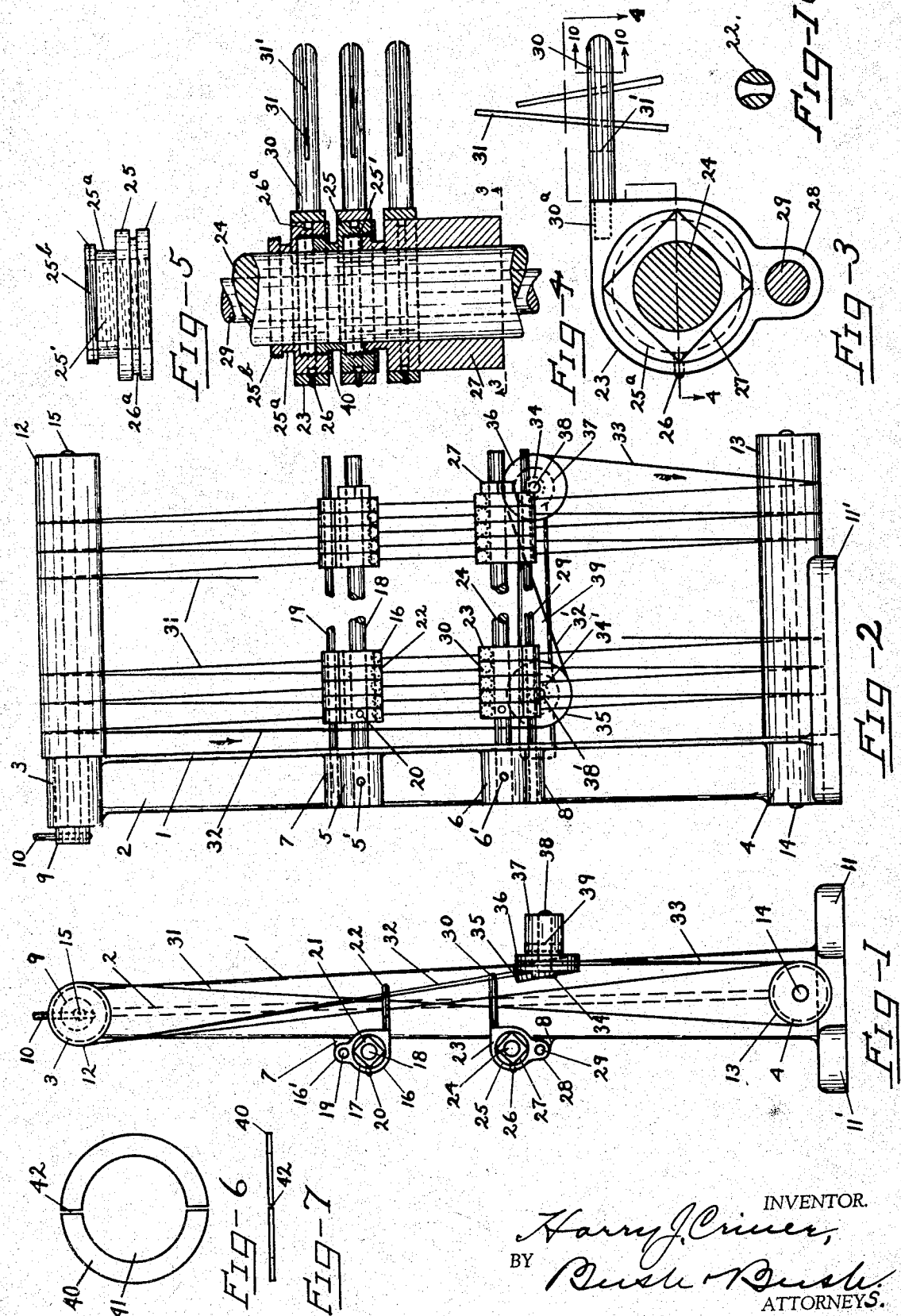
March 14, 1939. H. J. CRINER 2,150,427

BREAD SLICING MACHINE

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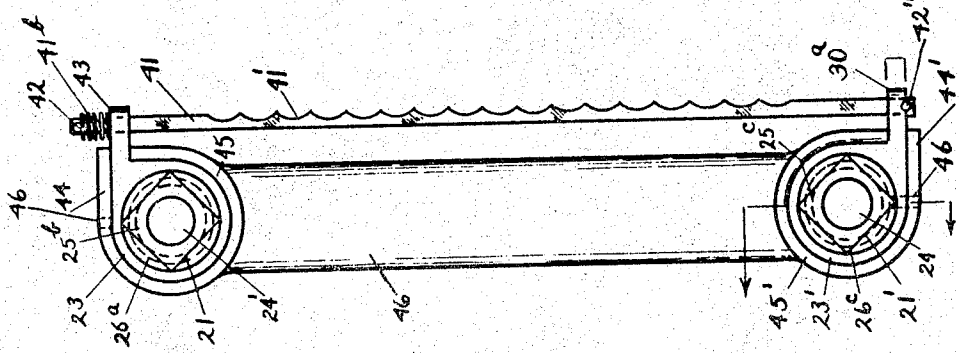


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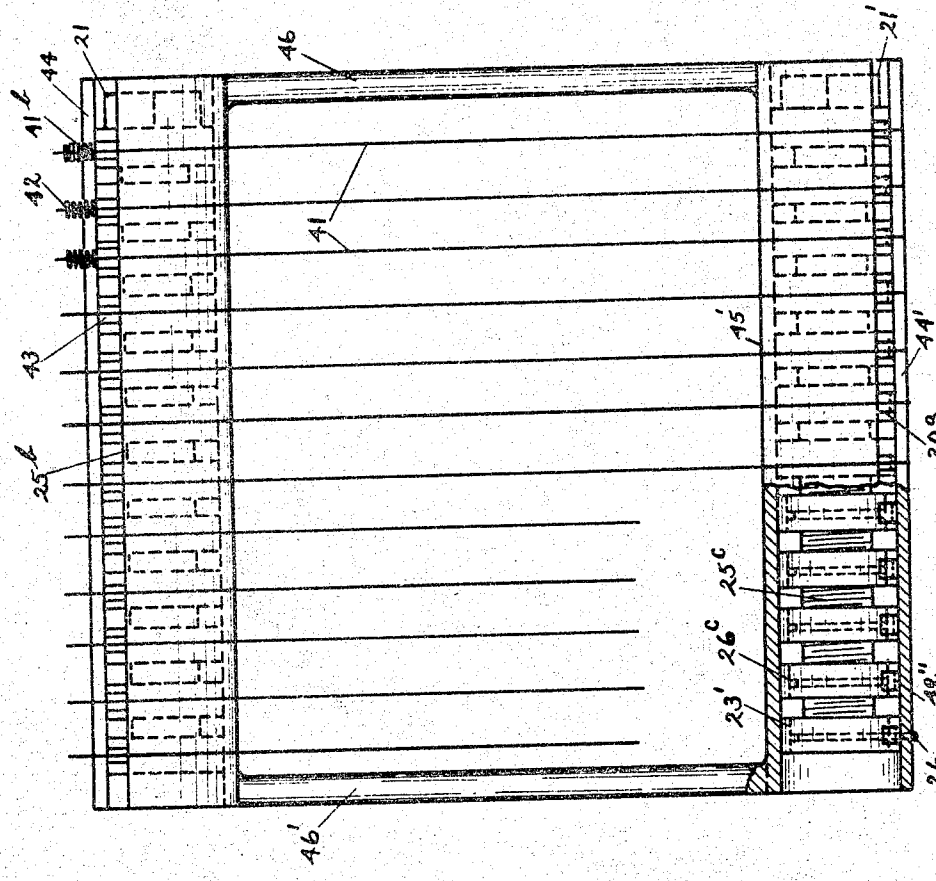
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BREAD SLICING MACHINE

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FIG—9



FIG—8

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BREAD SLICING MACHINE

Harry J. Criner, Davenport, Iowa, assignor of one-half to A. G. Bush, Davenport, Iowa

Application February 4, 1938, Serial No. 188,701

19 Claims. (Cl. 146—88)

My invention relates to bread slicing machines and is applicable to multiple-bladed slicing machines of either the reciprocating or endless band-blade type.

The objects of my invention are to provide improved, readily adjustable, means for guiding and spacing the blades of a slicing machine which will be capable also of supporting or carrying the blades of a reciprocating machine.

I accomplish these objects by the means illustrated in the accompanying drawings, in which:

Figure 1 shows a side elevation of an endless band-blade machine employing a single endless band-blade reeved in multiple figure 8 loops over two spaced cylinders or drums.

Figure 2 shows a front elevation of the same machine;

Figure 3 shows an enlarged detail of the shafts supporting the spacing members with a spacing member mounted thereon, in section on the line 3—3 of Figure 4;

Figure 4 shows an enlarged sectional detail on the line 4—4 of Figure 3;

Figure 5 is an enlarged detail of one of the threaded adjusting members;

Figures 6 and 7 are enlarged details of the washer-like detents, while Figure 10 is a sectional detail of one of the fingers on the line 10—10 of Figure 3;

Figure 8 shows a front elevation partly in section, and

Figure 9 is an end elevation of a blade-carrying frame fitted with my invention to carry, space and adjust the spacing of the blades.

In Figures 1 and 2 I have shown a band-blade machine comprising a vertical column, 1, with supporting feet, 11 and 11', united thereto.

Multiple-bladed pulleys or drums, 12 and 13, are revolvably mounted upon parallel shafts, 15 and 14, in hubs, 3 and 4, at the top and bottom of the column, 1, respectively, with a band-blade, 31, reeved upon such pulleys and crossing in figure 8 form.

A crossarm, 39, is united to the frame and extends transversely of the machine below the line of travel of the bread and has a pair of shafts, 38 and 38', rigidly mounted therein near the opposite ends thereof upon which the idler pulleys, 35 and 36, are revolvably mounted. The shafts, 38 and 38', may be mounted at any desired angle to each other to facilitate the travel of the blade around the pulleys, 36 and 35.

The portion, 32, of the band-blade runs from the upper drum, 12, to and under the idler pulley, 35, and thence over the pulley, 36, and down to the lower drum, 31, the last mentioned span of the blade being numbered, 33, and the portion intermediate the pulleys, 35 and 36, being numbered 32'.

The upper guide assembly comprises a shaft, 18, which has one end rigidly but removably united to a hub, 5, formed integral with the column, 1, or connected thereto by a shoulder, 7, and extends transversely of the machine. Above and parallel with the shaft, 18, I mount a shaft, 19, which is likewise removably united to the hub, 5, on the column, 1, and may be secured by a press-fit or any other desired means.

Upon the shaft, 18, are slidingly mounted a plurality of adjusting members each having an annular body, 25, threaded upon its interior face and a projecting annular flange formed integral therewith. Each flange is provided with a peripheral groove, 25a, and the portion of the flange beyond the groove has threads, 25b, formed upon its periphery, the threads of the flanges corresponding with the inner threads, 25', of the bodies so as to mesh therewith when in juxtaposition.

In order to secure the flange threads in permanent mesh with the interior body threads, the desired number of adjusting members are slidingly mounted upon the shaft, 18, and threaded together. The washers, 40, are formed in two halves as shown in Figure 6. This allows the half washers to be inserted between successive adjusting members and two complementary halves are then spot-welded to the end of the adjacent body of the adjusting member as shown at 40 in Figure 4 and form a detent which prevents the threaded flange from being withdrawn from the adjusting member with which it is in mesh.

The outermost adjusting member is provided with means by which it may be manually revolved upon the shaft, 18, as by a squarehead, 27, adapted to be engaged by a socket wrench.

The innermost adjusting member is rigidly secured to the shaft, 18, by a pin, 20, or other suitable means, which pin may extend through its adjacent spacing member.

It is obvious that as so arranged, when the outer adjusting member is turned in one direction, it will cause the successive adjusting members to be drawn closer together by the threads described within the limits permitted by the dimensions of the parts, and when the outer member is turned in the opposite direction, it will cause the adjusting members to be retracted or separated by the action of the threads described

within the limits permitted by their dimensions.

The threads are preferably formed loosely enough to turn freely and in that condition, the movement of the adjusting members will be in succession so the outermost member will travel until it reaches its permissible limit before it will cause the next adjusting member to turn and so on throughout the entire series until all of the adjusting members are bunched together as closely as possible or separated to their greatest possible extent.

Upon each one of the adjusting members, **25**, I mount a spacing member, **23**, in which the adjusting member is free to revolve. To retain the spacing members upon their relative adjusting members, the body of each adjusting member is provided with a peripheral groove, **26***a*, and a pin or set screw, **26**, is secured in each spacing member and projects into its corresponding groove, **26***a*, thus permitting the adjusting members to revolve freely in the spacing members, but preventing displacement thereof.

Each spacing member has an extension, **16'**, formed integral therewith, which extension is slidingly mounted upon a shaft, **19**, carried by the frame and parallel to the shaft, **18**.

Each spacing member is also provided with a projecting finger, **22**, which may be formed integral with the spacing member or united thereto by any suitable means.

The finger, **22**, is slotted to permit introduction therein of a slicing blade to be guided and spaced thereby.

In band-blade machines, I prefer to form these slots curved as shown in Figure 10 so as to prevent the edges of the slots from rubbing against the blades, and to form them with a diameter slightly greater than the thickness of the blades. In reciprocating machines, the slots are preferably straight and fit closely to the blades.

When used in band-blade machines, the fingers are preferably secured in the position necessary to guide and control the bread as it is being sliced, but in reciprocating machines the fingers not only space and guide the blades but also carry or support and drive the blades in their travel.

I have described the upper guide assembly as shown in Figures 1 and 2. The lower guide assembly corresponds in every way with the upper one, but is in inverted position, the fingers of the lower guide assembly being at the upper part thereof and the shaft, **29**, being located below the shaft, **24**.

In the reciprocating type of slicing machines, the transverse shafts upon which the assemblies are slidingly mounted, are fixed in a movable frame, the upper and lower members, **44** and **44'**, of which are provided with longitudinal slots and the pins, **46**, are united to the spacing members severally and project through the slots and the adjusting members are thereby prevented from turning.

The upper shaft, **15**, is preferably mounted in an eccentric bearing in the hub, **3**, the position of which may be adjusted by the handle, **9**, so as to take up any slack in the blade, or the shafts, **38** and **38'**, may be adjustably mounted upon the crossarm, **39**, to afford additional means for tensioning the blade, **31**.

While I have shown a thin, divided washer spotwelded to the adjusting arms to form a detent to prevent complete separation of the adjusting members, it is obvious various forms of detent for this purpose may be adopted, the main requirement being that the detent shall be rigidly secured to the outer end of the interiorly threaded portion of the body and must project sufficient toward the axis to engage the threaded portion of the flange and prevent complete withdrawal thereof.

The groove, **25***a*, is made substantially wider than the washer of detent, **40**, so as to permit maximum travel equal to the difference between the thicker and thinner slices of bread which this machine is intended to cut.

It is common practice to slice white bread in slices approximately half an inch thick and to slice rye bread in slices approximately three-eighths of an inch thick, and my machine is designed to give a variation of approximately one-eighth of an inch between the thicker and thinner slices and to be readily adjustable for the purpose of cutting either thickness of slices that may be desired, but is not intended for cutting slices of an intermediate thickness.

Various modifications of the different parts may be made without departing from the spirit of my invention and I do not limit my claims to the precise forms shown in the drawings.

In Figure 9 the blades, **41**, are secured to the fingers of the spacing members by pins, **42** and **42''**, and may be provided with compression springs, **41***b*, to maintain desired tension on the blades.

I claim:

1. In a bread slicing machine, the combination with supporting means, of a plurality of slicing blades traveling therein, a transverse shaft carried by the supporting means, a series of tubular adjusting members slidably mounted upon the shaft each having an interiorly threaded head and an exteriorly threaded neck with a relatively wide peripheral groove formed therein, the exterior threads of each member being engaged with the interior threads of the next succeeding member, narrow detents united to the heads of each members entering and engaging the grooves in the next preceding members respectively, one terminal member of the series being rigidly united to the shaft, and the opposite terminal member having an extension by which it may be manually revolved upon the shaft to cause the intermediate members to successively revolve upon the shaft in the same direction up to the limit of their travel, a corresponding series of annular spacing members severally mounted upon the heads of the adjusting members which are free to rotate therein but secured against lateral separation by pins seated in the spacing members severally and extending into peripheral grooves formed in the heads, arms united to the spacing members, and means to secure the spacing members from rotation upon the adjusting members.

2. In a bread slicing machine, the combination with a supporting column, of a pair of adjustably spaced cylindrical pulleys revolvably mounted therein, an endless band blade reeved upon the pulleys to form a plurality of figure 8 loops, a pair of spaced transverse shafts carried by the supporting means, opposed series of tubular adjusting members slidably mounted upon the shafts respectively, each having an interiorly threaded head and an exteriorly threaded neck with a relatively wide external peripheral groove formed therein, the exterior threads of each member being engaged with the interior threads of the next succeeding member, a narrow detent united to the head of each member entering and engaging the groove in the neck of the preceding member, means rigidly uniting one terminal

member of each series to its shaft, means formed upon the opposite terminal member for manually rotating it upon its shaft to cause the intermediate members to successively revolve upon the shaft in the same direction until their limit of travel has been reached, corresponding series of annular spacing members severally mounted upon the heads of the adjusting members of each series which are free to rotate therein but secured against lateral separation by pins seated in the spacing members severally and extending into peripheral grooves formed in the heads, arms united to the spacing members to engage, guide and space the blades in correspondence with the spacing of the spacing members, and means to secure the spacing members from rotation.

3. In a bread slicing machine, the combination with a supporting column, of a pair of adjustably spaced cylindrical pulleys revolvably mounted therein, an endless band blade reeved upon the pulleys to form a plurality of figure 8 loops, a pair of spaced transverse shafts carried by the supporting means, opposed series of tubular adjusting members slidably mounted upon the shafts respectively, each having an interiorly threaded head and an exteriorly threaded neck with a relatively wide external peripheral groove formed therein, the exterior threads of each member being engaged with the interior threads of the next succeeding member, a narrow detent united to the head of each member entering and engaging the groove in the neck of the preceding member, means rigidly uniting one terminal member of each series to its shaft, means formed upon the opposite terminal member for manually rotating it upon its shaft to cause the intermediate members to successively revolve upon the shaft in the same direction until their limit of travel has been reached, corresponding series of annular spacing members severally mounted upon the heads of the adjusting members of each series which are free to rotate therein but secured against lateral separation by pins seated in the spacing members severally and extending into peripheral grooves formed in the heads, arms united to the spacing members to engage, guide and space the blades in correspondence with the spacing of the spacing members, means to secure the spacing members from rotation and a pair of idler pulleys carried by the frame intermediate the cylindrical pulleys at right angles thereto to lead the blade from the end of one cylindrical pulley transversely of the machine and to the opposite end of the other cylindrical pulley.

4. In a bread slicing machine, the combination with supporting means, of a reciprocating frame traveling therein, a pair of spaced shafts carried by the frame, opposed series of tubular adjusting members slidably mounted upon the shafts each having an interiorly threaded head and an exteriorly threaded neck, an external peripheral groove formed in each head and in each neck, the exterior threads of each member being engaged with the interior threads of the next succeeding member, a narrow detent united to the head of each member entering and engaging the groove in the neck of the preceding member, which groove is wider than the detent, means rigidly uniting one terminal member of each series to its shaft, means formed upon the opposite terminal member for manually rotating it upon its shaft to cause the intermediate members to successively revolve upon the shaft in the same direction up to their limit of travel, a corresponding series of annular spacing members severally mounted upon the heads of the adjusting members which are free to rotate therein but secured against lateral separation therefrom by pins seated in the spacing members severally and extending into the grooves of the heads, slotted arms severally united to the spacing members, to space and carry a plurality of blades which have their extremities united to opposed arms and means to secure the spacing members from rotation upon the adjusting members.

5. A mechanical movement comprising supporting means, a straight rod preferably of circular cross-section supported thereby, a series of sleeves mounted upon said rod all except an end one being rotatable and slidable longitudinally thereon, each sleeve comprising a neck and an enlarged head integral therewith, the internal surface of the neck conforming substantially to the rod and the external surface of the neck being threaded, the internal surface of the head being correspondingly threaded, the threads of the successive necks cooperating with the threads of the succeeding heads to cause progressive motion of both longitudinally of the rod, detents united to the heads and coacting with relatively wide grooves upon the necks to limit the travel of and prevent withdrawal of the necks from their succeeding heads, one terminal member of the series being rigidly united to the shaft and the opposite terminal member being formed with means for manually revolving same upon the shaft in either direction.

6. A mechanical movement comprising supporting means, a straight rod preferably of circular cross-section supported thereby, a series of sleeves mounted upon said rod all except an end one being being rotatable and slidable longitudinally thereon, each sleeve comprising a neck and an enlarged head integral therewith, the internal surface of the neck conforming substantially to the rod and the external surface of the neck being threaded, the internal surface of the head being correspondingly threaded, the threads of these successive necks cooperating with the threads of the succeeding heads to cause progressive motion of both longitudinally of the rod, an external relatively wide groove formed in each neck, a narrow plate united to the outer end of each head and extending into the groove of the neck threaded into such head to prevent disengagement of such head and neck.

7. A bread slicing machine comprising supporting means, a plurality of slicing blades traveling therein, a transverse shaft carried by the supporting means, a series of tubular adjusting members slidably mounted upon the shaft each having an interiorly threaded head and an exteriorly threaded neck with a relatively wide peripheral groove formed therein, the exterior threads of each member being engaged with the interior threads of the next succeeding member, narrow detents united to the heads of each members entering and engaging the grooves in the next preceding members respectively, one terminal member of the series being rigidly united to the shaft, and the opposite terminal member having an extension by which it may be manually revolved upon the shaft to cause the intermediate members to successively revolve upon the shaft in the same direction up to the limit of their travel, a corresponding series of annular spacing members severally mounted upon the heads of the adjusting members which are free to rotate therein but secured against lat-

eral separation by pins seated in the spacing members severally and extending into peripheral grooves formed in the heads, arms united to the spacing members to engage, guide and space the blades in correspondence with the spacing of the spacing members, and a second shaft parallel to the transverse shaft, extensions formed integral with the spacing members having bores formed therein which surround the second shaft and are slidable longitudinally thereon.

8. A bread slicing machine comprising a supporting column, a pair of adjustably spaced cylindrical pulleys revolvably mounted therein, an endless band blade reeved upon the pulleys to form a plurality of figure 8 loops, a pair of spaced transverse shafts carried by the supporting means, opposed series of tubular adjusting members slidably mounted upon the shafts respectively, each having an interiorly threaded head and an exteriorly threaded neck with a relatively wide external peripheral groove formed therein, the exterior threads of each member being engaged with the interior threads of the next succeeding member, a narrow detent united to the head of each member entering and engaging the groove in the neck of the preceding member, means rigidly uniting one terminal member of each series to its shaft, means formed upon the opposite terminal member for manually rotating it upon its shaft to cause the intermediate members to successively revolve upon the shaft in the same direction until their limit of travel has been reached, corresponding series of annular spacing members severally mounted upon the heads of the adjusting members of each series which are free to rotate therein but secured against lateral separation by pins seated in the spacing members severally and extending into peripheral grooves formed in the heads, arms united to the spacing members to engage, guide and space the blades in correspondence with the spacing of the spacing members, a second shaft parallel to each transverse shaft, extensions formed integral with the spacing members having bores formed therein united to second shaft and slidable longitudinally thereon.

9. In blade adjusting means for bread slicing machines, the combination with a pair of spaced bars and a support therefor, of opposed series of adjusting members mounted upon the bars respectively, each series having one only of its terminal members rigidly united to the support and the remaining members being rotatable and slidable longitudinally upon their respective bars, and uniform screw-threaded means formed upon said adjusting member and operatively connecting the adjacent members to each other to cause, when the free terminal members are rotated, said rotatable members to approach toward or recede from the next succeeding members successively within predetermined limits and produce equal spacing of all of said members when at the limits of their travel in either direction.

10. In blade adjusting means for bread slicing machines, the combination with a pair of spaced bars and a support therefor, of opposed series of adjusting members mounted upon the bars respectively, each series having one only of its terminal members rigidly united to the support and the remaining members being rotatable and slidable longitudinally upon their respective bars, uniform screw-threaded means formed upon said adjusting members and operatively connecting the adjacent members to each other to cause, when the free terminal members are rotated, said rotatable members to uniformly approach toward or recede from the next succeeding members within predetermined limits either successively or simultaneously and produce equal spacing of all of said members when at the limits of their travel in either direction, annular supporting and spacing members mounted upon the adjusting members severally in which the adjusting members are free to revolve, crossbars united to the support extending transversely of the machine parallel to and respectively above and below the spaced bars first mentioned, longitudinal grooves formed in said crossbars respectively, and pins united to the spacing members extending into and co-acting with the slots in their adjacent crossbars respectively to prevent rotational movement of the spacing members upon the adjusting members.

11. In a blade adjusting means for bread slicing machines, the combination with a pair of spaced bars and a support therefor, of opposed series of adjusting members mounted upon the bars respectively, each series having one only of its terminal members rigidly united to the support and the remaining members being rotatable and slidable longitudinally upon their respective bars, uniform screw-threaded means formed upon said adjusting members and operatively connecting the adjacent members to each other to cause, when the free terminal members are rotated, said rotatable members to uniformly approach toward or recede from the next succeeding members within predetermined limits either successively or simultaneously and produce equal spacing of all of said members when at the limits of their travel in either direction, annular supporting and spacing members mounted upon the adjusting members severally in which the adjusting members are free to revolve, crossbars united to the support extending transversely of the machine parallel to and respectively above and below the spaced bars first mentioned, longitudinal grooves formed in said crossbars respectively, pins united to the spacing members extending into and co-acting with the slots in their adjacent crossbars respectively to prevent rotational movement of the spacing members upon the adjusting members, projecting slotted arms united to the spacing members in opposed pairs, and slicing blades attached to said opposed pairs of arms respectively.

12. In a blade adjusting means for bread slicing machines, the combination with a pair of spaced bars and a support therefor, of opposed series of adjusting members mounted upon the bars respectively, each series having one only of its terminal members rigidly united to the support and the remaining members being rotatable and slidable longitudinally upon their respective bars, uniform screw-threaded means formed upon said adjusting members and operatively connecting the adjacent members to each other to cause, when the free terminal members are rotated, said rotatable members to uniformly approach toward or recede from the next succeeding members within predetermined limits either successively or simultaneously and produce equal spacing of all of said members when at the limits of their travel in either direction, annular supporting and spacing members mounted upon the adjusting members severally in which the adjusting members are free to revolve, cross-bars united to the support extending transversely of the machine parallel to and respectively above and below the

spaced bars first mentioned, longitudinal grooves formed in said crossbars respectively, and means for preventing rotation of the spacing members upon or with the adjusting members.

13. A bread slicing machine comprising a supporting frame, a pair of spaced drums revolvably mounted upon the frame in parallel planes, a band slicing blade reeved upon said drums in figure 8 form with a plurality of parallel slicing courses intermediate the drums, a transverse crossbar united to the frame and spaced from the crossing points of the slicing courses of the blades, a flat-faced pulley revolvably mounted upon the crossbar near one end thereof with its axis secured substantially at a right angle to a line produced from the farther side of the corresponding end of the upper drum to the outer edge of said pulley (referring to the edge farthest from the center of the machine as the outer edge), a second flat-faced pulley revolvably mounted upon said crossbar near the opposite end thereof with its axis extending at a right angle to a line produced from the axis of said pulley to the near side of the corresponding end of the lower drum, said blade being mounted to travel either downwardly from the farther side of the upper drum to the outer edge of the first pulley thence under and partially around said pulley and transversely to the top of the second pulley thence partly around said second pulley and downwardly to the near side of the lower drum and thence around and under said lower drum and back to the opposite side of the corresponding end of the upper pulley, or in the opposite direction.

14. A bread slicing machine as described in claim 8, having a transverse crossbar united to the frame and spaced from the crossing points of the slicing courses of the blades, a short flat-faced pulley revolvably mounted upon the crossbar near one end thereof with its axis secured substantially at a right angle to a line produced from the farther side of the corresponding end of the upper cylindrical pulley to the outer edge of said short pulley (referring to the edge farthest from the center of the machine as the outer edge), a second short flat-faced pulley revolvably mounted upon said crossbar near the opposite end thereof with its axis extending at a right angle to a line produced from the axis of said pulley to the near side of the lower cylindrical pulley, said blade being mounted to travel either downwardly from the farther side of the upper cylindrical pulley to the outer edge of the first short pulley thence under and partially around said pulley and transversely to the top of the second short pulley thence partly around said second pulley and downwardly to the near side of the lower cylindrical pulley and thence around said lower cylindrical pulley and back to the opposite side of the corresponding end of the upper cylindrical pulley, or in the opposite direction.

15. A bread slicing machine as described in claim 8, in combination with a transverse crossbar united to the frame and spaced from the crossing points of the slicing courses of the blades, a short flat-faced pulley revolvably mounted upon the crossbar near one end thereof with its axis secured substantially at a right angle to a line produced from the farther side of the corresponding end of the upper cylindrical pulley to the outer edge of said short pulley (referring to the edge farthest from the center of the machine as the outer edge), a second short flat-faced pulley revolvably mounted upon said crossbar near the opposite end thereof with its axis extending at a right angle to a line produced from the axis of said pulley to the near side of the lower cylindrical pulley, said blade being mounted to travel either downwardly from the farther side of the upper cylindrical pulley to the outer edge of the first short pulley thence under and partially around said pulley and transversely to the top of the second short pulley thence partly around said second pulley and downwardly to the rear side of the lower cylindrical pulley and thence around said lower cylindrical pulley and back to the opposite side of the corresponding end of the upper cylindrical pulley, or in the opposite direction.

16. A bread slicing machine as described in claim 8, in combination with means for leading the band-blade from one side of one of said cylindrical pulleys transversely across the machine on a line spaced a short distance from the slicing courses of the blades and to the opposite end and side of the other cylindrical pulley.

17. A bread slicing machine as described in claim 13, and means to space the slicing courses of the blade comprising a pair of spaced transverse shafts united to the supporting frame intermediate the drums, opposed series of tubular adjusting members slidably mounted upon the shafts respectively, each having an interiorly threaded head and an exteriorly threaded neck with a relatively wide external peripheral groove formed therein, the exterior threads of each member being engaged with the interior threads of the next succeeding member, a narrow detent united to the head of each member entering and engaging the groove in the neck of the preceding member, means rigidly uniting one terminal member of each series to its shaft, means formed upon the opposite terminal member for manually rotating it upon its shaft to cause the intermediate members to successively revolve upon the shaft in the same direction until their limit of travel has been reached, corresponding series of annular spacing members severally mounted upon the heads of the adjusting members of each series which are free to rotate therein but secured against lateral separation by pins seated in the spacing members severally and extending into peripheral grooves formed in the heads, arms united to the spacing members to engage, guide and space the blades in correspondence with the spacing of the spacing members, and means to secure the spacing members from rotation.

18. A bread slicing machine as described in claim 8, in combination with means for leading the band-blade from one side of one of said cylindrical pulleys transversely across the machine on a line spaced a short distance from the slicing courses of the blades and to the opposite end and side of the other cylindrical pulley, and means for adjusting the spacing of the cylindrical pulleys.

19. A bread slicing machine as described in claim 8, in combination with means for leading the band-blade from one side of one of said cylindrical pulleys transversely across the machine on a line spaced a short distance from the slicing courses of the blades and to the opposite end and side of the other cylindrical pulley, and means for simultaneously adjusting the tension of all the slicing courses of the band-blade.

HARRY J. CRINER.