

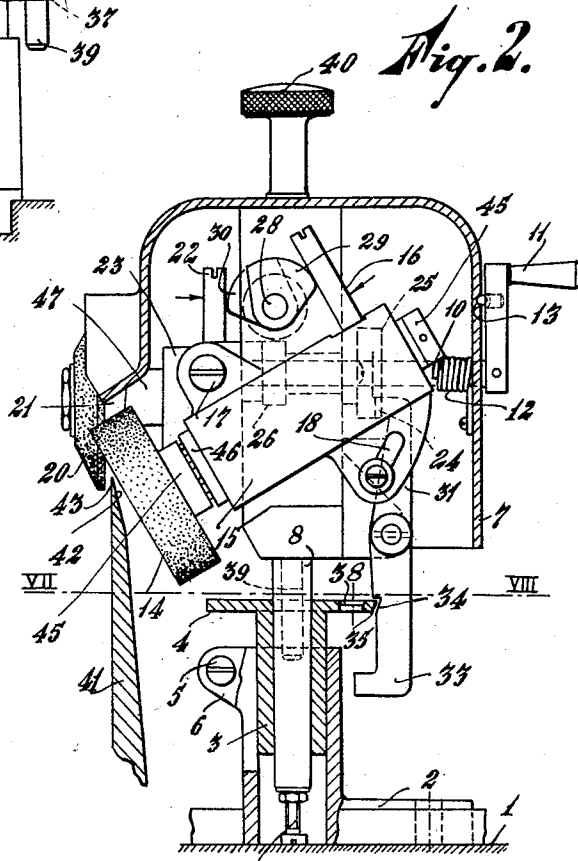
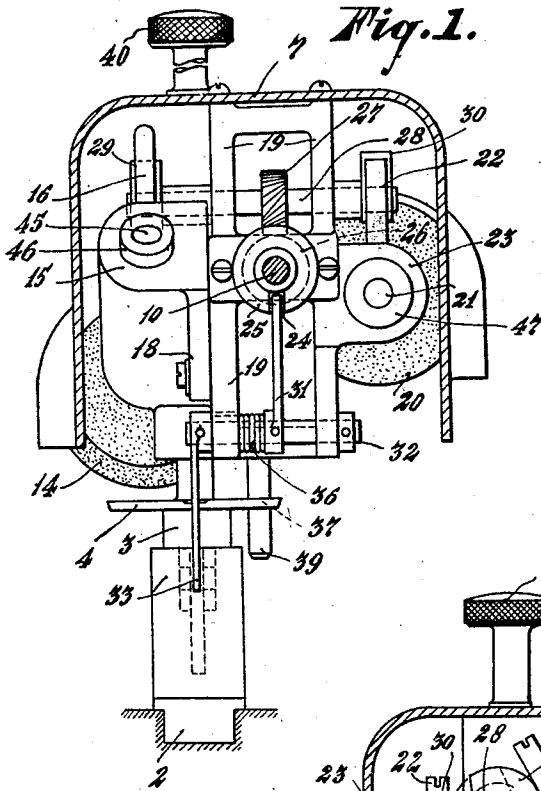
Sept. 1, 1931.

C. F. M. VAN BERKEL
DEVICE FOR SHARPENING THE ROTARY CIRCULAR
KNIVES OF SLICING AND OTHER MACHINES

1,821,280

Filed July 9, 1925

2 Sheets-Sheet 1



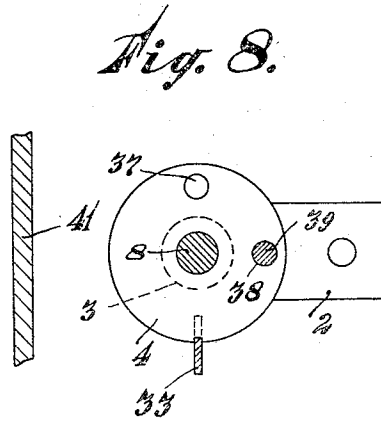
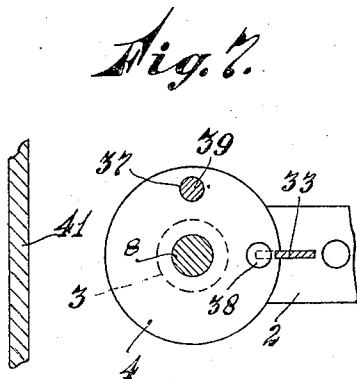
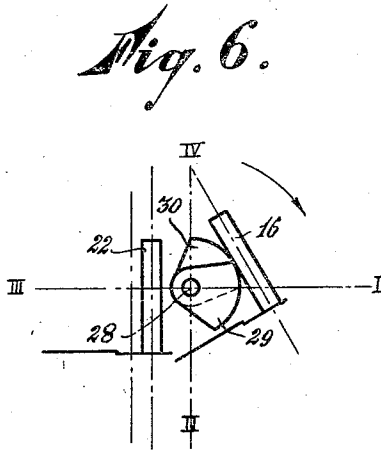
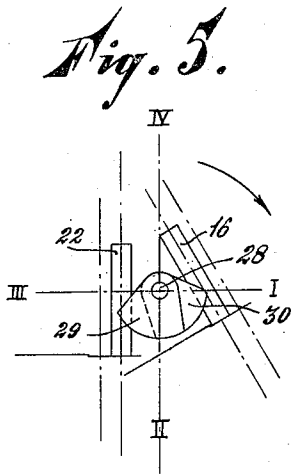
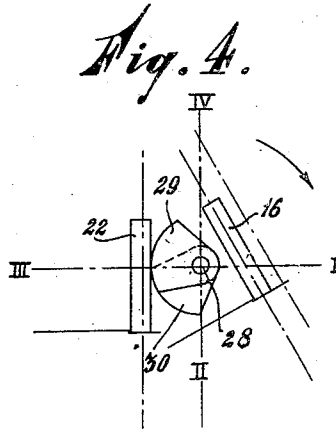
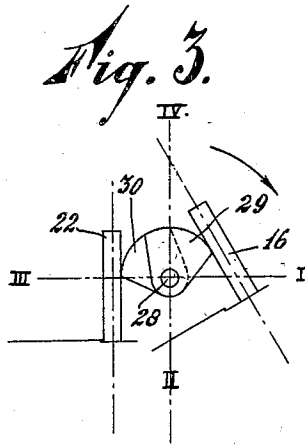
9 Cornelis F. van Berkel
Inventor
By Nissen & Lamm, Attys.

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Cornelis F. M. van Berkel
By Nissen & Crane, Attys.

UNITED STATES PATENT OFFICE

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DEVICE FOR SHARPENING THE ROTARY CIRCULAR KNIVES OF SLICING AND OTHER
MACHINES

Application filed July 9, 1925, Serial No. 42,553, and in Great Britain July 9, 1924.

The present invention relates to devices for use in sharpening the rotary circular knives of slicing and other machines.

Known sharpening devices comprise a grinding element and an element for removing the burr caused by grinding, each element being movable axially into and out of engagement with the knife.

A disadvantage of such devices is that the grinding element is removed from the knife after the element for removing the burr, so that after the grinding operation has been finished the knife is never entirely free from burrs.

The object of this invention is to avoid this disadvantage by providing a device of the kind referred to with mechanism whereby the grinding element is now earlier removed from the rotary knife than the burr removing element, thus ensuring that all the burrs have been removed from the knife.

The said mechanism is preferably constructed in such a manner that either the grinding element, and subsequently the grinding element and burr removing element, acts on the knife in the first case, or the grinding element together with the burr removing element act on the knife in the first case after which operations the burr removing element alone acts on the knife, being finally withdrawn therefrom.

The mechanism may be actuated by a single operating member for effecting the various movements of the burr removing and grinding elements and, preferably, the operating member is adapted to be rotated in one direction only.

Said mechanism may comprise two cams located in different planes, each cam acting on a projection or finger, or like member, which, when moved, causes a corresponding axial displacement of the burr removing element or the grinding element, as the case may be.

The sharpening device may also comprise means whereby the sharpening mechanism can be locked in a position that unauthorized persons playing or working with the adjusting handle or crank cannot, by so doing, move the elements against the knife,

the locking action taking place automatically.

Means may further be provided whereby the whole device is capable of being raised and lowered on its support, the construction of the device being such that, when it is raised upon its support, both sharpening elements are automatically locked, and when lowered on its support said elements are automatically unlocked.

Preferably, the device is combined with means whereby when one, or both, of the sharpening elements is, or are, in the sharpening position, said elements are positively held against lifting movement.

The above and other characteristics of the invention will be more fully described with reference to the accompanying drawings, illustrating a constructional form of the invention by way of example.

On the drawings:—

Fig. 1 is a side elevation, partly in section, of the sharpening device.

Fig. 2 is a front elevation, partly in section, of said device.

Figs. 3, 4, 5 and 6 show various positions of the actuating mechanism.

Figs. 7 and 8 are sections on the line VII—VIII in Fig. 2, the parts being shown in different positions.

Referring to the drawings:—

On the upper surface 1 of a support (e. g. the knife bearing of a slicing machine) is secured a holder 2 wherein a cylindrical sleeve 3, having a flange 4, is clamped by means of a screw 5 passing through two lugs 6 on the holder. The sharpening mechanism is enclosed in a casing 7 provided, at its bottom part, with a vertical cylindrical pin 8 projecting into an aperture in the sleeve 3 and bearing by means of a set screw 9 on the surface 1. A horizontally arranged actuating shaft 10 is mounted for rotation within the casing 7, said shaft being adapted to be rotated in one direction only by means of a crank 11. The shaft 10 is held against rotation in the other direction by a helical spring 12 secured at one end to the casing and wound tightly round the shaft so that when the latter is rotated so

as to wind up the spring by friction between the shaft and spring the latter grips the shaft and prevents its rotation. The crank can occupy four main positions I, II, III, IV, (Figs. 3 to 6) in each of which it is resiliently locked by means of a spring actuated ball 13 co-operating with corresponding recesses in the wall of the casing 7. The arrows in Figs. 3 to 6, inclusive, illustrate diagrammatically the direction of rotation of the crank 11 as viewed from the right-hand side of Fig. 2. When the crank arm is in its full line position shown in Fig. 2 it is in its main position IV and the cams 29 and 30 are in the positions shown in full lines in Fig. 3. When the crank arm 11 is moved to its main position I of Fig. 4, the shaft 28 by reason of the gearing 26, 27 of Figs. 1 and 2 moves in an anti-clockwise direction as viewed from the front side of Fig. 2 and as viewed in Figs. 3, 4, 5 and 6. Therefore as the crank arm 11 is moved in a clockwise direction to its various main positions I, II, III and IV the cams 29 and 30 move anti-clockwise as illustrated in Figs. 3, 4, 5 and 6.

A grinding stone 14 is located at one side of the knife with its shaft 45, which is spring controlled, rotatably arranged in a sleeve 46, the latter being slidably arranged in an outer sleeve 15 having a slot through which an arm 16 projects outwardly, said arm being connected to the sleeve 46 in such a manner that the movement of the arm in the direction of the arrow (Fig. 2) causes the stone 14 to move towards the knife. The sleeve 15 is pivotally connected at 17 to a part of the casing and is provided at 18 with a slot for a screw connection with a cross piece 19 of the casing in order to vary the grinding angle.

The burr removing stone 20 is mounted on a shaft 21 rotatably arranged in a sleeve 47 slidably in an outer sleeve 23, an arm 22 projecting through a slot in the sleeve 23, and being connected to the sleeve 47. A spring always tends to force said stone towards the knife.

A disc 25 is mounted on the shaft 10 and is formed with a slot 24, a spiral toothed wheel 26, engaging a corresponding wheel 27 mounted on a shaft 28, being also mounted on the shaft 10. The shaft 28 is rotatably mounted on the cross piece 19 of the casing and carries a cam 29 at the side of the grinding stone and a cam 30 at the side of the burr removing stone, said cams being located in different planes and co-operating with the arms 16 and 22, respectively.

The actuating shaft 10 may be locked by means of a finger 31 adapted to enter into the slot 24, said finger being mounted on a shaft 32, to which is also secured a hook 33, having a recess 34 for co-operating with the bevelled edge 35 of the disc 4. A helical

spring 36 tends to disengage the finger 31 from the disc 25. The disc 4 is further provided with two holes 37, 38 adapted to be engaged by a downwardly projecting pin 39 on the casing 7 for locking said casing in one or the other of two positions. The casing is provided at the top with a button 40 by means of which the casing may be lifted and rotated.

The operation of the device is as follows:—

In the position shown in Fig. 2, the mechanism occupies the inoperative, or neutral, position in which the crank 11, the cams 29, 30 and the arms 16 and 22 occupy the positions shown in Figs. 2 and 3. For the sake of clearness, the spiral wheels 26 and 27 and their appurtenances have been omitted in Figs. 3 to 6. If the crank 11 is turned to the right a quarter of a revolution, see Fig. 4, the cam 29 moves away from the arm 16 and the spring in the sleeve 15 forces the grinding stone 14 towards the knife 41. The stone 14 is rotated by said knife.

When the knife is sufficiently ground, the crank 11 is turned again through a quarter of a revolution to the right (Fig. 5) in which position the grinding stone 14 continues in action and the burr removing stone 20 comes into operation, in view of the fact that the cam 30 moves away from the arm 22. Thereafter the crank 11 is again turned a quarter of a revolution (Fig. 6) whereas the cam 29 moves back the arm 16 so that the grinding stone 14 is removed from the knife, which latter is then only acted upon by the burr stone 20 removing the burr from the cutting edge 43. Finally, upon completion of the revolution of the crank 11 the burr removing stone 20 is withdrawn from the knife and the position of the stones shown in Fig. 3 is again attained.

During all the above manipulations of the crank 11 the bevelled edge 35 of the flange 4 remains in the recess 34 of the hook 33. The casing 7 is lifted by taking hold of and lifting the button 40, the hook 33 and the shaft 32 being partially rotated by reason of the co-operation between the edge 35 and the hook 33. The finger 31 then enters into the slot 24 in the disc 25 and, consequently, if the crank 11 does not occupy the right position, lifting of the casing 7 is impossible.

As soon as the casing has been lifted high enough for the pin 39 to leave the hole 37, it may be turned through a quarter of a revolution around the pin 8 until the pin 39 can enter the hole 38, whereupon said casing is lowered and is locked by the engagement of the bevelled edge 35 and recess 34. A rotation of the crank 11 by any incompetent person is then harmless to the knife.

Having now particularly described and ascertained the nature of my said invention

and in what manner the same is to be performed what I claim is:—

1. A device for sharpening the rotary circular knife of a slicing machine, comprising a pair of grinders disposed at opposite sides of the knife to be sharpened, springs for moving said grinders into contact with the opposite sides of said knife respectively, cam members for holding said grinders away from said knife against the action of said springs, a rotary member for actuating said cam members, and mechanism for holding said rotary member against reverse rotation, said cam members being arranged when operated by said rotary member to permit one of said grinders to engage said knife in advance of the other grinder and upon further operation by said rotary member in the same direction to withdraw said grinders from contact with said knife and to permit the grinder which was last brought into contact with the knife to remain in contact therewith until withdrawal of the grinder which first engaged the knife.

2. A sharpener for the rotary circular knife of a slicing machine having one edge beveled, comprising a main and a supplemental grinder, the main grinder being arranged to engage the beveled edge of said knife while the supplemental grinder is arranged to engage the opposite edge of said knife, springs for moving said grinders into contact with said knife, cams for moving said grinders away from said knife against the action of said springs, a rotary device for operating said cams, and mechanism for holding said rotary device against reverse rotation, said cams being shaped upon operation of said rotary member to permit the main grinder to engage the beveled edge of said knife and thereafter to permit the supplemental grinder to engage the opposite side of said knife and upon further operation by rotation of said rotary member in the same direction to withdraw said main grinder and thereafter withdraw said supplemental grinder.

3. A sharpener for slicing machine knives comprising a pair of grinding elements one for sharpening and the other for removing the burr, means for effecting movement of said grinding elements into and out of operative position relative to a slicing machine knife in a predetermined sequence, there being movement of such moving means in only one direction, and mechanism for preventing reverse movement of said moving means to compel movement of said sharpening grinding element away from the knife prior to removal of the burr removing element therefrom.

4. A sharpener for slicing machine knives comprising a pair of grinders one for sharpening and the other for removing the burr, means for moving said grinders into and

out of operative position relative to a slicing machine knife to be sharpened by movements compelling removal of the sharpening grinder in advance of the removal of the burr removing grinder, a rotary member operable in one direction only for actuating said moving means, and mechanism for preventing reverse rotation of said rotary member during the cycle of operations.

5. A sharpener for slicing machine knives comprising a pair of grinders one for sharpening and the other for removing the burr movable into and out of operative position relative to a knife to be sharpened, a plurality of cams for controlling the movement of said grinders in a predetermined sequence into operative position and compelling the removal of the sharpening grinder in advance of the burr removing grinder, means movable in one direction only for actuating said cams to effect such predetermined sequence of movements of said grinders, and mechanism for preventing reverse movement of said cams.

6. A sharpener for rotary slicing machine knives comprising a grinding element and a burr removing element movable into and out of operative positions relative to a rotary slicing machine knife to be sharpened, mechanism comprising cams for compelling a predetermined sequence of movements of said grinding elements including removal of the grinding element in advance of the burr removing element, and mechanism for preventing reverse movements of said cams to maintain such predetermined sequence of movements of the said grinding elements.

7. A sharpener for slicing machine knives comprising grinding element and a burr removing element for engaging opposite sides of a knife to be sharpened, spindles on which said grinding elements are mounted, means for supporting said spindles for movement longitudinally thereof to bring said grinding elements into and out of engagement with a knife to be sharpened, mechanism comprising cams for actuating said spindles to move the grinders relative to said knife, means for supporting said cams for predetermined sequence of movements including delay in removal of the burr removing element until after the grinding element has been removed, and non-reversible means for moving said cams to secure such predetermined sequence of movements.

8. A sharpener for slicing machine knives comprising a grinder for performing the major operation, a second grinder for removing the burr formed by said first-named grinder, said grinders being movable into and out of engagement with a slicing machine knife to be sharpened, means for controlling the movements of said grinders to compel the same to have a predetermined

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sequence of movements to effect removal from the knife of said first-named grinder in advance of the removal of the burr removing grinder, and means for preventing any reversal of the predetermined cycle of movements of the grinders to prevent the grinders from moving relative to the knife in a different sequence from that predetermined.

9. A sharpener for slicing machine knives comprising a main grinder, a secondary grinder for removing the burr produced by the main grinder, said grinders being movable into and out of engagement at opposite sides of the knife to be sharpened, rotary cams for controlling the movements of said grinders toward and from said knife, a single shaft for carrying said cams to compel a predetermined sequence of movements of said grinders including delay in the removal of the burr removing grinder from the knife until after the main grinder has been removed, and means for preventing said shaft from being rotated except in one direction so as to cause said cams to always move said grinders through the same predetermined cycle of movements.

10. A sharpener for rotary slicing machine knives comprising a grinding element and a burr removing element, means for moving said elements into and out of operative positions relative to a rotary slicing machine knife to be sharpened, mechanism for actuating said moving means, and mechanism for compelling operation of the said moving means to effect removal of the grinding element away from the knife before the burr removing element is removed.

11. A sharpener for rotary slicing machine knives comprising a pair of grinders one for major operation and the other for removing the burr, means for moving said grinders into and out of operative positions relative to a rotary slicing machine knife to be sharpened, and mechanism for compelling a predetermined cycle of movements of said grinders while reversal thereof is prevented, such cycle of movements including movement of the major grinder into engagement with the knife followed by the movement of the burr grinder into engagement with the knife and after an interval while both grinders are in engagement with the knife movement of the major grinder away from the knife leaving the burr grinder in engagement therewith for an interval after which upon continued operation the same cycle must be repeated.

12. A sharpener for the rotary circular knife of a slicing or other machine, comprising a main grinder, a supplemental grinder for removing the burr produced by said main grinder, said grinders being movable into and out of engagement with the opposite sides of the rotary circular knife to be

sharpened, and manually operated mechanism for controlling the movement of the grinders into engagement with said knife and out of engagement therewith, said mechanism being so constructed and arranged that the main grinder must always be removed from the knife before the burr removing grinder is removed, the latter being confined upon operation of said manually operated mechanism to remain in engagement with said knife until after the main grinder has been removed.

In testimony whereof I affix my signature.

CORNELIS FRANCISCUS MARIA van BERKEL.