

Dec. 20, 1938.

W. A. VAN BERKEL  
KNIFE SHARPENING DEVICE

2,141,055

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2 Sheets-Sheet 1

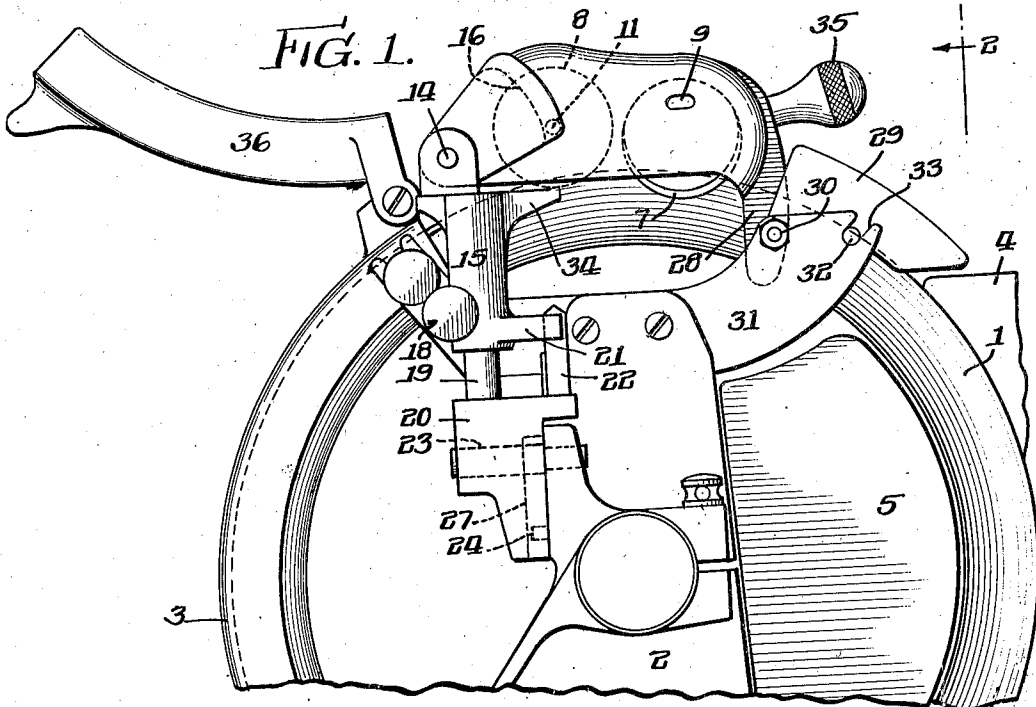


FIG. 2.

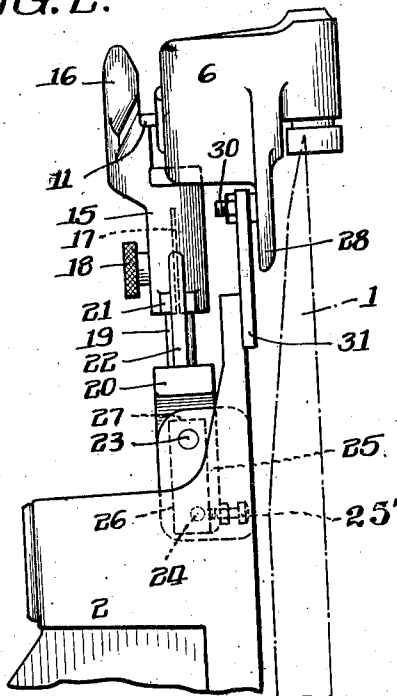


FIG. 3.

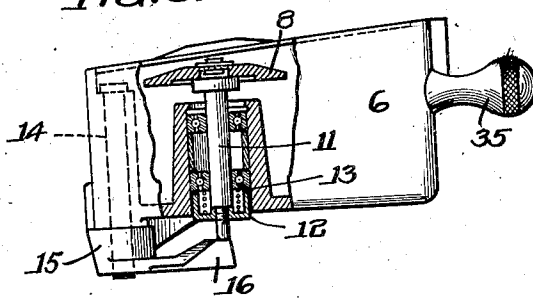
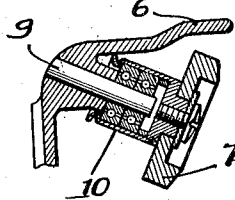


FIG. 4.



Inventor:  
Wilhelmus Adrianus van Berkel  
By: Cox & Moore attys

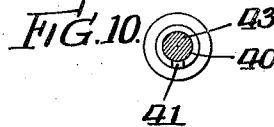
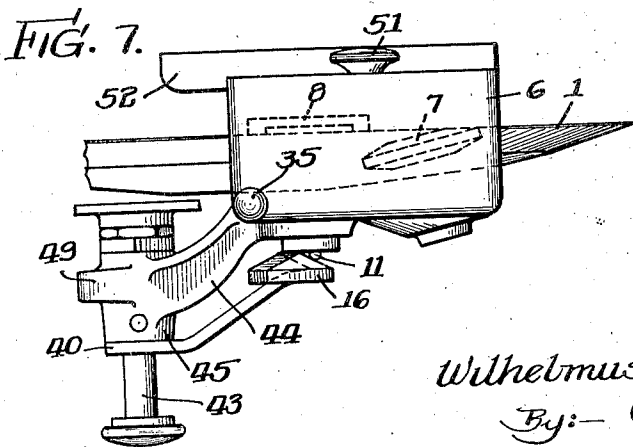
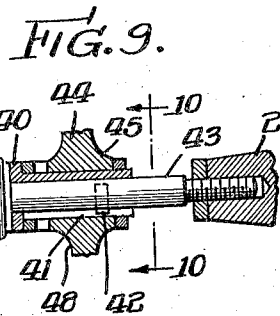
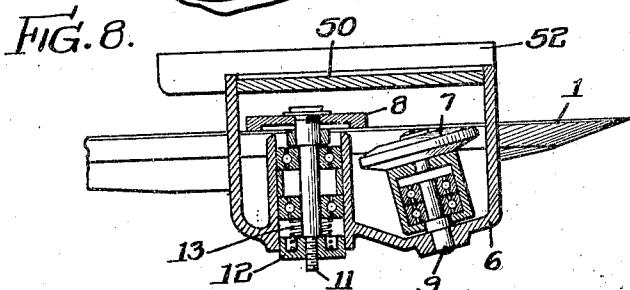
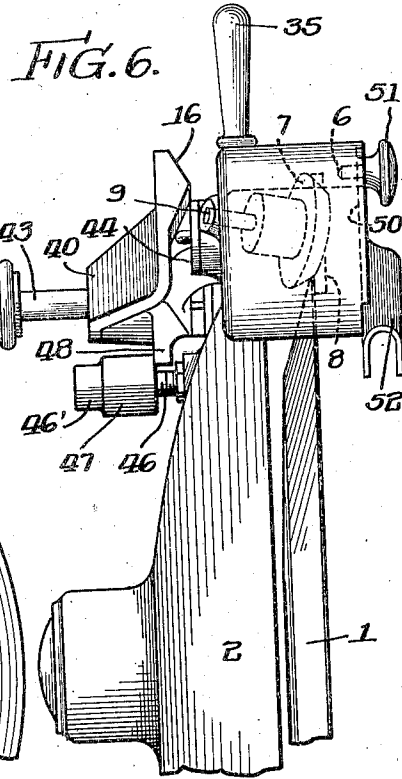
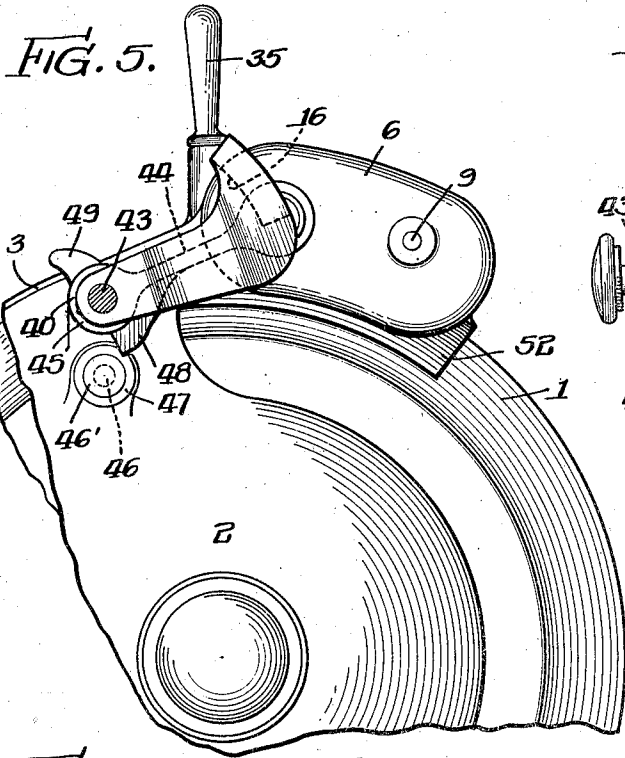
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Inventor:-  
Wilhelmus Adrianus van Berkel  
By:- Cox & Moore attys

# UNITED STATES PATENT OFFICE

2,141,055

## KNIFE SHARPENING DEVICE

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

Application December 6, 1935, Serial No. 53,206  
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15 Claims. (Cl. 51-248)

This invention relates in general to sharpening devices for slicing machines and more particularly to a form of knife sharpening device which is attached to a supporting part of the slicing machine for movement from an inoperative position into an operative or working position.

It is an object of this invention to provide means for sharpening a slicing machine knife which may be moved into and out of operative position from a position angularly disposed to the plane of the slicing knife.

It is a further object of this invention to provide a sharpening device for a slicing machine knife which may be brought into engagement in a more direct fashion which involves less movement of parts.

It is a still further object of this invention to provide a knife sharpening device for a slicing machine in which the sharpening elements are gravitationally held in contact with the knife edge.

It is also an object of this invention to provide a sharpening device for a slicing machine knife in which the frictional engagement between the sharpening elements and the knife edge acts to assist operative engagement between the sharpening elements and the knife edge.

It is an additional object of this invention to provide a sharpening device for a slicing machine knife which is protected against impairment and fouling from particles of the material being sliced by the knife.

It is, furthermore, an object of this invention to provide a knife sharpening device for a slicing machine in which the action of bringing the device into operative engagement with the knife edge brings one element of the sharpening device to bear on one face of the knife edge and another element of the sharpening device to bear on the other face of the knife edge in one unitary movement.

Numerous other objects and advantages will more fully appear during the course and progress of the following specification.

Figure 1 is an elevation view of the rear of a slicing machine knife and associated parts.

Figure 2 is an elevation view, with parts removed for clearness, in the direction of the arrow 2 in Figure 1.

Figure 3 is a partly sectioned plan view of the sharpening device.

Figure 4 is an elevation view of the grinding element of the sharpening device.

Figures 5 and 6 are views corresponding to

Figures 1 and 2 but showing another arrangement.

Figure 7 is a corresponding plan view.

Figure 8 is a sectional plan view of the sharpening device.

Figure 9 is a sectional elevation view of a constructional detail.

Figure 10 is a cross-section view of the embodiment shown in Figure 9 along the line 10-10 in Figure 9.

The embodiment shown in Figures 1 to 4 comprises the usual circular rotary slicing machine knife 1, the stationary bracket 2 in which the knife-shaft is journaled, the main knife-guard 3, the adjustable gauge-plate 4 arranged behind and parallel to the slicing plane of the knife (said plate serving either to position the substance prior to clamping thereof or to position the substance prior to the cutting of each slice), the slice deflector 5 arranged against the knife back, and the sharpening device casing 6. The grinding and burr-removing elements consist of abrasive wheels 7 and 8 respectively.

The grinding wheel 7 has a ball-bearing support on a fixed shaft 9 (see Figure 4), the support including a retaining clip 10 enabling the wheel to be removed from the ball-bearing simply by pulling forcibly on the wheel. The burr-removing wheel 8 is secured to a spindle 11 which is journaled in ball-bearings and which is slidable endwise through said bearings, the movement of the spindle in one direction being limited by the wheel and in the other by a hollow nut 12 screwed upon the spindle. A spring 13 continuously presses upon the nut 12 to urge the wheel 8 in the knife-engaging direction. To remove the wheel, it is only necessary to unscrew the nut 12 from the spindle. Thus both wheels 7 and 8 can be disconnected from their mountings without the use of tools.

The casing 6 of the sharpening device is pivotally attached by a pin 14 to a movable supporting sleeve 15, the axis of the pin 14 being parallel to the knife-axis when the sleeve occupies its operative position, in which it is shown in the drawings.

The sleeve 15 is provided with a cam 16 which co-operates with the spindle 11 of the burr-removing wheel 8 and which is adapted to displace the spindle and wheel in opposition to the pressure of the spring 13 whenever the cam is turned past the spindle by pivoting the casing 6 around the pin 14.

In order that the level of the pivot pin 14 can be adjusted in relation to the knife, which in

course of time becomes reduced in size due to wear, the sleeve 15 is formed with a split 17, as shown in Figure 2, and is provided with a clamping screw 18, by means of which the sleeve can be secured at any desired level to a column 19 on a bracket 20. The sleeve is restrained against turning around the column 19 by a forked extension 21 in sliding engagement with an auxiliary column 22 on the bracket 20.

The bracket 20 is pivotally attached to the knife-bracket 2 by a pin 23 whose axis is parallel to the slicing plane. The pivotal movement of the bracket 20 and the parts supported thereby takes place to and from the slicing plane and is limited to a comparatively small angle by any suitable stops; for example, by a pin 24 provided on the adjacent face of the knife-bracket 2 and arranged to engage with spaced abutments 25, 26 in a recess 27 in the bracket 20, the abutment having an adjustable screw 25'.

The casing 6 is provided with a fouling preventing projection 28 adapted to cooperate with an auxiliary knife-guard 29 which is pivotally attached by a screw 30 to an extension 31 on the knife-bracket 2 and is held in position by means of a pin 32 and slot 33.

The lowermost position which the sharpening device can occupy is defined by a ledge 34 on the sleeve 15, said ledge projecting below the casing 6 and serving to prevent excessive downward movement thereof. The casing 6 has a hand-knob 35 by means of which it can be raised from and lowered towards the ledge 34 around the pivot pin 14.

The main knife guard 3 has pivotally attached to it a supplementary portion 36 which must be swung out of the way before the sharpening device can be pivoted into its operative position.

In the drawings, the parts are shown in their operative positions; that is, the positions occupied by them when the abrasive wheels 7 and 8 engage the knife. In the inoperative position of the device, the bracket 20 and parts thereon are tilted rearwards (that is, towards the left as viewed in Figure 2) from the knife and the casing 6 rests upon the ledge 34; also, the burr-removing wheel 8 is spring-pressed fully rearwards.

During the slicing operation of the slicing machine, the sharpening device occupies its inoperative position, in which it is displaced away from the slicing plane. When it is desired to sharpen the knife the hand-knob 35 on the casing 6 is grasped and the device moved towards the slicing plane; the entire device, the sleeve 15, columns 19, 22 and bracket 20 turning as a whole around the pivot pin 23. The fouling prevention projection 28 moves against or towards the auxiliary knife-guard 29, the existence of which causes the operator to turn the device alone upwards around the pivot pin 14 attaching it to the sleeve 15. In the upward pivotal movement of the device, the burr-removing wheel 8 is moved axially forwards by the action of the cam 16. Thereafter, the movement towards the slicing plane is continued, the wheels 7 and 8 being meantime above the knife 1. The device is now lowered upon the knife, and during this movement the cam 16 permits the burr-removing wheel to return under the spring action against the knife. The device now occupies the operative position. In this position, the projection 28 abuts against the head of the screw 30, which helps to prevent deviation of the device from the proper position.

It will be seen that the complete movement of the device consists of component motions about two axes, namely, a pivotal motion of the device and its supporting sleeve around the pin 23 towards the slicing plane, an upward pivotal motion of the device alone around the pin 14 above the knife, and a return downward pivotal motion of the device into engagement with the knife.

In the downward movement of the device into the operative position, the grinding wheel 7 moves directly upon the knife edge and is pressed thereon by the weight of the device as a whole.

The location of the device is at the top of the knife, the axes of the wheels 7 and 8 in the operative position thereof being about level with the casing's axis of pivotal attachment, namely, the axis of the pin 14. Thus, the frictional interaction between the knife and grinding wheel 7 will be such that the knife will tend to exert a pulling effect upon the grinding wheel and thus hold the grinding wheel in proper grinding engagement with its edge.

If the aforesaid axis of pivotal attachment of the casing were materially below (or above) the wheel axes, the casing would require to be weighted (or counter-weighted) to give a corresponding knife-engaging effect.

If desired, instead of providing the projection 28 on the casing 6 of the device, a corresponding stationary projection—for example on the knife-bracket 2—could be provided to insure that the device would require to be lifted clear of the knife prior to crossing the plane thereof. Such an arrangement has the advantage that the operation requires to lift solely the device itself when moving it to or from the operative position.

In the embodiment shown in Figures 5 to 10, parts therein similar or corresponding to parts in Figures 1 to 4 have been denoted by the same reference numerals.

In the arrangement according to Figures 5 to 10, the means for controlling the burr-removing wheel 8 again consists of a cam 16, but this cam is formed with a boss 40 composed mainly of a sleeve formed with a slot 41 in sliding engagement with a pin 42 projecting from a journal 43 which is secured to the rear of the knife-bracket 2, as shown in Figures 9 and 10. The casing 6 has a supporting arm 44 which terminates in a boss 45 freely journalled on the boss 40.

A pin 46 screwed to the back of the knife-bracket is provided with an abutment collar 47 with which cooperates a projection 48 on the boss 45 of the casing, the arrangement being such that the casing can be pivotally lowered into its operative position and its inoperative position only when the projection 48 is beyond one or other end of the collar 47. The collar 47 and projection 48, therefore, serve to prevent fouling of the knife by the device and associated parts and to lock against sliding along the journal 43 the slidable unit, constituted by the sharpening device 6 and the cam 16, when lowered into either the operative or the inoperative position.

The pin 46 is preferably adjustable to insure precise operative relationship between the abrasive wheels 7 and 8 and the knife 1.

The sharpening device is retained in inoperative position by the projection 48 resting on the head 46' of the pin 46; and it is constrained against excessive pivotal movement by a stop 49 on the casing 6 adapted to abut against the collar 47 when the device is fully raised.

During the slicing operation of the slicing machine, the sharpening device occupies its inoperative position, in which it is displaced away from the slicing plane. When it is desired to sharpen the knife the hand-knob 35 on the casing 6 is grasped and the device pivotally raised around the journal 43. The device-and-cam unit is slid fully towards the slicing plane and then lowered, so that the projection 48 on the casing is engaged in front of the collar 47. Meantime, the downward-moving burr-removing-wheel axle 11 is displaced against the spring action by the now stationary cam 16, so that the wheel clears the knife edge. Thereafter, the cam 16 permits the burr-removing wheel 8 to return under the spring action against the knife; and, at the same time, the grinding wheel 7 moves against the knife edge and is pressed thereon by the weight of the device. The device now occupies its operative position.

A cover 50 may be provided at the front of the casing, this cover being held in place by a screw 51. The function of the cover 50 is to act as a shield between the wheels 7, 8 and the knife during slicing operations, so that particles of meat will not be projected upon the wheels and the wheels thereby soiled.

A supplementary knife-guard 52 may be provided and formed integrally with the cover 50 so as to register with the main knife-guard 3 when the sharpening device occupies the inoperative position.

It will be seen that in the present invention, a sharpening device for a slicing machine knife is provided such that the movement of the device to and from its working position comprises or includes a pivotal motion about an axis substantially parallel to the knife's axis of rotation. The device is provided with a freely pivotal attachment so that it can be gravitationally lowered without restraint upon the knife, the relationship between the lowered grinding element and the knife being such that the knife acts, in addition to the gravity action, to hold said element in contact with it.

It should be understood that a number of equivalent elements may be substituted for the various elements in the above described preferred embodiments without departing from the spirit or scope of the present invention. For instance, means may be provided for guiding the burr-removing element past the knife edge in the pivotal movement of the device towards the operative position and to cause said element to move substantially parallel to the axis of the knife into burr-removing engagement therewith as the device moves into said position.

Means may also be provided for varying the distance of the operative position of the device from the knife axis so that suitable adjustment can be made as the knife, due to wear, becomes reduced in size.

It will be understood, therefore, that the above embodiments of the invention have been set forth by way of description and not by way of limitation, the scope of the present invention being commensurate with the following claims.

What is claimed as new and desired to be secured by Letters Patent is as follows:

1. In a slicing machine having a circular rotatable knife, a frame member, a sharpener supporting arm pivotally mounted on the frame member and movable in a plane angularly disposed to the plane of the knife, a casing pivotally mounted on the sharpener supporting arm and movable in

a plane angularly disposed to the plane of movement of the sharpener supporting arm, an abrasive sharpening wheel rotatably mounted in said casing, a longitudinally shiftable burr-removing wheel rotatably mounted in said casing, cam means on the sharpener supporting arm, means associated with the burr-removing wheel, said last named means being actuable by the cam means whereby to induce longitudinal shifting of the burr-removing wheel, and means to cause said cam and shifting means to co-act to shift the burr-removing wheel as the sharpener is moved into knife-engaging position.

2. In a slicing machine having a circular rotatable knife, a frame member, an arm mounted on said frame member, knife sharpening means rotatably mounted on said arm and longitudinally slidable therealong, said knife sharpening means comprising an abrasive sharpening wheel, a burr-removing wheel rotatably mounted on the knife-sharpening means and longitudinally shiftable thereon, cam means operatively associated with said knife-sharpening means and said burr-removing wheel for producing longitudinal movement of said burr-removing wheel as said knife-sharpening means is moved into knife-engaging position, and means for moving said knife-sharpening means into knife-engaging position to cause said cam to produce longitudinal movement of the burr-removing wheel as the knife-sharpening means approaches said knife-engaging position, said cam being operative to permit the burr-removing wheel to engage the knife when the knife-sharpening means is in knife-engaging position.

3. In a slicing machine having a circular rotatable knife, a frame member, an arm mounted on said frame member, knife-sharpening means rotatably mounted on said arm and longitudinally shiftable therealong, said knife-sharpening means comprising an abrasive sharpening wheel, a burr-removing wheel rotatably mounted on the knife-sharpening means and longitudinally shiftable thereon, cam means operatively associated with said burr-removing wheel for producing longitudinal movement thereof, said cam means being mounted on said arm and being shiftable with the knife-sharpening means, means for moving the knife-sharpening means to knife-engaging position to cause said cam to move the burr-removing wheel longitudinally as the knife-sharpening means approaches said knife-engaging position, said cam being operative to permit the burr-removing wheel to engage the knife when the knife-sharpening means is in knife-engaging position.

4. In a slicing machine having a circular rotatable knife, a frame member, an arm mounted on said frame member, knife-sharpening means rotatably mounted on said arm and longitudinally shiftable therealong, said knife-sharpening means comprising an abrasive sharpening wheel, a burr-removing wheel rotatably mounted on the knife-sharpening means and longitudinally shiftable thereon, cam means operatively associated with said burr-removing wheel for producing longitudinal movement thereof, said cam means being mounted on said arm and being shiftable with the knife-sharpening means but being held against rotation about said arm, means for moving the knife-sharpening means to knife-engaging position to cause said cam to move the burr-removing wheel longitudinally as the knife-sharpening means approaches said knife-engaging position, said cam being operative to permit

the burr-removing wheel to engage the knife when the knife-sharpening means is in knife-engaging position.

5 In a slicing machine having a circular rotatable knife, a frame member, an arm mounted on said frame member so that its longitudinal axis is perpendicular to the plane of the knife, knife sharpening means rotatably mounted on said arm and longitudinally slidable therealong, said knife sharpening means comprising an abrasive sharpening wheel, a burr-removing wheel rotatably mounted in the knife sharpening means and longitudinally shiftable therein, and cam means operatively associated with said burr-removing wheel for producing longitudinal movement thereof upon movement to operative position, said cam means being operative to permit subsequent engagement of the burr-removing wheel with the knife in operative position.

20 6. In a slicing machine having a circular rotatable knife, a frame member, an arm mounted on said frame member, a sleeve mounted on said arm, said sleeve being slidable along said arm but not rotatable therearound, cam means on said sleeve, a casing pivotally mounted on said sleeve so as to be movable in a plane angularly disposed from the longitudinal axis of the arm, knife sharpening means carried by said casing, burr-removing means carried by said casing, said burr-removing means being shiftable within said casing, and means actuated by the cam means and associated with the burr-removing means for producing shiftable motion therein when the casing is moved through a portion of its path around said pivot.

35 7. In a slicing machine having a circular rotatable knife, a frame member and a knife sharpening means pivotally mounted on the frame member, said knife sharpening means comprising a mounting member having a knife sharpening wheel and a burr-removing wheel mounted for rotation thereon, one of said wheels being mounted for movement axially thereof, means for pivoting the knife sharpening means into operative position wherein the sharpening wheel engages the knife for sharpening thereof and the burr-removing wheel engages the knife for removing the burr, a cam mounted on said machine, and means to cause said cam to displace the slidably mounted wheel axially during the pivotal movement thereof whereby to clear the edge of the knife.

55 8. In a slicing machine having a circular rotatable knife, a frame member and knife sharpening means comprising a rotatably mounted abrasive sharpening wheel and a rotatably mounted burr-removing wheel, said knife-sharpening means being secured on the frame for movement from an inoperative position offset from the plane of the knife to an operative position wherein the sharpening means is positioned adjacent said knife edge with the knife sharpening wheel and the burr-removing wheel on opposite sides thereof, a cam surface on said machine and mounted in a path of said sharpening means to contact a portion thereof and constrain said sharpening means in a path away from said knife whereby to prevent premature contact between the sharpening means and the blade.

70 9. In a slicing machine having a circular rotatable knife, a frame member, a casing, an abrasive sharpening wheel rotatably mounted in said casing, a longitudinally shiftable burr-removing wheel rotatably mounted in said casing,

means on said frame member and attached to said casing to permit movement of said casing from an inoperative position removed from the plane of the knife to an operative position wherein the wheels are positioned on opposite sides of said knife, cam surfaces mounted on said machine, and means for causing said cam surfaces to co-act with means on said casing to prevent said casing and said wheels from contacting with said knife during movement of said casing to operative position.

10 10. A knife sharpener for a slicing machine having a frame member comprising in combination a knife-sharpening support shiftable mounted on said frame member for movement along a path parallel to the cutting plane of the knife, a burr-removing means mounted on said knife-sharpening support for bodily shiftable movement laterally of the cutting plane of the knife, means for manually moving the sharpening support along said parallel path, cam means operatively arranged relative to the path of movement of said support to impinge and shift said burr-removing means laterally to clear the edge of the knife during movement of said knife support in one direction along said path, said cam means being operative to cause the burr-removing means to move laterally and contact the edge of the knife as the support is moved along said parallel path in the opposite direction.

15 11. In a slicing machine, knife sharpening means comprising a frame member, a casing member pivotally mounted on the frame member, an abrasive sharpening wheel rotatably mounted on said casing, an abrasive burr-removing wheel rotatably mounted in said casing, said burr-removing wheel being slidable longitudinally along its axis of rotation, means to move the casing about its pivot to sharpening position wherein the wheels engage the edge of the blade, and means automatically to slide the burr-removing wheel along its axis to separate said wheel from the edge of the blade as it is lowered to grinding position, said last named means being operative to cause the burr-removing wheel to contact the blade in grinding position.

20 12. In a slicing machine, a knife and a knife sharpening means comprising a supporting member, a mounting member pivotally arranged on the supporting member, an abrasive wheel assembly mounted on said mounting member and comprising a rotatable abrasive wheel, said abrasive wheel assembly being also bodily shiftable with respect to the mounting member, said mounting member being pivotal with respect to said supporting member from inoperative position to operative position wherein the abrasive wheel is adjacent the edge of the knife, and cam means operatively arranged on the supporting member in the path of said abrasive wheel assembly when the mounting member is pivoted to operative position, said cam means having a portion thereof so shaped as to shift the abrasive wheel assembly bodily away from the plane of the knife edge as the mounting member is shifted toward operative position whereby to clear the edge of the knife, and said cam means having a following, oppositely formed portion adjacent said assembly in operative position to permit the assembly subsequently to shift toward the knife edge to permit operative engagement with the knife when said mounting member reaches operative position.

25 13. In a slicing machine, a knife, a knife-sharpening mechanism, and a frame member, 75

said knife-sharpening mechanism comprising a mounting member pivoted on the frame member for movement in a plane parallel to the cutting plane of the knife, an abrasive wheel assembly mounted on said mounting member and comprising a rotatable abrasive wheel operatively associated with said mounting member for movement relative to said member in a direction transverse to the cutting plane of the knife, said mounting member being movable in said parallel plane to and from an inoperative position, wherein the abrasive wheel is remote from the edge of the knife, from and to an operative position, wherein the abrasive wheel is adjacent the edge of the knife, and cam means operatively arranged relative to the path of movement of said mounting member and operatively associated with said abrasive wheel to shift the abrasive wheel transversely away from the cutting plane of the knife as the mounting member is moved to its inoperative position to cause the abrasive wheel to clear the edge of the knife and to shift the abrasive wheel transversely toward the cutting plane of the knife as the mounting member is moved to and reaches its operative position to cause the abrasive wheel to engage the edge of the knife.

14. In a slicing machine having a circular rotatable knife, a frame member and knife sharpening means comprising a rotatably mounted abrasive sharpening wheel and a rotatably mounted burr-removing wheel, said knife sharpening means being secured on the frame for movement

from an inoperative position offset from the plane of the knife to an operative position wherein the sharpening means is positioned adjacent said knife edge, with the knife sharpening wheel and the burr-removing wheel on opposite sides thereof, and a cam surface on said machine and mounted in a path of said sharpening means, said cam surface having oppositely directed portions to contact a portion of said sharpening means and first move said sharpening means in a path away from said knife and then in a path toward and into contact with said knife, whereby to prevent premature contact between the sharpening means and the blade.

15. In a slicing machine having a circular rotatable knife, a frame member, a casing, an abrasive sharpening wheel rotatably mounted in said casing, a longitudinally shiftable burr-removing wheel rotatably mounted in said casing, means on said frame member and attached to said casing to permit movement of said casing from an inoperative position removed from the plane of the knife to an operative position wherein the wheels are positioned on opposite sides of said knife, oppositely directed cam surfaces mounted on said machine, and means for causing said cam surfaces to coact with means on said casing first to longitudinally shift said burr-removing wheel away from the plane of the knife and subsequently toward the knife and into engagement with the cutting edge thereof during movement of said casing to operative position.

WILHELMUS ADRIANUS VAN BERKEL.