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2,097,068

GRINDER FOR SLICER BLADES

Filed Nov. 9, 1934

2 Sheets-Sheet 1

FIG. 1

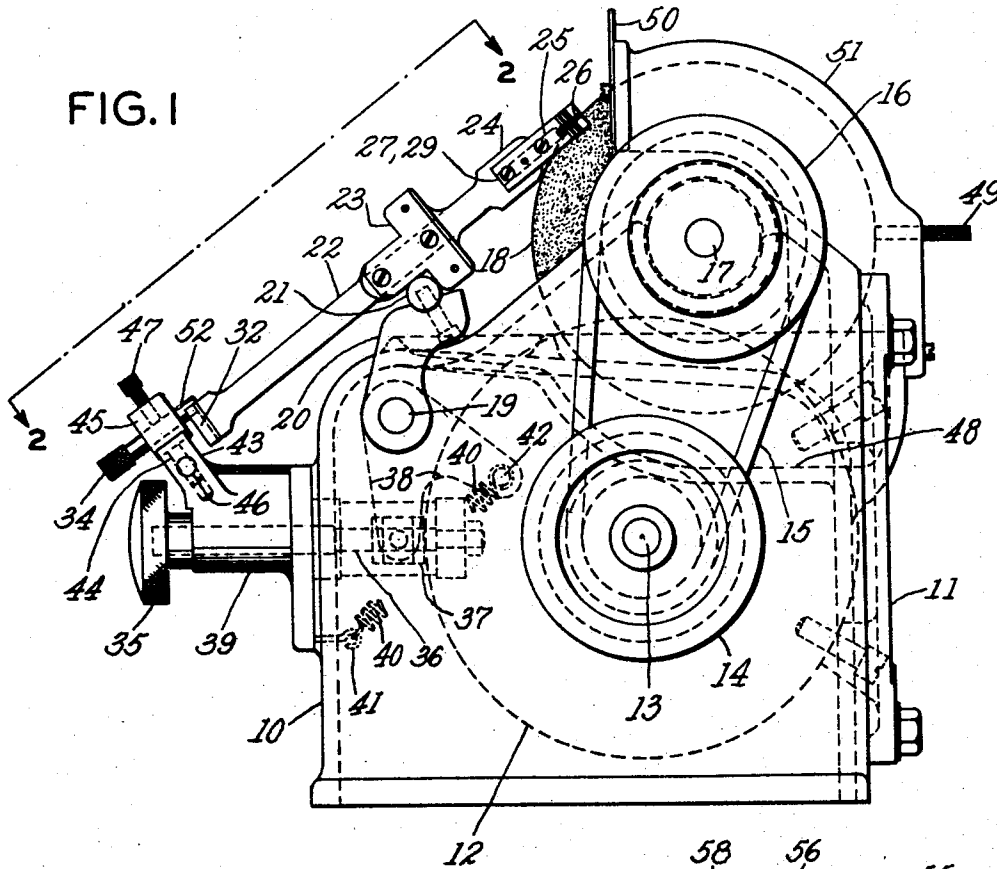


FIG. 4

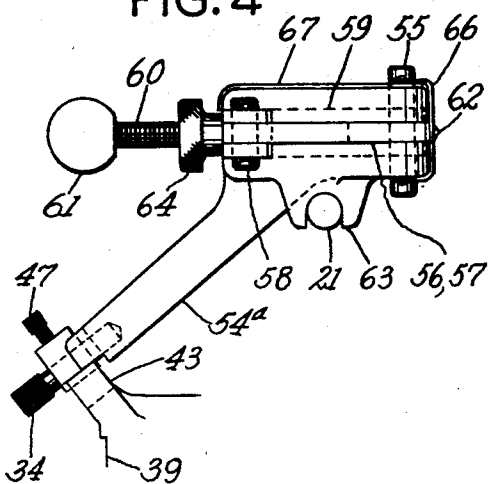
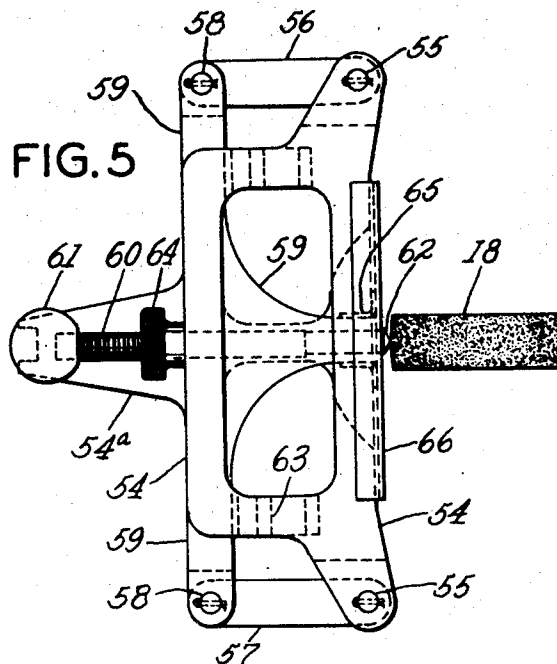


FIG. 5



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2 Sheets-Sheet 2

FIG. 2

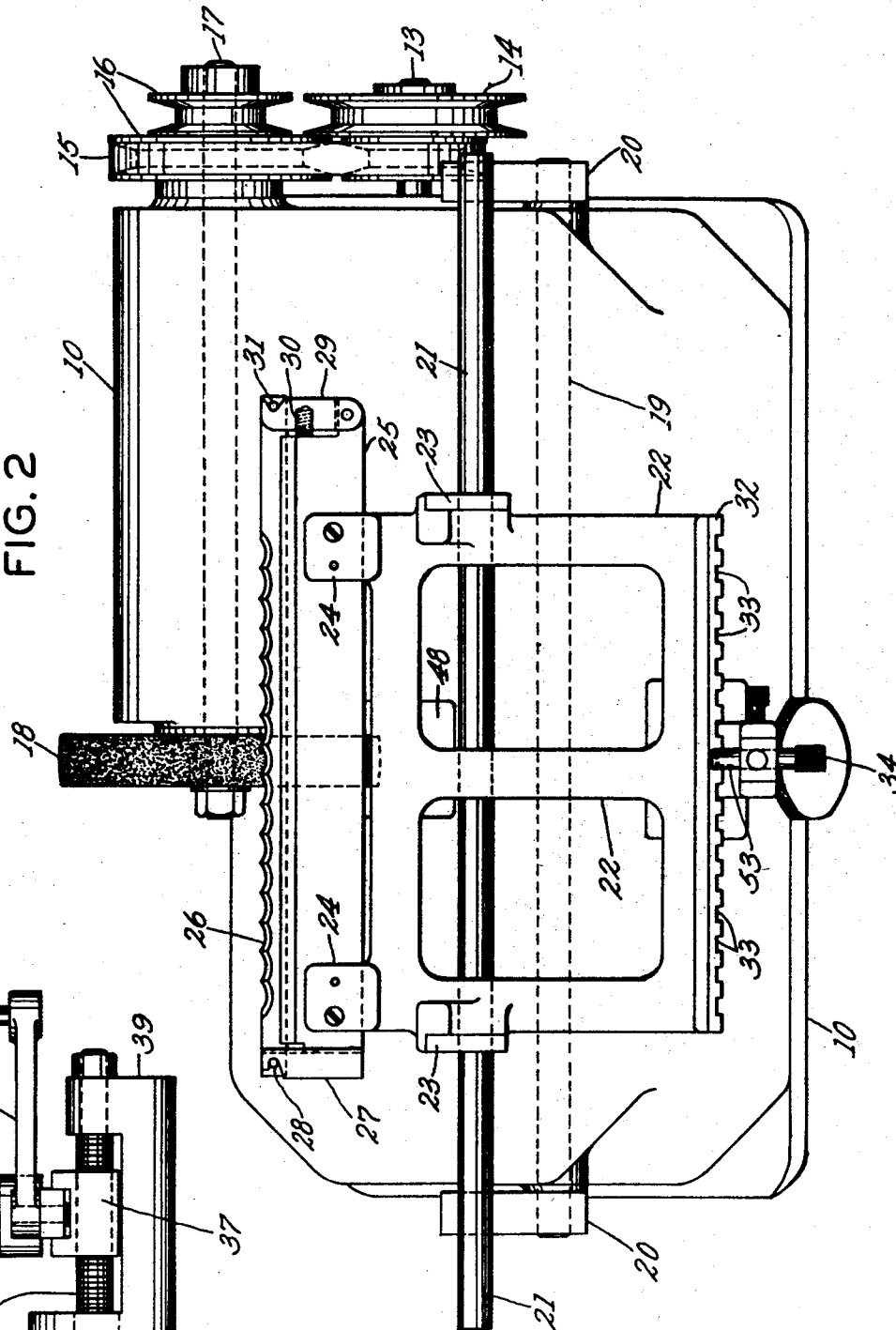
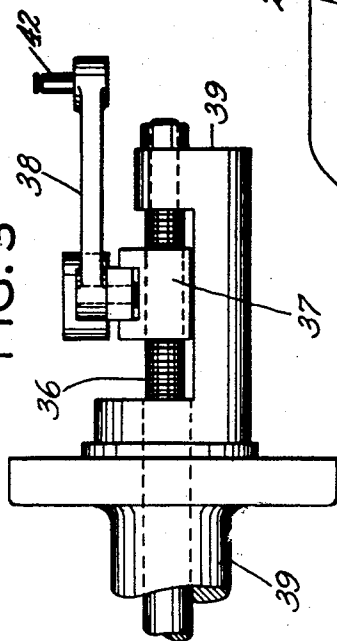


FIG. 3



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GRINDER FOR SLICER BLADES

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16 Claims. (Cl. 51—92)

This invention relates to a novel knife grinder, its main object being to touch up or sharpen the crenated cutting edge of slicer knives such as are used in bread slicing machines. To this end there is provided a stationary mount on which the work-holder carrying the knife to be ground may be swung to press the portions of the knife edge between the tips of adjacent crenations against the transversely convex periphery of a grinding wheel in order to grind the same.

A further object is to dress the periphery of the grinding wheel to maintain its predetermined contour. For this purpose there is provided a device which is interchangeable with the work-holder on the stationary mount, and including a frame which may be locked in position on the mount and on which is carried linkage supporting a diamond point arranged to engage the wheel periphery and true the same.

With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations hereinafter fully described and then specifically set forth in the claims hereunto appended.

In the accompanying drawings which form a part of this specification and in which like characters of reference indicate the same or like parts: Fig. 1 is an end elevation of the knife grinding machine;

Fig. 2 is a partial plan view of the same taken on line 2—2 of Fig. 1;

Fig. 3 is a detail view of the blade adjusting means;

Fig. 4 is an end view of the wheel dressing device; and

Fig. 5 is a plan view of the same.

In carrying the invention into effect there is provided a grinding wheel having a transversely convex periphery of predetermined contour, a stationary mount for interchangeably supporting a work-holder adapted to support a knife in parallel relation to the axis of the wheel and be swung forward on the mount toward the wheel, or a device for dressing the periphery of the wheel, whereby the portions of one side of the cutting edge of the knife between the tips of adjacent crenations may be pressed against the periphery of the wheel when the work-holder is swung toward the wheel, and thus be ground, or the periphery of the wheel may be trued by the dressing device. In the best constructions contemplated the work-holder is reversible on the mount to present the other side of the cutting edge of the knife to the grinding wheel, and there is provided means for adjusting the position of the mount to move the work-holder toward the wheel in order to compensate for the wear of the grinding wheel and retain the same angular relation of the cutting edge of the knife and the periphery of the wheel. There is also provided in

the best constructions a device for limiting the swinging movement of the work-holder toward the wheel. The wheel dressing device in the best constructions includes a frame resting on the mount, parallel arms pivoted on said frame, a link connecting said arms, and a diamond point supported from said link and arranged to engage the periphery of the wheel and strike an arcuate path corresponding to the predetermined contour of the wheel periphery to true the same.

These various means and parts may be widely varied in construction within the scope of the claims for the particular implement selected to illustrate the invention is but one of many possible concrete embodiments of the same. The invention, therefore, is not to be restricted to the specific construction shown and described.

Referring to the drawings, the housing 10 supports an adjustable base plate 11 carrying an electric motor 12. The motor shaft 13 carries a stepped pulley 14 which by means of a belt 15 drives a stepped pulley 16 mounted on one end of shaft 17. On the other end of shaft 17 is fastened a grinding wheel 18 having a transversely convex periphery.

The housing 10 supports a cross shaft 19 having fixed on its ends the arms 20, the free ends of arms 20 being provided with notches in which the ends of a mount 21 are suitably fastened.

A work-holder 22 is equipped with T-shaped stirrups 23 resting on the mount 21. The forked lugs 24 provided at the inner end of the work-holder receive the knife support 25 which is provided with a slot into which is inserted to be ground the knife 26. A stationary block 27 fast to one end of the knife support 25 is provided with a notch which receives the pin 28 at one end of knife 26, the other end of the knife support carrying a tension lever 29 equipped with a compression spring 30 serving to press the notch of the lever 29 against the pin 31 in the other end of the knife 26 and retain the knife firmly in the knife support. To the lower or outer end of the work-holder 22 is fastened a bar 32 having a plurality of spaced notches 33 each adapted to receive the shoulder on the inner end of the stop pin 34 when the work-holder 22 is shifted laterally on the mount 21 to bring the desired notch into alignment with the pin 34; whereupon the frame 22 may be swung toward the grinding wheel until it is stopped by the pin 34 in a position wherein the cutting edge of the knife blade will be ground to the desired angle as predetermined by the setting of the pin 34 and the position of the mount 21. The notches in the bar 32 correspond in number with the crenations of the cutting edge of the knife held in the knife support 25, and are centered with respect thereto.

Adjusting means are provided for moving the mount 21 in an arcuate path parallel to the axis

of the grinding wheel 18 in order to move the work-holder 22 toward or away from the grinding wheel to compensate for the wear of the latter and retain the same angular relation of the cutting edge of the knife and the wheel periphery, or vary said angular relation. This is accomplished by turning a knob 35 and thus rotating a threaded spindle 36 engaging a threaded block 37 provided with a groove receiving a slide-block pivoted on one arm of a bell-crank lever 38 fastened on shaft 19. The adjustment of block 37 in this manner turns the shaft 19 and moves the mount 21 in an arcuate path parallel to the axis of the grinding wheel, thereby causing the work-holder 22 to approach or retreat from the wheel. The spindle 36 (Figs. 1 and 3) is mounted in a bracket 39 attached to the housing 10, the bracket being provided with a flat surface bearing against one face of the block 39 to prevent rotation thereof on the spindle 36. One end of a tension spring 40 (Fig. 1) is anchored to a hook 41 in housing 10, and its other end is connected to a spring post 42 carried by arm 38. The action of spring 40 prevents any back-lash in the threaded connection of spindle 36 and the block 37 after the rod 21 has been properly set, thus effectively maintaining the knife blade in the desired position in relation to the grinding wheel.

The notched lug 43 of bracket 39 is provided with an axial bore to receive the shank 44 of the block 45. The block when correctly set in the notch of the lug is held in place by a set screw 46. The pin 34, which is adjustably mounted in a transverse hole of the block 45, is held by a set screw 47.

The grinding wheel 18 is partly submerged in water stored in a well 48 provided in housing 10. A wiper 49 removes excess water from the wheel, and a slotted plate 50 fitting over the wheel prevents the water from splashing onto the blade being ground. Plate 50 and wiper 49 are carried by a guard 51 partly surrounding the wheel 18, the guard being attached to housing 10. The plate 50 is secured to the guard 51 by screws passing through elongated slots in the plate, thus to be lowered as the wheel is worn down.

The operation of the grinder is as follows:

The knife is inserted in the knife support 25, and the work-holder 22 is then placed on the mount 21 with its stirrup 23 resting thereon, the knob 35 and block 45 being then adjusted until the top edge of one of the notches in bar 32 stops against the shoulder 52 of pin 34, so that the knife rests lightly against the wheel 18 in the proper position to cause its cutting edge to be ground to the desired angle (Fig. 1). With the adjustments thus set the frame 22 is moved back and forth laterally on the rod 21 by the attendant. This movement is limited by the engagement of the side walls of the notch with the undercut portions 53 of the sides of the pin 34 (Fig. 2), and, as hereinbefore stated, causes the tool marks of the grinding operation to be removed. This slight back and forth movement of the work-holder 22 was found to give the best results for touching up the crenated cutting edge of the knife. As one crenation is finished the work-holder 22 is advanced to engage the pin 34 with the next notch, and the grinding operation is repeated until all the crenations on one side of the cutting edge have been sharpened. The work-holder is then reversed and the other side of the cutting edge is sharpened in the same manner.

To true up the periphery of the grinding wheel 18 when wear or irregularities of its contour render the same necessary, a dresser unit is provided; this unit consisting of a frame 54 carrying pins 55 on which are pivotally mounted the parallel arms 56 and 57. The said arms are connected by means of pins 58 to a link 59. Link 59 is provided with a spindle 60 threaded therein and having a knob 61 on its outer end. By turning the knob 61 the diamond point 62 may be adjusted toward or away from the grinding wheel 18.

When the wheel 18 needs dressing, the work-holder 22 is removed from the mount 21 and replaced by frame 54, the notched lugs 63 of the frame 54 resting on the mount and the pin 34 being inserted into a bore provided in the arm 54a of frame 54 to lock the latter at operative position. The knob 61 is then turned until the diamond point 62 engages the wheel 18, and with the adjustment thus made the spindle 60 is locked in position by means of a nut 64. The knob is grasped to swing the linkage 56, 57, 59 to and fro about the pins 55 so that the diamond 62 will strike an arcuate path which suits the predetermined contour of the wheel 18. The grinding wheel is thus kept in shape, so that the cutting edge of the knife 26 will always be properly ground.

The link 59 carries angles 65 which support a guard 66 provided with a slot through which the diamond 62 engages the grinding wheel. A shield 67 supported by the pins 55 encloses the top of frame 54 (Fig. 4), and in this manner the dust from the grinding wheel is prevented from entering the bearings of the device.

While the invention has been illustrated as applied to the grinding of knives having crenated cutting edges, it will be understood that knives having other configurations of their cutting edges may be ground upon substituting a grinding wheel having a concave or concavo-convex transverse contour, and that such use is contemplated.

What is claimed is:

1. In a grinder for slicer knives having crenated cutting edges, the combination with a grinding wheel having a transversely convex periphery, of a stationary mount parallel to the axis of said wheel, a work-holder resting on said mount to support a knife in parallel relation to the axis of said wheel and adapted to be swung forward on said mount toward said wheel, whereby the portions of one side of the cutting edge of the knife between the tips of adjacent crenations may be pressed against the periphery of the wheel when the work-holder is swung toward the wheel and thus be ground, means for adjusting the position of said mount in an arcuate path parallel to the axis of said wheel to move the work-holder toward said grinding wheel in order to compensate for the wear of the grinding wheel and retain the same angular relation between the cutting edge of the knife and the periphery of the wheel, and a device for limiting the swinging movement of the work-holder toward said grinding wheel, said means including a shaft parallel to said mount and connected to the latter, a bell-crank lever fast to said shaft, mechanism connected to one arm of said lever for turning said shaft and thus moving said mount toward or away from the grinding wheel, and a tension spring connected to the other arm of the lever for holding it in adjusted position.

2. In a grinder for slicer knives having crenated cutting edges, the combination with a grinding

wheel having a transversely convex periphery, of a stationary mount parallel to the axis of said wheel, a work-holder resting on said mount to support a knife in parallel relation to the axis of said wheel and adapted to be swung forward on said mount toward said wheel, whereby the portions of one side of the cutting edge of the knife between the tips of adjacent crenations may be pressed against the periphery of the wheel when the work-holder is swung toward the wheel and thus be ground, means for adjusting the position of said mount in an arcuate path parallel to the axis of said wheel to move the work-holder toward said grinding wheel in order to compensate for the wear of the grinding wheel and retain the same angular relation between the cutting edge of the knife and the periphery of the wheel, and a device for limiting the swinging movement of the work-holder toward said grinding wheel, said work-holder being provided on its outer end with a notched bar, said notches corresponding in number with the crenations of the knife and being centered with respect thereto, and said device including a stationary stop pin provided with a shoulder adapted to enter one of said notches and engage its upper edge to limit the swinging movement of the work-holder toward the grinding wheel, and having undercut sides to permit a slight lateral play of the work-holder relative to the wheel so that the tool marks of the grinding operation will be removed.

3. In a grinder for slicer knives having crenated cutting edges, the combination with a grinding wheel having a transversely convex periphery, of a stationary mount parallel to the axis of said wheel, a work-holder resting on said mount to support a knife in parallel relation to the axis of said wheel and adapted to be swung forward on said mount toward said wheel, whereby the portions of one side of the cutting edge of the knife between the tips of adjacent crenations may be pressed against the periphery of the wheel when the work-holder is swung toward the wheel and thus be ground, means for adjusting the position of said mount in an arcuate path parallel to the axis of said wheel to move the work-holder toward said grinding wheel in order to compensate for the wear of the grinding wheel and retain the same angular relation between the cutting edge of the knife and the periphery of the wheel, a device for limiting the swinging movement of the work-holder toward said grinding wheel, said work-holder being provided on its outer end with a notched bar, said notches corresponding in number with the crenations of the knife and being centered with respect thereto, and said device including an adjustable stop pin provided with a shoulder adapted to enter one of said notches and engage its upper edge to limit the swinging movement of the work-holder toward the grinding wheel so that the adjustment of the pin may compensate for the adjustment of said mount and retain the same angular relation of the cutting knife and the periphery of the grinding wheel, or vary said angular relation.

4. In a grinder for slicer knives having crenated cutting edges, the combination with a grinding wheel having a transversely convex periphery, of a stationary mount parallel to the axis of said wheel, a reversible work-holder resting on said mount to support a knife in parallel relation to the axis of said wheel and adapted to be swung forward on said mount toward said wheel, whereby the portions of one side of the cutting edge of the knife between the tips of adjacent crenations

may be pressed against the periphery of the wheel when the work-holder is swung toward the wheel, and thus be ground, said work-holder including a knife support provided with a slot to receive the knife, a stationary block on said knife support having a notch adapted to receive a pin in one end of the knife and a tension lever on said knife support having a notch adapted to receive a pin in the other end of the knife.

5. In a grinder for slicer knives having crenated cutting edges, the combination with a grinding wheel, of a stationary mount parallel to the axis of said wheel, a work-holder resting on said mount to support a knife in parallel relation to the axis of said wheel and adapted to be swung forward on said mount toward said wheel, and means on said holder coextensive with said knives, and provided with centering devices for selectively maintaining any of the indentations on the cutting edge of the knife supported by said work-holder, in centered relation with respect to said grinding wheel, whereby the portions of one side of the cutting edge of the knife between adjacent crenations may be selectively pressed against the periphery of said wheel when the work-holder is swung toward the wheel, and thus be ground.

6. In a grinder for slicer knives having crenated cutting edges, the combination with a grinding wheel having a transversely convex periphery, of a stationary mount parallel to the axis of said wheel, a work-holder resting on said mount to support a knife in parallel relation to the axis of said wheel and adapted to be swung forward on said mount toward said wheel, means for selectively maintaining any of the indentations on the cutting edge of the knife supported by said work-holder, in centered relation with respect to said grinding wheel, whereby the portions of one side of the cutting edge of the knife between adjacent crenations may be selectively pressed against the periphery of said wheel when the work-holder is swung toward the wheel, and thus be ground, said work-holder being reversible on said mount to similarly present the other side of the cutting edge of the knife to the grinding wheel.

7. In a grinder for slicer knives having crenated cutting edges, the combination with a grinding wheel having a transversely convex periphery of predetermined contour, of a stationary mount for interchangeably supporting a work-holder adapted to support a knife in parallel relation to the axis of said wheel and be swung forward on said mount toward said wheel, or a device for dressing the periphery of said wheel to the predetermined convexity, and means for selectively maintaining any of the indentations on the cutting edge of the knife supported by the work-holder, in centered relation to the grinding wheel, whereby the portions of one side of the cutting edge of the knife between adjacent crenations may be selectively pressed against the periphery of said wheel when the work-holder is swung toward the wheel, and thus be ground.

8. In a grinder for slicer knives having crenated cutting edges, the combination with a grinding wheel having a transversely convex periphery of predetermined contour, of a stationary mount for interchangeably supporting a work-holder adapted to support a knife in parallel relation to the axis of said wheel and be swung forward on said mount toward said wheel, or a device for dressing the periphery of said wheel to the predetermined convexity, and means for selectively maintaining any of the indentations on

the cutting edge of the knife supported by the work-holder, in centered relation to the grinding wheel, whereby the portions of one side of the cutting edge of the knife between adjacent crenations may be selectively pressed against the periphery of said wheel when the work-holder is swung toward the wheel, and thus be ground, said work-holder being reversible on said mount to similarly present the other side of the cutting edge of the knife to the grinding wheel.

9. In a grinder for slicer knives having indented cutting edges, the combination with a grinding wheel, of a stationary mount, a work-holder on said mount adapted to support a knife having an indented cutting edge, and be swung forward on said mount toward said wheel, and means on said holder and provided with centering devices for selectively maintaining any one of the indentations of the knife supported on said work-holder, in centered relation with respect to the grinding wheel, whereby one side of any one of said indentations may be pressed against the periphery of the wheel when the work-holder is swung toward the wheel, and thus be ground.

10. In a grinder for slicer knives having indented cutting edges, the combination with a grinding wheel, of a stationary mount, a work-holder on said mount adapted to support a knife having an indented cutting edge, and be swung forward on said mount toward said wheel, and means for selectively maintaining any one of the indentations of the knife supported on said work-holder, in centered relation with respect to the grinding wheel, whereby one side of any one of said indentations may be pressed against the periphery of the wheel when the work-holder is swung toward the wheel, and thus be ground, said work-holder being reversible on said mount to similarly present the other side of the cutting edge of the knife to the grinding wheel.

11. In a grinder for slicer knives having crenated cutting edges, the combination with a grinding wheel having a transversely convex periphery of predetermined contour, of a stationary mount for interchangeably supporting a reversible work-holder adapted to support a knife in parallel relation to the axis of said wheel and be swung forward on said mount toward the wheel, or a device for dressing the periphery of the wheel to the predetermined convexity, whereby the portions of either side of the cutting edge between adjacent crenations of a knife supported on the work-holder may be pressed against the periphery of the wheel when the work-holder is swung toward the wheel, and thus be ground, or the periphery of said wheel may be trued by said device.

12. In a grinder for slicer knives having crenated cutting edges, the combination with a grinding wheel having a transversely convex periphery, of a stationary mount parallel to the axis of said wheel, a work holder provided with centering devices resting on said mount to support a knife in parallel relation to the axis of said wheel and adapted to be moved on said mount toward said wheel and parallel to the axis thereof, and means cooperating with said devices for selectively maintaining any of the indentations on the cutting edge of the knife supported by said work holder, in centered relation with respect to the grinding wheel, whereby the portions of one side of the edge of the cutting knife between adjacent crenations may be pressed

against the periphery of said wheel when the work holder is moved toward the wheel, and thus be ground.

13. In a grinder for slicing knives having indented cutting edges, the combination with a grinding wheel, of a support, a work holder on said support adapted to carry a knife having an indented cutting edge, and be moved on said support toward said wheel, and means for selectively maintaining any one of the indentations of the knife carried by said work holder, in centered relation with respect to the grinding wheel, whereby one side of any one of said indentations may be pressed against the periphery of the wheel when the work holder is moved toward the wheel, and thus be ground, said work holder being reversible on said support to similarly present the other side of the cutting edge of the knife to the grinding wheel.

14. In a grinder for slicer knives having crenated cutting edges, the combination with a housing, of a grinding wheel having a transversely convex periphery, a support, a blade holder arranged to be moved laterally step by step with respect to said support, and adapted to be moved on said support toward said wheel, whereby the portions of one side of the cutting edge of the knife between tips of adjacent crenations may be pressed against the periphery of the wheel when the blade holder is moved toward the wheel, selective locking means carried by the blade holder, a device mounted upon the housing cooperating with said locking means, whereby the selected crenation of the blade being ground may be held centered against the convex periphery of the grinding wheel during each pause in the lateral step by step movement of the blade holder.

15. In a grinder for slicer knives having crenated cutting edges, the combination with a frame, of a grinding wheel, a support, a blade holder resting thereupon and arranged for intermittent movement laterally, and adapted to be moved with respect thereto toward said wheel whereby crenations of the blade may be presented to the periphery of the grinding wheel, lateral positioning means provided upon said blade holder, a pin carried by said frame cooperating with said lateral positioning means, whereby the selected crenation of a blade being ground may be held centered against the grinding wheel during each pause in the lateral movement of the blade holder.

16. In a grinder for slicer knives having crenated cutting edges, the combination with a grinding wheel having a transversely convex periphery, of a stationary mount parallel to the axis of the wheel, a work holder resting on said mount to support a knife in parallel relation to the axis of the wheel and adapted to be moved along said support intermittently and be moved on said support toward said wheel, and means on said holder, and provided with centering devices for selectively maintaining any of the indentations on the cutting edge of the knife supported by the work holder, in centered relation with respect to the grinding wheel, whereby successive portions of one side of the cutting edge of the knife between adjacent crenations may be selectively pressed against the periphery of the said wheel when the work holder is moved toward the wheel, and thus be ground.

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