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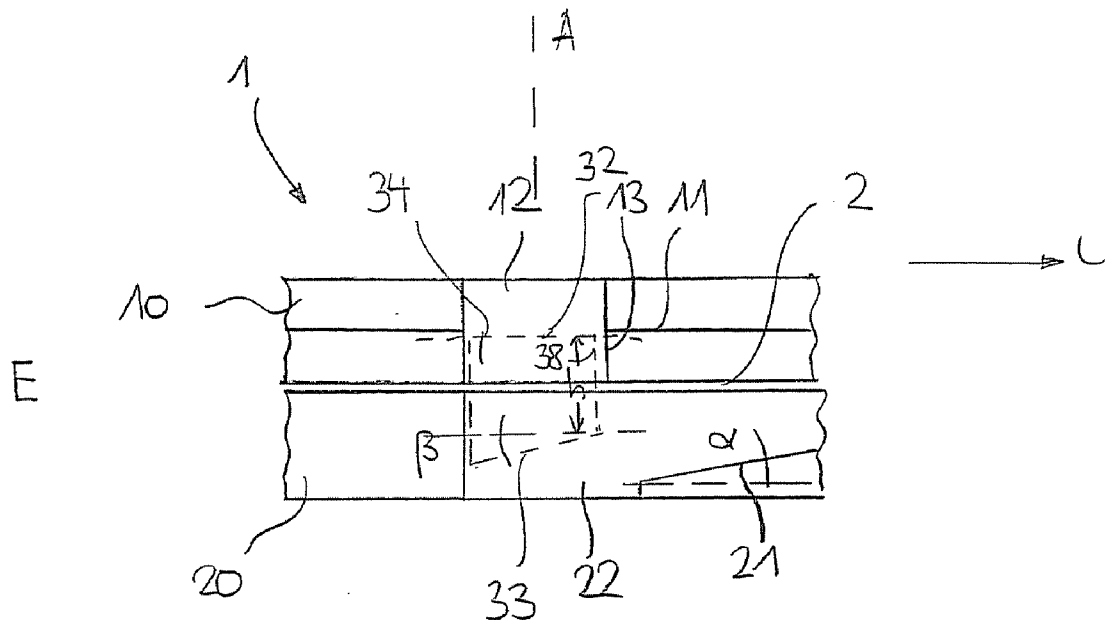
(19) **United States**(12) **Patent Application Publication**  
**Mueller et al.**(10) **Pub. No.: US 2008/0248733 A1**(43) **Pub. Date: Oct. 9, 2008**(54) **HOLDING FIXTURE FOR A GRINDING  
TOOL, GRINDING TOOL AND SUPPORTING  
BODY FOR A GRINDING TOOL**(75) Inventors: **Patrick Mueller**, Huettwilten (CH);  
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**B24B 41/00** (2006.01)(52) **U.S. Cl.** ..... **451/340**(57) **ABSTRACT**

A holding fixture (1) for a grinding tool (30) is comprised, in essence, of a first tension plate (10) and a second tension plate (20). The first tension plate (10) can rotate relative to the second tension plate (20) about an axis (A). The first tension plate (10) comprises a first bearing surface (11) and the second tension plate (20) has a second bearing surface (21). A supporting body (31) can be clamped firmly with a first and a second contact surface (32, 33) between the bearing surfaces (11, 21). An angle ( $\alpha$ ,  $\beta$ ) is formed between the first and the second bearing surface (11, 12) of the holding fixture (1) and/or between the first and the second contact surface (32, 33) of the supporting body (31).



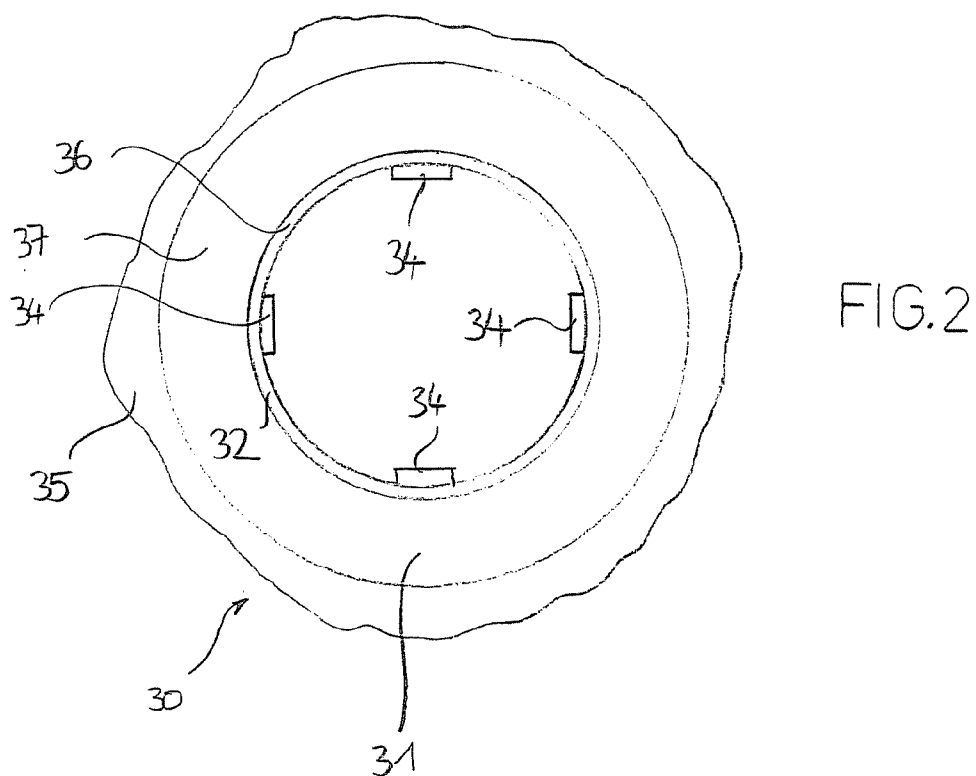
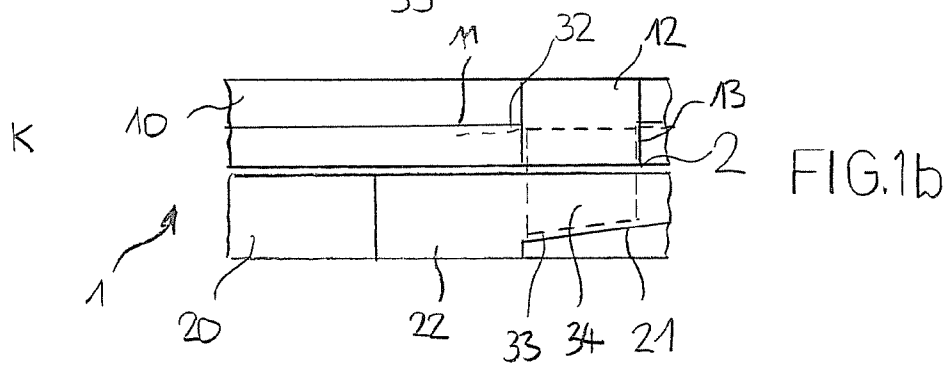
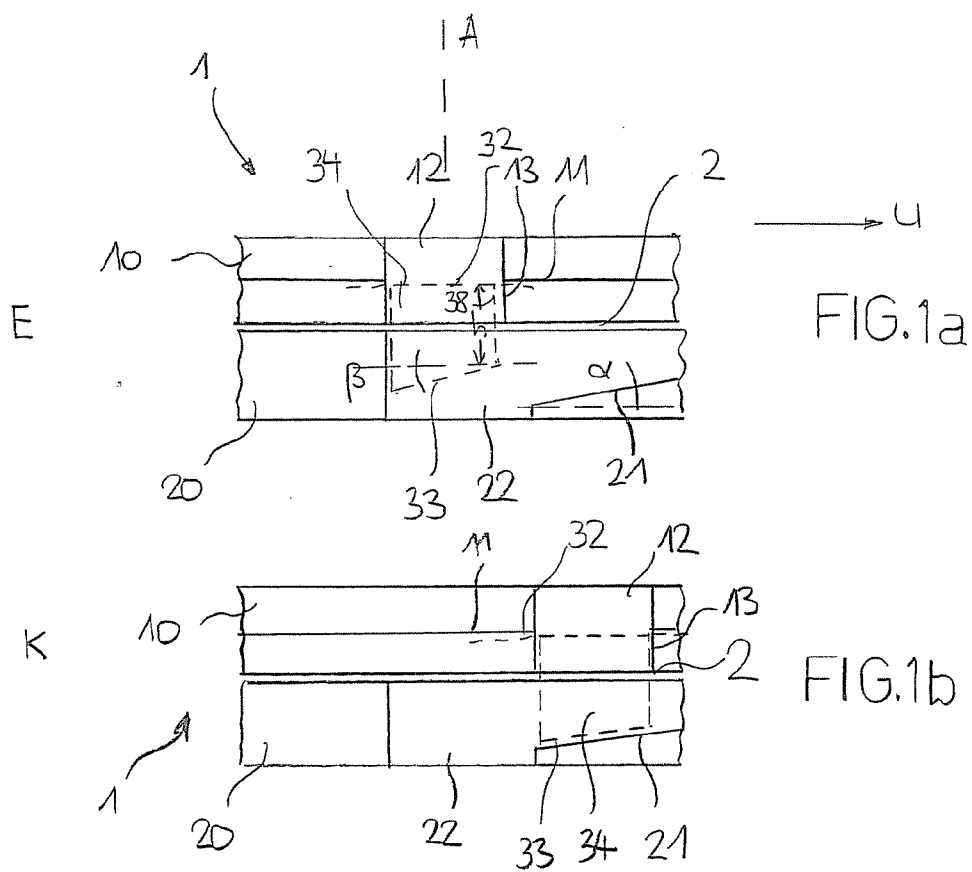


FIG. 3

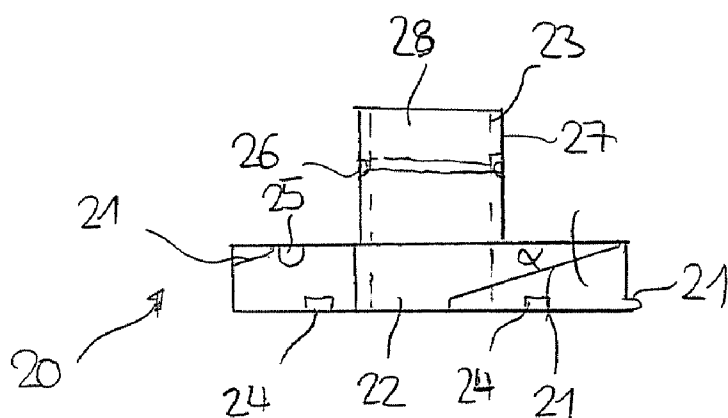
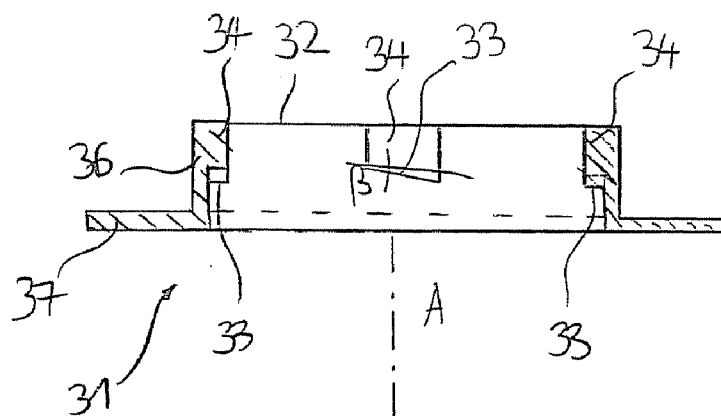


FIG. 4a

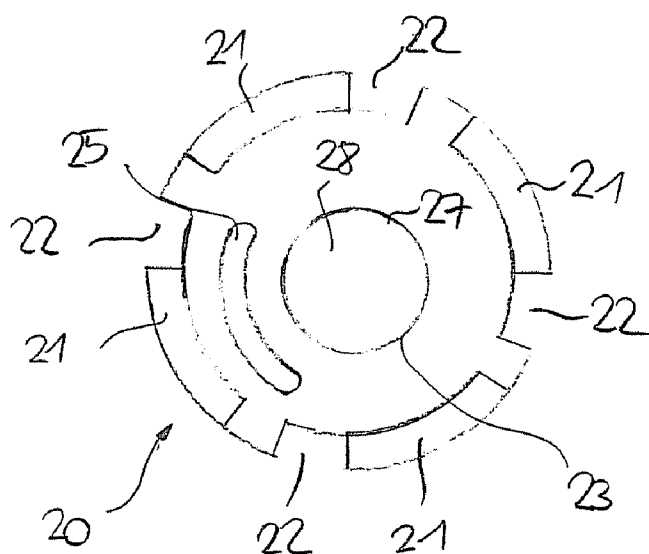


FIG. 4b

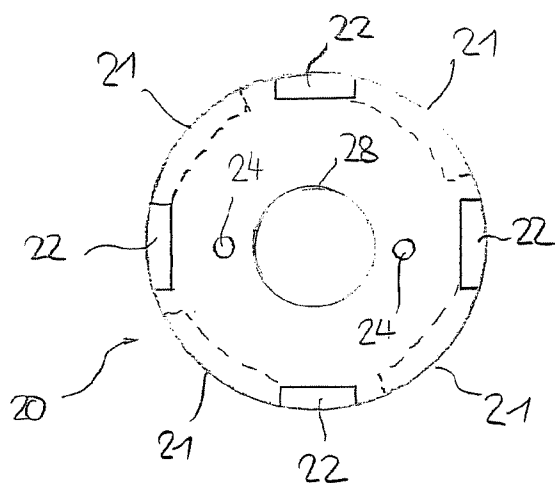


FIG. 4c

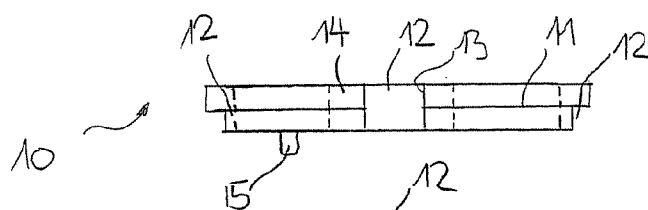


FIG. 5a

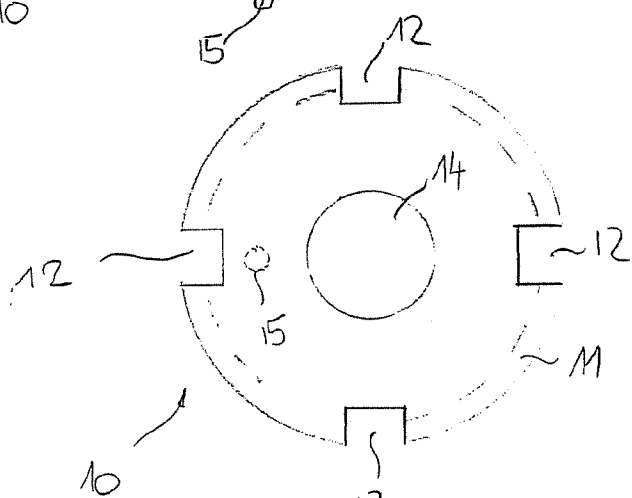


FIG. 5b

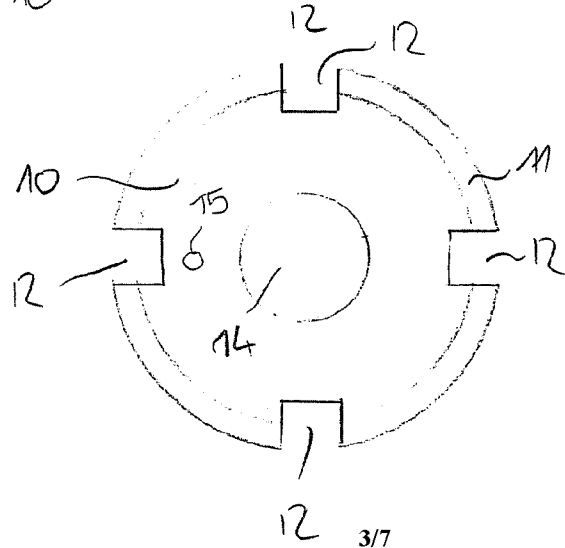


FIG. 5c

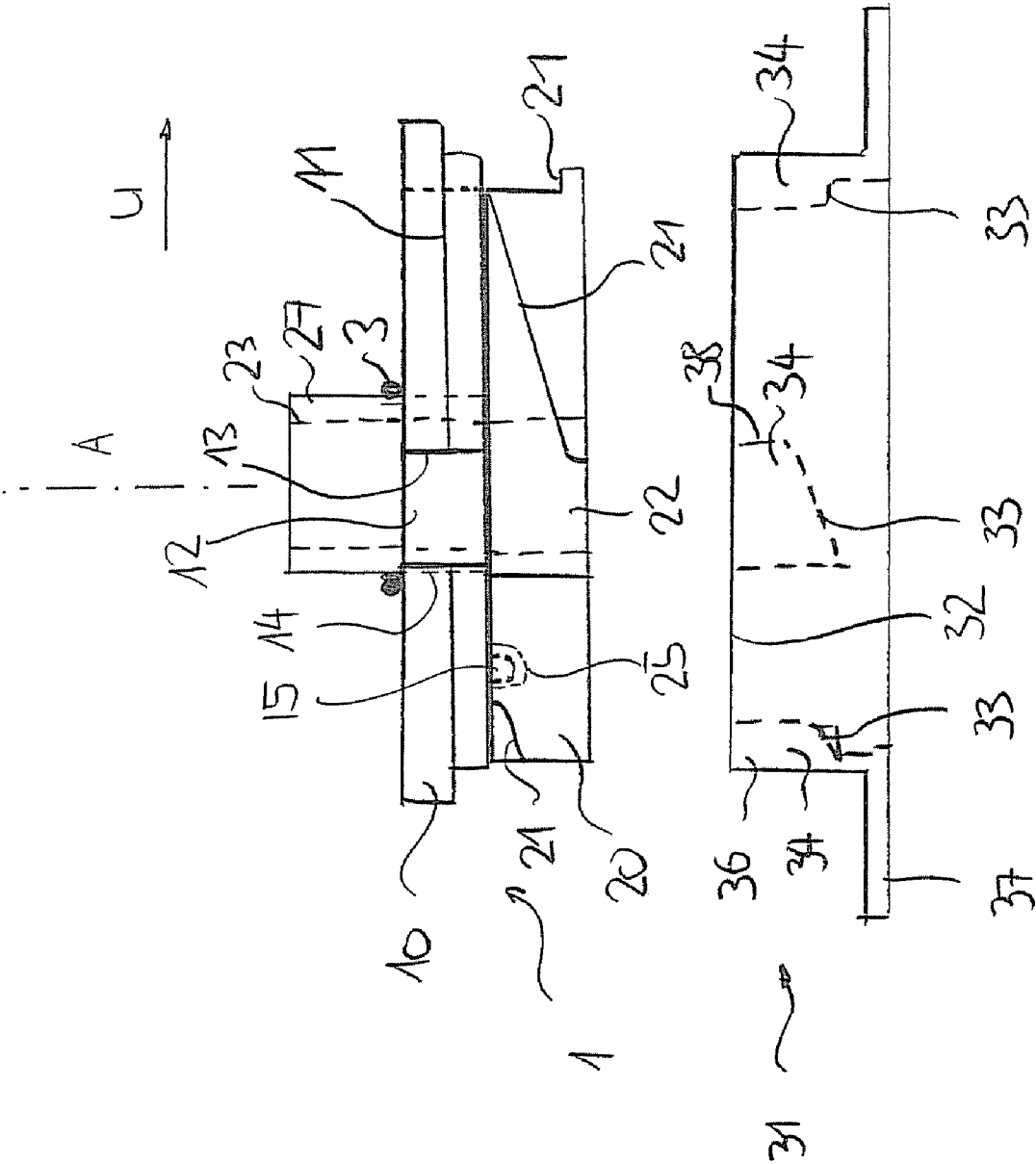


FIG. 6

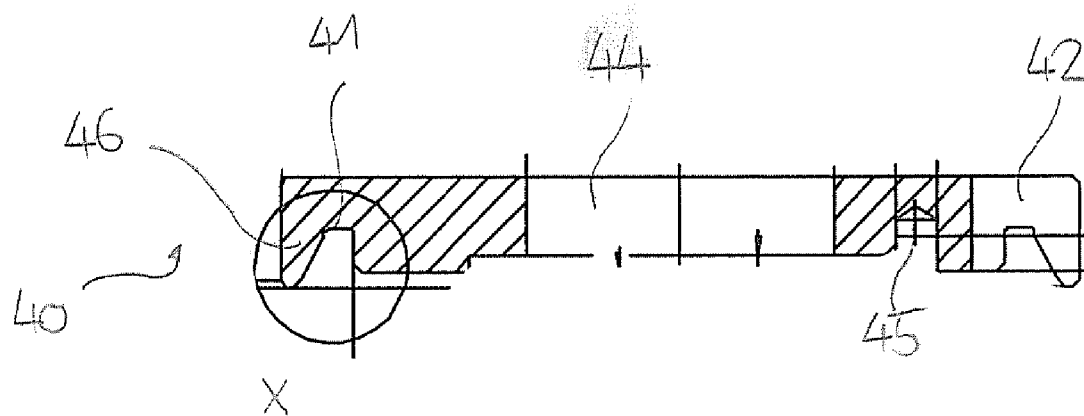


FIG. 7a

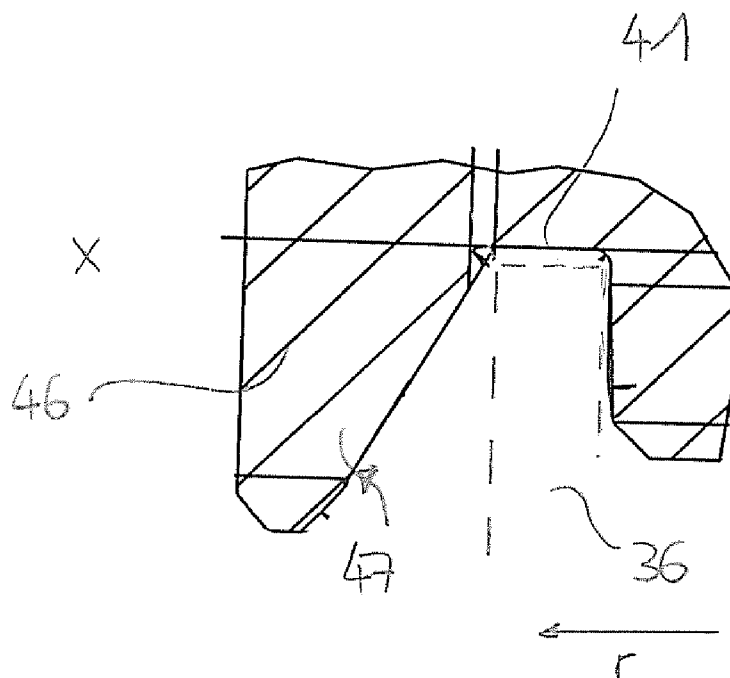


FIG. 7b

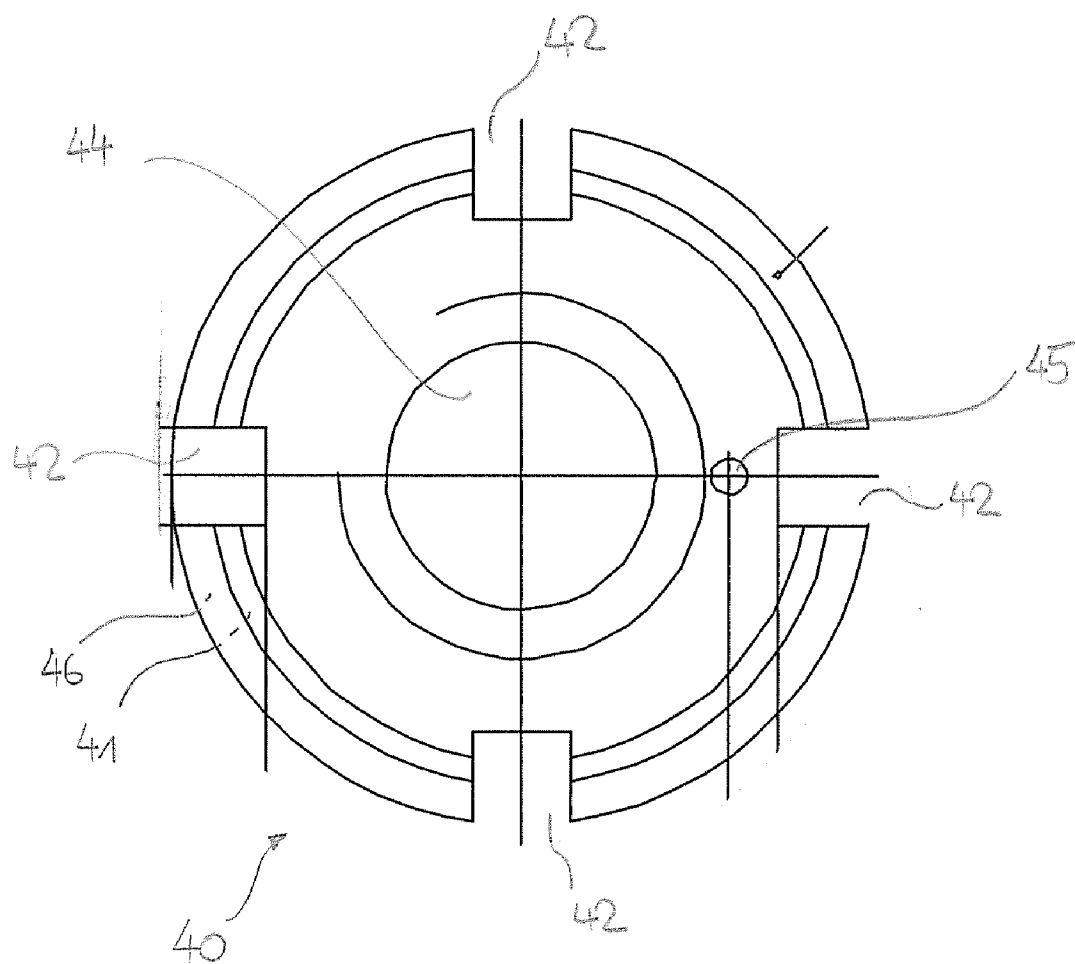
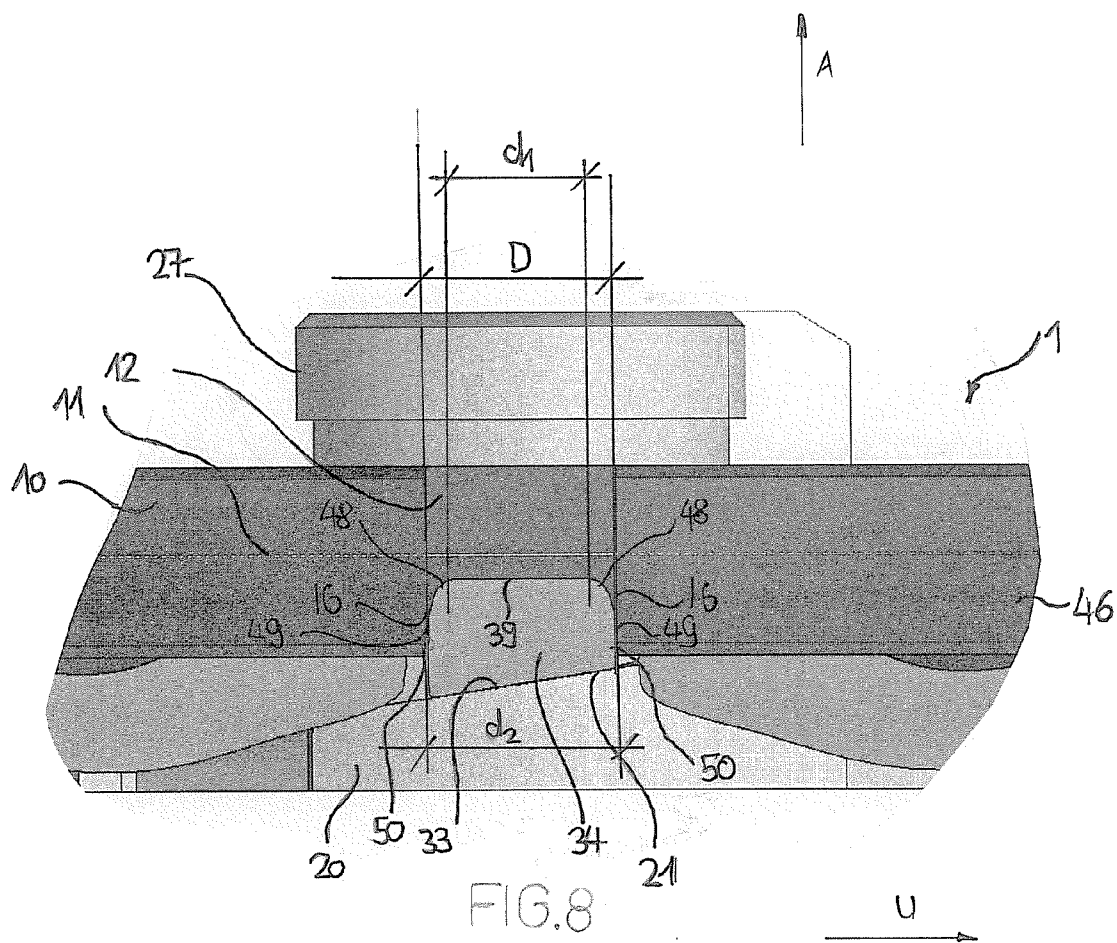


FIG. 7c



# **HOLDING FIXTURE FOR A GRINDING TOOL, GRINDING TOOL AND SUPPORTING BODY FOR A GRINDING TOOL**

**[0001]** The invention relates to a holding fixture for a grinding tool, to a grinding tool and to a supporting body for a grinding tool of said type, having the features of the preamble of the independent patent claims.

**[0002]** Rotating machine grinding tools are nowadays known and used in a multiplicity of different embodiments. Different shapes or types of grinding or polishing tools are used depending on the application. It is therefore desired, primarily in applications in which frequent tool changes are necessary, to provide the simplest possible means by which a grinding tool can be connected to a machine and removed again from the latter. A grinding tool and a holding fixture are presented for example in EP 1 050 377 A2 or in EP 1 174 219 A2. Said tools and holding fixture permit simple connection of the tool to a rotating machine part. However, in said known solution, the fastening of the grinding tool in the holding fixture requires the tightening of a clamping screw.

**[0003]** It is therefore an object of the present invention to avoid the disadvantages of the known solutions, in particular to further develop the grinding tools and holding fixtures known from EP 1 050 377 A2 and EP 1 174 219 A2. It is intended in particular to further simplify handling. At the same time, the stability of the connection between the holding fixture and the grinding tool should be further improved.

**[0004]** According to the invention, said objects are achieved with a holding fixture for a grinding tool, a grinding tool and a supporting body having the features of the characterizing part of the independent patent claims.

**[0005]** The holding fixture according to the invention for a grinding tool is substantially composed of a first and a second clamping disk. The first clamping disk is arranged so as to be rotatable about an axis relative to the second clamping disk. Here, the first clamping disk can be turned toward a machine to which the holding fixture is or should be fastened. The second clamping disk can be turned toward the workpiece to be machined. The first clamping disk has a first bearing face for a first contact face of a supporting body of the grinding tool. The second clamping disk has a second bearing face for a second contact face of the supporting body of the grinding tool. According to the invention, the first and second bearing faces of the holding fixture run at an angle with respect to one another. As a result, by rotating the first clamping disk relative to the second clamping disk, the supporting body can be firmly clamped between the bearing faces. The inclined bearing faces delimit a wedge-shaped intermediate space. By rotating the two disks relative to one another, the supporting body is wedged. It is possible to obtain various advantages in this way. In particular, it is possible to generate a clamping action by means of a simple rotation of the clamping disks relative to one another. The tightening of screws as in the prior art is not necessary.

**[0006]** According to one preferred embodiment, the second clamping disk is provided, at its periphery, with at least one groove. The at least one groove serves for holding a holding element of the conventionally annular supporting body. Through the groove, the holding element of the supporting body can be placed into an intermediate space which are defined by the first and the second bearing face of the first and

second clamping disks. A groove of said type permits particularly simple insertion of the grinding tool.

**[0007]** According to a further preferred embodiment of the invention, the first clamping disk is also provided with a groove. Said groove can be aligned with the groove of the second clamping disk. The groove of the first clamping disk extends at least as far as the first bearing face of the first clamping disk. As described below, a groove of said type on the first clamping disk permits particularly simple rotation of the clamping disks relative to one another once a projection on the supporting body comes into engagement with the groove on the first clamping disk.

**[0008]** For this purpose, the groove of the first clamping disk has, typically in the circumferential direction, an engagement face. When the holding element of the supporting body of the grinding tool engages on said engagement face, the first clamping disk can be co-rotated by rotating the supporting body or by rotating the grinding means which is connected to the supporting body. Tools for clamping are therefore not strictly necessary. The rotation takes place here counter to the rotational direction of the machine. The operation of the machine further intensifies the wedging action.

**[0009]** According to a further preferred embodiment, a plurality of, preferably four, grooves are arranged so as to be distributed uniformly over the periphery of the holding fixture. The number of grooves defines the number of possible projections or cams on a supporting body for fastening. In particular when using relatively flexible grinding means which should adapt to the surface to be machined, it is important that the supporting body itself can be fastened in a precisely defined position in the holding fixture. A plurality of grooves reduces deformations of the supporting body and therefore leads to better fastening and to better grinding results.

**[0010]** A further problem in the devices known for example from EP 1 050 377 A2 is their fastening to a machine drive. Said known holding fixtures are provided with clamping journals which firstly serve for holding the two clamping disks together and which are secondly provided for fastening to a machine drive. On account of the axial length of said clamping journal, however, the grinding tool projects relatively far below protective covers which are provided on the machine if necessary.

**[0011]** For this reason, according to a further aspect of the invention, the holding fixture is designed such that one of the clamping disks, in particular the second clamping disk, is provided with a threaded bore, by means of which said second clamping disk can be connected to a machine drive. It is possible in particular for the second clamping disk to be provided with a journal in which a threaded bore is provided and which extends through the second clamping disk. The first clamping disk can be provided with an opening through which the journal can extend. In this way, it is on the one hand possible for the length of the fastening to a machine to be shortened. At the same time, it is also possible in this way for the two clamping disks to be connected to one another in a particularly simple manner. A screw connection is not necessary because, on account of the inclined bearing faces, the required clamping action can be obtained by means of simple rotation of the two clamping disks in the circumferential direction without an axial feed movement between the clamping disks. While such a connection of the holding fixture is particularly preferable in connection with the above-described arrangement of the contact faces, such a fastening of

the holding fixture can also advantageously be used with non-wedge-shaped faces for fastening the supporting body.

**[0012]** In order to insert a supporting body into the holding fixture, it is firstly necessary for grooves on the first and on the second clamping disk to be aligned axially with one another. In order to simplify said alignment, according to a further preferred exemplary embodiment of the invention, means are also provided in order to restrict the rotational movement between the first and the second clamping disk to a predetermined angle range.

**[0013]** According to a further preferred exemplary embodiment, it is possible for one of the clamping disks, typically the second clamping disk, to also be provided with form-fitting elements which can be placed in engagement with a tool. If necessary, it is possible, with a tool, for the holding fixture to be sufficiently firmly screwed to a grinding machine by means of a tool.

**[0014]** According to a further preferred exemplary embodiment, the holding fixture can be provided with means for radially holding at least parts of the supporting body. It is possible in particular for the first clamping disk to be provided with a radially acting retaining face. Said radially acting retaining face can be placed in contact with the supporting body, in particular with a cylindrical ring of the supporting body. In this way, the supporting body is supported in the radial direction by means of the retaining face. A deformation or destruction of the supporting body in operation on account of centrifugal forces is thereby prevented. It is of course also conceivable to provide the second clamping disk with means for radially retaining the supporting body.

**[0015]** The grinding tool according to the invention is suitable in particular for being held in a holding fixture as described above. Reference is made here and below to a grinding tool. It is self-evident that the invention can be used equally for any type of rotating machining tool such as polishing tools, grinding tools or the like. The shape and type of grinding or polishing material is also not of particular significance within the context of the present invention.

**[0016]** The grinding tool according to the invention has a supporting body and a grinding means fastened to the supporting body. The supporting body has a holding element. The supporting body can be fastened in a holding fixture by means of the holding element. The holding element has a first contact face and a second contact face. By means of said contact faces, the supporting body can be firmly clamped between a first bearing face and a second bearing face of the holding fixture. According to the invention, the first and the second contact face run at an angle with respect to one another. In connection in particular with a holding fixture as described above with bearing faces which run at an angle with respect to one another, it is possible with a supporting body of said type to obtain a particularly stable areal connection.

**[0017]** According to one preferred embodiment of the invention, the holding elements are formed from at least one cam which projects radially inward from a lateral surface of the supporting body, typically from a plurality of cams. Here, the cams are preferably arranged asymmetrically on the supporting body as viewed in the axial direction. The arrangement is carried out such that the grinding tool can be fastened to the holding fixture only in a predetermined way, that is to say only with the grinding face aligned toward the workpiece to be machined. On account of said asymmetrical arrangement, it is ensured that a grinding tool cannot be fastened incorrectly. While such an arrangement is particularly pref-

erably used in connection with a supporting body with contact faces, as described above, which are at an angle with respect to one another, such an arrangement can also be used for other shapes of contact faces. In the case of tools which can be used in a double-sided fashion, it is also possible for a symmetrical arrangement of the cams to be provided, which permits assembly in both positions.

**[0018]** Here, the cams advantageously have, in the axial direction, a dimension which is such that, with correct positioning of the grinding tool, the cams can be placed in engagement with a groove of a first clamping disk which faces toward a machine, and such that, in the event of incorrect positioning of the grinding tool, the cams on the supporting body cannot be placed in engagement with said groove. As a result of the engagement, in the event of correct positioning, it is possible by rotating the grinding tool for the first clamping disk to be co-rotated relative to the second clamping disk. Because the second clamping disk is firmly held (in particular by firmly holding the machine drive), it is possible by rotating the grinding tool for the supporting body of the grinding tool to be firmly clamped in a holding fixture as described above in a particularly simple manner.

**[0019]** The supporting body is particularly preferably provided with four radially inwardly aligned cams. Here, the cams are preferably arranged such that the first contact face is formed by the upper side of a ring. The second contact face is formed by the underside of the cam, which runs at an angle with respect to the upper side. In this way, it is possible in a particularly simple manner to produce a supporting body which can be used with the holding fixture described above.

**[0020]** It is also preferable for the first and second contact face on the holding element of the supporting body to be designed such that the supporting body can, by being rotated in the circumferential direction while firmly holding the holding fixture, be placed into a clamping position. In this way, no additional tools such as screws are necessary for fastening the tool.

**[0021]** According to a further preferred embodiment, the cam of the holding element is also designed so as to taper as viewed in the axial direction. At an end of the cam which can be turned toward the holding fixture for the grinding tool, the width of the cam as viewed in the circumferential direction is smaller than on that side of the cam which faces away from the holding fixture, that is to say that side of the cam which has the second contact face. In this way, the cam can be inserted in a particularly simple manner into the groove of a holding fixture.

**[0022]** Here, the dimensions are preferably selected such that the narrower side of the cam has a smaller width, and that the wider side of the cam has greater width, than the width of the groove in the holding fixture. In this way, punctiform contact is obtained between the side faces of the cam and the lateral delimiting faces of the groove. The grinding tool is thereby stabilized in the holding fixture even more effectively. In order to insert the grinding tool into the holding fixture, it is desirable for a certain degree of play to be provided between the cams and the grooves. With the tapering design of the cams, it is possible to obtain play despite the fact that, in the inserted position, the cam is held in the holding fixture without play both in the axial direction and also in the circumferential direction. In particular if a plurality of, for example four, cams are arranged uniformly over the periphery, it is possible in this way, in the fastened position, to

prevent play between the holding fixture and the grinding tool relative to the axis of the arrangement.

**[0023]** While the invention has been explained above in terms of grooves on a holding fixture and cams on a supporting body, it is self-evident that similarly-shaped grooves on a supporting body of the grinding tool and cams on a corresponding holding fixture could also be used in the sense of a kinematic reversal. By rotating cams on the first disk relative to the cams on the second disk, it is possible for the cams to be wedged in the groove of the supporting body.

**[0024]** A further aspect of the invention relates to a supporting body for a grinding tool. The supporting body has at least one holding element, by means of which it can be fastened in a holding fixture. The holding element has a first and a second contact face. By means of said contact faces, the supporting body can be firmly clamped between a first and a second bearing face of a holding fixture. According to the invention, the contact faces of the holding element run at an angle with respect to one another.

**[0025]** The invention is explained in more detail in exemplary embodiments and on the basis of the drawings, in which:

**[0026]** FIG. 1a is an illustration of a detail of grooves and cams of a holding fixture according to the invention and of a supporting body according to the invention in an insertion position,

**[0027]** FIG. 1b is an illustration of a detail of grooves and cams of a holding fixture according to the invention and of a supporting body according to the invention in a clamping position,

**[0028]** FIG. 2 shows a plan view of a grinding tool according to the invention,

**[0029]** FIG. 3 shows a side view of a supporting body in section through a plane through a rotational axis,

**[0030]** FIG. 4a shows a side view of a second clamping disk,

**[0031]** FIG. 4b shows a plan view of the clamping disk from FIG. 4a,

**[0032]** FIG. 4c shows a view of the clamping disk as per FIG. 4a from below,

**[0033]** FIG. 5a shows a side view of a first clamping disk,

**[0034]** FIG. 5b shows a plan view of the clamping disk as per FIG. 5a,

**[0035]** FIG. 5c shows a view of the clamping disk as per FIG. 5a from below,

**[0036]** FIG. 6 shows a side view of a supporting body and of a holding fixture for holding the supporting body,

**[0037]** FIG. 7a to 7b are various illustrations of a first clamping disk of an alternative exemplary embodiment of the invention, and

**[0038]** FIG. 8 is a schematic illustration of a further preferred exemplary embodiment of the invention in a side view.

**[0039]** FIG. 1a shows, in an enlarged illustration, a detail of a holding fixture 1 for holding a grinding tool. Of the grinding tool, a cam 34 with a first contact face 32 and a second contact face 33 are shown only schematically by means of dashed lines. An angle  $\alpha$  is formed between the first contact face 32 and the second contact face 33. The angle  $\beta$  is typically approximately  $10^\circ$ .

**[0040]** The holding fixture 1 is substantially composed of a first clamping disk 10 and a second clamping disk 20, of which in each case only a detail is shown. The first clamping disk 10 is provided at its periphery (see also FIG. 5a, 5b and 5c) with an encircling first bearing face 11. The first bearing

face 11 is interrupted by a groove 12. The second clamping disk 20 is provided with a second bearing face 21. The latter is arranged at an angle  $\alpha$  relative to the first contact face. An intermediate space 2 formed between the first bearing face 11 and the second bearing face 21 for holding the cam 34 can be accessed by the cam 34 through a groove 22 on the periphery of the second clamping disk 20. FIG. 1a shows the cam 34 in an insertion position E. In the insertion position E, the groove 12 is aligned with the groove 22 in the axial direction A such that the cam 34 can be inserted from below. The cam 34 is of course not to be considered in isolation but rather as being fastened to a supporting body. The construction of the supporting body is shown in more detail below on the basis of FIGS. 2 and 3.

**[0041]** In order to clamp the cam 34 between the first and second bearing faces 11, 21, the first clamping disk 10 is rotated in the circumferential direction U relative to the second clamping disk 20. For this purpose, the cam 34 engages with a peripheral contact face 38 on an engagement face 13 on the first clamping disk 10. If the second clamping disk 20 is held firm and a grinding tool which has the cam 34 is rotated in the circumferential direction U, the first clamping plate 10 rotates together with the cam 34 into the clamping position K shown in FIG. 1b. In order that engagement between the peripheral contact face 38 and the engagement face 13 is possible, the cam 34 must be designed to be sufficiently long in the axial direction A. The height h of the cam 34 in the region of the peripheral contact face 38 must therefore be at least large enough that, when the grinding tool is correctly inserted, the cam 34 extends into the groove 12 of the first clamping disk. If the cam 34 is fastened asymmetrically to the supporting body as viewed in the axial direction (in this regard, see also FIGS. 2 and 3), then with suitable selection of the height h of the cam 34, engagement can occur only when the grinding tool is correctly positioned. In this way, it is prevented that the grinding tool is mounted with the grinding face aligned toward the grinding machine.

**[0042]** In the clamping position K as per FIG. 1b, the supporting body is clamped with its contact faces 32, 33 between the bearing faces 21, 11 of the second clamping disk 20 and of the first clamping disk 10. Here, a lower face of the cam 34 is the second contact face 33. An upper contact face 32 of the only partially illustrated ring of a supporting body (see FIGS. 2 and 3) forms the first contact face, which is in contact with the first bearing face 11 of the first clamping disk 10.

**[0043]** FIG. 2 shows a plan view of a grinding tool 30. The grinding tool 30 is substantially composed of a supporting body 31 and of a grinding means 35 (illustrated only schematically) which is fastened to the supporting body 31. The supporting body 31 is substantially composed of a cylindrical ring 3 to which a flange 37 is fastened. Provided on the inner side of the cylindrical ring 36 are four radially inwardly projecting cams 34 which are arranged uniformly over the periphery of the ring 36 at intervals of  $90^\circ$ . The upper side of the ring forms a first contact face 32 which can be placed in contact with the first bearing face 11 of the first clamping disk 10.

**[0044]** FIG. 3 shows a section through a central axis of the supporting body 31. It can be seen from FIG. 3 that the second contact face 33 on the underside of the cam 34 runs at an angle  $\beta$  with respect to the first contact face 32 formed by the upper edge of the ring 36.

**[0045]** Here, the cam 34 is of geometrically simple construction and has a substantially trapezoidal shape as viewed

from above. Two side faces which run in the axial direction delimit the cam **34** at the sides. In the axial direction, the cam **34** is delimited at one side by a first stop face **32** which runs flush with the upper side of the ring **36** and at the other side by a second stop face **33** which runs at an angle  $\gamma$  with respect to the upper side of the ring **36**. The stop faces run in each case in a plane, so that by means of a rotation in the circumferential direction, the supporting body can be inserted into the holding fixture.

[0046] The cam **34** is arranged asymmetrically with respect to the ring **36** in the axial direction A. The cam **34** is, on the upper side in FIG. 3, flush with the first contact face **32**. The second contact face **33** is however arranged with a spacing to the lower end of the supporting body **31** in FIG. 3. The positioning of the supporting body in the holding fixture according to the invention is precisely defined on account of said arrangement and also on account of the inclined arrangement of the second contact face **33**. Fastening with the flange **37** aligned toward the grinding machine is not possible.

[0047] The angle  $\beta$  is selected as a function of a corresponding angle  $\alpha$  on the holding fixture such that the desired clamping action can be obtained by means of a rotation. The angle  $\beta$  is typically approximately  $10^\circ$ . Certain deviations are however also conceivable.

[0048] The holding fixture **1** formed from a first clamping disk **10** and a second clamping disk **20** is described in more detail in FIGS. 4a to 4c, 5a to 5c and 6.

[0049] FIG. 4a shows a side view of the second clamping disk **20**. The second clamping disk **20** is embodied substantially as a disk which is integrally provided on its upper side with a journal **27**. The journal **27** is provided with a bore **28** with a thread **23** which extends downward through the clamping disk **20**. Along its periphery, the clamping disk **20** is provided with grooves **22** and also with a second bearing face **21** which runs at an angle  $\alpha$  with respect to the first bearing face of a first clamping disk (see FIGS. 5a to 5c). As shown in the plan view of FIG. 4b, four second bearing faces **21** and four grooves **22** are arranged so as to be distributed uniformly over the periphery of the second clamping disk **20**.

[0050] A circular-segment-shaped depression **25** is provided on the surface of the clamping disk, the function of which will be explained in more detail below. The internal thread **23** serves for connecting the holding fixture to a shaft of a grinding machine. An encircling depression **26** is also arranged on the outer side of the journal **27**. A clamping ring for connecting the second clamping disk **20** to a first clamping disk (see also FIG. 6) can be arranged in the depression **26**.

[0051] FIG. 4c shows a view of the second clamping disk **20** from below. The bore **28** extends, as can be seen from FIG. 4c, through the entire body of the second clamping disk **20**. Depressions **24** are additionally provided on the underside of the second clamping disk **20**, which depressions **24** form form-fitting elements for a tool. With a rotary key, typically a key as is known for angle grinders, it is possible to generate an engagement with said depressions **24**. In this way, it is possible for the holding fixture **1** with a tool to be firmly screwed to a shaft of a grinding machine.

[0052] FIG. 5a shows, in a side view, a first clamping disk **10** which, together with the second clamping disk **20** shown in FIGS. 4a to 4c, forms a holding fixture **1** for a tool. The first clamping disk **10** is designed substantially as a disk. A first bearing face **11** is formed along the periphery thereof in the manner of a shoulder. Arranged over the periphery are four grooves **12**. The first clamping disk **10** is additionally pro-

vided with a central opening **14** which serves for holding the journal **27** of the second clamping disk **20**. On the lower side in FIG. 5a, the clamping disk **10** is also provided with a pin **15**. The pin **15** runs, when the holding fixture **1** is assembled, in the circular-ring-shaped depression **25** of the second clamping disk **20**. In this way, the possible rotational movement between the first clamping disk **10** and the second clamping disk **20** is limited to a predetermined angular range. The pin **15** is in particular arranged in relation to the position of the depression **25** such that, in the one extreme angular position, the grooves **12** of the first clamping disk **10** and the groove **22** of the second clamping disk **20** are aligned with one another axially, that is to say the holding fixture **1** is in the insertion position E. In the other axial extreme position, the holding fixture **1** is in the clamping position K shown in FIG. 1b.

[0053] FIG. 5b shows a plan view of the first clamping disk **10** shown in FIG. 5a. As can be seen from FIG. 5, the grooves **12** are arranged uniformly over the periphery of the first clamping disk **10**. Here, the grooves **12** are slightly deeper in the radial direction than the radial width of the first bearing face **11**.

[0054] FIG. 5c shows a view of the first clamping disk **10** from below.

[0055] The holding fixture **1** composed of the first clamping disk **10** and the second clamping disk **20** is shown in assembled form in FIG. 6. The same reference symbols denote identical parts to those in the preceding figures. The journal **27** of the second clamping disk **20** is guided through the opening **14** of the first clamping disk **10**. The first clamping disk **10** and the second clamping disk **20** are held together axially by means of a clamping ring **3** which is arranged in the annularly running depression **26** on the journal **27**. In this way, it is possible for the first clamping disk **10** and the second clamping disk **20** to rotate relative to one another in the circumferential direction U, so that the clamping disks **10**, **20** can be moved back and forth between the insertion position E and the clamping position K (see FIGS. 1a and 1b). A plate spring (not illustrated) can also create a preload between the first and the second clamping disks. It is also possible for a nut to be provided on an external thread of the shaft instead of a clamping ring **3**.

[0056] FIG. 6 also schematically shows the supporting body **31** in a side view. By means of a movement in the axial direction A, it is possible for the ring **36** to be pushed with its inner lateral surface over the outer lateral surface of the second clamping disk **20**. Here, the grooves **22** in the second clamping disk and the grooves **12** in the first clamping disk **10** allow the radially inwardly projecting cams **34** to be held on the ring **26**. Dimensions of the inner lateral surface of the ring **36** and of the outer lateral surface of the second clamping disk **20** and also the radial dimensions and dimensions in the circumferential direction of the grooves and cams are coordinated with one another here. The supporting body **31** is pushed onto the holding fixture **1** in the axial direction A until the first contact face **32** bears against the first bearing face **11**. Here, contact is at the same time generated between a peripheral contact face **38** of the cam **34** and the engagement face **13** of the groove **12** of the first clamping disk **10**. By rotating the supporting body **31** in the circumferential direction U while at the same time holding the second clamping disk **20** firm, for example on the journal **27**, the first clamping disk **10** is rotated into the clamping position K shown in FIG. 1b.

[0057] The first and second clamping disks 10, 20 are typically produced from a metallic material such as for example aluminum. The supporting body 31 is typically a plastic injection molded part.

[0058] The dimensions of the holding fixture and of the supporting body are dependent on the respective application. A holding fixture with a diameter of approximately 50 mm with four cams with a length in the circumferential direction of approximately 10 mm and a depth in the radial direction of approximately 3 mm has typically been well proven. The first and the second clamping disks 10, 20 are preferably composed here of plates which are 4 to 5 mm thick. As a connection to a shaft of a grinding machine, a journal 27 with an outer diameter of 20 mm and with an M14 internal thread is typically used. The supporting body 31 typically has a ring 36 with a wall thickness of 1 mm. The cams 34 typically have a thickness of 2 mm in the radial direction and a height of 5 mm in the axial direction. The clear inner diameter of the ring 36 of the supporting body 31 is adapted to the outer diameter of the holding fixture 1 and is typically 45 to 50 mm.

[0059] FIG. 7a shows an alternative exemplary embodiment of a first clamping disk 40 in cross section. The embodiment as per FIG. 7a is an alternative to the first clamping disk as per FIG. 5a. Like the clamping disk as per FIG. 5a, the first clamping disk 40 as per FIG. 7a has a central opening 44, a peripheral encircling stop face 41, and four grooves 42 which are arranged over the periphery of the first disk 40 (see also FIG. 7c). Similarly to FIG. 5a, a bore 45 serves for holding a pin. In contrast to the embodiment as per FIG. 5a, the first clamping disk 40 as per FIG. 7a is provided with an encircling collar 46. A detail X with the collar 46 is illustrated in an enlarged illustration in FIG. 7b. The collar 46 has a beveled retaining face 47. The retaining face 47 defines an approximately conical holding fixture. On account of the retaining face 47, a ring 36 (illustrated by dashed lines) of a supporting body is retained in the radial direction r. Forces which act in the radial direction r on the supporting body are absorbed by the retaining face 47. It is alternatively also conceivable to use conical rings instead of a cylindrical ring 36 of a supporting body.

[0060] FIG. 7c shows a plan view of the clamping disk 40 as per FIG. 7a. Four grooves 42 are arranged over the periphery so as to be spaced apart from one another by 90°, which grooves 42 serve for holding cams of a support disk of a grinding tool in the above-described way. In FIG. 7c, the retaining collar 46 is of encircling design with the exception of the grooves 42. It is however also conceivable to provide only individual circle sections with retaining means.

[0061] FIG. 8 shows, in a side view, an arrangement with a cam 34 as per a further preferred exemplary embodiment. In the exemplary embodiment as per FIG. 8, a grinding tool 30 is shown only with its cam 34 of the supporting body. The grinding tool is inserted with a collar 46 into the holding fixture 1 shown in FIGS. 7a and 7b. Some other holding fixture, such as is shown for example in the preceding figures, could of course also be used. In contrast to the preceding exemplary embodiments as per FIGS. 2, 3 and 6, in FIG. 8, the cam 34 is designed to taper in the axial direction A. This means that the width D1 of the cam 34 in the circumferential direction U on that side 39 which can be turned toward the holding fixture 1 is smaller than the width d2, as viewed in the circumferential direction U, on that side of the cam 34 which forms the stop face 33. Here, the width d1 is smaller than the width D of the groove 12 in the holding fixture 1. The width

d2 is greater than the width D of the groove 12 as viewed in the circumferential direction U. This results, when the grinding tool is inserted, in linear contact at points 50 between a lateral delimiting face 16 of the groove 12 and side faces 49 of the cam 34.

[0062] The cam 34 as per FIG. 8 is provided with roundings 48 between the side faces 49 and the face 39. It would however also be conceivable to provide a cam with a trapezoidal shape, that is to say with lateral faces 49 and the face 39 which can be turned toward the holding fixture 1 coinciding at a fold.

[0063] In the embodiment illustrated in FIG. 8, the differences between the width d2 of the cam 34 and the width D of the groove 12 appear to be slight. In practice, it has been found that the dimensions of the supporting body, which is produced from plastic, with the cam 34 vary, in particular increase, on account of air humidity. Proceeding from the dimensions shown in FIG. 8 of a tool for producing the supporting body, a more pronounced difference between the widths in the circumferential direction U is therefore obtained in the event of contact of the supporting body with air humidity, such that even more clearly defined contact lines can be obtained.

1-20. (canceled)

21. A holding fixture for a grinding tool,

having a first clamping disk and a second clamping disk which is arranged so as to be rotatable relative to the first clamping disk and which can be turned toward the work-piece to be machined,

with the first clamping disk having at least one first bearing face for a first contact face of a supporting body of the grinding tool, and

with the second clamping disk having at least one second bearing face for a second contact face of the supporting body,

wherein the first and second bearing faces run at an angle with respect to one another, such that by rotating the first clamping disk relative to the second clamping disk, the supporting body can be firmly clamped between the bearing faces.

22. The holding fixture as claimed in claim 21, wherein the second clamping disk has, at its periphery, at least one groove for at least one holding element, through which groove the holding element can be guided into an intermediate space delimited by the first bearing face and the second bearing face.

23. The holding fixture as claimed in claim 22, wherein the first clamping disk has a groove which can be aligned with the groove of the second clamping disk and which extends in the axial direction at least as far as the first bearing face.

24. The holding fixture as claimed in claim 23, wherein the groove of the first clamping disk has, in the circumferential direction, an engagement face, such that when the holding element comes into contact with the engagement face, the first clamping disk can be rotated relative to the second clamping disk by rotating the supporting body.

25. The holding fixture as claimed in claim 22, wherein, on the second clamping disk, four grooves are arranged so as to be distributed uniformly over the periphery of the holding fixture.

26. The holding fixture as claimed in claim 23, wherein, on the first clamping disk, four grooves are arranged so as to be distributed uniformly over the periphery of the holding fixture.

27. A holding fixture having a first clamping disk and a second clamping disk between which a supporting body of a

grinding tool can be fastened, wherein one of the clamping disks is provided with a thread for connecting to a shaft of a grinding machine.

**28.** The holding fixture as claimed in claim **27**, wherein the holding fixture is a holding fixture for a grinding tool, wherein the second clamping disk is arranged so as to be rotatable relative to the first clamping disk and can be turned toward the workpiece to be machined, the first clamping disk has at least one first bearing face for a first contact face of a supporting body of the grinding tool, and the second clamping disk has at least one second bearing face for a second contact face of the supporting body, the first and second bearing faces run at an angle with respect to one another, such that by rotating the first clamping disk relative to the second clamping disk, the supporting body can be firmly clamped between the bearing faces.

**29.** The holding fixture as claimed in claim **27**, wherein the second clamping disk is provided with a journal which extends through the first clamping disk, with the thread being formed as an internal thread on the journal.

**30.** The holding fixture as claimed in claim **21**, wherein the holding fixture is provided with means for limiting the rotatability of the first clamping disk relative to the second clamping disk to a predetermined or predeterminable angle value in the circumferential direction.

**31.** The holding fixture as claimed in claim **21**, wherein the holding fixture is provided with form-fitting elements for a tool for fastening the holding fixture to a grinding machine.

**32.** The holding fixture as claimed in claim **21**, wherein the first clamping disk is provided, in the region of its periphery, with radial retaining means which can be placed in contact with the supporting body, such that the supporting body is retained in the radial direction by the retaining means.

**33.** A grinding tool having a supporting body and having a grinding means fastened to the supporting body,

with the supporting body having at least one holding element, by means of which the supporting body can be fastened in a holding fixture,

and with the holding element having a first contact face and a second contact face, by means of which the supporting body can be firmly clamped between a first bearing face of a first clamping disk and a second bearing face of a second clamping disk of a holding fixture,

wherein the first contact face and the second contact face are at an angle with respect to one another.

**34.** A grinding tool having a supporting body and having a grinding means fastened to the supporting body, with the supporting body having at least one holding element, by means of which it can be fastened in a holding fixture, with that the holding element being embodied as a cam which projects radially from a lateral surface of the supporting body, wherein the cam, as viewed in the axial direction, is arranged on the lateral surface of the supporting body in such a way that the grinding tool can be fastened in the holding fixture only with the grinding face aligned toward the workpiece to be machined.

**35.** The grinding tool as claimed in claim **34**, wherein the holding element has a first contact face and a second contact face, by means of which the supporting body can be firmly clamped between a first bearing face of a first clamping disk and a second bearing face of a second clamping disk of a holding fixture,

the first contact face and the second contact face are at an angle with respect to one another.

**36.** The grinding tool as claimed in claim **34**, wherein the at least one cam has, in the axial direction, a dimension which is selected such that, with correct positioning of the grinding tool in the holding fixture, the cam can be placed in engagement with an engagement face of a groove of the first clamping disk, and such that, in the event of incorrect positioning of the grinding tool, the cam cannot be placed in engagement with the engagement face of the groove of the first clamping disk.

**37.** The grinding tool as claimed in claims **33**, wherein the holding element has a plurality of radially inwardly extending cams arranged uniformly over the periphery of the supporting body.

**38.** The grinding tool as claimed in claim **33**, wherein the holding element of the supporting body has such a shape and size that the holding element can, in the radial direction, be placed in contact with a contact face of retaining means of the holding fixture.

**39.** The grinding tool as claimed in claim **37**, with the supporting body being composed of a ring with a radially outwardly extending flange, and that the cams extend radially inward from the inner side of the ring,

wherein the first contact face is formed by the upper side of the ring and in that the second contact face of the cam runs at an angle with respect to the first contact face which is formed by the upper edge of the ring.

**40.** The grinding tool as claimed in claim **33**, wherein the first contact face and the second contact face are designed such that, by rotating the supporting body in the circumferential direction relative to the holding fixture, the holding element can be placed into a clamping position.

**41.** The grinding tool as claimed in claim **33**, wherein the holding element has at least one cam which projects radially from a lateral surface of the supporting body,

with the cam being designed so as to taper in the axial direction, such that the width of a cam face, which can be turned toward a holding fixture, of the cam is smaller as viewed in the circumferential direction than the width, as viewed in the circumferential direction, of the cam on the side of the second contact face.

**42.** The grinding tool as claimed in claim **41**, wherein the width of the cam at the side which can be turned toward the holding fixture is smaller than the width of the groove of the holding fixture, and in that the width of the cam at the side of the cam with the contact face is greater than the width of the groove of the holding fixture, such that, when the grinding tool is inserted in the holding fixture, there is linear contact laterally between points of the cam and the delimiting faces of the groove.

**43.** A supporting body for a grinding tool as claimed in claim **33**,

with the supporting body having at least one holding element, by means of which it can be fastened in a holding fixture, with the holding element having a first contact face and a second contact face, by means of which the supporting body can be firmly clamped between a first bearing face and a second bearing face of the holding fixture, wherein the first and second contact faces are at an angle with respect to one another.