Sept. 20, 1932. C. F. M. VAN BERKEL 1,878,066

SHARPENER FOR SLICING MACHINES

Filed Oct. 28, 1927

Fig. 1.

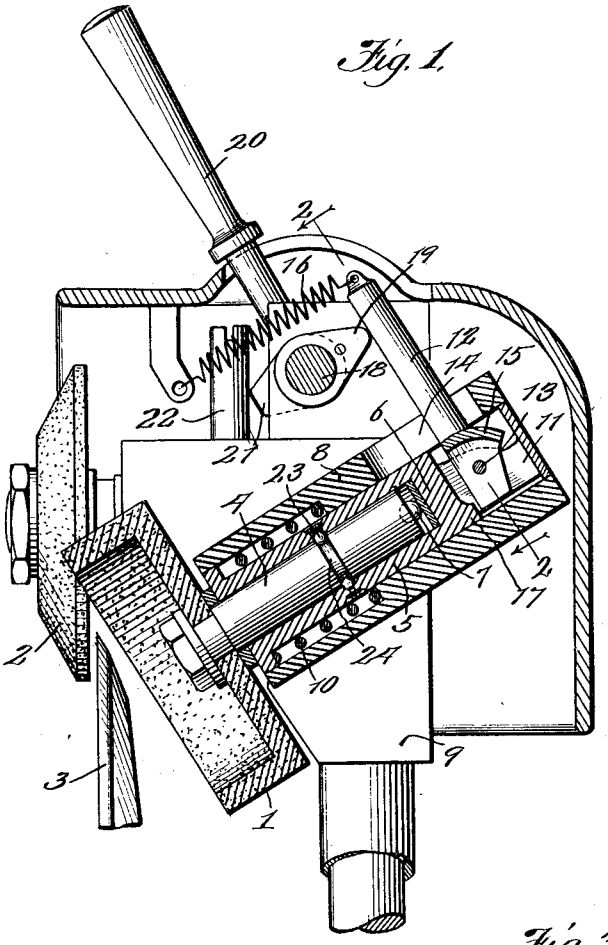


Fig. 2.

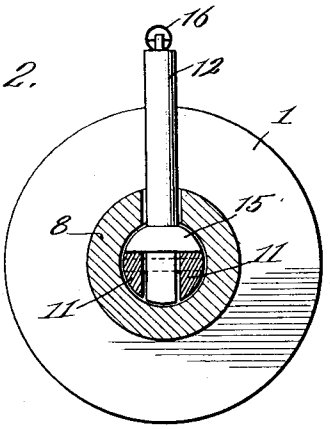


Fig. 3.

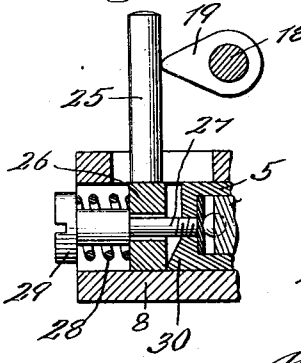
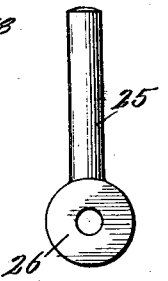


Fig. 4.



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UNITED STATES PATENT OFFICE

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SHARPENER FOR SLICING MACHINES

Application filed October 28, 1927, Serial No. 229,339, and in Germany March 14, 1927.

This invention relates to grinders for sharpening the rotary circular knives of slicing machines and has for its object the provision of a sharpener which will assist in maintaining the cutting edge of the knife in a true plane. A further object is to provide a knife sharpener which shall be of improved construction and operation. Other objects and advantages will appear from the following description.

The invention is exemplified in the combination and arrangement of parts shown in the accompanying drawing and described in the following specification, and it is more particularly pointed out in the appended claims.

In the drawing:

Fig. 1 is a vertical sectional view of a sharpener showing one embodiment of the present invention;

Fig. 2 is a transverse section substantially on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view showing a modified form of the invention; and

Fig. 4 is an elevation of a part of the device shown in Fig. 3.

In grinding devices for the rotary knives of meat slicing machines, as heretofore constructed, the grinding elements are usually brought into engagement with the knife by spring pressure and are maintained in engagement with the knife also by spring pressure. In the use of this kind of grinding device, some difficulty is experienced because of the fact that the grinding device yields when the knife does not run true or is provided with projections or depressions. Because of this tendency to yield to inequalities or irregularities of the knife, the grinder cannot be used to remove these inequalities or irregularities. This objection is overcome in the present invention by special arrangements which automatically lock the grinding elements in their operative position so that they cannot recede from a position in which they are locked.

In the embodiment of the invention shown in the drawing, the numerals 1 and 2 designate grinders for engaging the opposite sides of the knife blade 3. The grinder 1 is secured to a spindle 4 which is journaled in a sleeve 5 having its rear end closed by an end wall 6. A ball bearing 7 is interposed between the end wall 6 and the end of the spindle 4 to receive the end thrust on the spindle. The sleeve 5 is slidably mounted in a socket 8 which is carried on a support 9 in the usual way. A spring 10 urges the sleeve 5 forwardly in the socket 8. Spaced ears 11 extend backwardly from the inner end of the sleeve 5 and a lever 12 is pivotally mounted at 13 between the ears 11. The lever 12 extends upwardly through a slot 14 in the socket 8. A cam 15 disposed eccentrically relative to the pivot pin 13 is formed on the lever 12 in position to bind against the inner face of the socket 8 when the upper end of the lever 12 is moved forwardly or to the left, as viewed in Fig. 1.

A spring 16 normally draws the upper end of the lever 12 forwardly. Backward movement of the lever 12 about its pivot 13 is limited by a shoulder 17 on the sleeve 5. A transverse shaft 18 is provided with a cam 19 arranged to engage the lever 12. The shaft 18 is rotated by a handle 20 in a well known manner. A second cam 21 is carried by the shaft 18 in position to engage a pin 22 for operating the grinder 2 in the usual way. The spindle 4 is retained in the sleeve 5 by balls 23 which engage a groove 24 in the spindle.

When it is desired to sharpen the knife 3, the handle 20 is moved to release the lever 12 from the cam 19. The spring 10 will move the sleeve 5 forwardly to bring the grinder 1 into engagement with the knife. At the same time, the spring 16 will rotate the lever 12 upon its pivot 13 to cause the cam 15 to engage the inner surface of the socket 8. This will not interfere with the forward movement of the sleeve 5 because forward movement of the sleeve tends to release the cam from its binding pressure against the interior of the socket. Backward movement of the sleeve, however, is prevented because backward movement jams the cam more tightly against the inner face of the socket 8. In this way, the grinder is urged forwardly by the spring

10 and is locked against backward movement so that it will not yield to any irregularity in the knife but will retain its foremost position and grind the edges of the knife to a true plane.

When the handle 20 is again moved to cause the cam 19 to force the lever 12 backwardly, the first effect will be to impart a slight rotation to the lever 12 in a clockwise direction until the lower end of the lever bears upon the shoulder 17. Further rotation of the cam will then move the lever 12 backwardly and carry with it the sleeve 5 and grinder 1 to remove the latter from contact with the knife.

In the form of the invention shown in Figs. 3 and 4, the lever 12 is replaced by an arm 25 having a perforated head 26 through which a pin 27 loosely extends, the pin being threaded into the rear end of the sleeve 5. A spring 28 is interposed between the head 29 of the pin 27 and the perforated head 26 of the arm 25. When the arm 25 is released by the cam 19, it will be tilted by the spring 28 so that the head 26 jams in the socket 8 to prevent backward movement of the sleeve 5. When pressure is again exerted by the cam 19, the perforated head 26 will bear against the shoulder portion 29 of the pin 27 and against a stop shoulder 30 on the sleeve 5 so that the head 26 will not jam in the socket 8 under the force of the cam 19.

It is thus seen that operating mechanism for the grinder 1 is provided which permits the grinder to be moved into contact with the knife by its operating spring but which holds the grinder locked in its advanced position until it is positively retracted by the operating handle and the cam controlled thereby.

It should be particularly noted that the detent 15 shown in Fig. 1 and the detent 26 shown in Fig. 3 each operates automatically to prevent retraction of the grinder during operation while such grinder is held resiliently against the knife by the spring 10. Therefore the wearing down of the knife by grinding is automatically compensated for as soon as such wearing down takes place and any tendency toward irregularities in the knife edge is automatically counteracted by the clutch mechanism preventing retraction of the grinder; notwithstanding the fact that there may be relative hard portions on the knife edge they will be ground away to the same extent as the relative soft portions, because of the fact that the harder portions cannot move the grinder backwardly, such tendency being prevented by the clutch mechanism which is acting constantly and automatically during all grinding operations to sharpen the knife.

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. Sharpening mechanism for a slicing machine knife comprising a grinder, a detent connected with said grinder and having one position of adjustment in which it moves freely with said grinder toward and from said knife and another position in which it moves freely toward said knife but automatically operates to prevent reverse movement of said grinder, and means cooperating with said detent to withdraw said grinder from said knife, said last-named means being arranged to hold said detent in its first-mentioned position of adjustment during withdrawal of said grinder.

2. Sharpening mechanism for a slicing machine knife comprising a grinder, a spindle for supporting said grinder, a spring for moving said spindle and grinder toward the knife, an operating arm pivotally connected with said spindle, a cam lock connected with said operating arm, a spring connected with said operating arm for holding said cam lock in position for automatically preventing reverse movement of said spindle and grinder, and means for engaging said operating arm to move said cam lock out of operative position and retract said spindle and grinder.

3. Sharpening mechanism for a slicing machine knife comprising a grinder, a spindle for supporting said grinder, a journal bearing in which said spindle is mounted, means for holding said spindle against longitudinal movement in said journal bearing, a socket member in which said journal bearing is slidably mounted, a spring for moving said journal bearing in said socket member to cause said grinder to engage the knife, an operating arm pivotally connected with said journal bearing and having a cam detent mounted thereon, a spring for holding said cam detent in position to prevent reverse movement of said journal bearing in any position to which it is moved by said spring, an operating handle, and means connected with said operating handle for engaging said operating arm to release said detent and thereafter retract said journal bearing, spindle and grinder.

4. Sharpening mechanism for a slicing machine knife comprising a grinder, a support for said grinder movable in the direction of the axis of rotation of said grinder toward and from the slicing machine knife, a detent connected with said support, a spring for moving said detent in one direction into a position for preventing movement of said support from said knife, means for

limiting the movement of said detent in the opposite direction when said detent is in inactive position, and means for moving said detent to said inactive position and for retracting said support and grinder away from said knife.

5. Sharpening mechanism for a slicing machine knife comprising a grinder, a spring for moving the grinder into engagement with the knife, means comprising a detent for holding said grinder against reverse movement from any position to which it is moved by said spring but permitting further forward movement of said grinder by said spring, and means for releasing said detent to permit withdrawal of the grinder from the knife.

6. Sharpening mechanism for a slicing machine knife comprising a grinder, means for moving said grinder into engagement with said knife, and an automatic one-way clutch for preventing reverse movement of the grinder from its position in engagement with the knife but permitting further movement of the grinder in a direction toward said knife.

7. Sharpening mechanism for a slicing machine knife comprising a grinder, a spring acting on said grinder urging it toward said knife, an automatic device for preventing reverse movement of the grinder in a direction away from said knife but permitting movement of the grinder in a direction toward said knife, and means for releasing said automatic device and then moving said grinder away from said knife.

8. Sharpening mechanism for a slicing machine knife comprising a grinder, means comprising a spindle for supporting said grinder, a spring for actuating said supporting means to move said grinder toward said knife, a detent for preventing reverse movement of said supporting means but permitting forward movement thereof, a spring for operating said detent to its holding position, and an operating arm connected to said detent to release the same against the action of said last-named spring to permit retraction of said supporting means and said grinder.

9. Sharpening mechanism for a slicing machine knife comprising a grinder, means for supporting said grinder for movement toward and from the knife, and means comprising a tiltable detent for preventing reverse movement of the grinder in a direction away from the knife but permitting automatic movement of the grinder in a direction toward said knife.

10. Sharpening mechanism for a slicing machine knife comprising a grinder, a spindle for supporting said grinder, a journal bearing for said spindle, a support for slidably supporting said journal bearing, a spring between said support and said journal bearing for moving the latter and said spindle and said grinder in a direction toward the knife, a clutch between said journal bearing and said support for preventing reverse movement of said journal bearing in a direction away from said knife but permitting movement thereof by said spring in a forward direction, an operating arm for said clutch, a spring for actuating said arm to operate said clutch to its locking position, and a manually actuated cam for engaging said arm to release the clutch against the action of said last-named spring and then effect movement of the grinder away from the knife.

11. Sharpening mechanism for a slicing machine knife comprising a grinder, resilient means for pressing the grinder against the knife during operation of the latter, and automatic clutch mechanism adapted to prevent retraction of the grinder during operation while the latter is held resiliently against said knife to automatically compensate for the wearing down by grinding of the knife and tendency toward irregularities in the knife edge is counteracted by said clutch mechanism preventing such retraction.

12. Sharpening mechanism for a slicing machine knife comprising a grinder, mechanism supporting said grinder for movement into and out of engagement with the knife edge to be sharpened, and clutch mechanism co-acting with said supporting mechanism to prevent movement of the grinder away from the knife but permitting movement of the grinder toward the knife.

13. Sharpening mechanism for a slicing machine knife comprising a grinder, resilient means for pressing said grinder toward the knife, mechanism supporting said grinder for movement into and out of engagement with the knife, and clutch mechanism co-acting with said supporting mechanism to automatically lock the grinder against movement in a direction away from the knife, but at the same time permits said grinder to move toward said knife under the influence of said spring.

14. A sharpening mechanism for slicing machine knives comprising a journal bearing, a sleeve slidably mounted in said journal bearing, a grinding spindle rotatably supported within said sleeve, means for advancing said sleeve toward the knife which is to be sharpened, means for preventing reverse movement of said grinders except when it is desired to retract said grinders comprising a cam member pivoted to said sleeve and adapted to engage the inner surface of said bearing, means for tilting said cam to wedge the cam against said inner surface, an abutment on said sleeve, and mechanical means for retracting said sleeve comprising an operating element on said cam, a manually operable second cam for operating said element to

move said element about its pivot and into engagement with said abutment.

15. A sharpening apparatus for slicing machines comprising a journal bearing having an opening extending therethrough, a sleeve slidably mounted in said opening longitudinally thereof, a grinder spindle carried by said sleeve, a projection on the end of said sleeve extending parallel to the longitudinal axis of said opening, a clutch loop surrounding said projection, a spring concentrically mounted with respect to said projection for urging said clutch loop toward said sleeve, an abutment on said sleeve against which one side of said clutch loop abuts and about which said clutch loop is adapted to pivot under the action of said spring to cause a wedging action between said clutch loop and said bearing which prevents movement of said sleeve away from the knife being ground, but permits free movement of said sleeve toward the knife being ground, and operating means for moving said grinder toward the grinding position.

16. In a sharpening apparatus for slicing machine knives, the combination with a bearing having a longitudinal opening therein, a sleeve slidably mounted in said opening, a grinder spindle carried by said sleeve, a grinding element on said spindle, a projection on one end of said sleeve within said opening, a shoulder on said projection, a clutch loop surrounding said projection and adapted to abut against said shoulder to align said clutch loop in said opening out of binding engagement therewith, an abutment on said sleeve adapted to co-operate with said clutch loop and said shoulder to hold said clutch loop out of binding engagement with said bearing, means for moving said clutch loop against said shoulder and said abutment simultaneously to permit movement of said sleeve and grinder away from grinding position, continued movement of said last mentioned means causing the retraction of said grinder through the intermediary of said projection, clutch loop, shoulder and abutment, and a spring for normally tilting said clutch loop to cause binding action between said clutch loop and said bearing to prevent the retraction of said grinder from grinding position or any movement thereof away from the grinding position during the sharpening operation.

17. A device as claimed in claim 16 in which a coiled spring surrounds said projection and in which the projection is provided with a second shoulder against which one end of the spring abuts, the opposite end of the spring abutting against the clutch loop.

In testimony whereof I have signed my name to this specification on the eleventh day of October A. D. 1927.

CORNELIS FRANCISCUS MARIA van BERKEL.