65 like the slots 54 of the wick 51 and the retaining plate 64 has slots 66 like the slots 56 in the retaining plate 53 of the lower guide unit, so that lubricant is applied to opposite sides of band blades moving downwardly through the upper guides into the article being sliced. The retaining portions of the plate 64 between the slots 66 are provided with end flanges 67 engaging the ends of the guide fingers and attached to the fingers by means of screws 68.

The retaining plate 64 has an upwardly extending flange 69 that overlies the lower end of the retaining plate 63 and screws 70 passing through the flange 69 and the lower end of the plate 63 clamp the plates against the wick 61 and provide means for regulating pressure of the plates against the wick to increase or decrease the flow of lubricant through the wick. Screws 71 secure the upper ends of the plate 53 to the supporting member 29a. By means of the lubricant applying pads at the ends of the wicks 51 and 61, the blades moving upwardly through the lower guides and the blades moving downwardly through the upper guides are coated with films of lubricant prior to their engagement with the material being sliced, so that there is little tendency for the material of the article being sliced to adhere to the blade surfaces. By reason of the narrow spaces of considerable height through which the band blades pass over and below the slicing zone, the portions of the plate engaging the article being sliced are positively held against lateral movements and are caused to cut straight through the material with the formation of a minimum amount of crumbs. Since the opposite faces of each blade are supplied with a film of lubricant immediately prior to entry of the blade into a guide slot, the abrasive friction between the blades and the guide faces of the guide fingers is reduced to a minimum. By forming alternate guide fingers integral with separate attaching bars, accurate spacing is obtained and accurately formed, smooth guide surfaces on the opposite sides of the narrow guide slots are made possible.

It is to be understood that in accordance with the provisions of the patent statutes, variations and modifications of the specific devices herein shown and described may be made without departing from the spirit of the invention.

What I claim is:

1. A blade guide for band blade slicing machines comprising two members, each having an elongated attaching portion and a series of parallel guide fingers integral with said attaching portion and projecting laterally from one side thereof, the guide fingers of each of said members being of uniform width and uniformly spaced, the width of the spaces between fingers being greater than the width of the fingers, and means for securing the attaching portions of said members together in superposed relation with the fingers of each interposed between and spaced from the fingers of the other to provide blade receiving slots.

2. A blade guide for band blade slicing machines comprising two members, each having an elongated attaching portion and a series of parallel guide fingers integral with said attaching portion and projecting laterally from one side thereof, the guide fingers of each of said members being of uniform width and uniformly spaced, the width of the spaces between fingers being greater than the width of the fingers, the fingers of each of said members being of greater thickness than the attaching portion thereof and the attaching portions of said members having interengaging longitudinal alining shoulders, and means for securing said attaching portions together with said shoulders in engagement and with fingers of each interposed between fingers of the other to provide uniformly spaced blade receiving slots of uniform width.

3. A blade guide for band blade slicing machines comprising two members, each having an elongated attaching portion and a series of parallel guide fingers integral with said attaching portion and projecting laterally from one side thereof, the guide fingers of each of said members being of uniform width and uniformly spaced, the width of the spaces between fingers being greater than the width of the fingers, the fingers of each of said members having flat faces lying in a single plane, the attaching portions of the two members being so disposed with respect to the face plane of its fingers that the said attaching portions may be superposed one upon the other with the fingers of each interposed between fingers of the other and with said flat faces of all the fingers in the same plane, and means for securing said attaching portions together with fingers of one member midway between fingers of the other to provide uniformly spaced blade slots and flat article guiding portions between the slots.

4. A blade guide for band blade slicing machines comprising two members, each having an elongated attaching portion and a series of parallel guide fingers integral with said attaching portion and projecting laterally from one side thereof, the guide fingers of each of said members being of uniform width and uniformly spaced, the width of the spaces between fingers being greater than the width of the fingers, the blade engaging side faces of each of said fingers having a uniform plating composed of a wear resistant and corrosion resistant metal, and means for securing the attaching portions of said members together in superposed relation with the fingers of each interposed between and spaced from the fingers of the other to provide narrow blade receiving slots between said plated surfaces.

5. A blade guide for band blade slicing machines comprising two members, each having an elongated attaching portion and a series of parallel guide fingers integral with said attaching portion and projecting laterally from one side thereof, the guide fingers of each of said members being of uniform width and uniformly spaced, the width of the spaces between fingers being greater than the width of the fingers, the fingers of each of said members being of greater thickness than the attaching portion thereof and having flat top faces lying in a single plane and flat bottom faces lying in a parallel plane, the attaching portion of one of said members having a face portion in the plane of the top faces of its fingers and the attaching portion of the other of said members having a face portion in the plane of the bottom faces of its fingers, said attaching portions being of a thickness such that they may be superposed one upon the other with the fingers of one of the members interposed between the

fingers of the other and the top and bottom faces of the fingers of the two members in the same planes, and means for securing said attaching portions together with all the fingers uniformly spaced to provide blade receiving slots between them.

6. A blade guide for band blade slicing machines comprising a supporting member disposed transversely of the band blades, a pair of finger members each having an elongated attaching portion running generally parallel to said supporting member and fixed thereto, and a series of parallel guide fingers integral with said attaching portion and projecting laterally from one side thereof, the guide fingers of each of said members being of uniform width and uniformly spaced, the width between adjacent pairs of fingers associated with each of said attaching portions being greater than the width of the fingers, said attaching portions being mounted together in superposed relation on said supporting member with fingers of each interposed between and spaced from the fingers of the other to provide blade receiving slots, a lubricant reservoir carried by said supporting member and extending along the majority of the length thereof, a wick comprising a wide pad received in said lubricant reservoir, the width of said pad extending along the length of said reservoir, said pad extending out of said reservoir and into engagement with one side of said fingers, a retaining plate having slots that register with said blade receiving slots between said fingers, said retaining plate providing a retaining strip for the portion of said wick adjacent said fingers, said wick having slots at its finger-engaging end that register with the retaining plate slots.

7. A blade guide for band blade slicing machines comprising a supporting member disposed transversely of the band blades, a pair of finger members each having an elongated attaching portion running generally parallel to said supporting member and fixed thereto, and a series of parallel guide fingers integral with said attaching portion and projecting laterally from one side thereof, the guide fingers of each of said members being of uniform width and uniformly spaced, the width between adjacent pairs of fingers associated with each of said attaching portions being greater than the width of the fingers, said attaching portions being mounted together in superposed relation on said supportnig member with fingers of each interposed between and spaced from the fingers of the other to provide blade receiving slots, a lubricant reservoir carried by said supporting member and extending along the majority of the length thereof, a wick comprising a wide pad received in said lubricant reservoir, the width of said pad extending along the length of said reservoir, said pad extending out of said reservoir and into engagement with one side of said fingers, a retaining plate having slots that register with said blade receiving slots between said fingers, said retaining plate providing a retaining strip for the portion of said wick adjacent said fingers, said wick having slots at its finger-engaging end that register with the retaining plate slots, and means to adjustably tighten said retaining plate against said pad across the width thereof to control the amount of lubricant supplied to said blade receiving slots.

8. A blade guide for band blade slicing machines comprising a supporting member disposed transversely of the band blades, a pair of finger members each having an elongated attaching portion running generally parallel to said supporting member and fixed thereto, and a series of parallel guide fingers integral with said attaching portion and projecting laterally from one side thereof, the guide fingers of each of said members being of uniform width and uniformly spaced, the width between adjacent pairs of fingers associated with each of said attaching portions being greater than the width of the fingers, said attaching portions being mounted together in superposed relation on said supporting member with fingers of each interposed between and spaced from the fingers of the other to provide blade receiving slots, the blade engaging side faces of each of said fingers having a uniform plating composed of a wear-resistant and corrosion-resistant metal, a lubricant reservoir carried by said supporting member and extending along the majority of the length thereof, a wick comprising a wide pad received in said lubricant reservoir, the width of said pad extending along the length of said reservoir, said pad extending out of said reservoir and into engagement with one side of said fingers, a retaining plate having slots that register with said blade receiving slots between said fingers, said retaining plate providing a retaining strip for the portion of said wick adjacent said fingers, said wick having slots at its finger-engaging end that register with the retaining plate slots.

9. A blade guide for band blade slicing machines comprising a supporting member disposed transversely of the band blades, a plurality of guide fingers disposed transversely of the band blades and mounted on said supporting member, blade receiving slots being defined between said fingers, a lubricant reservoir carried by said supporting member and extending along the majority of the length thereof, a wick comprising a wide pad received in said lubricant reservoir, the width of said pad extending along the length of said reservoir, said pad extending out of said reservoir and into engagement with one side of said fingers, a retaining plate having slots that register with said blade receiving slots between said fingers, said retaining plate providing a retaining strip for the portion of said wick adjacent said fingers, said wick having slots at its finger-engaging end that register with the retaining plate slots.

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