Sharpening jig with adjustable angle

The present invention relates to a sharpening jig, in particular for holding a cutting tool with a blade that is to be sharpened or polished, and for positioning the blade in at least one positioning angle relative to a sharpening and/or polishing tool, such as a rolling grinder.

A sharpening jig of the general type according to the general term of Claim 1 is known from DE 10 2020 123 503 A1. A rolling grinder is known, for example, from EP 3 278 928 A.

Such a sharpening jig secures the blade, which is typically made of metal and is therefore magnetizable, by means of magnetic force and is also referred to as a magnetic sharpening jig. However, the principle of the present invention is fundamentally applicable to all types of sharpening jigs, provided that the blade of the cutting tool to be sharpened or polished can be positioned at a predetermined positioning angle relative to the sharpening and/or polishing tool.

The sharpening jig known from DE 10 2020 123 503 A1 comprises at least two parts that are adjustable relative to one another to set different positioning angles. The parts of this sharpening jig that are adjustable relative to one another can be adjusted at right angles to one another, causing the parts to protrude in mutually perpendicular directions and preventing the sharpening jig from having a compact shape.

To reduce the space required by the sharpening jig and to facilitate its handling, the objective of the present invention is therefore to provide a compact sharpening jig.

To solve this problem, the present invention provides the sharpening jig according to claim 1. The sharpening jig according to the invention is intended, in particular, for holding a cutting tool with a blade that is to be sharpened or polished and for positioning the blade in at least one positioning angle relative to a sharpening and/or polishing tool, such as a rolling grinder, wherein the sharpening jig comprises at least two parts that are adjustable relative to one another. According to the invention, the two parts are adjustable relative to one another along a curved path. The two parts may have complementary shapes relative to one another along the curved path, such that one part surrounds or even encloses the other part, at least in sections. Ultimately, the adjustability of the two parts along a curved path contributes to the compactness of the sharpening jig.

It may be advantageous for the curved path lies in a plane oriented perpendicular to the setup plane of the sharpening jig. This configures the sharpening jig as a type of seesaw. Furthermore,

this promotes the compactness of the sharpening jig in the plane oriented perpendicular to the setup plane. In other words, this allows the height of the sharpening jig to be kept low.

It may be useful that the curved path is a circular arc. This allows different positioning angles to be achieved at regular intervals.

It may prove helpful if the parts, which are adjustable relative to one another, can be adjusted in steps between different positions. This increases the user-friendliness of the sharpening jig.

It can be beneficial if the parts that are adjustable relative to one another can be locked in different, preferably three, positions, in particular by friction-fit and/or form-fit, preferably with a detent mechanism. This ensures that the set positioning angle remains unchanged even when high forces are applied to the sharpening jig, e.g., during the sharpening or polishing of the blade. Furthermore, this ensures the reproducibility of the sharpening or polishing results.

It may prove practical for the sharpening jig to include a guide for moving the parts that are adjustable relative to one another in a guided manner between different positions. This further improves the user-friendliness of the sharpening jig according to the invention. It thereby prevents or at least makes it more difficult to operate the sharpening jig incorrectly.

It can be useful if the guide is fixedly connected to one of the parts that are adjustable relative to one another and comprises at least one guide setting, and the other of the parts that are adjustable relative to one another comprises a guide element, preferably a guide pin, which engages with the guide setting, preferably forming a transition fit. This allows the parts that are adjustable relative to one another to be connected in such a way that they have only the degree of freedom of movement permitted by the guide. The relative movement between the parts that are adjustable relative to one another is thereby clearly defined.

It may be advantageous if the relatively adjustable parts are resiliently biased against one another, preferably into a locked state relative to one another, wherein the locked state can preferably be released by reducing or eliminating the resilient bias, such that the parts are adjustable relative to one another. This reduces the risk that the parts, which are adjustable relative to one another, will be unintentionally adjusted, thereby changing the positioning angle.

It may be advantageous for the sharpening jig to include at least one spring pressure piece for generating the spring-loaded preload between the parts, wherein the spring pressure piece is preferably connected to one of the relatively adjustable parts and engages in a locking recess in the other of the relatively adjustable parts to create a locked state. The spring pressure piece

provides a simple and robust component for generating the spring-loaded preload between the parts that are adjustable relative to one another.

It may be advantageous for at least one of the relatively adjustable parts comprises an actuation section that a user can actuate, preferably manually, in particular by applying pressure or tension, to adjust the parts relative to one another. The provision of an actuation section facilitates intuitive operation of the sharpening jig by a user. Furthermore, the actuation section makes it easier to adjust the parts relative to one another.

It may prove advantageous if one of the parts that are adjustable relative to one another is received in an opening of the other part, wherein the two parts can preferably assume a position in which one part completely closes the opening of the other part, and/or can assume a position in which one part protrudes, at least in sections, from the opening of the other part. Such a configuration also entails that the other of the parts that can be adjusted relative to one another forms a housing, the opening of which is located in a side of the housing, preferably in a flat lower surface of the housing, wherein the one part, when in a certain position, is flush with the side of the housing having the opening or lies in the same plane as it. As a result, the compactness of the sharpening jig is improved.

It may be advantageous if the sharpening jig comprises at least a first support foot attached to one of the parts that are adjustable relative to one another, and at least a second support foot, which is attached to the other of the parts that are adjustable relative to one another. This prevents static overdetermination and, consequently, wobbling of the sharpening jig.

It may prove advantageous for the sharpening jig to include a scale for reading the degree value of the set positioning angle. This makes it easy for a user to see which positioning angle is currently set. This improves the user-friendliness of the sharpening jig.

It may prove practical if a plurality of degree values corresponding to the adjustable positioning angles are affixed, preferably printed, on one of the relatively adjustable parts, preferably printed thereon, and the other of the parts that are adjustable relative to one another comprises at least one opening through which the corresponding degree value of the set positioning angle can be read. This allows the scale to be easily integrated into the parts that are adjustable relative to one another without the need for additional components.

It may be advantageous for at least one of the parts that are adjustable relative to one another to be designed as a body having at least one contact surface, preferably two contact surfaces,

against which the blade can be held in contact as intended, wherein the two contact surfaces, in every position of the two parts that are adjustable relative to one another, preferably form different angles with a setup plane of the sharpening jig. This allows for an increased number of different positioning angles and expands the functionality of the sharpening jig.

Terms and Definitions

The positioning angle, as used in the present invention, refers to the angle at which the blade, in particular, the blade body, of the sharpening or polishing tool to be sharpened or polished is held, during the intended use of the sharpening jig according to the invention, relative to a plane oriented perpendicular to the support surface (setup plane), in particular the sharpening plane. During intended use, the sharpening jig is positioned in the intended configuration on a preferably flat, preferably horizontal support surface (setup plane), most preferably on the same surface on which the rolling grinder is moved. In addition, the (typically magnetic) blade is held (preferably magnetically) in contact with a contact surface of the sharpening jig, such that the blade is aligned parallel to this contact surface. Thus, the positioning angle generally corresponds to the sharpening angle.

Brief Description of the Drawings

The figures show:

Fig. 1: a perspective view of the top side of the sharpening jig 1.

Fig. 2: a perspective view of the lower surface of the sharpening jig 1, in which the parts that can be adjusted relative to one another, i.e., the slide 3 relative to the base body 2, are in a first position corresponding to a default position of the sharpening jig 1.

Fig. 3: A perspective view of the lower surface of the sharpening jig 1, in which the parts that can be adjusted relative to one another, i.e., the slide 3 relative to the base body 2, are in a second position, which corresponds to a intermediate position of the sharpening jig 1.

Fig. 4: A perspective view of the lower surface of the sharpening jig 1, in which the parts that can be adjusted relative to one another, i.e., the slide 3 relative to the base body 2, are in a second position corresponding to a maximum position of the sharpening jig 1.

Fig. 5: an exploded view of the parts that are adjustable relative to one another, i.e., the base body 2 and the slide 3.

Fig. 6: an exploded view of the slide 3 and the guide 4 from a first perspective.

Fig. 7: An exploded view of the slide 3 and the guide 4 from a second perspective.

Fig. 8: An exploded view of the sharpening jig 1 from a first perspective.

Fig. 9: An exploded view of the sharpening jig 1 from a second perspective.

Fig. 10: A side sectional view of the sharpening jig 1 in its default position.

Fig. 11 A side sectional view of the sharpening jig 1 in the maximum position.

Detailed Description of the Preferred Embodiments

The preferred embodiments of the present invention are described in detail below with reference to the accompanying figures.

As shown in Fig. 1, the sharpening jig 1 comprises an approximately cuboid base body 2 with two opposing contact surfaces that are inclined toward a setup plane AE of the sharpening jig 1, each of which is fitted with an elastic contact element 8. The base body 2 therefore has a trapezoidal cross-section in a cross-sectional plane that intersects the contact element 8 perpendicularly. The base body 2 may be made, in particular, of wood and/or metal and/or plastic. Preferably, the base body 2 is a die-cast part.

Each of the elastic contact elements 8 is designed to serve as a contact surface for the blade of a cutting tool. When the sharpening jig 1 is used as intended, the blade is attracted by one or more magnets 9 (not shown in Fig. 1; see instead Figs. 8 and 9), which are located behind the respective contact element 8, and lies flat against the contact element. The contact element is an elastomer with high adhesive force.

As shown in Figs. 2 through 4, the base body 2 has an opening 2a in which a slide 3 is housed. The slide 3 can be adjusted relative to the base body 2 along a curved path by applying pressure or pulling on the slide 3. For this purpose, the slide 3 has an actuation section 3a in the form of ribs on its lower surface. A user can manually apply pressure or pull to the actuation section 3a, particularly with the thumb, and thereby adjust the slide 3 relative to the base body 2.

The slide 3 is adjustable in steps relative to the base body 2, allowing it to assume several defined positions. Fig. 2 shows a first position of the slide 3, in which the slide 3 completely closes the opening 2a of the base body 2. That is, in the first position, the lower surface of the slide 3 is flush

with the lower surface of the base body 2. This first position of the slide 3 relative to the base body 2 corresponds to a default position of the sharpening jig 1. Fig. 3 shows a second position of the slide 3 relative to the base body 2, in which one end of the slide 3 protrudes from the opening 2a of the base body 2, that is, beyond the lower surface of the base body 2, and the opposite end of the slide 3 extends into the opening 2a of the base body 2. This second position of the slide 3 relative to the base body 2 corresponds to an intermediate position of the sharpening jig 1. Finally, Fig. 3 shows a third position of the slide 3 relative to the base body 2, in which one end of the slide 3 protrudes further from the opening 2a of the base body 2 than in Fig. 2, and the opposite end of the slide 3 extends further into the opening 2a of the base body 2a than in Fig. 2. This third position of the slide 3 relative to the base body 2 corresponds to the maximum position of the sharpening jig 1. The slide 3 may be made of wood and/or metal and/or plastic. In particular, the slide 3 may be made of the same material as the base body 2 or of a different material. Preferably, the slide 3 is a die-cast part.

If the sharpening jig 1 is positioned with its lower surface on the setup plane AE, which is preferably designed as a horizontal surface, the base body 2 can be oriented in a total of three positions relative to the setup plane AE, in accordance with the configuration described above. Fig. 10 shows a side sectional view of the sharpening jig 1 in the default position, i.e., in the first position of the slide 3 relative to the base body 2. Fig. 11 shows a side sectional view of the sharpening jig 1 in the maximum position, i.e., in the third position of the slide 3 relative to the base body 2. Because the two opposing contact surfaces of the base body 2, each of which has an elastic contact element 8 attached, form different angles with the plane of the lower surface of the base body 2, the described sharpening jig 1 can provide a total of six different positioning angles (sharpening angles) α. In the described embodiment, the possible positioning angles α are 10°, 13°, 15°, 20°, 22°, and 25°. The sharpening jig 1 is configured such that, on the opposite contact sides of the base body 2, the positioning angles α of 15° and 20° are formed in the default position, the positioning angles α of 13° and 22° are formed in the intermediate position, and the positioning angles α of 10° and 25° are formed in the maximum position.

To position the sharpening jig 1 on the setup plane AE, support feet 7 are attached to the lower surface of the sharpening jig 1. The support feet 7 are designed as elongated elastic elements, with one support foot 7 attached to one end of the lower surface of the base body 2 and another support foot 7 attached to an opposite end of the lower surface of the slide 3. The support feet 7 are bonded to the base body 2 and the slide 3, respectively. Due to their elasticity, the support feet 7 prevent the sharpening jig 1 from slipping during the sharpening or polishing process.

Figures 5 through 9 are used below to describe the internal structure of the sharpening jig 1 and the operating principle of the slide's 3 adjustability relative to the base body 2.

The slide 3 is connected to the base body 2 via a guide 4. The guide 4 is an elongated plastic element. In particular, the guide 4 may be an injection-molded part. The guide 4 is secured in the opening 2a of the base body 2 by means of fasteners 10, such as a screw, using either a form-fit and/or a force-fit connection. The screw can be used, for example, to press the guide 4 against contact surfaces provided in the opening 2a. To do this, the screw is screwed into the base body 2 and exerts an oblique pressure on one side of the guide 4. The screw can be secured in the base body 2 using adhesive.

The guide 4 comprises two separate guide settings 4a, each of which is formed as an elongated hole extending along a curved path, in particular a circular arc. The two guide settings 4a are arranged one behind the other along the curved path. The slide 3a comprises a base plate, one side of which forms the lower surface of the slide 3, and two walls 3b arranged perpendicular to and opposite one another on the other side of the base plate. The walls 3b are spaced apart from one another so that they can accommodate the guide 4 between them. Furthermore, the walls 3b each have two through-holes. When the slide 3 is mounted in the base body 2, guide elements 5, specifically guide pins, are inserted into the through-holes of the walls 3b, with each guide element 5 also protruding through a corresponding guide setting 4a in the guide 4 located between the walls 3b. The slide 3 can thus be adjusted in a guided motion along the guide 4, since the guide elements 5 connected to the slide 3 are guided by the guide settings 4a of the guide 4. For this purpose, a transition fit is preferably formed between each guide element 5 and the corresponding guide setting 4a.

The guide 4 features three locking recesses 4b with a curved profile in a surface that runs parallel to the guide settings 4a and faces the base plate of the slide 3. On the other side, the base plate of the slide 3 accommodates two adjacent spring pressure pieces 6, whose ball heads protrude beyond the base plate of the slide 3. The ball heads of the spring pressure pieces 6 are preloaded against the guide 4 and engage in the corresponding locking recess 4b in the first, second, and third positions of the slide 3 relative to the base body 2, thereby locking the set position of the slide 3 with respect to the base body 2. When pressure or tension exceeding a certain threshold is applied to the slide 3 in a direction in which adjustment is possible, the locking mechanism is released, as the ball heads of the spring pressure pieces 6 slide along the curved profile of the locking recess 4b and are pushed back against the preload until they finally leave one locking recess 4b and engage in another locking recess 4b.

In the default position and in the maximum position of the sharpening jig 1, adjustment is possible in only one direction in each case. In these two positions, the guide settings 4a serve as end stops for the guide elements 5. This means that in these two positions, adjustment of the slide 3 relative to the base body 2 is prevented in one direction in each case (see Figs. 10 and 11).

Sharpening jig 1 features a scale 11 for reading the degree value of the set positioning angle α. For this purpose, several degree values corresponding to the adjustable positioning angles α are printed or engraved on the surface of the guide 4, which also incorporates the locking recesses 4b. In the specific embodiment, three degree values (10°, 13°, 15°) are provided on one side of the locking recesses 4b, and three degree values (20°, 22°, 25°) are provided on the other side of the locking recesses 4b. The slide 3 has two openings 3c in its base plate, which are spaced apart from one another such that one of the openings 3c is located near one contact side of the base body 2 and the other of the openings 3c is located near the other contact side of the base body 2. The positioning angle α, which is set at the respective contact side of the base body 2 by the position of the slide 3 relative to the base body 2, is indicated in the opening 3c located near the relevant contact side.

Figures 8 and 9 also show that the elastic contact element 8 is mounted on the respective contact side of the base body 2 via a carrier 12. To this end, the elastic contact element 8 is secured to one side of the carrier 12, and the other side of the carrier 12 is connected to the base body 2. For this purpose, the carrier 12 comprises two connecting sections that are formed as cylindrical sleeves and are press-fitted into recesses 2b in the contact side of the base body 2. To increase the connection strength, the connecting sections may feature a locking toothing on their outer circumference. An inner contour of the connecting sections serves as a magnet reception. That is, the carrier 12 can accommodate one or more magnets 9, which generate the magnetic force required to attract the blade to the contact surface. With this configuration, when the carrier 12 is mounted, the magnets 9 are positioned in the receiving openings 2b of the base body 2.

In the described embodiment, the sharpening jig 1 can assume three defined positions (default position, intermediate position, maximum position), whereby a total of six different positioning angles can be achieved due to the differently inclined contact surfaces of the base body 2 relative to the lower surface of the base body 2. It goes without saying that the invention is not limited to three defined positions of the sharpening jig 1, and the sharpening jig 1 may also be configured to assume only two or more than three defined positions.

List of Reference Numerals

1	Sharpening jig
2	Base body
2a	Opening
2b	Carrier reception
3	Slide
3a	Actuation section
3b	Wall
3c	Opening
4	Guide
4a	Guide setting
4b	Locking recess
5	Guide element (guide pin)
6	Spring pressure piece
7	Support foot
8	Elastic contact element
9	Magnet
10	Fastener (screw)
11	Scale
12	Carrier
AE	Setup plane of the sharpening jig

Claims

1. Sharpening jig (1), in particular for holding a cutting tool with a blade that is to be sharpened or polished, and for positioning the blade in at least one positioning angle (α) relative to a sharpening and/or polishing tool such as a rolling grinder, wherein the sharpening jig (1) comprises at least two parts (2, 3) that are adjustable relative to one another to set different positioning angles (α), **characterized in** that the two parts (2, 3) are adjustable relative to one another along a curved path.

2. The sharpening jig (1) according to the preceding claim, **characterized in** that the curved path lies in a plane oriented perpendicular to the setup plane (AE) of the sharpening jig (1).

3. The sharpening jig (1) according to one of the preceding claims, **characterized in** that the curved path is a circular arc.

4. The sharpening jig (1) according to one of the preceding claims, **characterized** in that the parts (2, 3), which are adjustable relative to one another, can be adjusted in steps between different positions.

5. The sharpening jig (1) according to one of the preceding claims, **characterized** in that the parts (2, 3) that are adjustable relative to one another can be locked in different, preferably three, positions, in particular by friction-fit and/or form-fit, preferably with a detent mechanism.

6. The sharpening jig (1) according to one of the preceding claims, **characterized** in that the sharpening jig (1) comprises a guide (4) for moving the parts (2, 3) that are adjustable relative to one another in a guided manner between different positions.

7. The sharpening jig (1) according to the preceding claim, **characterized** in that the guide (4) is fixedly connected to one of the parts (2, 3) that are adjustable relative to one another and comprises at least one guide setting (4a), and the other of the parts (2, 3) that are adjustable relative to one another comprises a guide element (5), preferably a guide pin, which engages with the guide setting (4a), preferably forming a transition fit.

8. The sharpening jig (1) according to one of the preceding claims, **characterized** in that the relatively adjustable parts (2, 3) are resiliently biased against one another, preferably into a locked state relative to one another, wherein the locked state can preferably be released by reducing or eliminating the resilient bias, such that the parts (2, 3) are adjustable relative to one another.

9. The sharpening jig (1) according to the preceding claim, **characterized** in that the sharpening jig (1) comprises at least one spring pressure piece (6) for generating the spring-loaded preload between the parts (2, 3), wherein the spring pressure piece (6) is preferably connected to one of the relatively adjustable parts (2, 3) and engages in a locking recess (4b) in the other of the relatively adjustable parts (2, 3) to create a locked state.

10. The sharpening jig (1) according to any one of the preceding claims, **characterized** in that at least one of the relatively adjustable parts (2, 3) comprises an actuation section (3a) that a user can actuate, preferably manually, in particular by applying pressure or tension, to adjust the parts (2, 3) relative to one another.

11. The sharpening jig (1) according to any of the preceding claims, **characterized** in that one of the parts (2, 3) that are adjustable relative to one another is received in an opening (2a) of the other part, wherein the two parts (2, 3) can preferably assume a position in which one part (3) completely closes the opening (2a) of the other part (2), and/or can assume a position in which one part (3) protrudes, at least in sections, from the opening (2a) of the other part (2).

12. The sharpening jig (1) according to any one of the preceding claims, **characterized** in that the sharpening jig (1) comprises at least a first support foot (7) attached to one of the parts (2, 3) that are adjustable relative to one another, and at least a second support foot (7), which is attached to the other of the parts (2, 3) that are adjustable relative to one another.

13. The sharpening jig (1) according to one of the preceding claims, **characterized in** that the sharpening jig (1) comprises a scale (11) for reading the degree value of the set positioning angle (α).

14. The sharpening jig (1) according to the preceding claim, **characterized** in that a plurality of degree values corresponding to the adjustable positioning angles (α) are affixed, preferably printed, on one of the relatively adjustable parts (2, 3), preferably printed thereon, and the other of the parts (2, 3) that are adjustable relative to one another comprises at least one opening (3c) through which the corresponding degree value of the set positioning angle (α) can be read.

15. The sharpening jig (1) according to one of the preceding claims, **characterized in** that at least one of the parts (2, 3) is designed as a body (2) having at least one contact surface, preferably two contact surfaces, against which the blade (2a) can be held in contact as intended, wherein the two contact surfaces, in every position of the two parts (2, 3) that are adjustable relative to one another, preferably form different angles with a setup plane (AE) of the sharpening jig (1).