Jan. 16, 1934. C. F. M. VAN BERKEL 1,943,642

SHARPENER FOR SLICING MACHINES

Filed Dec. 4, 1929

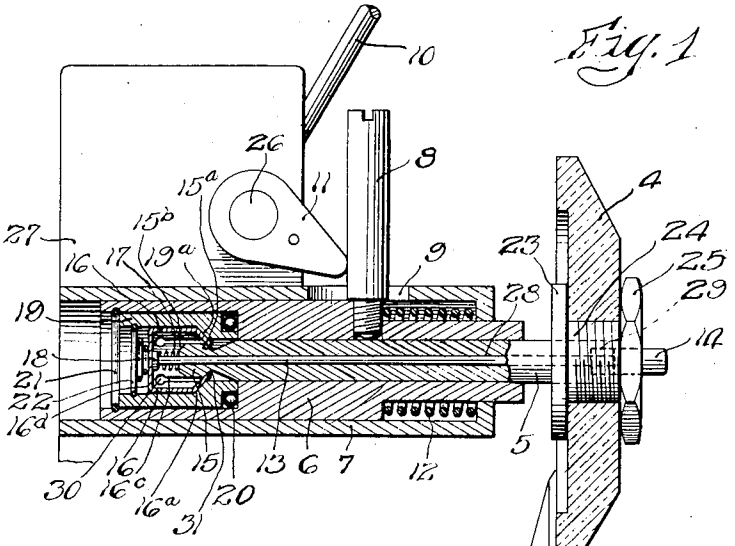

Fig. 1

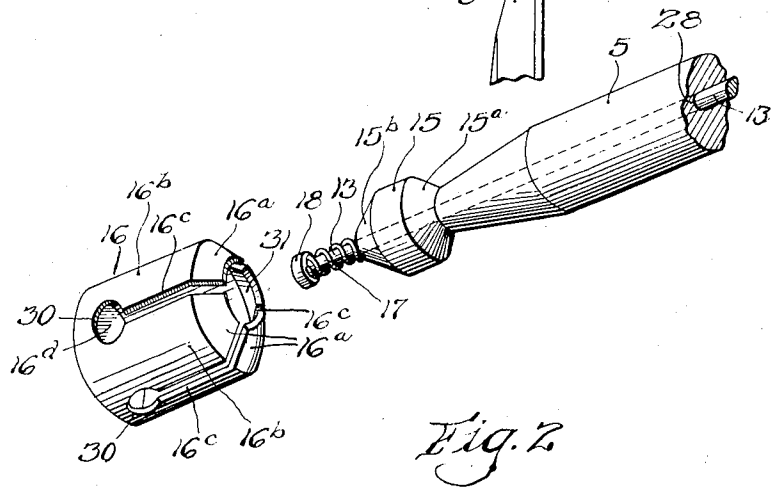

Fig. 2

Inventor:
Cornelis F. M. Van Berkel,
By Chas. M. Nissen,
Atty.

Patented Jan. 16, 1934 1,943,642

UNITED STATES PATENT OFFICE

1,943,642

SHARPENER FOR SLICING MACHINES

Cornelis F. M. van Berkel, Wassenaar, Netherlands, assignor to U. S. Slicing Machine Company, La Porte, Ind., a corporation of Indiana

Application December 4, 1929, Serial No. 411,662, and in Great Britain December 7, 1928

17 Claims. (Cl. 57—248)

The invention relates to grinding apparatus adapted to sharpen the knives of slicing machines of the type having rotary circular knives.

Usually grinding apparatus used in slicing machines of the type referred to, comprises one or two knife-sharpening wheels, one acting as a grinding wheel for performing the primary grinding of the beveled edge of the knife with or without a finishing wheel for removing the ragged edge or burr formed on the opposite edge of the knife during the primary grinding operation.

It is one of the objects of the present invention to provide improved and efficient means for mounting such knife-sharpening wheels that they may be easily removed from the supports or bearings in which they are rotatably mounted so that cleaning may be effected.

Another object of the present invention is to provide a removable knife-sharpening wheel with retaining means which will act automatically to hold the wheel in operative position with a force proportional to the tendency to move the wheel out of its operative position.

More particularly it is the object of the present invention to provide in grinding apparatus of the type referred to, a separate retaining member which automatically engages the spindle of the knife-sharpening wheel at a predetermined part of said spindle and holds said wheel in operative position against a force tending to move it out of operative position, said separate retaining member being so constructed and arranged that its tightness of engagement is in proportion to such force.

A further object of the invention is the provision of retaining means for a removable knife-sharpening wheel including a wedge acting to hold the knife-sharpening wheel in operative position in proportion to the force tending to move the wheel out of its operative position.

Another object of the invention is the provision of automatic retaining mechanism for the knife-sharpening wheel combined with means for releasing at will such retaining means.

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

In the accompanying drawing—

Fig. 1 is a sectional elevation of grinding apparatus including a knife-sharpening wheel; and

Fig. 2 is a perspective view on an enlarged scale showing details of the retaining mechanism for the knife-sharpening wheel.

In Fig. 1, 3 designates the usual rotary knife of a slicing machine of the type to which the present invention is particularly adapted. A knife-sharpening wheel constituting a finishing wheel or burr removing grinder is shown at 4.

The wheel or grinder 4 is detachably secured to a spindle 5 by means of the clamping mechanism comprising the collar 23 secured to the hub 24 which is screw-threaded to receive the clamping nut 25.

The spindle 5 is journaled in the sleeve 6 and may have a limited longitudinal movement or axial movement relatively thereto. The sleeve 6 is mounted in a tubular support 7 for sliding movement longitudinally therein. The tubular support 7 is provided with a slot 9 through which projects a pin 8, the latter being secured to the sliding sleeve 6. The pin and slot connection 8, 9 prevents rotation of the sleeve 6 relatively to the tubular support 7, but permits the sleeve 6 to slide longitudinally.

The position of the knife-sharpening wheel or grinder 4 relative to the rotary circular slicing machine knife 3 is controlled in a well-known manner by a manual lever 10 connected to a shaft 26 in the support 27, which in turn is secured to the tubular support 7. A cam 11 is secured to the shaft 26 so that when the lever 10 is moved in an anti-clockwise direction as viewed in Fig. 1, the pin 8 will be moved toward the right against the action of the spring 12 to move the sleeve 6 toward the right, together with the spindle 5 and the grinder 4 carried thereby. In this manner the grinder may be moved out of engagement with the knife 3 and when the lever 10 is moved in a clockwise direction to cause the cam 11 to release the pin 8, the spring 12 will yieldingly hold the grinder against the knife edge to be sharpened during the rotation of the knife 3.

As shown in Fig. 2, the spindle 5 is provided with an axial cylindrical aperture or bore 28 throughout its length to receive the rod 13. The right-hand end of the rod 13 as viewed in Fig. 1, is provided with a push-button 14 fitting into a cylindrical recess 29 in the outer end of the spindle 5.

The spindle 5 at that end thereof remote from the wheel or grinder 4, is provided with an integral knob 15 which is normally located within a socket 16. The spindle 5 merges into the knob 15 through the conical face or shoulder 15^a.

The socket 16 comprises resilient fingers 16^b which are provided with inward extensions or tips 16^a. The fingers 16^b are spaced from one another by the slots 16^c which extend from the circular openings 30. The base or bottom 16^d of the socket 16 is closed as shown in Fig. 1, but the top is pro-

vided with a circular opening 31 which is surrounded by the tips or inward extensions 16a.

A light spring 17 is interposed between the knob 15 and a collar 18 on that end of the rod 13 remote from the push-button 14. The spring 17 is located on the rod 13 between the collar 18 and the inner end of the conical face 15b which extends from the knob 15 as shown in Fig. 2.

The socket 16 fits loosely within a cylinder 19 which is journaled by means of the ball-bearings 20 in the sleeve 6. The cylinder 19 is provided with an inner beveled face 19a which is shaped as the counterpart of the inturned tips 16a. That is to say, the beveling at 16a of the socket 16 corresponds to the bevel 19a so as to fit the latter when in the position shown in Fig. 1.

The cylinder 19 is retained in place by means of the ring spring 21 which fits into a circular recess in the cylindrical opening in the left-hand end of the sleeve 6.

A spiral spring 22 is sprung into an annular recess within the cylinder 19 as shown in Fig. 1, and this spiral spring 22 presses against the bottom or base 16d of the socket 16 and thus tends to maintain the tips 16a of the socket against the bevel face 19a of the cylinder 19.

If any force is applied such as to the wheel 4 tending to withdraw the spindle 5 from the sleeve 6 the tips 16a will be engaged by the beveled face 15a and wedged thereby against the bevel face 19a of the cylinder 19; therefore any force applied tending to withdraw the spindle 5 will be resisted in proportion to the force applied. That is to say, the greater the pull on the spindle 5 to withdraw the same from the sleeve 6, the greater will be the wedging action of the beveled face 15a against the tips 16a, thereby causing the spindle to be gripped with a tightness proportional to the pull exerted.

The grinding wheel 4 together with the spindle 5 may be very easily removed from the sleeve 6 by simply pressing the push-button 14 which will project the rod 13 toward the left as viewed in Fig. 1 against the action of the spiral spring 22. The collar 18 by pressing against the button of the socket 16 displaces the latter toward the left along the cylinder 19. The finger 16b may then be spread apart by the beveled face 15a engaging the tips 16a to enlarge the opening 31. The knob 15 may then be withdrawn from the socket 16. That is to say, by pressing inwardly on the push-button 14 the socket 16 is moved to the left against the action of the spring 22 to release the tips 16a from the beveled face 19a. At the same time that the socket 16 is moved toward the left as viewed in Fig. 1' and the tips 16a are moved away from the beveled face 19a, such tips 16a will ride over the beveled face 15a being now free to do so, the spring 17 permitting sufficient relative movement between the spindle 5 and the rod 13 to accomplish this result. It can readily be seen that after the tips 16a have been released from the beveled face 19a and ride on the cylindrical surface of the knob 15, the spindle 5 may be withdrawn from the sleeve 6, together with the rod 13, collar 18 and the spring 17. As soon as the knob 15 is withdrawn from the socket 16 the tips 16a resume their initial positions and the spring 22 moves such tips 16a again into engagement with the beveled face 19a.

When it is desired to replace the grinding wheel, the spindle 5 may be inserted into the sleeve 6 whereupon the beveled face 15b will engage the tips 16a surrounding the opening 31 and pry such tips apart to permit the knob 15 to enter the socket 16. When the beveled face 15b first engages the tips 16a the spring 22 will be compressed and the tips 16a moved away from the beveled face 19a. The tips 16a will then be free to be spread apart. After they slide over the cylindrical surface of the knob 15, such tips will engage the beveled face 15a and the spring 22 will again move the tips 16a against the beveled face 19a. It should be understood that the principal function of the spring 17 is to maintain the face 15a in tight engagement with the under surfaces of the tips 16a. When the parts assume their normal positions, the spring 22 holds the tips 16a against the beveled face 19a and the bottom 16d of the socket 16 serves as an abutment for the collar 18 and the spring 17 then acts to hold the spindle 5 toward the right as viewed in Fig. 1, with the beveled face 15a against the bottom surfaces of the tips 16a. The push-button 14 will then have the relative position with respect to the socket or recess 29 as illustrated in Fig. 1.

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. For instance, the spindle carrying the knife-sharpening wheel is not necessarily rotatable. Furthermore, the manually operated mechnism for releasing the spindle retaining means need not pass through the spindle as the socket 16 may be displaced by pulling it from the left-hand side of the apparatus as viewed in Fig. 1.

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

1. A knife sharpener comprising a sharpening wheel, a spindle for carrying the same, a support for said spindle, means for locking said spindle in said support to hold the said wheel in a predetermined position, and means comprising a push button in the center of said wheel connected to said locking mechanism for moving said locking mechanism from operative to inoperative position.

2. A sharpener for slicing machine knives comprising a grinding wheel, a stem to carry the same, a support for said stem, a retainer having inwardly extending radial fingers, resilient means for pressing said fingers against an annular beveled wall within said support, a knob at the inner end of said stem having a beveled shoulder, and additional resilient means for pressing said beveled shoulder against said fingers.

3. A sharpener for knives comprising a sharpening element, a stem therefor, a support for said stem, a retainer having inwardly extending fingers, resilient means for pressing said fingers against an annular wall in said support, and a knob at the inner end of said stem having an annular shoulder in position to engage said fingers and press them against said first-named annular wall with a force proportional to that tending to remove said stem from said support.

4. In a sharpener for knives, the combination with a grinder, a spindle upon which said grinder is mounted, a peripheral recess in said spindle, a support for said spindle, an abutment shoulder on said support, resilient fingers releasably positioned so as to bring portions thereof into said recess and against said shoulder for positively preventing removal of said spindle from its support, means on said support for positively pre-

venting movement of said fingers out of said recess while said fingers are against said shoulder, and means for rendering said last mentioned means inoperative selectively when desired.

5. In a sharpening apparatus, the combination with a support, of a spindle adapted to be releasably and rotatably mounted in said support, a sharpening element carried by said spindle, a shoulder on said spindle, a shoulder on said support, means movable inwardly and outwardly away from said spindle adapted to be arranged with portions thereof against both of said shoulders to prevent movement of said spindle in one direction, the movement of the spindle in that direction increasing the amount of force with which said movable means resists the movement of the spindle in that direction, and means for moving said movable means outwardly away from said spindle to withdraw the same from operative position against said shoulder on said spindle and thereby permit the removal of said spindle from its support.

6. In a sharpening apparatus, the combination with a spindle, a sharpening element secured to said spindle, a support for said spindle, a shell surrounding said spindle and provided with spring fingers, a shoulder on said spindle, a shoulder on said support, said spring fingers being releasably arranged against both of said shoulders, opposite sides of said spring fingers being in engagement with said shoulders so that movement of said spindle in one direction is prevented and the resistance to the removal of said spindle increases as the withdrawal force increases, and means for releasing said spring fingers from operative engagement with one of said shoulders.

7. In a sharpening apparatus, the combination with a spindle, a sharpening element secured to said spindle, a support for said spindle, a shell surrounding said spindle and provided with spring fingers, a shoulder on said spindle, a shoulder on said support, said spring fingers being releasably arranged against both of said shoulders, opposite sides of said spring fingers being in engagement with said shoulders so that movement of said spindle in one direction is prevented and the resistance to the removal of said spindle increases as the withdrawal force increases, and means for releasing said spring fingers from operative engagement with one of said shoulders comprising means for moving said shell longitudinally of said spindle to cause one of said shoulders to move said spring fingers radially out of engagement with one of said shoulders.

8. In a sharpening apparatus, the combination with a support having a spindle receiving recess therein, and an enlarged recess at one end of said spindle recess, a spindle rotatably mounted in said spindle recess and extending partly into said enlarged recess, said spindle having a reduced portion adjacent the junction of said recesses, a shell fitting within said enlarged recess and provided with spring fingers resiliently engaging said reduced portion of said spindle, a head on said spindle within said enlarged recess for preventing withdrawal of said spindle from its engagement with said spring fingers, one end of said enlarged recess preventing the longitudinal movement of said shell, and means for moving said shell to release said spring fingers from their engagement with said reduced portion on said spindle.

9. In a sharpening apparatus, the combination with a support having a spindle receiving recess therein, and an enlarged recess at one end of said spindle recess, a spindle rotatably mounted in said spindle recess and extending partly into said enlarged recess, said spindle having a reduced portion adjacent the junction of said recesses, a shell fitting within said enlarged recess and provided with spring fingers resiliently engaging said reduced portion of said spindle, a head on said spindle within said enlarged recess for preventing withdrawal of said spindle from its engagement with said spring fingers, one end of said enlarged recess preventing the longitudinal movement of said shell, and means for moving said shell to release said spring fingers from their engagement with said reduced portion on said spindle comprising a rod extending longitudinally through said spindle and engaging said shell to move said shell longitudinally in its recess and to thereby permit the spring fingers to ride over said head on said spindle and out of operative engagement with said reduced portion.

10. A device as claimed in claim 9 in which a spring normally moves said shell in a direction opposite to the direction in which said rod is moved to release said shell.

11. In a sharpening apparatus, the combination with a bearing, a spindle rotatably mounted in said bearing, an enlarged recess in said bearing arranged coaxially with said spindle, a hollow shell arranged within said enlarged recess, a spring for moving said shell in one direction, an operating member for manually moving said shell in the opposite direction, said spindle having a recess in the peripheral surface thereof, and spring fingers on said shell adapted to be arranged within said recess in said spindle to prevent removal of said spindle from said bearing, said manually operable means being adapted to remove the spring fingers from said recess.

12. A sharpening apparatus comprising a bearing member having a bearing for a spindle adapted to support a sharpening element, an enlarged recess in said bearing, a sleeve rotatably mounted within said recess, a thrust bearing arranged between said sleeve and adjacent portion of said first mentioned bearing, a hollow shell arranged within said sleeve and slidable longitudinally thereof, a spindle rotatably mounted in said first bearing, manual means for moving said shell in one direction longitudinally of said sleeve, yielding means for normally moving said shell in the opposite direction in said sleeve, a shoulder on said sleeve against which said sleeve normally urges said shell, spring fingers on said shell extending inwardly toward said spindle, a peripheral recess in said spindle into which said spring fingers normally extend for preventing removal of said spindle from its bearing, any movement of said spindle in the direction in which the same is to be removed from its bearing causing an increased gripping effect of said fingers against said spindle to prevent its removal from its bearing, said manually operable means being adapted to move said shell against the action of said spring to thereby withdraw said spring fingers from their operative relation within their peripheral recess.

13. A device as claimed in claim 12 in which said recess is bevelled on one side thereof so that the spring fingers will ride over said beveled surface when said manually operable means moves said shell and in which an additional beveled surface is provided on said spindle for engaging the ends of said spring fingers and moving the same outwardly when said spindle is inserted within its

bearing so that said spring fingers will ride over the outer peripheral surface of said spindle until the same drop into said peripheral recess on said spindle.

14. A sharpener for slicing machine knives, comprising a sharpening wheel, a spindle carrying the same, a support for slidably supporting said spindle, retaining means comprising a socket mounted on said support and having resilient fingers with radially inturned ends in position to engage a beveled annular wall in said support, said wall preventing outward movement of said fingers to releasing position if and when a pull is exerted in the direction in which said spindle is moved to release the same from said support, and a knob on the inner end of said spindle having an annular bevel shoulder in a position to engage said radially inturned ends on the side away from said wall to enable said spindle to release itself from its socket as said sleeve is moved relative to said spindle.

15. A knife sharpener comprising a sharpening element, a stem for carrying the same, a support for said stem, releasable locking mechanism comprising a socket, and means arranged within said socket for holding said spindle therein, and releasing means comprising an actuating device resiliently held against the bottom of said socket, said releasable means being manually operable to move said socket relative to said stem whereby said stem is released from said locking mechanism, and said releasable locking mechanism being prevented from releasing said stem except when said actuating device is operated.

16. A sharpener for slicing machine knives comprising a sharpening element, means for supporting the same in operative position, comprising a spindle, a double bevel knob on one portion of said spindle, and manually releasable retaining means cooperating with said knob and normally positively held against movement to an inoperative position for retaining said spindle with said sharpening element in operative position against removal from said supporting means, said bevel surfaces cooperating with said retaining means to hold said retaining means in operative position and for assisting the release of said releasable retaining means when the same is manually moved relative to said spindle to release said spindle from its supporting means.

17. A knife sharpener comprising a sharpening element, a stem for carrying the same, means for retaining said sharpening element on said stem, a support for said stem, means within said support for locking said stem in a predetermined position in said support, and manually operable means, independent of the locking means and of the means for holding the sharpener on said stem, extending through said stem to said locking means for releasing said locking means to permit removal of said stem from said support without disengaging said sharpening element from said stem.

CORNELIS F. M. VAN BERKEL.