July 31, 1934. W. A. VAN BERKEL 1,968,664

SHARPENER FOR SLICING MACHINES

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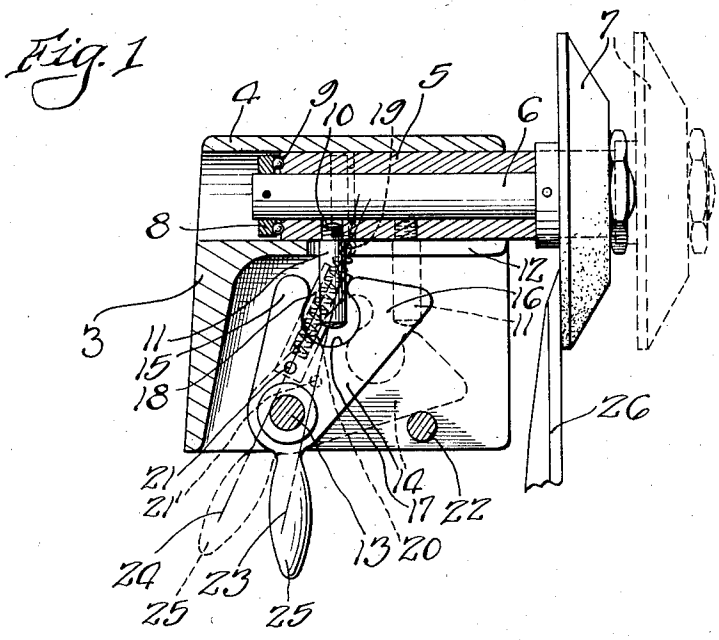
Fig. 1



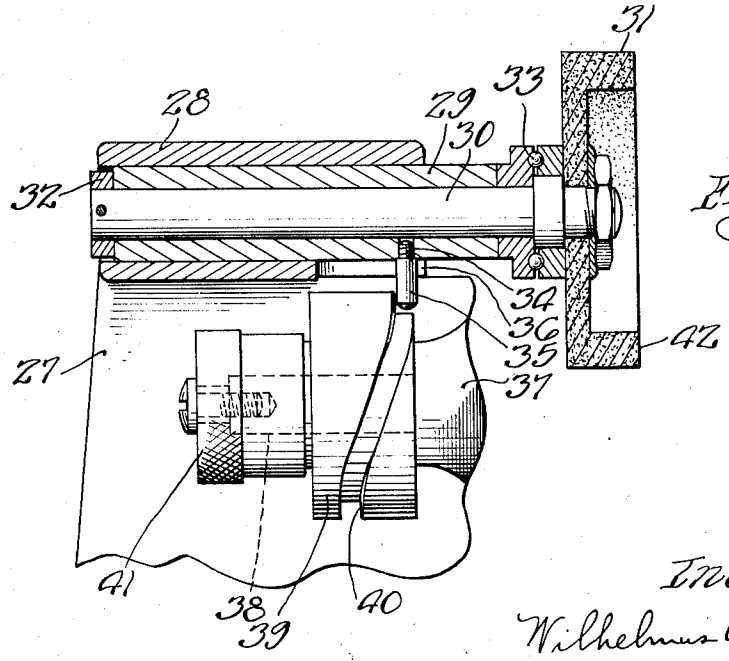


Fig. 2

Inventor:
Wilhelmus A. van Berkel,
By Chas. M. Nissen,
Atty.

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SHARPENER FOR SLICING MACHINES

Wilhelmus Adrianus van Berkel, Clarens, Switzerland, assignor to U. S. Slicing Machine Company, La Porte, Ind., a corporation of Indiana

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In Germany December 23, 1929

24 Claims. (Cl. 51—248)

The details of the cam means for advancing the grinder and the actuating means therefor, shown particularly in Fig. 2 are shown and claimed specifically in my copending application, Serial Number 435,117, filed March 12, 1930.

My invention relates to slicing machines of the type having a rotary circular knife with which is associated sharpening mechanism comprising a grinding element for application to the beveled edge of the slicing machine knife and a burr-removing grinding element for application to the opposite edge of the knife, and one of the objects of the invention is the provision of improved and efficient means for mounting such grinding elements for ready detachment of the journal bearings in which the spindles of the grinding elements are rotatable so as to facilitate cleaning of the grinding elements and repair, adjustment and lubrication of the spindles in the journal bearings.

Another object of the invention is the provision of improved and efficient means for detachably mounting the grinding element on a frame and yieldingly holding the grinding element in operative position.

Another object of the invention is the provision of manually operated mechanism for moving a detachably mounted grinding element toward and away from the knife which is adapted to be sharpened by the grinding element.

Other objects of the invention will appear hereinafter, the novel features and combinations being set forth in the appended claims.

In the drawing—

Fig. 1 is an elevational view, partly in section, of my improved mechanism for detachably mounting the journal bearing in a frame; and

Fig. 2 is an elevational view, partly in section, of a modification.

In Fig. 1, the housing or supporting frame 3 of the grinding apparatus is provided with a sliding bearing 4 for the journal bearing 5 of the spindle 6. Fig. 1 shows a burr-removing grinding element 7 secured to the spindle 6 for rotation bodily therewith.

At that end of the spindle 6 removed from the grinding element 7, is secured a ring collar 8 between which and the rear end of the journal bearing 5 is a ball-thrust bearing 9.

Screw-threaded at 10 into an opening in the journal bearing 5 is a radial pin 11 which is adapted to depend into the slot 12 in the frame 3. The pin 11 fits in the slot 12 and is guided by the same for movement along a rectilinear path of travel parallel to the axis of the spindle 6.

Pivoted at 13 to the frame 3 is a Y-cam 14 or cam plate having two arms 15 and 16. Between the arms 15 and 16 is an arcuate recess 17 nearly circular in form and having an opening between the inner ends of the arms 15 and 16 somewhat larger than the diameter of the pin 11.

A compression spring 20 is secured at its upper end at 19 to the frame 3. The lower portion of the spring 20 fits into an elongated cup 18 which is pivoted at its lower end at 21 to the cam plate 14 at a point to the left of a straight line extending between the point 19 and the pivot 13.

The grinding wheel or grinding element 7 may be grasped manually and moved to the dotted line position as shown in Fig. 1, whereupon the pin 11 will be moved to its dotted line position and when this movement takes place the pin engages the inner end of the arm 16 and moves the cam plate to its dotted line position against the stop or abutment 22 which is fixed to the frame 3. When this movement takes place the pivot point 21 moves to the position indicated at 21'. Then a straight line such as that shown at 23 will extend to the right of the pivot 13. Consequently when the cam plate 14 is in its full line position the spring 20 will act along the line 24 to hold the pin 11 in its left-hand position, whereas when the cam plate 14 is in its dotted line position against the stop 22, the spring 20 will act on the line 23 to hold the cam plate in its dotted line position. When the spring is in the position shown in Fig. 1 and acting along the line 24, the spring will not only hold the cam plate 14 with its arm 16 engaging the right-hand side of the pin 11, but will also effect a yielding pressure of the grinding wheel in its burr-removing operating position.

By means of the handle 25 secured to the cam plate 14 the latter may be moved in a clockwise direction to release the pin 11 from the opening 17 between the arms 15 and 16. The movement of the cam plate 14 to its dotted line position against the stop 22 will enable ready removal of not only the grinding wheel 7, but also the journal bearing 5 so that the grinding wheel may be cleaned and the journal bearing repaired or adjusted or lubricated. When the grinding wheel assembly is to be replaced in the frame 3, the spring 20 is acting on the line 23 and holding the cam plate 14 in its dotted line position. When the pin 11 slides along the slot 12 it will engage the arm 15 and move the cam plate in an anti-clockwise direction until the spring 20 passes the dead-center and acts toward the left of the pivot 13 to snap the grinding wheel into its left-hand position where the spring 20 yieldingly holds the burr-

removing grinding wheel 7 in engagement with the knife 26.

In the modification shown in Fig. 2, the frame 27 has on the upper side thereof a slide bearing 28 for receiving the journal bearing 29. Journaled in the bearing 29 is a spindle 30 which is secured to the sharpening grinding element or grinding wheel 31. A collar 32 is secured to that end of the spindle 30 remote from the grinding element 31 and a ball-thrust bearing 33 is located between the journal bearing 29 and the grinding element 31 adjacent the latter.

Screw-threaded to the journal bearing 29 at 34 is a radial pin 35 which is adapted to extend downwardly into the slot 36. The latter guides the pin 35 for securing rectilinear adjustment of the grinding wheel assembly along a path parallel to the axis of the spindle 30.

Both in the form shown in Fig. 1 and in the form shown in Fig. 2, the slot in which the radial pin fits is open at that end adjacent the grinding element to permit free removal of the grinding wheel assembly including the journal bearing 29.

Mounted on an auxiliary support 37 secured to the frame 27, is a fixed bearing 38 on which is mounted a cam drum 39 provided with a spiral cam slot 40 in position to engage the pin 35. By means of a knurled knob 41 secured to the drum 39, the latter may be rotated on the bearing 38.

One end of the cam slot 40 is open as shown in Fig. 2 so that the pin 35 together with the grinding wheel assembly may be readily withdrawn along the slot 36. When the journal bearing 29 is manually placed in the sliding bearing 28 with the pin 35 in the slot 36 and projecting downwardly into the open end of the cam slot 40, the knob 41 may be turned in an anti-clockwise direction as viewed from the left so as to cause the cam slot 40 to move the pin 35 along the slot 36 to its left-hand position. When in such left-hand position the walls of the cam slot 40 will retain the pin 35 in adjusted position. Since the ring-faced portion 42 of the sharpening wheel 31 is adapted to be brought into engagement with the beveled edge of the slicing machine knife, the desired movement of the sharpening wheel 31 into operative position may be obtained by moving the knob 41 in a clockwise direction as viewed from the left of Fig. 2 and the degree of sharpening pressure may be regulated by the manual torque exerted on the knob 41.

While in the construction shown in Fig. 1 the spring 20 may be relied on to exert pressure of the burr-removing wheel 7 against the knife edge, such pressure may be increased by a manual force exerted on the handle 25 in an anti-clockwise direction because the arm 16 will then engage positively the right-hand side of the pin 11 and move the journal bearing 5 toward the left.

It should be particularly noted that the ball-thrust bearing 9 in Fig. 1 is in such position that when manual pressure is exerted to move the grinding element into engagement with the knife edge, the force will be exerted through the thrust-bearing. In a similar manner in the construction shown in Fig. 2, when a manual force is exerted to move the sharpening wheel 31 into engagement with the beveled edge of the knife the force would be exerted through the thrust-bearing 33.

Obviously those skilled in the art may make various changes in the details and arrangement of parts without departing from the spirit and scope of the invention as defined by the claims hereto appended and I wish therefore not to be restricted to the precise construction herein disclosed.

Having thus fully disclosed an embodiment of my invention, what I desire to secure by Letters Patent of the United States is:

1. A sharpener for slicing machine knives, comprising a grinding element, a spindle on which said element is mounted, a journal bearing for said spindle, means for confining said spindle against longitudinal movement relatively to said journal bearing, a frame having a sliding bearing for said journal bearing, said frame having a longitudinally extending open-ended slot extending substantially in the general direction of said slide bearing, a radially extending pin on said journal bearing adapted to enter said slot when the journal bearing is inserted in said slide bearing, and means for releasably holding said journal bearing from movement out of said slide bearing and for holding said pin against movement out of said slot while said releasable means is operative but permitting said last mentioned movements of said bearing and pin if and when said releasable means is released and without removing said pin from said journal bearing.

2. Sharpening apparatus for slicing machine knives, comprising a grinding element, a spindle therefor, a journal bearing for said spindle, a radial pin on said journal bearing, a supporting frame, a slide bearing for said journal bearing, said frame having an open-ended slot for receiving said pin, a U-shaped lever mounted in position for said pin to project between the arms thereof, and a compression spring between said frame and said U-shaped lever to yieldingly hold the pin in position to hold the grinding element connected to said frame.

3. In sharpening apparatus for slicing machine knives, the combination with a grinding element, of a spindle therefor, a journal bearing for said spindle, a pin extending radially from said journal bearing, a frame having a sliding bearing for said journal bearing and an open-ended slot for receiving said pin, and manually operated mechanism for releasing said journal bearing by action on said pin to permit removal of the journal bearing together with said grinding element from said sliding bearing.

4. In sharpening apparatus for slicing machine knives, the combination with a grinding element, of means for supporting said grinding element for rotation, a frame for said supporting means, a Y-lever, an extension from said supporting means in position to engage between the arms of said Y-lever when said supporting means is placed in said frame, and a spring acting on said Y-lever.

5. In sharpening apparatus for slicing machine knives, the combination with a grinding element, of supporting means therefor, a frame for detachably carrying said supporting means, means comprising a Y-lever and a cooperating projection for manually moving said supporting means relatively to said frame, and a spring for holding the grinder in operative position.

6. In sharpening apparatus for slicing machine knives, the combination with a grinding element, of a spindle carrying the same, a journal bearing for said spindle, a radial pin secured to said journal bearing, a frame having a slot into which said pin projects, a slide bearing for said journal bearing, and a spiral cam for engaging said pin to slide said journal bearing relatively to said frame, said spiral cam having an

open-ended cam slot to permit ready detachment of the grinding element and said journal bearing from said frame.

7. In sharpening apparatus for slicing machine knives, the combination with a grinding element, of a spindle for carrying the same, a journal bearing for said spindle, a frame, a slide bearing on said frame for said journal bearing, a radial pin on said journal bearing extending into an open-ended slot in said frame, a Y-cam pivoted to said frame in position to be engaged by said pin, a stop for limiting the movement of said cam to releasing position, a spring connected between said frame and said cam to hold the same in position to confine said pin between the arms of said cam, and a handle connected to said Y-cam.

8. In a sharpening apparatus, the combination with a frame, of a grinder, means for supporting said grinder for longitudinal movement on said frame, a movable member, interlocking means between said movable member and said support for actuating said support longitudinally for retaining said support against longitudinal movement when said support is in operative position except when actuated by said movable member, and means for actuating said movable member, said interlocking means being releasable to permit the removal of said grinder support from said frame when said movable member is in a predetermined position of adjustment.

9. In a sharpening apparatus, the combination with a pair of supports one of which supports the other, said supports being guided for movement relative to each other, a grinder carried by the other of said supports, and quickly detachable interlocking means for moving said supports relative to each other and for preventing separation of said supports from each other except when said interlocking means is in a predetermined position, said interlocking means comprising a pivoted arm on one of said supports having a recess therein, a projection within the other section of said supports engaging within said recess, and means for manually moving said pivoted arm to move said support for said grinder relative to the other of said supports and permit separation of said supports from each other after predetermined movement of said lever about its pivot.

10. A device as claimed in claim 9 in which yielding means is provided for actuating said pivoted lever and for holding said pivoted lever in either of two positions, in one of which the interlocking means prevents separation of said supports and in the other of which positions, the interlocking means permits separation of said supports and in which said manual means supplements the action of said yielding means to move said lever into either of said aforementioned positions, and in which said manual means may be operated to position said supports at other selected positions at the will of the operator.

11. In a sharpening apparatus, the combination with a main supporting bearing, a grinder support slidably mounted in said bearing, a projection on said grinder support, said bearing having an open-ended slot therein for the reception of said projection, a movable member on said bearing having a recess therein for the reception of said projection, a yielding means for moving said member in a direction away from the open end of said slot, manual means for operating said member against the action of said spring to move said member in a direction toward the open end of said slot and to a position in which said projection is free of said recess to thereby permit the grinder support to be removed from said bearing.

12. A device as claimed in claim 11 in which said spring is so mounted as to also retain said member in said last mentioned position after the manual means has been actuated to move said member to that position whereby said member will be in a proper operative position to receive said projection when said grinder support is again placed in said bearing.

13. In a sharpening device for slicing machine knives, the combination with a frame, a grinder, a support for said grinder movably mounted on said frame, a cam, a groove in said cam, a projection on said support arranged within said groove, means for rotating said cam to cause said support to move relative to said frame, said cam groove being open at a predetermined position so that when said projection arrives at that position, the support for said grinder can be manually moved relative to said frame and independently of said cam to thereby permit removal of said grinder from said frame.

14. In a sharpening apparatus for slicing machine knives, the combination with a rotatable spindle, a grinder movable with said spindle, a projection movable with said spindle in the direction of the axis of said spindle, a cylindrical cam having a peripheral groove therein mounted to rotate about an axis parallel to the axis of said spindle, said projection being arranged within said groove and guided in a substantially rectilinear path substantially parallel to the axis of said spindle, said cam being for the purpose of manually actuating said spindle and for preventing removal of said spindle from its support, said groove being shaped at one portion thereof to a shape which will permit withdrawal of said projection from said groove independently of the movement of said cam when said cam is in a predetermined position whereby said spindle may be removed from its support.

15. A device as claimed in claim 14 in which said projection is formed on a bearing which bearing is restrained to move longitudinally with said spindle and in which said bearing rotatably supports said spindle.

16. In a grinding apparatus for slicing machines, the combination with a grinding element, of means for supporting said grinding element for rotation, a pin connected to said supporting means, a supporting frame having a bearing for receiving said supporting means by an endwise movement thereof into said bearing, an open-ended slot in said frame adapted to receive said pin when said supporting means is moved into said bearing, and means automatically becoming operable upon movement of said supporting means into said bearing for actuating said supporting means while said pin is in said open-ended slot.

17. In a grinding apparatus for slicing machines, the combination with a grinding element, of supporting means therefor, a pin connected to said supporting means, a frame having an opening to receive said supporting means and having a slot therein open at the end thereof adjacent the grinding element and adapted to receive said pin when said supporting means is moved into said opening longitudinally of the axis of said grinding element, and means automatically operable upon movement of said supporting means into said opening for preventing acci-

dental longitudinal displacement of said grinding element but permitting removal of said supporting means from said opening by manual pressure applied thereto longitudinally of the axis of said grinding element.

18. Sharpening apparatus for slicing machine knives comprising a supporting frame, a grinding element detachably supported on said frame, and mechanism comprising a spring-pressed double-armed lever for yieldingly and releasably holding the grinding element in its position on said frame but being automatically rendered operative or inoperative upon manual pressure applied to said grinding element in a direction to move said grinding element onto or off said supporting frame.

19. In a sharpening apparatus for slicing machine knives, the combination with a grinding element, of a carrier therefor, a frame, said grinding element and carrier being releasably mounted on said frame by means releasable solely upon the application of manual pressure to said grinding element and carrier, manual means for moving said supporting means and carrier relatively to said frame toward and from said knife, and a spring adapted to automatically hold said grinding element yieldingly in engagement with the knife independently of said manual means.

20. Sharpening apparatus for slicing machine knives comprising a grinding element, a spindle for carrying the same, a journal bearing for said spindle, a supporting frame, a slide bearing for said journal bearing, and quickly and readily detachable connections between said journal bearing and said frame releasable by application of pressure applied only to said spindle in the direction in which said spindle is moved to release the same from said slide bearing whereby manual removal of the journal bearing together with said grinding element is permitted solely by pressure applied thereto.

21. In a sharpening apparatus, the combination with a main support, of an auxiliary support movably mounted on said main support, a grinder carried by said auxiliary support, a projection on one of said supports, a member on the other of said supports having a recess into which said projection extends when said supports are in predetermined position relative to each other, a yielding means for selectively holding said movable member in either of two positions, in one of which the projection is out of said recess and in the other of which said projection is in said recess, means for moving said member into either of said positions, said member being operable to move said supports relative to each other and to either of said positions, and said auxiliary support being retained in operative position in said bearing against removal solely by the engagement of said projection within said recess, whereby upon movement of said member to the position in which said projection is free of said recess, said auxiliary support may be manually removed from said bearing by a movement in the direction longitudinally of the axis of rotation of said grinder.

22. In a sharpening apparatus for slicing machine knives, the combination with a grinding element, of a supporting means on which the same is mounted for rotative movement, yielding means acting longitudinally of said supporting means for selectively urging the grinding element in opposite directions, holding means for normally holding the grinding element in a predetermined position longitudinally of said supporting means while urging the same in the direction in which the same is moved into contact with the knife whereby to yieldingly urge the sharpener against the knife, and manually operated mechanism for releasing said holding means from operative holding relation with said grinding element to permit said grinding element to be moved free from operative engagement with the holding means to urge the grinding element away from sharpening engagement with the knife.

23. In a sharpening apparatus, the combination with a stationary support, of a sharpening element, a support for said sharpening element on which said sharpening element is rotatably supported, a member having a recess therein and movably mounted on one of said supports, a fixed member on the other of said supports engaging within a recess in said first member to prevent any substantial longitudinal relative movement between said supports except when and if said movable member is moved relative to the support on which it is mounted, said movable member being manually operable to move said supports relative to each other and being movable to a position to free said projection from said recess, whereby said supports may be moved longitudinally relative to each other without additional movement being imparted to said movable member relative to its support, whereby said supports may be separated from each other by manually moving said supports longitudinally relative to each other.

24. In a sharpening apparatus, the combination with a stationary support, of a sharpening element, a second support for said sharpening element, means on said first support for positively guiding said second support relative to said first support in a rectilinear path, a movable member movably mounted on one of said supports having a recess therein, said means also providing a support for said movable member, a fixed member on the other of said supports engaging within said recess in said movable member in one position of movement of said movable member to prevent substantial longitudinal relative movement between said supports except when and if said movable member is moved relative to the support on which it is mounted while permitting rotating movement of said guider, said fixed member being disengaged from said recess when said movable member is moved to another position of adjustment whereby the sharpening element with the support upon which it is mounted may be separated from the other support.

WILHELMUS ADRIANUS VAN BERKEL.