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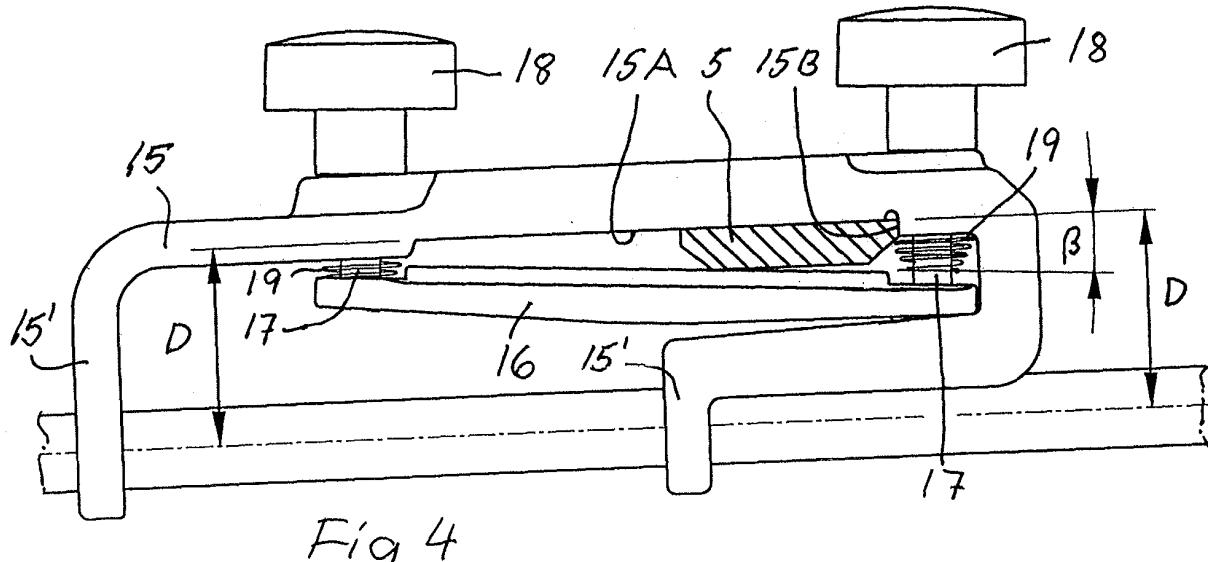
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### (54) A grinding machine and a grinding jig therefore

(57) A grinding jig is to be used at the grinding of a straight edge woodworking tool (5) on the peripheral surface of a rotating grindstone (2) in a grinding machine (1). The grinding machine has a cylindrical support bar (3) parallel with the rotation axis of the grindstone. The jig (4) comprises a base (15), which is parallel with the

support bar (3) and is intended for slidable and rotational mounting on the support bar (3), and a clamp (16), wherein the tool (5) is attached between the base and the clamp. The grinding jig has a support surface (15A) on the base (15) for supporting the face of the tool (5) opposite its bevel.



## Description

### Technical Field

**[0001]** The present invention relates to a grinding machine having a grinding jig to be used at the grinding of a straight edge woodworking tool on the peripheral surface of a rotating grindstone in the grinding machine, which has a cylindrical support bar parallel with the rotation axis of the grindstone, wherein the jig comprises a base, which is parallel with the support bar and is intended for slidable and rotational mounting thereon, and a clamp, the tool being attached between the base and the clamp.

### Background of the Invention

**[0002]** It is well known in the art of grinding machines as defined that it is difficult to obtain an exact 90° edge angle at the grinding in a conventional straight edge jig intended for grinding such woodworking tools as plane irons, wood chisels and spoke shave blades. The design of such a jig is such that manual skill is needed from the operator for obtaining the desired exact 90° edge angle.

**[0003]** It may be held that the obtaining of this 90° edge angle is normally not imperative. However, if for example 89° is obtained, the same angle will probably not be obtained at the following grinding. The result will be a faceted shape for the edge or that more tool material than otherwise needed will have to be ground away.

**[0004]** The problem basically stems from the fact that the position of the tool in the jig and hence in relation to the grindstone is dependent on the manual tightening of two knobs on the jig for obtaining the desired result that the face of the tool becomes exactly parallel with the grinding surface of the grindstone.

### The Invention

**[0005]** The above problem is according to the invention solved by a support surface on the side of the base facing the grindstone and parallel therewith for supporting the tool by its flat machined side or face opposite its bevel.

**[0006]** By the provision of this support surface, the tool will always be parallel with the grinding surface of the grindstone, which is a prerequisite for the desired result.

**[0007]** The clamp will hereby be arranged between the base and the support bar, instead of above the base as in the conventional design.

**[0008]** The tool will become correctly positioned in relation to the grindstone for obtaining the 90° edge angle, if the base is provided with a shoulder for the tool to engage at one end of the support surface, said shoulder being perpendicular to the support bar.

**[0009]** In order to obtain a secure fastening of a tool, even if it has for example a conical shape, a clamping surface of the clamp is longitudinally beveled.

**[0010]** A security stop may be provided on the cylind-

rical support bar at either side of the grinding jig for preventing the tool from laterally leaving the grindstone.

**[0011]** A grinding jig for a grinding machine as described above is also within the scope of the appended claims.

### Brief Description of the Drawings

**[0012]** The invention will be described in further detail below under reference to the accompanying drawings, in which

Fig 1 is an isometric view of a grinding machine with a grinding jig according to the invention,

Fig 2 is a front view of a known grinding jig,

Fig 3 is a side view, partly in section, of the jig shown in Fig 2,

Fig 4 is a front view of a grinding jig according to the invention, and

Fig 5 is a side view, partly in section, of the jig shown in Fig 4.

### Detailed Description of an Embodiment

**[0013]** A conventional grinding machine 1 is shown in Fig 1. The machine is provided with a grindstone 2 driven for rotation by an electric motor in the machine. The machine 1 is provided with a cylindrical support bar 3, called a universal support, which is parallel with the rotation axis of the grindstone 2. The position of the universal support can be adjusted to suit different purposes at grinding of different edge tools by the grindstone 2.

**[0014]** A grinding jig 4 for a straight edge tool 5 is mounted for lateral and rotational movements on the universal support 3. Examples of tools that can be ground or sharpened by the grinding machine 1 and attached in the grinding jig 4 are plane irons, wood chisels and spoke shave blades. With the tool 5 attached in the jig 4 as shown, the tool may be manually brought in engagement with the rotating grindstone 2 and be laterally moved over the grindstone by means of the jig 4, which is slidable on the universal support 3.

**[0015]** A conventional or known grinding jig is shown in Fig 2. The jig basically comprises a base 6 and a clamp 7.

**[0016]** The base 6 has two legs 6' each provided with a circular hole 6" (Fig 3) for slidable mounting on the universal support 3. On its side opposite the legs 6', the base is provided with two fixed screws 8 (of which only the left one is visible in Fig 2). Stops 9 for aligning a tool 5 are arranged on either side of the base 6, leaving room for the clamp 7 between them.

**[0017]** The clamp 7 has two holes corresponding to the screws 8. Threaded knobs 10 are attached to the screws 8 above the clamp 7. A tool 5 is placed between the base 6 and the clamp 7 against the stops 9 and can be clamped to a fixed position by means of the screws 8. The tool 5 is placed with its flat machined side, called

face, or side opposite the bevel facing the clamp 7 for obtaining the grinding geometry shown in Fig 1.

**[0018]** In order to obtain an exact 90° grinding of the edge, it is imperative that the face of the tool 5 abutting the clamp 7 or in other words the clamp 7 is parallel to the universal support 3 and hence the surface of the grindstone 2. The position of the clamp 7 depends on the manual setting of the two knobs 10. Experience shows that the desired position of the clamp 7 is very difficult to obtain and that accordingly the exact 90° grinding of the edge is not normally obtained. It is for example quite natural to tighten the left hand knob 10 in Fig 2 or the knob at a distance from the tool 5 harder than the right one, resulting in the situation illustrated in Fig 2 with an angle  $\alpha$  between the base 6 and the clamp 7. The tool 5 - being parallel to the clamp 7 - will accordingly not be parallel to the grindstone 2, resulting in an edge angle differing from 90°.

**[0019]** Reference is now made to Fig 4 showing a grinding jig according to the invention. This jig has the same main constituents as the conventional one shown in Fig 2, namely a base 15 and a clamp 16. The clamp 16 has two fixed screws 17 to extend through corresponding holes in the base 15. A knob 18 is in thread engagement with each screw 17 for determination of the distance between the base 15 and the clamp 16. A compression spring 19 may be arranged around each screw 17 for biasing the base 15 and the clamp 16 apart.

**[0020]** The base 15 has two legs 15' each provided with a circular hole 15" (Fig 5) for slidable mounting on the universal support 3.

**[0021]** On its side facing the universal support 3 the base is provided with a support surface 15A, which preferably is plane. It is parallel with the universal support, i.e. the two distances D are equal. The tool 5 is to be placed with its face or flat machine side opposite its bevel against this support surface 15A, whereupon it is clamped in position by the movable clamp 16, operated by the knobs 18.

**[0022]** To the right in Fig 4 the surface 15A is ended by a shoulder 16B in the base 15. This shoulder 16B is perpendicular to the longitudinal direction of the base 15 and thus the universal support 3.

**[0023]** By this design the tool 5 will always be guided by the base 15 with its surface 15A and shoulder 16B to be in the correct position for grinding (and thus for obtaining the desired 90° edge angle) irrespective of the position of the clamp 16. This is illustrated in Fig 4, where the clamp 16 forms an angle  $\beta$  with the base surface 15B without any negative influence on the correct position of the tool 5.

**[0024]** A further positive feature of the invention appears at a comparison between Fig 3 and Fig 5. Fig 3 shows a conventional jig, where the clamping surfaces of the base 6 and the clamp 7 are plane and parallel, which means that the tool 5, if it has a conical shape as shown, is only clamped as indicated by the arrows, resulting in a less stable clamping. In the jig according to

the invention on the other hand and as shown in Fig 5, the clamping surface of the clamp 16 may be longitudinally beveled, which results in a more favourable clamping of a possibly conical tool 5, as indicated by the arrows, with the face of the tool in flat contact with the base surface 15A.

**[0025]** A further feature of the grinding machine according to the invention is illustrated in Fig 1. In a conventional grinding machine 1 the grinding jig is freely slideable along the universal support 3. This means that the tool 5 in the grinding jig 4 may leave its grinding engagement with the grindstone 2, possibly resulting in injuries on the operator's fingers.

**[0026]** According to the invention, however, the universal support 3 may be provided with two security stops 20, 21. The stop 20 to the right in Fig 1 is fixed and can have the form of a screw in a threaded axial hole in the end of the universal support 3. The reason for it to be fixed is that the tool 5 has a fixed position against the shoulder 15B to the left in the drawing. The other stop 21 to the left in the drawing is adjustable: its position on the universal support can be adjusted according to the width of the tool 5, so that the tool can not leave its grinding engagement with the grindstone 2. The stop 21 can have the form of a screw operated clamp.

## Claims

30. 1. A grinding machine having a grinding jig (4) to be used at the grinding of a straight edge woodworking tool (5) on the peripheral surface of a rotating grindstone (2) in the grinding machine (1), which has a cylindrical support bar (3) parallel with the rotation axis of the grindstone, wherein the jig (4) comprises a base (15), which is parallel with the support bar (3) and is intended for slideable and rotational mounting thereon, and a clamp (16), the tool (5) being attached between the base and the clamp, **characterized by** a support surface (15A) on the side of the base (15) facing the grindstone (2) and parallel therewith for supporting the tool (5) by its flat machined side or face opposite its bevel.
45. 2. A grinding machine according to claim 1, wherein the clamp (16) is arranged between the base (15) and the support bar (3).
50. 3. A grinding machine according to claim 1, wherein the base (15) is provided with a shoulder (15B) for the tool (5) to engage at one end of the support surface (15A), said shoulder being perpendicular to the support bar (3).
55. 4. A grinding machine according to claim 1, wherein a clamping surface of the clamp (16) is longitudinally beveled.

5. A grinding machine according to claim 1, wherein a security stop (20, 21) is provided on the cylindrical support bar (3) at either side of the grinding jig (4) for preventing the tool (5) from laterally leaving the grindstone (2).  
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6. A grinding jig for a grinding machine according to any of the preceding claims.

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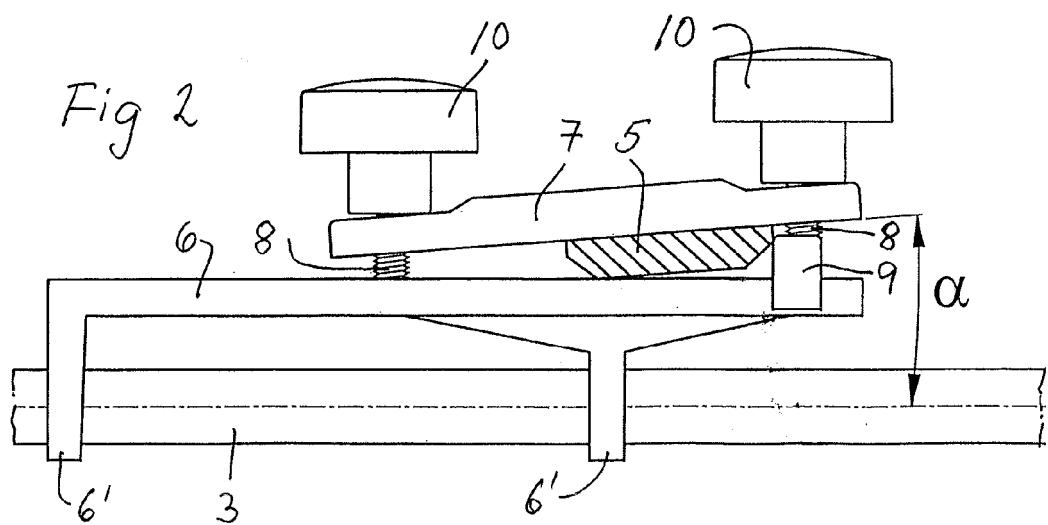
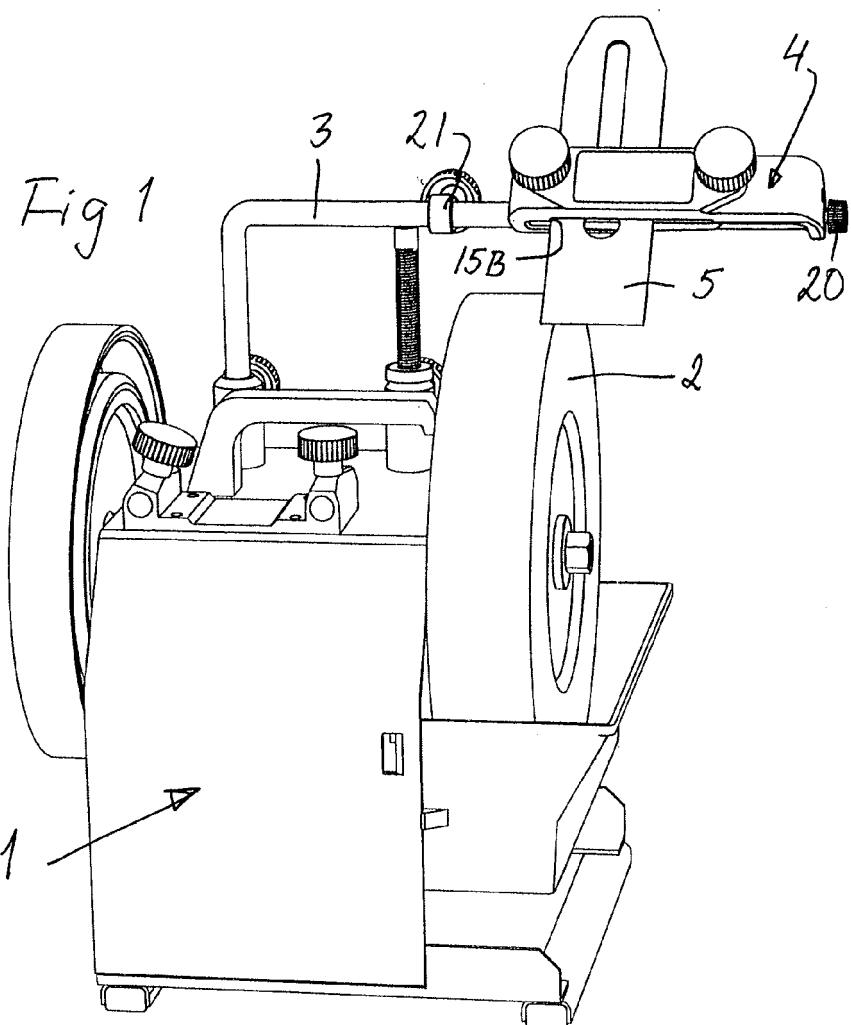
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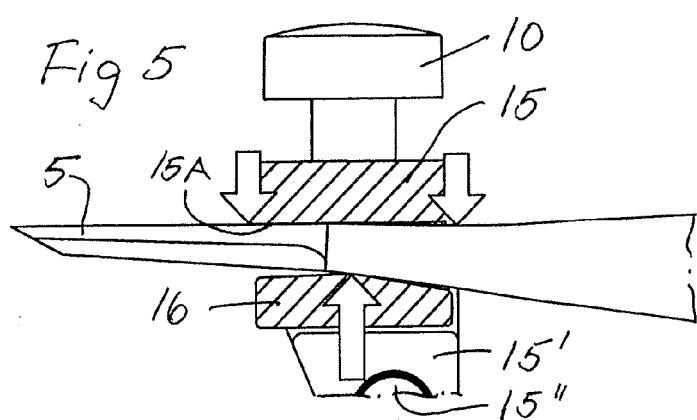
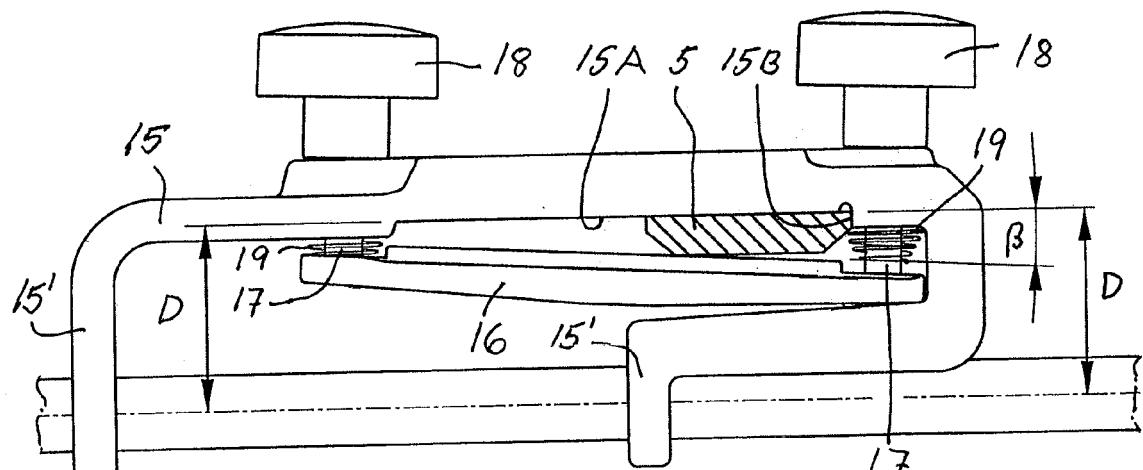
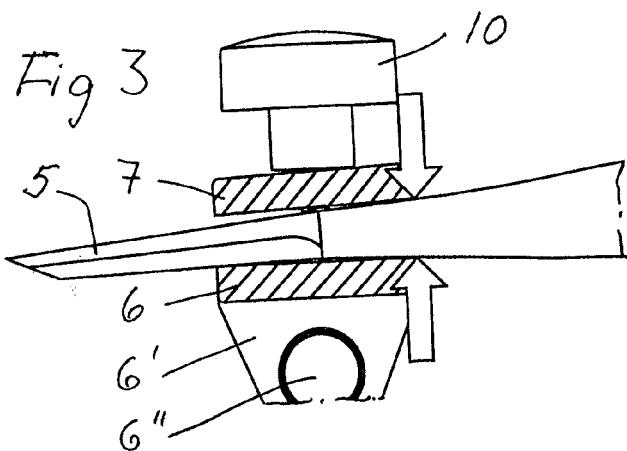
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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
Y	US 2005/090184 A1 (ZHANG ROSS [CN] ET AL) 28 April 2005 (2005-04-28)	1-3	INV. B24B3/36 B24B41/06
A	* paragraph [0082]; figures 11,12 *	4,5	
X	-----	6	
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A	US 6 676 495 B1 (SIEMERS MATTHEW BRUCE [CA] ET AL) 13 January 2004 (2004-01-13) * column 5, line 51 - column 6, line 42; figure 8 *	1-5	
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			TECHNICAL FIELDS SEARCHED (IPC)
			B24B
The present search report has been drawn up for all claims			
1	Place of search	Date of completion of the search	Examiner
	Munich	29 August 2008	Zeckau, Jochen
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone		T : theory or principle underlying the invention	
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 15 5316

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

29-08-2008

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