

Dec. 7, 1943.

T. K. WALMA

2,336,050

ADJUSTING MEANS FOR CUTTING BLADES

Filed Aug. 24, 1942

4 Sheets-Sheet 1

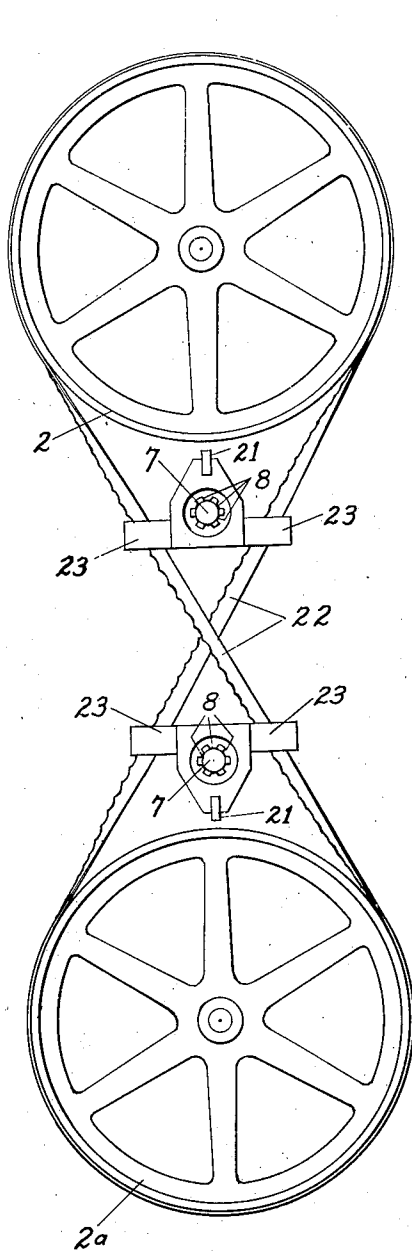


Fig. 1

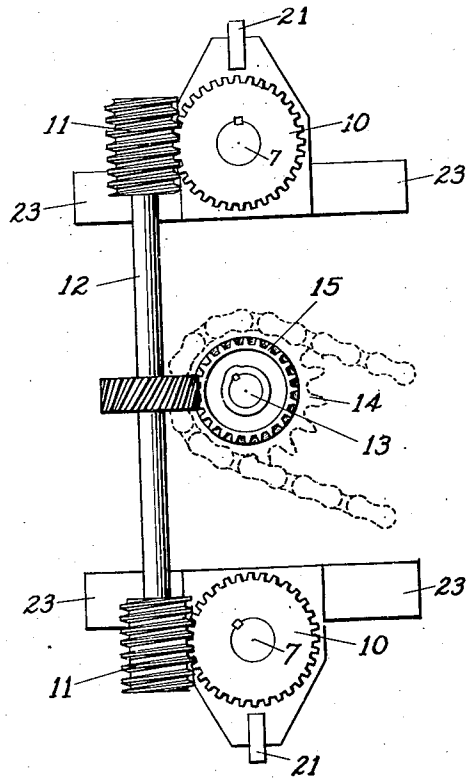


Fig. 2

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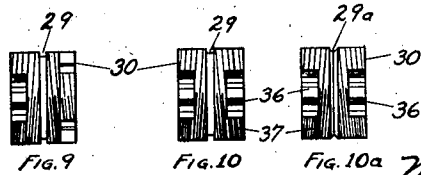
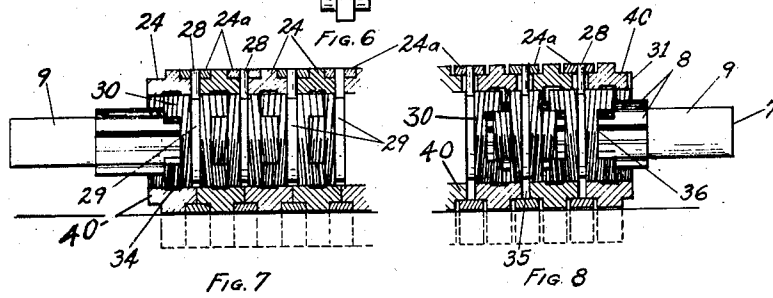
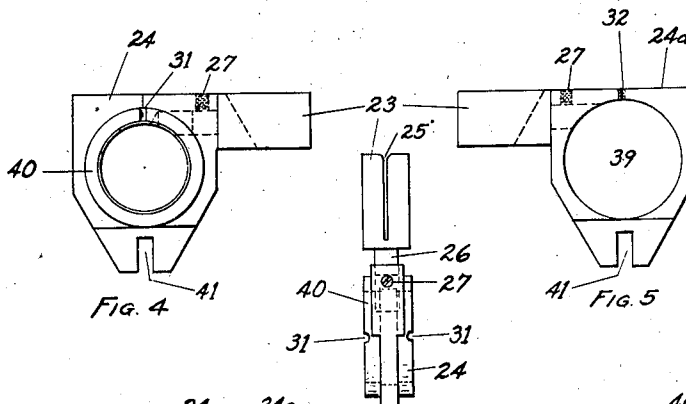
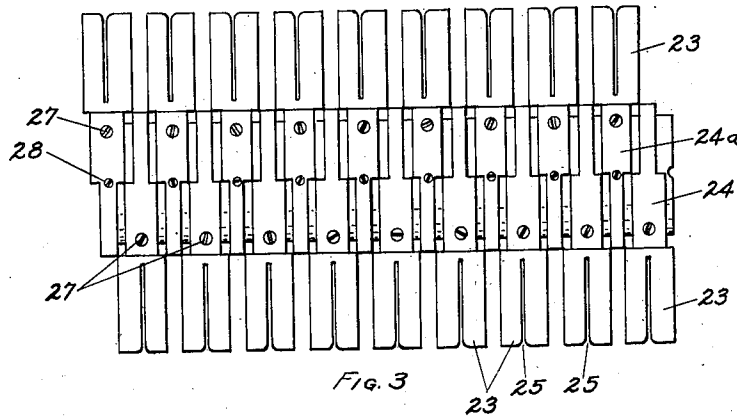
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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

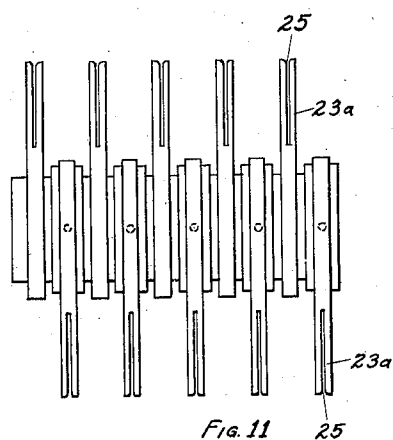


Fig. 11

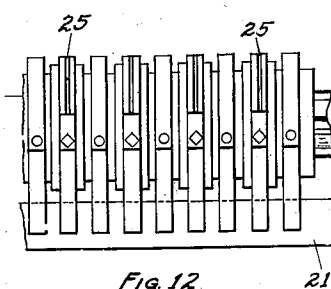


Fig. 12

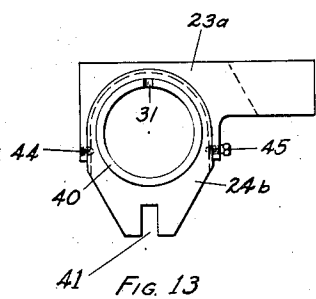


Fig. 13

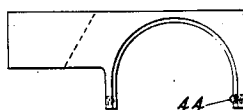


Fig. 14

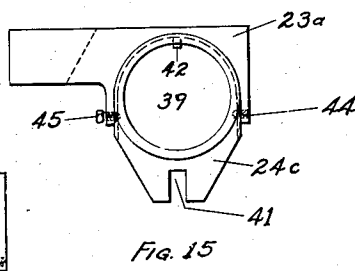


Fig. 15

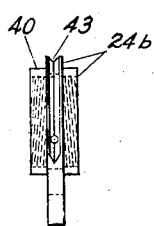


Fig. 16

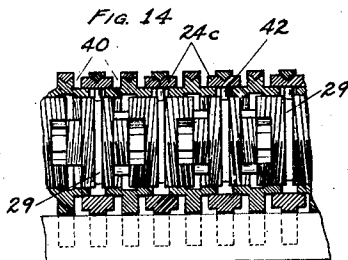


Fig. 17

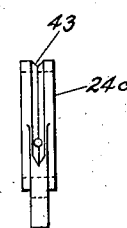


Fig. 18

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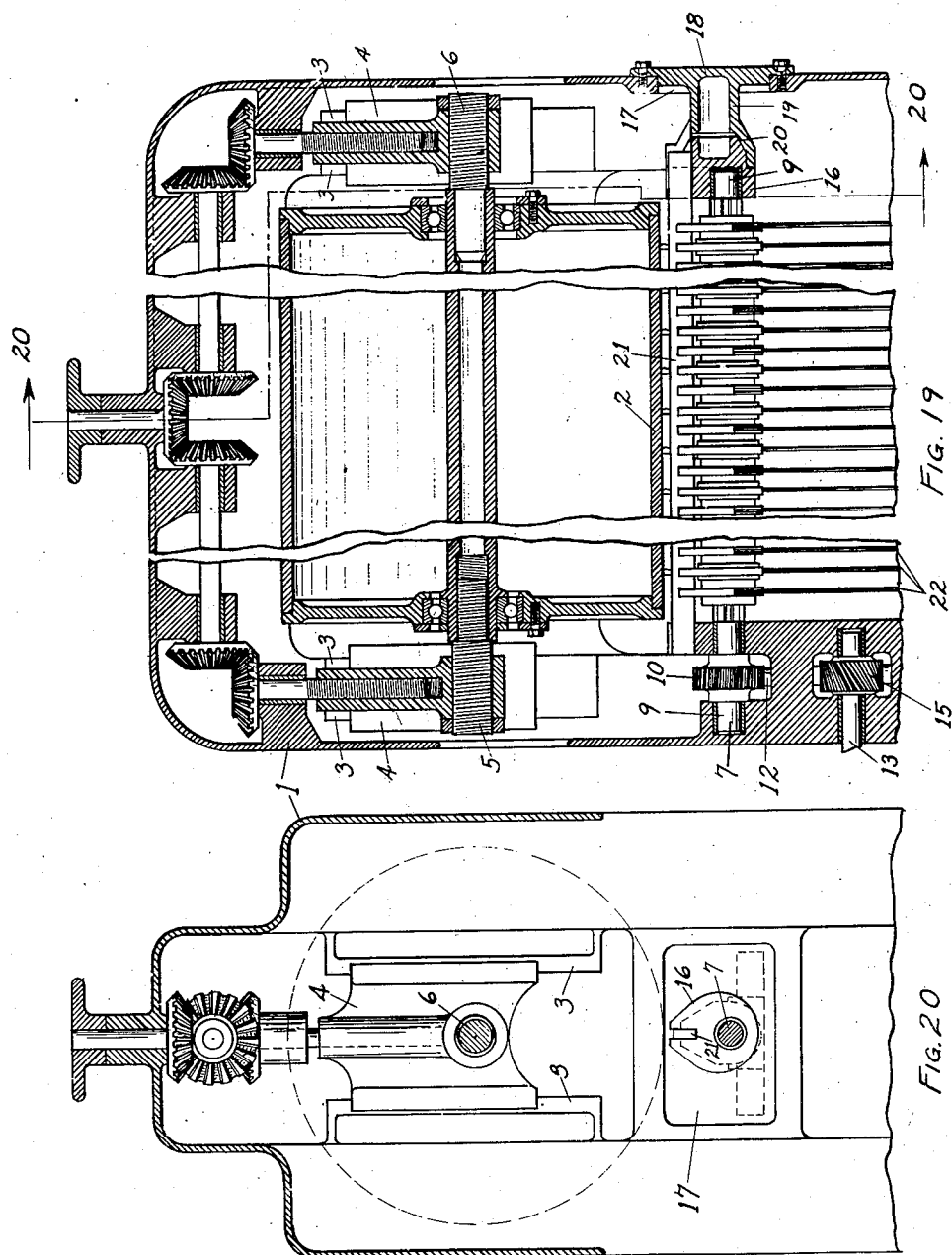
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ADJUSTING MEANS FOR CUTTING BLADES

Filed Aug. 24, 1942

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,336,050

ADJUSTING MEANS FOR CUTTING BLADES

Theodore K. Walma, Iowa City, Iowa

Application August 24, 1942, Serial No. 456,111

18 Claims. (Cl. 146—88)

This invention pertains to mechanism for adjusting the spacing of cutting blades and more particularly to mechanism for adjusting the spacing of blades in a bread-slicing machine, whether this be of the reciprocating cutter type, the band blade type, or any other type, such as the annular type. This invention is shown in its application to a machine of the band blade type, now the most popular variety for heavy duty. The illustration in Fig. 1 is, intentionally, somewhat compressed vertically; that is, its vertical and horizontal dimensions are somewhat out of proportion. However, this does not detract from the showing, so far as illustration of the applicable principle is concerned.

The present invention is essentially the carrying forward and improvement upon the structure of my Reissue Patent No. 21,376, granted February 27, 1940. It comprises among its objects the provision of improved means for altering the spacing of substantially parallel cutting blades; the provision of improved means for simultaneously adjusting the spacing of slicing machine blades in a machine having several slicing blades; the provision of improved means for guiding slicing machine blades whereby to insure their proper positioning at all times; and such further objects, advantages, and capabilities as will hereafter appear and as are inherent in the structure disclosed herein. My invention further resides in the combination, construction, and arrangement of parts illustrated in the accompanying drawings and, while I have shown therein what is now regarded as the preferred embodiment of this invention, I desire the same to be understood as illustrative only and not to be interpreted in a limiting sense.

In the drawings annexed hereto and forming a part hereof,

Fig. 1 represents an end elevation of the blade-carrying drums of a band blade machine and the spacing means for causing shifting of the blades on the drums;

Fig. 2 represents an end elevation of the driving mechanism for operating the spacing mechanism;

Fig. 3 represents a plan view of a group of blade guides in partly expanded position;

Figs. 4 and 5 are elevational views of the two types of blade guiding members which are used in making up the assembly shown in Fig. 3;

Fig. 6 represents a plan view of the structure shown in Fig. 4;

Fig. 7 represents a fragmentary vertical lon-

gitudinal section of the adjusting mechanism, collapsed;

Fig. 8 represents a partly expanded view of the same structure;

Figs. 9 and 10 represent two differently constructed but similar adjusting units for adjusting the blade guides;

Fig. 10a illustrates a slightly modified form of the structure shown in Fig. 10;

Fig. 11 represents a modified form of the structure shown in Fig. 3, the same being shown in plan;

Fig. 12 represents an elevation of the structure shown in Fig. 11;

Figs. 13 and 15 are views similar to Figs. 4 and 5 but illustrating the modification represented in Fig. 11;

Fig. 14 represents an elevation of a part of the structure shown in Figs. 13 and 15;

Figs. 16 and 18 represent edge views of the two forms of adjusting means for the blade guides shown in the views of this modification;

Fig. 17 represents a vertical longitudinal section similar to Fig. 8, illustrating the structure embodied in this modification;

Fig. 19 represents a vertical longitudinal central section, partly broken away, of a slicing machine embodying this invention; and

Fig. 20 represents a vertical transverse section taken substantially along the broken plane indicated by the line 20—20, Fig. 19.

Reference will now be made in greater detail to the annexed drawings for a more complete description of this invention. As shown in Figs. 19 and 20, the frame 1 of the machine is provided with adjusting mechanism for vertically adjusting the upper band blade supporting drum 2 of a band blade machine. At the two ends of the machine are guides 3 for the slides 4 which carry the end supports 5 and 6 for the drum 2. Inasmuch as this structure forms no part of my invention and is illustrated merely for the purpose of showing an operative construction, it is not believed necessary to go into further detail concerning the adjusting means for tensioning the blades.

Somewhat below the upper drum 2 is a shaft 7 having grooves 8 formed longitudinally thereof for a purpose to be presently explained. A comparable shaft 7, similarly fluted, is spaced downwardly from the upper shaft and between it and the lower drum 2a, comparable to the upper drum 2. As shown in Fig. 19, suitable means are provided for supporting these two drums. The grooved shafts 7 take the place of and do

the work of the angular shafts 5 of my Reissue Patent No. 21,376, referred to above. As shown in Figs. 7 and 8, the extremities of the shaft 7 are reduced and made cylindrical, as indicated at 9, to provide bearing ends adapted to fit in suitable bearings in the frame of the machine. Each of the shafts 7 is provided at one end with a worm gear 10, and these mesh with worms 11 carried by the shaft 12 which is provided with suitable driving means, shown in Fig. 2 as a worm gearing, sprocket and chain. The shaft 13, on which the sprocket 14 is mounted, might be provided with other driving means, such as a crank. The worm gear 15 is connected to the shaft 13 in any suitable driving relation as, for example, by means of a key.

Socket members 16 furnish support for the second end of the shafts 7, each being provided with a suitable socket and bearing material for rotatably supporting the cylindrical ends 9 of the shafts. The end of the frame is provided with an opening 17 of a size sufficient to permit removal therethrough of the blade guide assembly, including the support 16, the shaft 7, and the guide members supported thereby. This opening 17 is closed by a removable plate 18 provided on its inner surface with a boss 19 which has a socket 20 in which the support 16 is received to be rigidly supported.

One end of the frame and the supporting block 16 are provided with notches for the reception of a guiding bar 21, as shown in Figs. 19 and 20, this bar serving to prevent rotation of the blade guide units about the shafts 7. In Fig. 20, the location of the blade guide unit is shown in dotted lines within the outline of the opening 17.

As shown in Fig. 1, when this invention is used in connection with a band blade machine, the blades 22 are twisted into the form of a figure 8. That this is common practice is shown by Sperry Patent No. 469,177, Criner Patents No. 1,937,332 and No. 2,022,187, and various other patents. These blades 22 are looped over the upper and lower drums 2 and 2a and their intermediate portions are passed through the slots in the arms 23 of the guiding members, as shown most clearly in Fig. 1. It is not regarded as necessary to show the driving means for the drums and blades as this is old structure and may take any one of several well known forms.

Reference has been made above to the adjusting means, broadly, as shown in Fig. 2. Specifically, the parts of this adjusting means may take any one of several forms, some of which are shown in Figs. 3 to 18, inclusive. It will be seen that the slotted arms 23 and 23a may be thick and heavy, as shown in Figs. 3 to 6, inclusive, or may be thin and light, as shown in Figs. 11 to 18, inclusive. We will first refer to the form shown on Sheet 3 of the drawings. From Figs. 4, 5, and 6, it will appear that these blade guides comprise, in addition to the slotted fingers 23, a body member 24 or 24a. A slot 25 is provided in each finger for the reception of the slicing blade, and it will be noted from Fig. 3, as well as from Fig. 2, that these fingers extend in opposite directions from the shafts 7. Each body member 24 or 24a is provided with a lateral opening for the reception of a pin 26 projecting from the inner face of the finger. When this pin is pushed into the opening and the set screw turned in, as shown at 27, the finger is held in place with relation to the body member.

If for any reason one of the fingers 23 gets badly worn or if for any other reason it seems

advisable to replace it, this can be done without disassembling the machine. However, it is not commonly necessary to replace these fingers but this provision is made in order to make the machine as universally adaptable as possible. In Fig. 6, the finger 23 is shown partly withdrawn from the body member 24, thus exposing the pin 26.

The body members 24a are provided with inwardly projecting pins 28 which reach into grooves 29 or 29a in the internal nuts 30 which are rotatable with and slidable upon the shafts 7. In Fig. 10a, the groove 29a is similar to the groove 29 of the other figures except that it is V-shaped instead of being rectangular. Therefore, if the pins 28 have their inner ends pointed at approximately the same angle as the grooves 29a, then forcing these pins into the grooves will cause a close fit of these parts and prevent longitudinal motion of the nuts 30, other than desired.

Each nut 30 has six internal ribs to fit and slide in the grooves 8 of the shafts 7. It is apparent from this that each shaft 7 is provided with six longitudinal grooves separated by six similarly shaped ribs, each of which occupies approximately thirty degrees (30°) of the circumference of the shaft. As shown in Fig. 6, each body member 24 is provided with a semicircular notch 31 upon opposite sides thereof, while the body members 24a are provided with openings, as shown at 32, for the reception of the pins 28 which engage in the grooves 29a. Furthermore, when these guide members are collapsed, longitudinally of the shaft, the pins 28 engage in the grooves 29 or 29a, as the case may be, and hold the members 24a centrally positioned with relation to the nuts 30.

The internal nuts 30 are threaded externally, upon opposite sides of the grooves 29 and 29a, one-half being provided with right hand threads and the other half with left hand threads. The body members 24 are provided internally with grooves 34 which are shallow but occupy approximately the central one-third of the internal surface of the body members. The other two-thirds are provided with right and left hand threads to interfit with the external threads of the nuts 30. Therefore, a nut may screw approximately two-thirds of the way through a body member 24 before it strikes against the wall of the groove 34 separating the threading in the end portions of the internal surface. Therefore, when the nut 30 is screwed into two adjacent body members 24, the opposite threading results in the two body members being drawn toward each other with the result that, as shown in Fig. 7, the body members are not separated by a space, as shown at 35 in Fig. 8. The grooves 29 or 29a permit the rotation of the nuts 30 with relation to the pins 28, as is clear from Figs. 7 and 8.

The size and arrangement of the notches 36 and intervening portions 37 of the nut bodies is such that these may interfit and overlap, as shown in Figs. 7 and 8. The notches 31 receive the pins 28 and thus permit the body members 24 to completely collapse longitudinally of the shafts 7, the faces of the body members 24 engaging each other, as shown in Fig. 7. Because of the interfitting of the parts of the nuts 30, it is possible to have longer nuts and still get the blade guides close enough together for the cutting of three-eighths inch ($\frac{3}{8}$ "') slices, normally regarded as the minimum thickness of slice desirable when cutting bread. At the same time, the

increased length of the nuts permits expansion of the blade guides to three-quarters of an inch without the threads of the nuts and body members disengaging. Thus there is positive drive from minimum to maximum, and reverse, when changing the spacing of the blades.

The openings 39 in the body members 24a are large enough to receive within them the parts 40 of the body members 24. This is clear from Figs. 7 and 8. From what has been said, it is apparent that rotation of the shafts 7 will cause rotation of the nuts 30 simultaneously and in equal amounts. It is also clear that such rotation of the nuts 30 will cause them to be screwed into or out of adjacent pairs of body members 24, resulting in separation or bringing together of the guide fingers 23 and guide slots 25, thereby varying the spacing of the blades 22. The only difference between the structures of Figs. 9 and 10 is the difference in location of the notches or indentations 36 and the intervening projections 37.

In the structure shown on Sheet 3, the shape of the body members 24b and 24c is not essentially different from that of Sheet 2. However, the guide fingers, as shown in Fig. 14, are shaped as saddles which fit over the body members and are received in grooves therein, the inner face of the saddle being V-shaped in configuration to fit into a similarly shaped groove in the body member. Since it is not necessary to provide a mass of material to receive pins 26, the guide fingers 23a, as shown in Fig. 11, are substantially the same thickness throughout and are thin enough to leave some space therebetween when the spacing mechanism is completely collapsed.

The openings 39 in the body members 24c, as in the structure previously described, are of a size to receive therein the parts 40 of the body members 24b. All of the body members, in both forms described, are provided with slots 41 for the reception of the guide bars 21.

The guide fingers 23a of Figs. 13 and 15 are the same with the exception that one is provided with a pin 42 which extends into the groove 43 of the body member 24c and serves the same purpose as the pins 28 of the structure previously described, namely, to keep the guide finger and body member properly positioned with relation to the nut with which it cooperates by entering into the groove 29 or 29a. The downwardly or upwardly extending arms of the guide fingers are provided with screws 44 and 45 which extend into the grooves 43 of body members 24b and 24c to hold the guide fingers properly positioned with relation to the body members and prevent inadvertent detachment thereof from the body members.

It is clear from the foregoing description and the attached drawings that I have provided a structure capable of fulfilling all of the objects of this invention as set forth herein.

While I have described this invention with considerable particularity, I desire it understood that I do not wish my claims to be limited to the specific details set forth herein but desire that this disclosure shall be interpreted merely as illustrative of the principles involved.

Having now described my invention, I claim:

1. Blade guiding mechanism for a band blade bread-slicing machine comprising upper and lower supporting shafts for blade-engaging members, said shafts being non-circular in cross-section, blade-engaging members supported and positioned by said shafts, said members each comprising a body and a longitudinally slitted finger

extending transversely of the length of the shafts, guiding means engaged by said bodies and serving to prevent revolution of the bodies about the axes of the shafts, alternate fingers extending in opposite directions with relation to the shafts, and externally screw-threaded members connecting non-adjacent bodies, said screw-threaded members being slidably mounted on said shafts, being fitted thereto to be non-rotatable with relation thereto, and being rotated by rotation of said shafts, the remaining alternate body members surrounding parts of other body members adjacent thereto and being slidably connected thereto, and means for holding said remaining alternate body members centered longitudinally of said externally screw-threaded members.

2. In a bread-slicing machine, blade-adjusting means comprising a shaft non-circular in cross-section, and having angles extending longitudinally thereof, externally screw-threaded blocks having longitudinally extending openings of substantially the same form as the cross-section of the shaft, so that, upon rotation of the shaft, the blocks will be rotated simultaneously therewith, the threading at opposite ends of the blocks being of opposite inclination, the blocks having at their ends projections and depressions of similar dimensions alternating around the shaft so that the depressions and projections upon adjacent ends of abutting blocks may interfit and the alternating projections overlap, and blade-guiding means surrounding said blocks and having operative screw-threaded connection therewith so that said means will be caused to approach and recede from each other upon rotation of the shaft.

3. In a blade adjusting mechanism, a longitudinally grooved shaft, longitudinally apertured blocks in which the longitudinal apertures have substantially the same cross-sectional size and form as the external form of the shaft whereby to make it possible for the blocks to slide longitudinally of the shaft without rotational lost motion, said blocks having upon their ends alternating projections and depressions of similar size and form enabling the projections upon the end of one block to fit into the depressions between the projections upon the end of the next block, said blocks having their external surfaces roughly cylindrical and screw-threaded in opposite directions at opposite ends, and body members surrounding said blocks, said body members having openings therethrough for the reception of said blocks, said openings being substantially the same size as the external surface of the blocks and being similarly screw-threaded whereby to cooperate with the threads of the blocks.

4. In a blade adjusting mechanism, a longitudinally grooved shaft, longitudinally apertured blocks in which the longitudinal apertures have substantially the same cross-sectional size and form as the external form of the shaft whereby to make it possible for the blocks to slide longitudinally of the shaft without rotational lost motion, said blocks having upon their ends alternating projections and depressions of similar size and form enabling the projections of one block to fit into the depressions between the projections of the next block, said blocks having their external surfaces roughly cylindrical and screw-threaded in opposite directions at opposite ends, the body members surrounding said blocks, said body members having openings therethrough for the reception of said blocks, said openings being substantially the same size as the external surface of

the blocks and being similarly screw-threaded whereby to cooperate with the threads of the blocks, said body members having the central portion of their internal openings enlarged and devoid of threads whereby said central portion is free from engagement with the threads of the blocks.

5. In a blade adjusting mechanism, a longitudinally grooved shaft, longitudinally apertured blocks in which the longitudinal apertures have substantially the same cross-sectional size and form as the external form of the shaft whereby to make it possible for the blocks to slide longitudinally of the shaft without rotational lost motion, said blocks having upon their ends alternating projections and depressions of similar size and form enabling the projections of one block to fit into the depressions between the projections of the next block, said blocks having their external surfaces roughly cylindrical and screw-threaded oppositely upon the opposite end portions, body members surrounding said blocks, part of said body members having openings there-through for the reception of said blocks, said openings being substantially the same size as the external surface of the blocks and being similarly screw-threaded whereby to cooperate with the threads of the blocks, said screw-threaded body members having the central portion of their internal openings enlarged and devoid of threads whereby said central portion is free from engagement with the threads of the blocks, and other body members surrounding and closely fitting portions of pairs of adjacent body members having screw-threaded engagement with said inter-fitting blocks.

6. In a blade space adjusting mechanism for a bread slicing machine, a shaft, a series of blocks fitting around said shaft and slidable therealong, a series of body members fitting closely around said blocks and cooperating therewith, a second series of body members fitting closely around the first series of body members and cooperating therewith and with the blocks, and guide fingers projecting from said body members in opposite directions, the shaft, blocks, and body members having interfitting connections such that when the shaft is rotated the body members will be caused to approach or separate in a manner to keep adjacent guide fingers equally spaced from each other along the series.

7. In a blade space adjusting mechanism for a bread slicing machine, a shaft, a series of blocks fitting around said shaft and slidable therealong, a series of body members fitting closely around said blocks and cooperating therewith, a second series of body members fitting closely around the first series of body members and cooperating therewith and with the blocks, and guide fingers projecting from said body members in opposite directions, the shaft, blocks, and body members having interfitting connections such that when the shaft is rotated the body members will be caused to approach or separate in a manner to keep adjacent guide fingers equally spaced from each other along the series, the shaft and blocks having interrelated grooves and ridges slidably fitting together whereby rotation of the shaft will cause similar rotation of the blocks.

8. In a blade space adjusting mechanism for a bread slicing machine, a shaft, a series of blocks fitting around said shaft and slidable therealong, a series of body members fitting closely around said blocks and cooperating therewith, a second series of body members fit-

ting closely around the first series of body members and cooperating therewith and with the blocks, and guide fingers projecting from said body members in opposite directions, the shaft, blocks, and body members having interfitting connections such that when the shaft is rotated the body members will be caused to approach or separate in a manner to keep adjacent guide fingers equally spaced from each other along the series, the blocks having centrally arranged circumferential grooves and having their ends upon opposite sides of said grooves screw-threaded in opposite directions, and the body members engaging and cooperating with said blocks having similar threads to cooperate with the threads of the blocks.

9. A blade spacing mechanism comprising, in combination, a pair spaced, substantially parallel, shafts provided externally with longitudinally extending surfaces arranged angularly with relation to each other, said shafts being spaced sufficiently to permit loaves of bread to pass between them, blocks surrounding said shafts, said blocks being provided with openings of substantially the same shape and size as the cross-section of the shafts and being provided externally with screw threads, blade guiding members mounted upon and having operative connection with said blocks so that upon rotation of said shafts the guiding members will be caused to move longitudinally of said shafts and maintain substantially uniform spacing of the blades, cutting blades extending through said guiding members and moved laterally thereby as said shafts are rotated, and driving means positively connecting said shafts for causing simultaneous movement of said guiding members along the shafts, alternate ones of said guiding members extending laterally from said shafts in one direction and the remaining alternate ones thereof extending in the opposite direction, each of said guiding members being progressively thicker by steps from the outer blade-engaging end to the inner end in a direction transversely of said shafts.

10. A blade spacing mechanism comprising, in combination, a pair of spaced, substantially parallel, shafts provided externally with longitudinally extending surfaces arranged angularly with relation to each other, said shafts being spaced sufficiently to permit loaves of bread to pass between them, blocks surrounding said shafts, said blocks being provided with openings of substantially the same shape and size as the cross-section of the shafts and being provided externally with screw threads, blade guiding members mounted upon and having screw-threaded connection with said blocks so that upon rotation of said shafts the guiding members will be caused to move longitudinally of said shafts and maintain substantially uniform spacing of the blades, cutting blades extending through said guiding members and moved laterally thereby as said shafts are rotated, and driving means positively connecting said shafts for causing simultaneous movement of said guiding members along the shafts, alternate ones of said guiding members constituting a set and extending laterally from said shafts in one direction and the remaining alternate ones thereof constituting another set and extending in the opposite direction, each of said guiding members being progressively thicker by steps from one end to the other in a direction transversely of said shafts and having its thicker end pro-

vided with a slot for the reception of a cutting blade, the thinner ends of one set of guiding members being aligned longitudinally of said shafts with the parts of intermediate thickness of the other set.

11. A blade spacing mechanism comprising, in combination, a pair of spaced, substantially parallel, shafts provided externally with longitudinally extending surfaces arranged angularly with relation to each other, said shafts being spaced sufficiently to permit loaves of bread to pass between them, blocks surrounding said shafts, said blocks being provided with openings of substantially the same shape and size as the cross-section of the shafts and being provided externally with screw threads, blade guiding members mounted upon and having screw-threaded connection with said blocks so that upon rotation of said shafts the guiding members will be caused to move longitudinally of said shafts and maintain substantially uniform spacing of the blades, cutting blades extending through said guiding members and moved laterally thereby as said shafts are rotated, and driving means positively connecting said shafts for causing simultaneous movement of said guiding members along the shafts, said blocks having their end portions notched to provide alternating depressions and projections of substantially the same size so that as two blocks are brought together when moving along the shafts the projections and depressions of two adjacent blocks will interfit and mesh, the projections being spaced around the shafts and being parallel to the axis thereof.

12. Actuating means for blade-spacing guides comprising fluted shafts, internally fluted rings fitting closely around said shafts and sliding thereon, said rings having a groove extending therearound, centrally thereof, the external approximately cylindrical surface of the rings, upon opposite sides of the groove, being oppositely screw-threaded, the end portions of the rings being notched to provide alternate longitudinal projections and depressions alternately arranged about the axis of the shafts so that adjacent rings assembled upon said shafts may fit together, said projections and depressions of adjacent rings interfitting so that the overall length of the assembled rings upon said shafts, when collapsed, is less than the sum of the lengths of the rings, and blade guides mounted upon said rings and having screw-threaded connection therewith.

13. A blade-spacing assembly for a slicing machine comprising a fluted shaft, a series of externally threaded nuts having their interior openings shaped to fit and slide on said shaft, and a series of blade-guiding units having openings therethrough, threaded to cooperate with the external threading of said nuts, said nuts having notches in opposite ends forming alternating fingers and depressions extending longitudinally of the shaft whereby to permit the end portions of the nuts to interfit and overlap.

14. A blade-spacing assembly for a slicing machine comprising a fluted shaft, a series of externally threaded nuts having their interior openings shaped to fit and slide on said shaft, and a series of blade guiding units having openings therethrough, threaded to cooperate with the external threading of said nuts, said nuts having notches in opposite ends to permit the end portions of the nuts to interfit and overlap, said blade-guiding units having their lateral portions,

directed toward the ends of the shaft, formed cylindrically to receive thereon other blade-guiding units.

15. In a blade-adjusting assembly for a slicing machine, in combination, a shaft, non-circular in cross-section, a series of externally threaded nuts having openings extending substantially axially therethrough, said openings being made to fit the shaft and permit the nuts to slide thereon, said nuts having external grooves substantially midway between their ends and two series of blade-guiding units having arms extending laterally, transversely of the shaft, one series of said units being internally threaded to fit and cooperate with the external threading of said nuts, and the second series of blade-guiding units being shaped internally to fit around the end portions of the first series of units and being provided with inwardly projecting guide members to fit into said grooves to maintain the spacing arrangement of the units with reference to the nuts.

16. In a spacing assembly for adjusting the spacing of a series of cutting blades, the combination of a rotatable shaft of non-circular cross-section, a series of externally threaded nuts slidable thereon and rotatable therewith, two series of blade-guiding units mounted on said shaft and supported thereby, the units of one series alternating with the units of the other series, the units of one series being internally threaded in opposite directions from their opposite ends, and the units of the second series being internally smooth and partially overlapping the first series of units, the nuts being externally grooved approximately centrally between the threading at the ends thereof, and guides extending inwardly from the units of the second series, between the units of the first series and into the external grooves of the nuts.

17. In a spacing assembly for adjusting the spacing of a series of cutting blades, the combination of a rotatable shaft of non-circular cross-section, a series of externally threaded nuts slidable thereon and rotatable therewith, two series of blade-guiding units mounted on said shaft and supported thereby, the units of one series alternating with the units of the other series, the units of one series being internally threaded in opposite directions from their opposite ends, and the units of the second series being internally smooth and partially overlapping the first series of units, the nuts being externally grooved approximately centrally between the threading at the ends thereof, and guides extending inwardly from the units of the second series, between the units of the first series and into the external grooves of the nuts, the opposite faces of said nuts being notched whereby to form on the ends of the nuts alternating depressions and projections so that the projections and depressions of adjacent nuts may interfit to permit collapsing of the series of nuts to occupy less length than the sum of the extreme lengths of the nuts.

18. In a blade-guiding means for a slicing machine, the combination of a body member to surround a shaft and be actuated thereby and a longitudinally slotted guiding arm to partially surround said body member and be supported thereby, said body member having a circumferential groove extending part way around the body member and receiving the guiding arm, said guiding arm being shaped to fit in said groove and being provided with means to secure it in the groove.

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