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(54) **Title:** SHARPENING DEVICE

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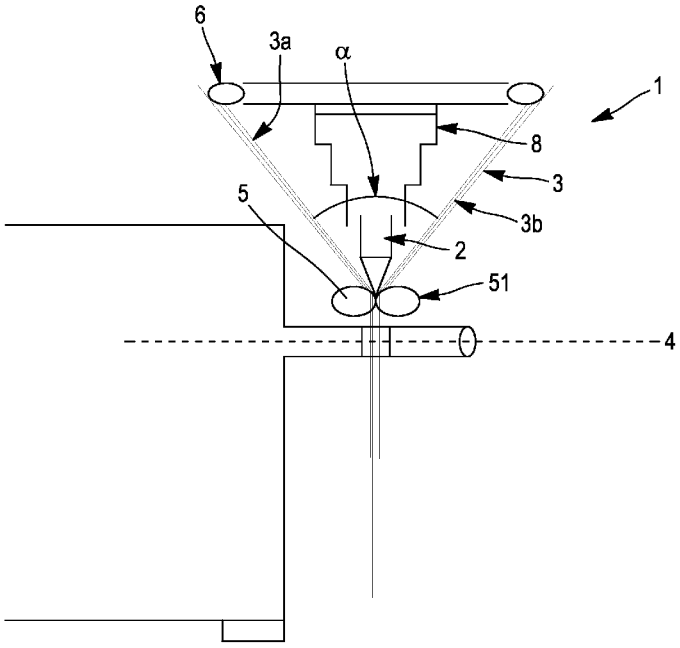

FIG. 1

(57) **Abstract:** A sharpening device (1) for sharpening a blade (2) of a cutting tool, such as a knife or the like, the device comprising: - at least two flexible discs (3) each having an abrasive inner face (3a), said discs abutting with their abrasive faces (3a) facing each other, mounted so as to rotate in the same direction and at the same speed about a same axis (4), - pressure means (5), arranged outside said flexible discs (3) and clamping them along a non-diametrical chord, - inner means (6) to the inside of said discs, exerting pressure on the inner faces (3a) of the discs (3), in the parts of same delimited by the chord and not traversed by the axis (4), the choice of positioning of said inner means (6) relative to said pressure means (5) defining the sharpening angle (a).

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(57) Abrégé : Dispositif d'affûtage Dispositif d'affûtage (1) de lame (2) d'outil coupant, de type couteau ou similaire, le dispositif comprend : - au moins deux disques flexibles (3) présentant chacun une face intérieure abrasive (3a), accolés faces abrasives (3a) en regard, montés en rotation dans un même sens et à la même vitesse autour d'un même axe (4), - des moyens de pression (5), disposés extérieurement et serrant lesdits disques flexibles (3) selon une corde non diamétrale, - des moyens internes (6) auxdits disques exerçant un appui sur les faces intérieures (3a) des disques (3), dans leurs parties délimitées par la corde et non traversées par l'axe (4), le choix du positionnement desdits moyens internes (6) par rapport auxdits moyens de pression (5), définissant l'angle d'affûtage (a).

Sharpening device

The present invention relates to the field of devices for sharpening blades, in particular knives.

In a known manner, many machines exist making it possible to sharpen blades. These machines generally have a grinding wheel system with a rotary abrasive strip or abrasive rotary round stone, which rotates and in contact with which one of the faces of the blade to be sharpened is brought.

In practice, the operator alternately applies one of the two faces of the blade to be sharpened against the abrasive strip or the round stone in order to perform the sharpening operation.

These systems have the drawback of requiring the blade to be turned over in order to sharpen one face after the other, which requires the operator to have a certain dexterity and to have a certain experience to keep the blade at the right angle and to obtain the desired sharpening profile.

In order to resolve this problem, sharpening machines have been built having two abrasive strips or round stones that intersect. With these bilateral abrasion systems, the blade becomes positioned between the two strips or the two stones allowing simultaneous sharpening on each of its opposite faces.

Nevertheless, these systems have the drawback of requiring a particular agility of the operator when he can obtain an adequate blade angle corresponding to the use he wishes to make thereof.

To resolve this problem, blade guide systems are used making it possible to wedge and hold the blade during the sharpening operation, and which are placed upstream from bilateral abrasion strips or stones.

Nevertheless, the sharpening machines known from the prior art are not fully satisfactory.

Indeed, the sharpening duration for the users is long; it is around 1 to 3 min. Furthermore, the precision of the sharpening angle has an error risk relative to the initial angle, which can be between 10 and 25%, which is still too high for the users of the blades to be sharpened.

An alternative solution should be found to the existing blade sharpening devices, not having the aforementioned drawbacks and allowing easy sharpening, quick to perform and having a quality and a cutting angle precision greater than that obtained by said existing devices.

The present invention aims to offset the drawbacks of the state of the art, by proposing a device for sharpening a cutting tool blade, of the knife type or the like.

Thus, said device comprises at least two flexible discs each having an abrasive inner face, alongside facing abrasive faces, mounted rotating in a same direction and at the same speed around a same axis; pressing means, arranged outwardly and gripping said discs along a non-diametric chord; and means inside said discs exerting bearing on the inner faces of the discs, in their parts delimited by the chord and not passed through by the axis, the choice of the positioning of said internal means relative to said pressing means defining the sharpening angle.

Furthermore, according to other features of the invention:

- the pressing means consist of an alignment of carrier balls;

- said pressing means consist of two magnets of opposite polarities positioned opposite one another and associated with sliding means arranged in contact with the flexible discs;

- said abrasive inner face consists of an abrasive disc attached and fastened reversibly on the flexible disc;

- the abrasive disc is secured to the flexible disc through a fastening system of the velvet-hook type;

- said internal means exerting bearing on the inner faces

of the discs consist of a ball spacer intended to roll on the periphery of the part delimited by the chord and not passed through by the axis of each of the flexible discs.

Advantageously also according to the invention, said device is provided in its upper part with a stair-stepping removable blade guide, able to be positioned between the two parts delimited by the chord and not passed through by the axis of said two flexible discs.

Other features and advantages of the invention will emerge from the following detailed description of non-limiting embodiments of the invention, in reference to the appended figures, in which:

- figure 1 schematically shows a profile sectional view of the sharpening device of the invention,

- figure 2 schematically shows a front view of the outer face of the flexible discs,

- figures 3A and 3B schematically show a view of the inner face of the flexible discs in the presence and in the absence of adhesive means supporting the abrasive means.

The present invention relates to a sharpening device 1 for a blade 2.

The blade 2 in question is of the knife type or the like, for example a kitchen knife or surgical scalpel.

The device 1 of the invention comprises two flexible discs 3 as shown in figure 1.

Advantageously, the flexible discs 3 are made from a material such as plastic, cardboard, flexible steel or the like.

According to the invention, each flexible disc 3 has an inner face 3a and an outer face 3b as shown by figures 3A and 3B.

The inner face 3a is abrasive and serves to sharpen said blade 2.

According to one preferred embodiment of the invention,

the inner face 3a for example consists of an abrasive disc 7 attached and fastened reversibly on said flexible disc 3.

Preferably, said abrasive disc 7 has a particle size of between 8 and 5000 nm.

Preferably, said abrasive disc 7, also flexible, is secured to the flexible disc 3 through a fastening system of the velvet-hook type.

Nevertheless, any other reversible fastening means known from the prior art is possible, such as a double-sided adhesive, a pull-tab system, press button or a magnetized system.

As shown in figure 1, the two flexible discs 3 are alongside one another and mounted such that their abrasive faces are facing one another.

According to the invention, said flexible discs 3 are mounted rotating about a same axis 4.

According to a first embodiment, the two flexible discs 3 are mounted fixed on a same axle shaft 4 rotated by a motor.

According to a second embodiment, not shown, each of the flexible discs 3 is mounted at the end of a shaft rotated by a motor, the two shafts being coaxial, and are driven in the same direction and at the same speed by a single motor means or by several synchronized motor means.

Thus, irrespective of the considered embodiment, during the operation of the device 1 according to the invention, when the motor means are activated, the flexible discs 3 rotate together, in the same direction and at the same speed while having their abrasive inner faces alongside one another.

According to the invention, said sharpening device also comprises pressing means 5 arranged outwardly, i.e., cooperating directly with the outer face 3b of said flexible discs 3.

Said pressing means 5 are linear and grip said at least two flexible discs 3 between them along a non-diametric chord

of said flexible discs 3 as shown in figure 2.

In other words, the linear pressing means 5 define a chord on said flexible disc 3, said chord not passing through the axis 4.

According to one privileged embodiment visible in figures 1 and 2, said pressing means 5 consist of an alignment of carrier balls 51.

During the operation of the device 1, when said flexible discs 3 are rotatable, the carrier balls 51 guarantee the pinching of the two discs 3 along a line, their possible rotation performing an anti-friction function.

According to another embodiment, not shown, the pressing means 5 consist of two magnets of opposite polarities positioned opposite one another and associated with sliding means arranged in contact with the flexible discs 3.

According to still another embodiment, not shown, the pressing means 5 consist of two single bars in a half-moon shape made from ceramic or steel, for example.

According to one additional embodiment, not shown, the pressing means 5 consist of an air pressing system.

The sharpening device 1 also comprises internal means 6 exerting bearing on the inner faces 3a of the flexible discs 3. Said internal means 6 of said discs 3 act by bearing in the part 30 of the discs 3 delimited by the chord and not passed through by the axis 4 as shown in figures 1 and 3A.

In other words, said internal means 6, by exerting bearing on the inner faces 3a of said discs 3, generate a separation of said discs 3 that are alongside one another. The choice of the positioning of the bearing on the discs by the internal means 6 relative to the pressing means 5 defines a sharpening angle α as shown in figure 1.

In the space delimited by the separation of the two discs 3, the blade 2 is introduced in order to position it between the two rotating flexible discs 3; the angle α is that chosen

as a function of the blade characteristics 2, which, during the sharpening operation, will make it possible to sharpen this blade 2.

According to one particular embodiment, said internal means 6 exerting bearing on the inner faces 3a of the discs 3 consist of a ball spacer intended to roll on the periphery of the part delimited by the chord and not passed through by the axis of each of the flexible discs 3, as shown in figures 3A and 3B.

In this embodiment, during the sharpening operation, during the rotation of the flexible discs 3, the balls of the spacer will roll against the inner faces 3a of said two discs 3 that are alongside one another to keep them separated in order to leave a passage for insertion of the blade 2 to be sharpened, said passage corresponding to the sharpening angle.

Advantageously, in order to facilitate the insertion of the blade 2 into the sharpening angle, the device 1 in its upper part [sic] with a removable blade guide 8, preferably staircase-shaped as shown in figure 1.

Said blade guide 8 is able to be positioned between the two parts 3a of each of the two flexible discs 3. In other words, said blade guide 8 is positioned at the sharpening angle as shown in figure 1.

According to one particular embodiment, said device 1 according to the invention includes two pairs of flexible discs 3 each connected to an axle shaft 4 actuated in rotation by a same motor, thus it is possible to sharpen two blades with the same device and at the same time.

The present invention has the advantage of facilitating the blade sharpening that one wishes to sharpen at a precise angle. More specifically, the use of the device 1 according to the invention makes it possible to:

- increase the precision of the sharpening angle, the angle error risk of which is at most between 0.1 and 0.2%,

- increase the sharpening speed, the sharpening is fast, approximately from 15 to 20 seconds versus 2 to 3 minutes with the devices of the prior art;

- increase the longevity of the sharpness retention of the sharpened blades;

- have an equal and equivalent angle on both faces of the sharpened blade.

The other advantage of the device 1 of the invention consists of its ease of use, which does not require special diligence by the operator to position the blade within the sharpening angle of the device 1. The sharpening angle being created by the positioning of the pressing means 5 relative to the internal means 6, the two faces of the blade 2 to be sharpened are sharpened simultaneously and at the same time, resulting in a better sharpening quality and angle precision than that obtained with the devices of the state of the art. The blades 2 obtained by using the device 1 therefore have a superior cutting quality and longevity compared to that obtained in the prior art, even if a sharpening operation is performed by a user who is not a trained expert.

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CLAIMS

1. A sharpening device for a cutting tool blade, the device comprising:

a first flexible disc having a first abrasive inner face and first outer face opposite said first abrasive inner face;

a second flexible disc having a second abrasive inner face and second outer face opposite said second abrasive inner face,

wherein said first abrasive inner face faces said second abrasive inner face so as to form a sharpening angle,

wherein said first flexible disc is rotatably mounted on an axis in a first direction at a first speed, and

wherein said second flexible disc is rotatably mounted on said axis in said first direction at said first speed;

a first pressing means against said first outer face of said first flexible disc along a first non-diametric chord so as to form a first chord portion;

a second pressing means against said second outer face of said second flexible disc along a second non-diametric chord so as to form a second chord portion, said second non-diametric chord being aligned with said first non-diametric chord;

a first bearing means against a first bearing portion of said first abrasive inner face of said first flexible disc corresponding to said first chord portion; and

a second bearing means against a second bearing portion of said second abrasive inner face of said second flexible disc corresponding to said second chord portion,

wherein said first pressing means, said first chord portion, said first bearing means on said first bearing portion, said second pressing means, said second chord

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portion, and said second bearing means on said second bearing portion, form said sharpening angle between said first flexible disc and said second flexible disc.

2. The sharpening device according to claim 1, wherein said first pressing means is comprised of a first plurality of carrier balls, and wherein said second pressing means is comprised of a second plurality of carrier balls aligned with said first plurality of carrier balls.
3. The sharpening device according to claim 1 or claim 2, wherein said first pressing means is comprised of a first magnet with a first polarity, and wherein said second pressing means is comprised of a second magnet with a second polarity, said first polarity being opposite said second polarity, said first magnet and said second magnet being arranged on a sliding means arranged in contact with said first flexible disc and said second flexible disc.
4. The sharpening device according to any one of claims 1 to 3, further comprising a first abrasive disc removably attached to said first flexible disc.
5. The sharpening device according to claim 4, wherein said first abrasive disc is secured to said first flexible disc through a hook and loop fastener engagement.
6. The sharpening device according to any one of claims 1 to 5, wherein said first bearing means is comprised of a ball spacer.
7. The sharpening device according to any one of claims 1 to 6, further comprising a stair-stepping removable blade guide positioned between said first chord portion and said second chord portion.

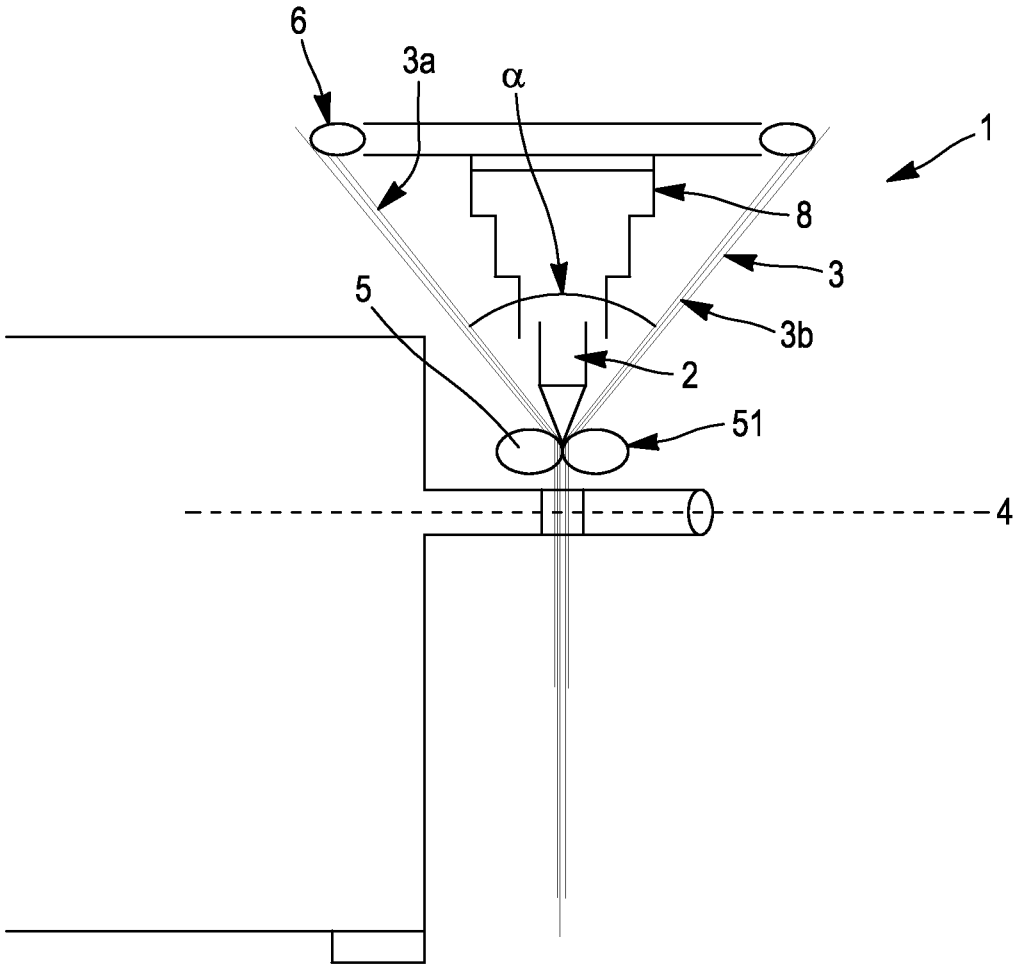

FIG. 1

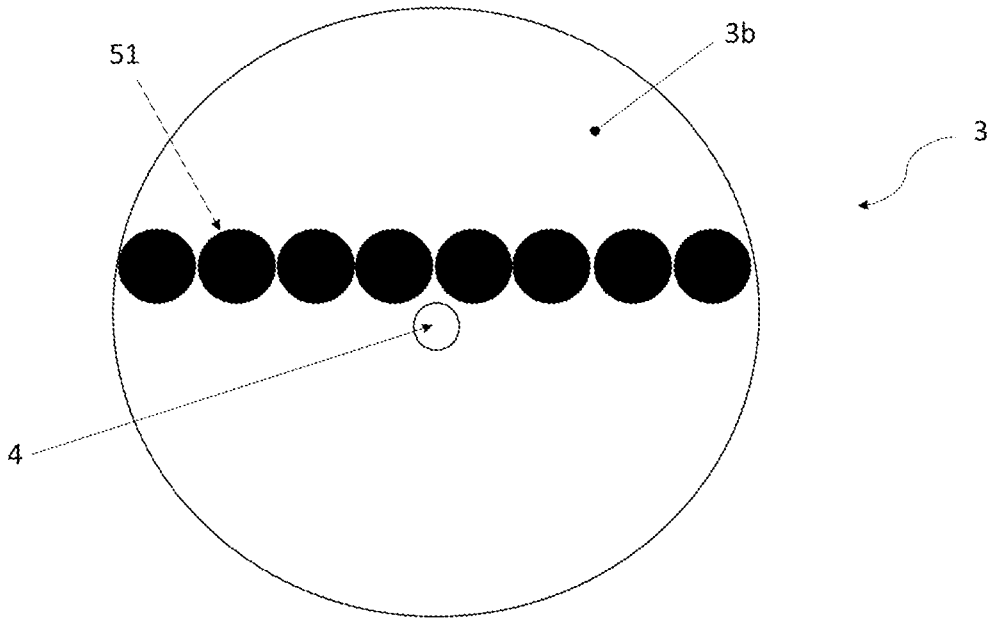

FIG. 2

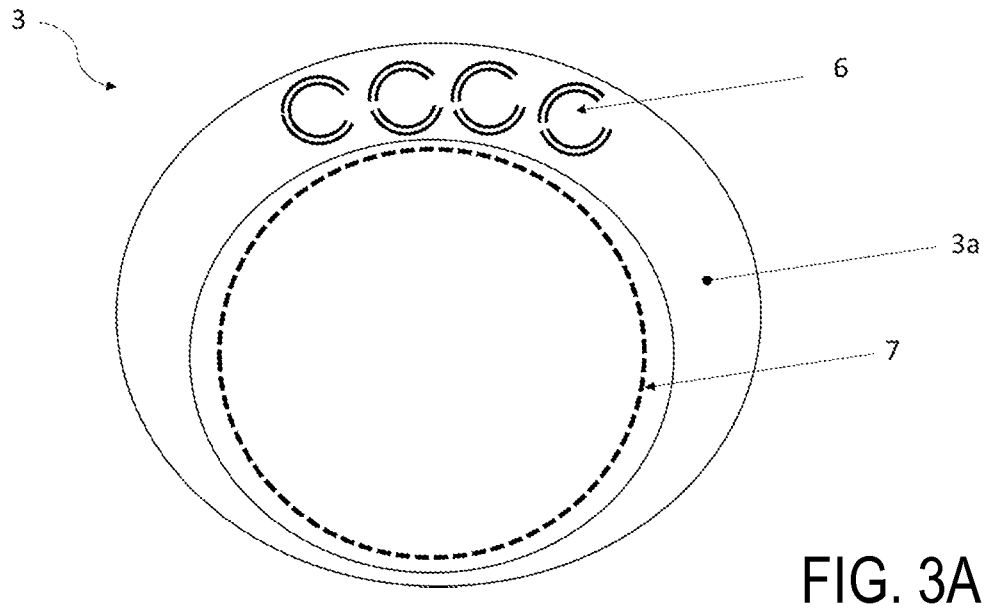

FIG. 3A

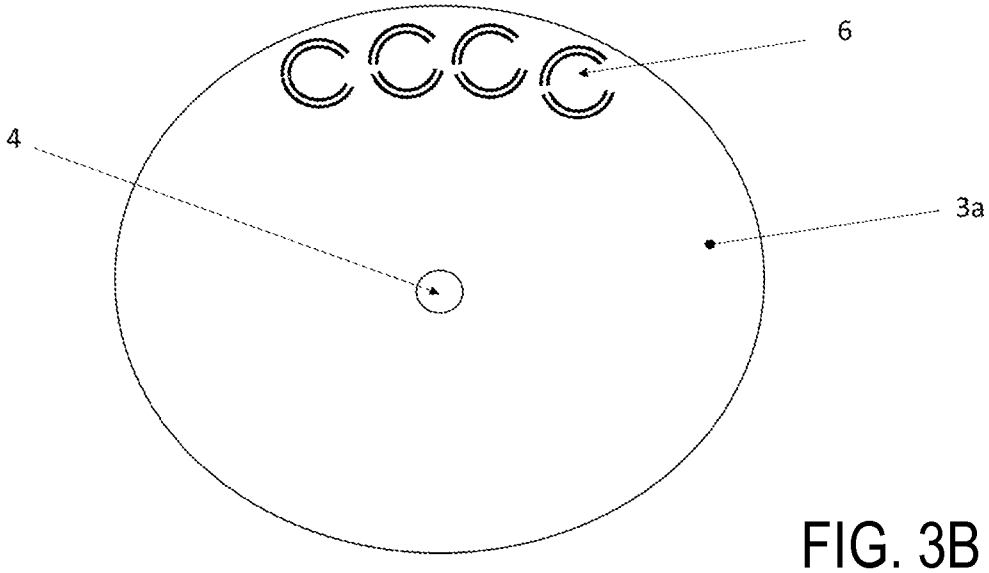

FIG. 3B