

Aug. 16, 1938.

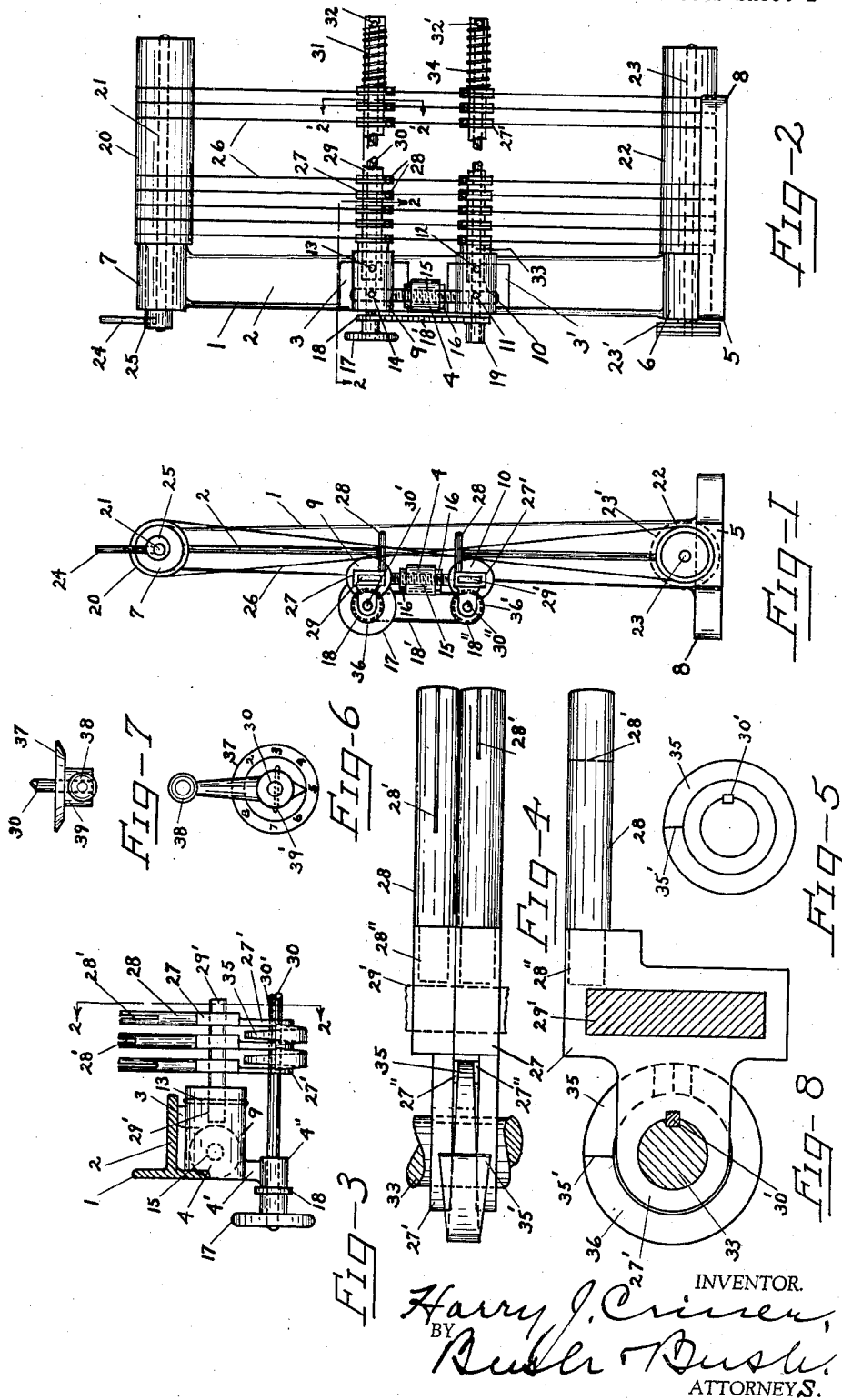
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2,126,987

BREAD SLICING MACHINE

Filed Oct. 30, 1937

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

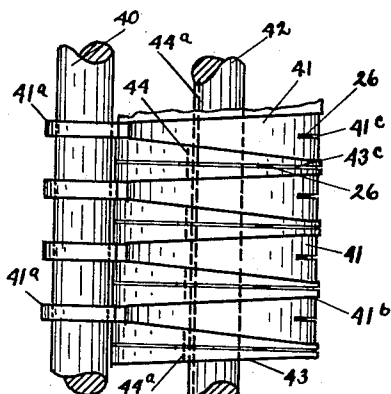


Fig-9

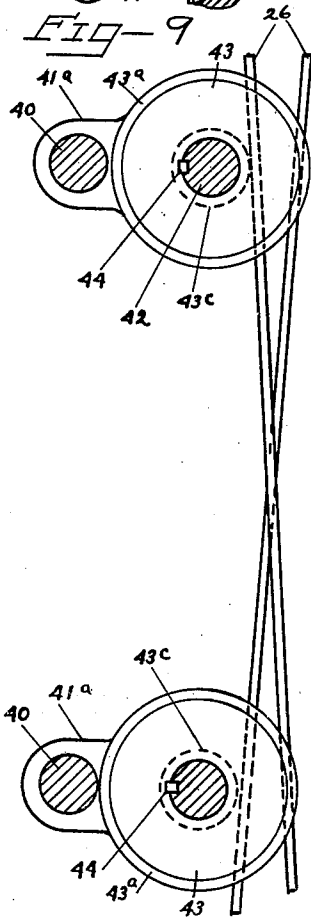


Fig-10

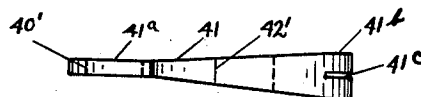


Fig-11

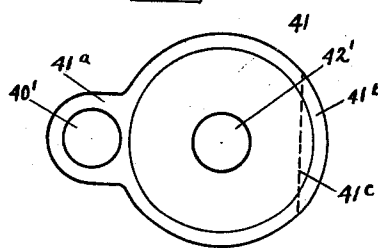


Fig-12

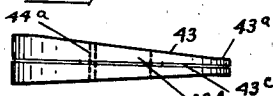


Fig-13

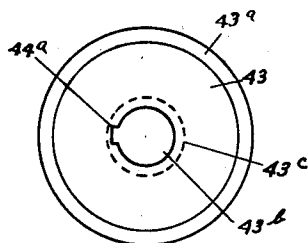


Fig-14

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UNITED STATES PATENT OFFICE

2,126,987

BREAD SLICING MACHINE

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Application October 30, 1937, Serial No. 171,866

10 Claims. (Cl. 146—88)

My invention relates to improvements in bread slicing machines employing a plurality of slicing blades and the objects of my invention are to provide a manually operable mechanical movement adapted for various purposes such as uniformly widening the spacing of the slicing blades of a bread slicing machine either while the machine is idle or in operation and spring actuated means for narrowing the spacing thereof; to provide facile blade guiding and spacing means to guide and space the blades of a band blade slicing machine both above and below the crossing point of the blades and above and below the bread while the machine is either idle or in operation; to provide means by which the height of the upper and lower blade guides of a slicing machine may be simultaneously adjusted while the machine is either idle or in operation; to provide a unit embracing a plurality of upper blade guides and spacers and a plurality of lower blade guides and spacers combined with means by which the lateral spacing of all such guides may be simultaneously adjusted and means by which the height of both upper and lower sets of guides may be simultaneously and uniformly adjusted.

I attain these objects by the means illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my machine;
Figure 2 is a rear elevation of the machine with parts omitted for clearness;

Figure 3 is an enlarged detail plan view in section on the line 2—2 of Figure 2;

Figure 4 is an enlarged detail of one of the cam wedges and contacting parts;

Figure 5 is an enlarged detail side elevation of one of the cam wedges;

Figures 6 and 7 are details showing an alternate form of adjusting the spacing guides;

Figure 8 is an enlarged detail sectional elevation of the parts shown in Figure 4;

Figure 9 is an enlarged fractional detail of an alternate form of blade guides having rotatable wedges to vary the spacing thereof;

Figure 10 is a sectional detail showing a pair of crossed blades with the upper and lower guides in contact therewith;

Figures 11 and 12 are details of unrotatable wedge blocks;

Figures 13 and 14 are details of the rotatable wedges shown in Figure 9.

Similar numerals refer to similar parts throughout the several views.

My apparatus comprises a base, 5, with laterally extending feet, 8, formed integral therewith, and an upright T-shaped side frame comprising

a web, 2, and flanges, 1, united thereto. The side frame may be formed integral with or united to the base by any suitable means and carries in a hub, 6, formed integral with the lower part of the side frame, a shaft, 23, upon which the lower blade-pulley, 22, is revolvably mounted.

A drive wheel, 23', is secured upon a projecting end of the shaft, 23, adjacent the base, 5, by which the pulley, 22, may be driven from any suitable prime mover.

The upper end of the side frame has a hub, 7, formed integral therewith in which an eccentric, 25, is mounted carrying an offset shaft, 21, revolvably mounted therein, which in turn is provided with a pulley, 20, over which the blades, 26, may pass.

A hand lever, 24, is united to the eccentric, 25, and by turning the eccentric by means of this lever, the spacing of the pulleys, 20 and 22, may be adjusted so as to tighten the belts thereon for operation or to loosen them when necessary to change or add blades.

Integral with the web, 2, of the side frames, are formed flat pads, 3 and 3'. A boss, 4, is cast integral with the side frame and contains a vertical bore extending through the same in which a shaft, 15, is slidably mounted. The middle portion of the shaft, 15, is threaded and nuts, 16 and 16', are threaded upon the shaft, 15, by which its relative height in the boss, 4, may be governed. When it is desired to raise the shaft, 15, the lower nut, 16, is loosened and the upper nut, 16', tightened so as to carry the shaft, 15, upwardly. After the shaft, 15, has been raised to the desired point, the nut, 16, is tightened and acts as a lock nut to prevent any further movement of the shaft, 15.

When it is desired to lower the shaft, the nut, 16, is loosened and the nut, 16', is then loosened or turned away from the hub, 4, and the shaft, 15, will descend by force of gravity. When the desired point has been reached, the lower nut, 16, is again tightened, thus locking the shaft in the desired position.

The upper end of the shaft, 15, is not threaded and is preferably made slightly smaller than the threaded portion of the shaft. Upon this upper end of the shaft, 15, I mount by a hammer-fit or press-fit or otherwise as desired, a cylindrical hub or boss, 9, of such proportions that when in place it will rest against the upper pad, 3, so as to steady the hub.

A set screw or pin, 14, may be provided to lock the hub, 9, in fixed position upon the shaft, 15, and should be utilized when the hub, 9, is fitted

loosely upon the shaft, 15, so as to be readily removable therefrom.

The inner end of the hub, 9, is provided with an opening, 29', in which a crossbar, 29, is rigidly mounted and may be secured in place by a pin, 13, extending through the hub, 9, and the crossbar, 29. The crossbar, 29, may be either rectangular as shown in Figure 5, or round, but I prefer to form it in rectangular section as affording a more secure support for the parts slidably mounted thereon.

Movable guide blocks, 27, having a maximum thickness corresponding to the minimum desired spacing of the blades, are slidably mounted upon the crossbar, 29, and corresponding in number to the number of slicing blades of the machine. Guide fingers, 28, are mounted in suitable recesses, 28'', formed in the guide blocks, 27, and may be secured by a press-fit or other desired means. The outer ends of the guide fingers, 28, are provided with guide slots, 28', through which the blades may travel and are so proportioned that the fingers, 28, will bear against the heels of the cutting blades when the machine is in operation and the sides of the slots, 28', will bear lightly against the sides of the cutting blades so as to hold them in parallel with the line of travel of the bread while being sliced.

Integral with the hub, 9, I form an arm, 4', which carries a bearing, 4'', in which a shaft, 30, is revolvably mounted having a hand wheel, 17, keyed upon or otherwise rigidly secured to an outwardly projecting end of the shaft, 30, and carrying a sprocket wheel, 18, interposed between the hand wheel, 17, and the bearing, 4''.

The shaft, 30, extends crosswise of the machine parallel with the crossbar, 29, and has slidably mounted thereon a plurality of cam wedges, 36, equal in number to the intervals between the slicing blades, each of which carries a key, 30', united thereto and the shaft, 30, is provided with a keyway or groove extending lengthwise thereof in which the keys, 30', may freely slide laterally in either direction.

The guide blocks, 27, are provided with rearward extensions, 27', which are slidably mounted upon the shaft, 30, and are free to slide laterally thereon, except as retained by the cam wedges, 36, or other stops.

The extensions, 27', are provided with small bearing members, 27'', which are preferably located approximately midway between the shaft, 30, and the crossbar, 29, and afford lateral bearings for the cam wedges. These cam wedges are provided with a wedge-shaped or graduated rim which is narrowest at the point, 35, and widens gradually to the point, 35'.

When the shaft, 30, is revolved by the hand wheel, 17, in one direction, the cam wedges are carried around until their thinnest portion, 35, rests between the bearing members, 27'', and thus permits the minimum spacing of the blades, 26, but when the shaft, 30, is rotated in the opposite direction, it brings the wider portions of the cam wedge into contact with the bearing members, 27'', and separates them, thus spreading the fingers, 28, apart and likewise spreading the blades, 26. The wedging action of the cam wedges, 36, will in itself cause the separation of the fingers and as both the finger extensions and the cam wedges, 36, are freely slidable upon the shaft, 30, the wedging action will automatically space all of the blades alike. The inner end of the hub, 9, forms a stop for the first guide block, 27, and it is obvious that it will remain stationary at all

times, but the succeeding guide blocks will be moved at successively greater distances along the shaft, 30, and crossbar, 29.

The outermost guide block will contact the inner end of a compression coiled spring, 31, which surrounds the extended end of the crossbar, 29, and is secured in place thereon by a pin, 32. The fingers, 28, will normally form an upper stop or guide for the bread as it passes through the cutting blades.

A similar hub, 10, is mounted upon the lower end of the shaft, 15, and may be secured in place by a set screw, 11. A similar crossbar, 29', is mounted in this hub bearing similar guide blocks fitted with similar fingers, 28. A shaft, 33, is similarly mounted in arm of the hub, 10, and carries similar cam wedges slidably mounted thereon. The lower guide assembly corresponds in all respects with the upper one, except that in the lower one, the fingers, 28, are approximately level with the upper faces of the guide blocks, while in the upper assemblies, the fingers, 28, are mounted even with the lower faces of the guide blocks.

In the lower guide assembly, the guide blocks, 27, and the fingers, 28, form supports for the bread while it is being fed through the slicing blades. The fingers, 28, may be either round or square as desired, it being obvious that square fingers will afford a little better support for the slices of bread than the round ones, but in practice it has been found that round fingers will sufficiently support the bread during the slicing operation, or the slices of bread while passing over the fingers and onto a discharge table or apron, such as in common use and any of the ordinary types may be utilized with my machine.

In order to synchronize the adjustment of the cam wedges and the spacing of the upper and lower sets of guide fingers, I mount upon the lower shaft, 33, a sprocket wheel, 18'', connected by a sprocket chain, 18', to the sprocket wheel, 18, upon the upper shaft, 30, so that when the hand wheel, 17, is turned, the chain, 18', will cause the lower shaft, 33, to turn to the same extent as the upper shaft, 30, thus causing a corresponding change in the spacing of the guide blocks upon the two shafts.

In order to overcome slight differences in spacing which might be due to irregular action or loose fit of the sprockets and sprocket chain, I show in Figures 6 and 7 an alternate form of apparatus in which levers, 38, are keyed to the extended ends of the shafts, 30 and 33, having pointers attached to the levers, with dials, 37, having corresponding intervals marked thereon attached to the side frames adjacent such levers, so that the guide fingers may be adjusted independently; and when the pointer upon the upper lever is turned to a given mark on the dial, the lower lever may be correspondingly turned until its pointer reaches the corresponding mark on the lower dial and when this is done, the guide blocks in the upper and lower assemblies will be correspondingly spaced.

In Figures 9 to 14 I show an alternative form of rotating-wedge adjustment in which the rotating wedges, 43, alternate with wedge blocks, 41, and both the rotating wedges and the wedge blocks are provided with slots, 43c and 41c, respectively, to guide the blades and take the place of the fingers carried by the wedge blocks heretofore described.

In this form of apparatus, the stationary crossbar, 29, has its place taken by the stationary cross-

bar, 40, which may be either round or rectangular in section and the cam or rotating wedges are carried by the shaft, 42.

Figures 11 and 12 show detail views of the individual wedge blocks which are preferably made substantially circular in form, with an extended portion, 41a, extending toward the front of the machine and provided with an opening or bore, 40', which is slidably mounted upon the shaft, 40, so as to move freely thereon lengthwise of the shaft.

A bore or opening, 42', is formed in the center of the body of each wedge block, large enough to encompass the shaft, 42, and permit the shaft, 42, to rotate freely within the opening and also to permit the wedge blocks to slide freely lengthwise of the shaft, 42.

The rear edge of each wedge block, 41, is provided with a slot, 41c, which straddles its corresponding cutting blade and is adapted to bear against the heel of the blade and guide the blade laterally as well as space it from the adjoining blades.

The rotating wedges are shown in detail in Figures 13 and 14. They may be cast, stamped or otherwise formed and are circular, with an opening or bore, 43b, at the center thereof adapted to permit them to be assembled upon the shaft, 42, in alternation with the wedge blocks heretofore described, and to slide freely lengthwise of the shaft. The rotating wedges, 43, are formed with a key-seat, 43a, in which an individual key, 44, for each rotating wedge may be rigidly seated. A groove or keyway, 44a, is formed in the shaft, 42, into which the keys, 44, may project and thus cause the rotating wedges to turn with the shaft, 42, when that is rotated.

The rotating wedges, 43, are provided with deep slots, 43c, which extend all the way around their peripheries and also extend inwardly nearly to the shaft, 42.

The outer edges of the rotating wedges may be flattened slightly on opposite sides as at 43a, to provide a good bearing against the wedge blocks, which may be correspondingly flattened as at 41b.

In this form of apparatus, the shaft, 42, may be provided with a hand-wheel, 17, the same as shown in Figures 6 and 7.

When either form of apparatus above described is used, either the fingers, 28, or the wedge blocks and rotating wedges, 41 and 43, may be utilized to support the bread as it is fed to the slicing blades; or slotted tables or aprons in any of the forms in common use may be utilized and may rest upon the fingers or the wedge blocks and rotating wedges, and may be mounted upon the frame or upon the crossbars or shafts heretofore described, as desired.

The same simple form of springs, 31 and 34, may be mounted upon the upper and lower stationary crossbars to force the wedge blocks and rotating wedges together as are shown in Figure 2 and they will act in the same way for that purpose.

In the operation of my machine, the blades, 26, are mounted upon the pulleys, 20 and 22, in the usual way. The shaft, 15, has the upper nut, 16', screwed thereon to the desired point and is then inserted in the bore of the hub, 4, and the lower nut, 16, screwed thereon until it comes in contact with the hub, 4. The upper and lower hubs, 9 and 10, are then placed upon the shaft, 15, and secured in place by their respective set screws, 14 and 11. The crossbars and shafts are

then secured in place in the hubs, 9 and 10, and the bearings, 4, and the guide blocks, with their fingers attached, alternating with the cam wedges, are then placed in position.

The springs, 31 and 34, are then placed upon the crossbars, 29 and 29', and secured in place by the pins, 32 and 32'.

After the guide blocks are in place, the band blades are inserted in the slots, 28', and the eccentric, 25, is then tightened so as to tighten the blades to the operating tension. The drive wheel, 23', being driven by the prime mover, drives the pulley, 22, and the movement of the blades over the pulley, 20, causes the pulley, 20, to revolve in unison with the pulley, 22.

The blades, 26, being crossed as shown in Figure 1, necessarily turn as they travel from one pulley to the other and the slotted guide members hold the intermediate portions of the blades as they pass through the slots parallel to the line of travel of the bread.

When necessary to change blades, the movement of the eccentric will loosen the blades sufficiently so that they can be readily drawn out of the slots in the guide members, or if desired, the entire guide assemblies may be removed by loosening the set screws which hold them to the shaft, 15.

In an endless-blade slicing machine it is important that the bread be carried to the blades at such a level that the middle of each loaf is carried at a height corresponding to the crossing point of the blades and when so carried, the downward movement of half the blades will usually stabilize the bread on its support sufficiently so that no guides or retainers for the tops of the loaves are really essential.

In my apparatus, the upper and lower guide assemblies are preferably spaced at a distance corresponding to the height of the thickest loaves of bread to be sliced, but when thinner loaves are to be sliced, the entire guide unit, including both upper and lower guide assemblies, can be adjusted upwardly upon the shaft, 15, by the action of the adjusting nuts, 16', and locked in position by the nuts, 16.

It will thus be possible to slice thinner loaves of bread, such as rye bread, without changing the distance of the upper and lower guide assemblies from each other and when necessary, a single adjustment will suffice to raise or lower both guide assemblies uniformly. In this way, the position of the respective guide assemblies may be fixed relative to each other so as to most effectively guide the blades; and the entire blade spacing and guiding apparatus may be raised and lowered as a unit without changing the spacing of the upper and lower guide assemblies from each other.

It will be noted that the vertical adjustment of the entire guide unit may be made while the machine is in operation as well as when it is idle and the necessary movement of the blades on the pulleys, 20 and 22, is facilitated by making the lateral adjustments of the cam wedges while the machine is in operation.

As various equivalents may be utilized for parts of my machine, I do not limit my claims to the precise forms shown in the drawings.

It is obvious that my form of apparatus will permit slicing a given loaf of bread in slices of varying thickness, because as the thickness of the slices is determined by the thickness of the cam wedges or the thickness of the rotating wedges, a part of the cam wedges or rotating wedges in 75

a given machine may be made thinner or thicker than the remaining wedges.

For instance, half of the wedge members could be made with a maximum thickness of a quarter of an inch and the remaining half of a maximum thickness of three-eighths of an inch, and in such a case, half of the slices would be an eighth of an inch thinner than the other half.

Likewise, if it were desired to build a wider machine which would slice two loaves of bread at the same time, the wedges could be proportioned so that one of the loaves could be cut into thinner slices than the other loaf.

I claim:

1. In a bread slicing machine, a frame, a plurality of slicing blades mounted to travel thereon, a boss united to the frame, a threaded shaft slidably mounted in said boss, nuts threaded upon the shaft at the upper and lower ends of the boss, upper and lower hubs detachably mounted upon the ends of said shaft respectively, a stationary crossbar and a rotatable crossbar secured in each of said hubs respectively and extending transversely of the machine parallel to the slicing plane of the blades, a plurality of uniform spacing members slidably mounted upon the fixed shafts respectively to space and guide the blades, and a plurality of uniform circular wedge members keyed to and slidable upon the rotatable shaft respectively in contact with the spacing members adapted to spread said spacing members uniformly when the shaft is rotated in a certain direction.

2. In a bread slicing machine, a frame, a plurality of slicing blades mounted to travel thereon, a boss united to the frame, a threaded shaft slidably mounted in said boss, nuts threaded upon the shaft at the upper and lower ends of the boss, upper and lower hubs detachably mounted upon the ends of said shaft respectively, a stationary crossbar and a rotatable crossbar secured in each of said hubs respectively and extending transversely of the machine parallel to the slicing plane of the blades, a plurality of uniform spacing members slidably mounted upon the fixed shafts respectively to space and guide the blades, a plurality of uniform circular wedge members keyed to and slidable upon the rotatable shaft respectively in contact with the spacing members adapted to spread said spacing members uniformly when the shaft is rotated in a certain direction, and compression springs mounted upon the outer ends of one of the crossbars in each hub and exerting continuous pressure upon the spacing members in the direction of the hubs.

3. In a bread slicing machine, a frame, a plurality of slicing blades mounted to travel thereon, a boss united to the frame, a threaded shaft slidably mounted in said boss, nuts threaded upon the shaft at the upper and lower ends of the boss, upper and lower hubs detachably mounted upon the ends of said shaft respectively, a stationary and a rotatable crossbar secured in each of said hubs respectively and extending transversely of the machine parallel to the slicing plane of the blades, a plurality of slotted spacing members slidably mounted upon both of the crossbars in the upper hub and a like plurality of slotted spacing members slidably mounted upon both of the shafts in the lower hub, the slots in said members engaging the slicing blades at the heel thereof and acting to space and guide said blades, and means actuated by the rotatable

shafts to uniformly spread apart the spacing members.

4. In a bread slicing machine, a frame, a plurality of slicing blades mounted to travel thereon, a boss united to the frame, a threaded shaft slidably mounted in said boss, nuts threaded upon the shaft at the upper and lower ends of the boss, upper and lower hubs detachably mounted upon the ends of said shaft respectively, a stationary and a rotatable crossbar secured in each of said hubs respectively and extending transversely of the machine parallel to the slicing plane of the blades, a plurality of slotted spacing members slidably mounted upon both of the shafts in the lower hub, the slots in said members engaging the slicing blades at the heel thereof and acting to space and guide said blades, means actuated by the rotatable shafts to uniformly spread apart the spacing members, and separate means mounted upon one of the crossbars to uniformly reduce the spread of the spacing members when the rotatable shafts are retracted.

5. In a bread slicing machine, the combination with a frame, of a plurality of slicing blades mounted to travel thereon, a boss united to the frame, a threaded shaft slidably mounted in said boss, nuts threaded upon the shaft at the upper and lower ends of the boss, upper and lower hubs detachably mounted upon the ends of said shaft respectively, a stationary and a rotatable crossbar secured in each of said hubs respectively and extending transversely of the machine parallel to the slicing plane of the blades, a plurality of slotted spacing members slidably mounted upon the crossbars in the upper hub and a like plurality of slotted spacing members slidably mounted upon the shafts in the lower hub, the slots in said members engaging the slicing blades at the heel thereof and acting to space and guide said blades, a plurality of circular wedge-blocks slidably mounted upon the rotatable crossbars respectively interposed between and adapted to bear against the spacing members and united to their respective rotatable crossbars by feather-keys to uniformly spread apart the spacing members and means to exert continuous pressure inwardly upon the outer end of each series of spacing members.

6. In a bread slicing machine, a frame, a plurality of slicing blades mounted to travel thereon, a boss united to the frame, a threaded shaft slidably mounted in said boss, nuts threaded upon the shaft at the upper and lower ends of the boss, upper and lower hubs detachably mounted upon the ends of said shaft respectively, a stationary and a rotatable crossbar secured in each of said hubs respectively and extending transversely of the machine parallel to the slicing plane of the blades, a plurality of slotted spacing members slidably mounted upon the cross-bars in the upper hub and a like plurality of slotted spacing members slidably mounted upon the shafts in the lower hub, the slots in said members engaging the slicing blades at the heel thereof and acting to space and guide said blades, and wedge members interposed between the spacing members and slidably mounted upon the rotatable shafts and rotatable therewith to uniformly spread apart the spacing members.

7. Blade spacing and guiding means for bread slicing machines, comprising a supporting frame with a plurality of slicing blades mounted for travel therein, a crossbar and a shaft carried by the supporting frame and having a plurality of spacing members slidably mounted upon the

crossbar and the shaft, slotted fingers united to the spacing members adapted to straddle and guide and space the cutting blades, rotary wedges between and contacting the spacing members, slidably mounted upon the shaft and rotatable therewith, for uniformly increasing the space between the successive spacing members, and means for uniformly narrowing the spacing of the spacing members as the rotary wedges are retracted.

- 10 8. A mechanical movement to uniformly and simultaneously adjust the relative spacing of a plurality of movable blocks mounted in series upon a bar, comprising a support, a bar rigidly united thereto, a shaft pivotally mounted upon the support parallel to and spaced from the bar, a plurality of spaced blocks slidably mounted upon both the bar and the shaft in series and in spaced relation, a plurality of similar annular cam wedges slidably mounted upon the shaft for free longitudinal movement thereon and in alternation with the blocks, each wedge bearing against the adjacent blocks on opposite sides thereof at points intermediate the bar and the shaft, a longitudinal slot formed in the periphery of the shaft, feather-keys united to the wedges and extending into said slot to prevent relative rotation of the shaft and wedges, said wedges being arranged to exert pressure laterally against the adjacent blocks to force them apart when the shaft is rotated in one direction and to remove such pressure when the shaft is rotated in the opposite direction, and means for rotating the shaft.

9. A structure as described in claim 8, in combination with resilient means bearing against the outermost block exerting continuous inward pressure thereon to hold the entire series of blocks and wedges in continuous close contact in all adjusted positions.

10. A mechanical movement to uniformly and simultaneously adjust the relative spacing of a plurality of movable blocks mounted in series upon a bar, comprising a support, a shaft rotatably mounted upon the support, a plurality of spaced blocks slidably mounted upon the shaft in series and in spaced relation, a plurality of similar annular cam wedges slidably mounted upon the shaft for free longitudinal movement thereon and in alternation with the blocks, each wedge bearing against the blocks on opposite sides thereof, a longitudinal slot formed in the periphery of the shaft, feather-keys united to the wedges and extending into said slot or keyway to prevent relative rotation of the shaft and wedges, said wedges being arranged to exert pressure against the adjacent blocks to force them apart when the shaft is rotated in one direction and to remove such pressure when the shaft is rotated in the opposite direction, means to secure the blocks against rotation, and means for rotating the shaft, in combination with resilient means bearing against the outermost block exerting continuous pressure inward thereon to hold the entire series of blocks and wedges in continuous close contact in all adjusted positions.

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