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(72) Inventor: **Van der Starre, Maurice Ivo**
2061 XK Bloemendaal (NL)

(74) Representative: **Aalbers, Arnt Reinier**
De Vries & Metman
Overschiestraat 180
1062 XK Amsterdam (NL)

(71) Applicant: **Van der Starre, Maurice Ivo**
2061 XK Bloemendaal (NL)

(54) **Adjustable mitre device**

(57) The invention pertains to an adjustable mitre device (4) comprising a centre arm (3) and a first (1) and a second side arm (2), pivotable with respect to each other and the centre arm (3). The centre arm (3) comprises at least one surface (3A) or edge for marking a measured angle on a workpiece, such as a wooden plank, beam or board, and least the upper or the lower surface of the first side arm (1) extends beyond respectively the upper or the lower surfaces of the second arm (2) and the centre arm (3), thus providing a side surface (1A) for alignment with the workpiece.

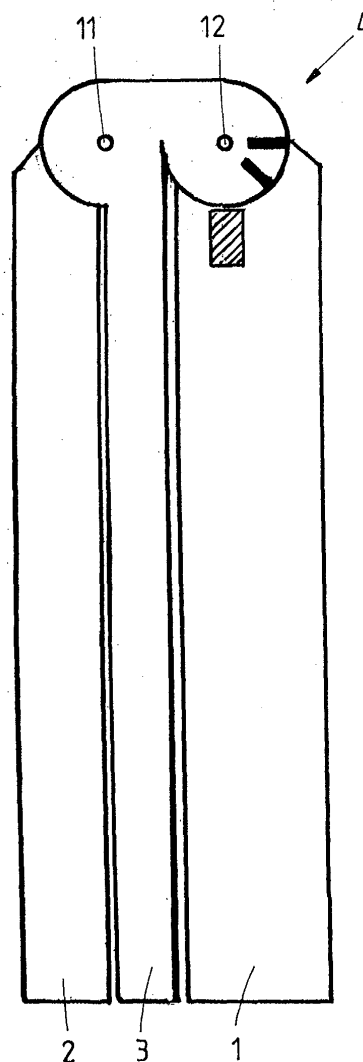


Fig.3

Description

[0001] The invention relates to an adjustable mitre device comprising a centre arm and a first and a second side arm, pivotable with respect to each other and the centre arm.

[0002] Such a mitre device is known from e.g. GB 2 243 576, which relates to an adjustable mitre guide comprising a centre arm having a longitudinally aligned guide slot (numeral 2 in the figures of GB 2 243 576) to receive and guide a saw blade, two side arms (5, 11) hinged to a front end of the centre arm whereby each side arm is capable of pivotal movement through at least 90° from a position substantially adjacent and parallel to the centre arm to an angled position at which the angle of each arm to the centre arm is greater than 90°, and location means including link arms (30, 31) to adjustably secure the side arms at equal angles to the centre arm. Instead of link arms (30, 31), the side arms may have intermeshing teeth to result in the side arms always lying at equal angles to the centre arm.

[0003] It is further explained in GB 2 243 576 that mitre guides, commonly known as mitre blocks, are well known in the woodworking and engineering industries for cutting materials at angles of 45° or 90°, e.g. to fit architrave around a door frame or coving at the corners of a room. GB 2 243 576 acknowledges a need for a mitre guide that is adjustable and can be used for cutting materials at a wide range of angles including angles less than 45° up to approaching 180° for internal corners and from greater than 180° up to more than 270° for external angles.

[0004] FR 2817892 relates to a handsaw jig for cutting butt joint miters in planks. The jig has a saw guide (1) and two plank guides forming three concurrent planes on the same fixed imaginary axis with respect to three guides (1,2,3). The plank guides (2,3) can simultaneously and symmetrically turn around the axis with respect to the saw guide. The saw guide remains on the bisector plane of the two plank guides. At the end of each plank guide (2,3) is a toothed gear with a common vertical axis for the three guides (1,2,3) and a third toothed gear, with its axis perpendicular to the common axis, and meshing with the two other gears, which symmetrically and simultaneously move the two plank guides (2,3).

[0005] It is an object on the present invention to provide a improved mitre device, which allows a relatively compact design and is practical to use.

[0006] To this end, the mitre device according to the present invention is characterised in that the centre arm comprises at least one surface or edge for marking, e.g. by means of a pencil or felt-tip, a measured angle on a workpiece, such as a wooden plank, beam or board, and in that at least the upper or the lower surface of the first side arm extends beyond respectively the upper or the lower surfaces of the second arm and the centre arm, thus providing a side surface for alignment with the

workpiece.

[0007] It is preferred that the first side arm has a height that exceeds the height of the centre arm and of the second side arm. It is further preferred that both side surfaces or edges of the centre arm are straight, that the said edges are readily accessible, and/or that the lower surface of the centre arm is substantially flat. This can be achieved by means of a centre arm having a square or rectangular cross-section, or, optionally, a triangular, trapezoid or similar cross-section. It is further preferred that the height of the cross-section of the centre arm is equal to or smaller than its width.

[0008] The mitre device according to the present invention can be designed to be relatively compact and, in addition to intuitive use as a mitre device, it can be used as a sash angle or bevel square, i.e. instruments consisting of two rules or arms, jointed together at one end, respectively at a fixed angle of 90° or opening to any angle.

[0009] It is preferred that the first side arm extends beyond both the upper surface and the lower surface of both the second side arm and of the centre arm thus providing two surfaces for alignment with the workpiece.

[0010] By providing a first side arm having a width that exceeds the width of the centre arm and the second side arm, use as a sash angle is further facilitated.

[0011] The centre arm preferably comprises a relatively broad end portion, yielding e.g. a T-shapes centre arm, with at least one of the side arms, preferably both side arms, pivotably mounted on this portion.

[0012] It is further preferred that an end of each of the side arms comprises a circular section concentric with its respective axis and that the circular sections are operatively engaged, e.g. by means of intermeshing gear teeth, such that pivoting one of the side arms results in equal pivoting of the other side arm. Thus, there is no need for link arms, such as rods or strips, between each of the side arms and the centre arm and the marking of a workpiece is hence not obstructed by such arms.

[0013] The mitre device according to the invention can also comprise a means for increasing friction between the end of at least one of the side arms and the centre arm, such as a wing nut, or means for blocking the same relative to each other.

[0014] The invention will now be explained in more detail and with reference to the figures, which schematically show a preferred embodiment of the mitre device according to the present invention.

Figure 1 shows a top plan view of the separate components of the mitre device.

Figure 2 shows a side view of the same components.

Figure 2A shows a side view of alternative components.

Figures 3 and 4 show respectively a top plan view of an assembled mitre device and of just the side arms.

[0015] Figures 1 and 2 show respectively a top plan view (i.e. the upper surfaces) and a side view (i.e. the side surfaces seen from the left) of a first rule or side arm 1, a second rule or side arm 2, and a centre arm 3 for a mitre device 4 according to the invention, as depicted in figure 3.

[0016] The first side arm 1 has a width (W), which is equal to its height (H) and e.g. in a range from 1 to 4 cm. The length of the first side arm is e.g. in a range from 5 to 35 cm. One of the ends of the first side arm 1 comprises a narrow portion 5A, which has an at least semi-circular circumference provided with gear teeth 6A. A round through-hole 7A is present in the centre of the semicircular circumference. The first side arm 1 further comprises a slide 8, which will be discussed below.

[0017] The second side arm 2 has a width and height smaller than, e.g. halve of width and height of the first side arm 1. The second side arm 2 also comprises a narrow portion 5B, which has an at least semi-circular circumference provided with gear teeth 6B. Also, a round through-hole 7B is present in the centre of semi-circular circumference.

[0018] The centre arm 3 is, in top plan view, T-shaped. The total of the width of the centre arm 3 and the second side arm 2 is substantially equal to the width of the first side arm 1. The height of the centre arm is substantially equal to the height of the second side arm 2. One end of the centre arm 3 comprises two parallel and, in this example, substantially identical extensions 9A, 9B, forming a fork or claw (figure 2) for receiving the narrow portions 5. The left hand side of the extensions 9 has a semi-circular circumference, whereas the right hand side is circular over three-quarters of its circumference. Two round through-holes 10A, 10B are located in each of the extensions 9, such that, when the narrow portions 5 of the side arms 1, 2, are positioned between the extensions 9 and the respective gear teeth 6 intermesh (figure 4), these holes 10 (four in total), are in register with the holes 7 in the narrow portions 5. In this position, assembly can be completed (figure 3) by subsequently placing suitable pens 11, 12, through these holes, in a manner known in itself. Once assembled, the first side arm 1 extends beyond both the upper surface and the lower surface of the second side arm 2 and centre arm 3 thus providing two surfaces 1A for alignment with a workpiece during marking.

[0019] The right hand side of at least one of the extensions 9 is provided with two notches 13, 14, one at an angle of 90°, with respect to the longitudinal axis of the centre arm 3, and one at an angle of 45°. The above-mentioned slide 8 comprises a protrusion, below the operating surface of the slide 8 and hence hidden from view, with which one of the notches 13, 14 can be engaged so as to lock the arms, 1, 2, 3, with respect to each other.

[0020] In an alternative embodiment (not shown), the extensions (9) on the one hand and the centre arm on the other are formed by or are part of separate compo-

nents. In that case, the side arms 1, 2 are interconnected by means an interconnecting element, e.g. similar in shape to the extensions, and the centre arm 3 is mounted, e.g. by means of a further extension similar to one of the extensions described above, on one of the side arms 1, 2, preferably the first side arm 1, and is pivotable about the respective pen 11, 12. The centre arm 3 will thus be able to move (mostly pivot) with respect to the extensions and the side arms 1, 2 and can be kept parallel to one of the side arms when the device according to the invention is being used as a sash angle or bevel square. In an alternative embodiment, one of the side arms 1, 2, e.g. the first side arm 1, is provided with a slot or recess for receiving, partially or entirely, the centre arm 3.

[0021] To allow use as a mitre device, locking means are provided for locking the centre arm 3 with respect to the interconnecting element such that the centre arm 3 divides the angle between the side arms 1, 2 into two equal angles. The locking means can comprise e.g. a pen or bolt fitted through holes in the interconnecting element and in the centre arm 3 (or the further extension).

[0022] In another alternative embodiment, shown in figure 2A, the centre arm 3 comprises a narrow portion 5 and the side arms 1, 2 comprise substantially identical extensions forming a fork or claw for receiving the narrow portion 5 of the centre arm 3.

[0023] The arms 1, 2, 3, are preferably made of metal or a synthetic material, such as a polyester or a polyolefin. The gear teeth can be integral with the side arms or be part of a separate component, e.g. a gear wheel, made of a synthetic material or a metal.

[0024] The mitre guide described above can measure external angles as small as 20° (requiring an angle of 340° between the side arms, when compared to the closed condition shown in figure 3) and can be readily aligned first with an object of which an angle is to be measured and then with a side surface of a workpiece, such as a wooden plank, beam or board used in building a window-ledge or doorcase, to mark the same e.g. by drawing a line along the centre arm. The mitre device in hand is relatively compact and, although this device offers many more possibilities than existing devices, it can be used intuitively by those who are familiar with a sash angle.

[0025] Further, neither measuring an angle nor marking a measured angle on a workpiece, such as a wooden plank, beam or board, is obstructed by the presence of link arms between the side arms and the centre arm.

[0026] The invention is not restricted to the above described embodiments which can be varied in a number of ways within the scope of the claims. For instance, the second side arm may be longer than the first side arm or *vice versa*. In a further example, at least one of the side arms comprises a longitudinal slot or recess and the centre arm is accommodated in this recess or slot, when the mitre is in a closed condition.

Claims

1. An adjustable mitre device (4) comprising a centre arm (3) and a first (1) and a second side arm (2), pivotable with respect to each other and the centre arm (3), **characterised in that** the centre arm (3) comprises at least one surface (3A) or edge for marking a measured angle on a workpiece, such as a wooden plank, beam or board, and **in that** at least the upper or the lower surface of the first side arm (1) extends beyond respectively the upper or the lower surfaces of the second arm (2) and the centre arm (3), thus providing a side surface (1A) for alignment with the workpiece. 5
2. The mitre device (4) according to claim 1, wherein the first side arm (1) has a height (H) that exceeds the height (H) of both the second side arm (2) and of the centre arm (3). 10
3. The mitre device (4) according to claim 1 or 2, wherein the height (H) of the cross-section of the centre arm (3) is equal to or smaller than its width (W). 15
4. The mitre device (4) according to any one of the preceding claims, wherein the first side arm (1) extends beyond both the upper surface and the lower surfaces of the second side arm (2) and centre arm (3). 20
5. The mitre device (4) according to any one of the preceding claims, wherein the centre arm (3) comprises a relatively broad end portion (9) and wherein at least one of the side arms (1, 2) is pivotably mounted on this portion (9). 25
6. The mitre device (4) according to any one of the preceding claims, wherein the side arms (1, 2) are pivotable about parallel axes (11, 12). 30
7. The mitre device (4) according to any one of the preceding claims, wherein one of the ends of each of the side arms (1, 2) comprises a circular section concentric with its respective axis (11, 12) and that the circular sections are operatively engaged (6) such that pivoting one of the side arms (1, 2) results in equal pivoting of the other side arm (2, 1). 35
8. The mitre device (4) according to claim 7, wherein the circular sections comprise intermeshing gear teeth (6). 40
9. The mitre device (4) according to any one of the preceding claims, comprising a means (8; 13, 14) for increasing friction between the end of at least one of the side arms (1, 2) and the centre arm (3) or for blocking the same (1,2,3) relative to each other. 45
10. The mitre device (4) according to claim 9, wherein the means (8; 13, 14) are adapted to block the side arms (1, 2) relative to each other at an angle of 45° and/or 90°. 50
11. The mitre device (4) according to any one of the preceding claims, wherein the first (1) and a second side arm (2) are pivotable with respect to the centre arm (3), such that the centre arm (3) divides the angle between the side arms (1, 2) into two equal angles. 55
12. The mitre device (4) according to any one of the preceding claims, wherein the side arms are pivotably mounted on an interconnecting element and the centre arm is mounted pivotable with respect to this element.

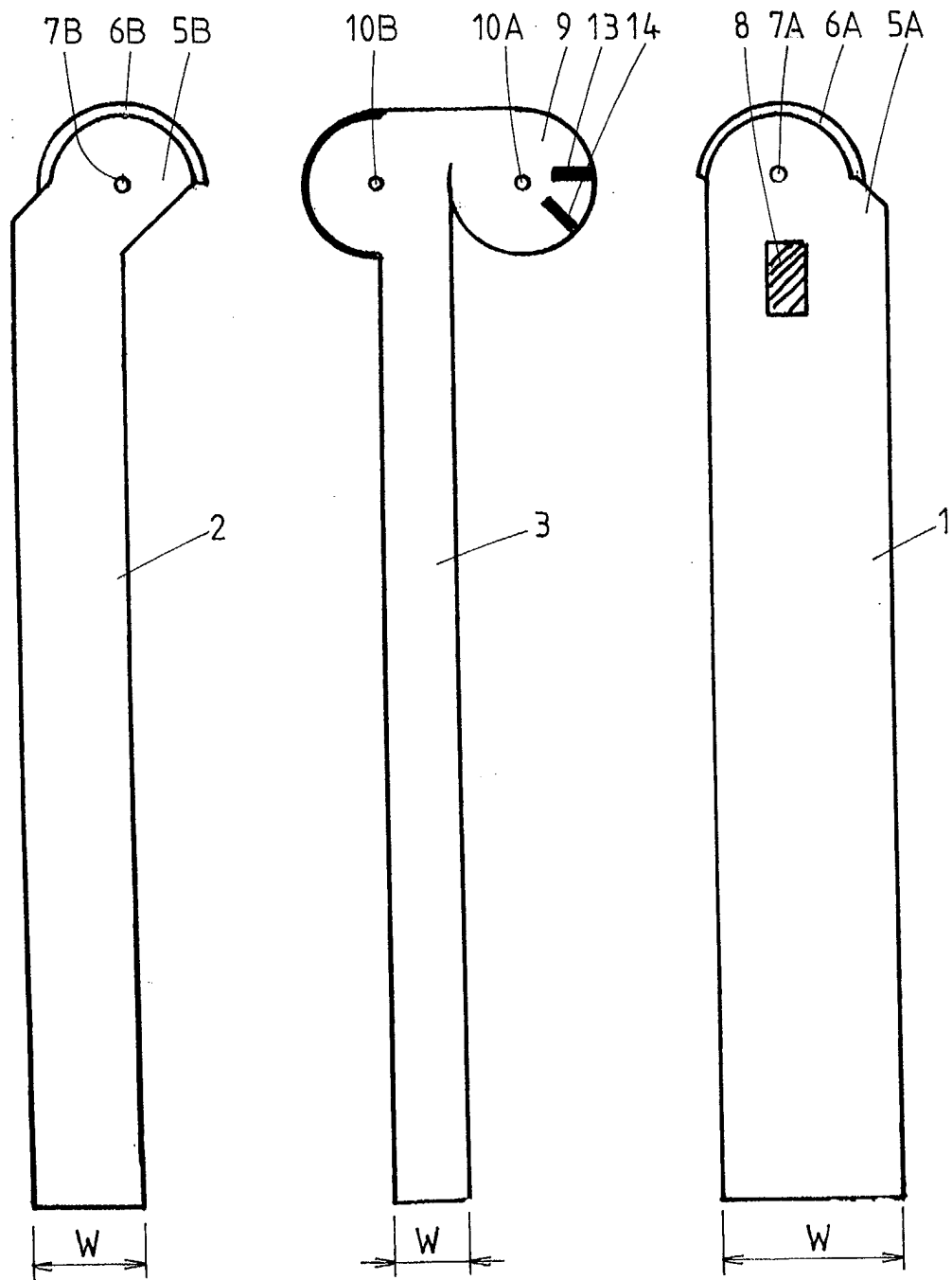


Fig.1

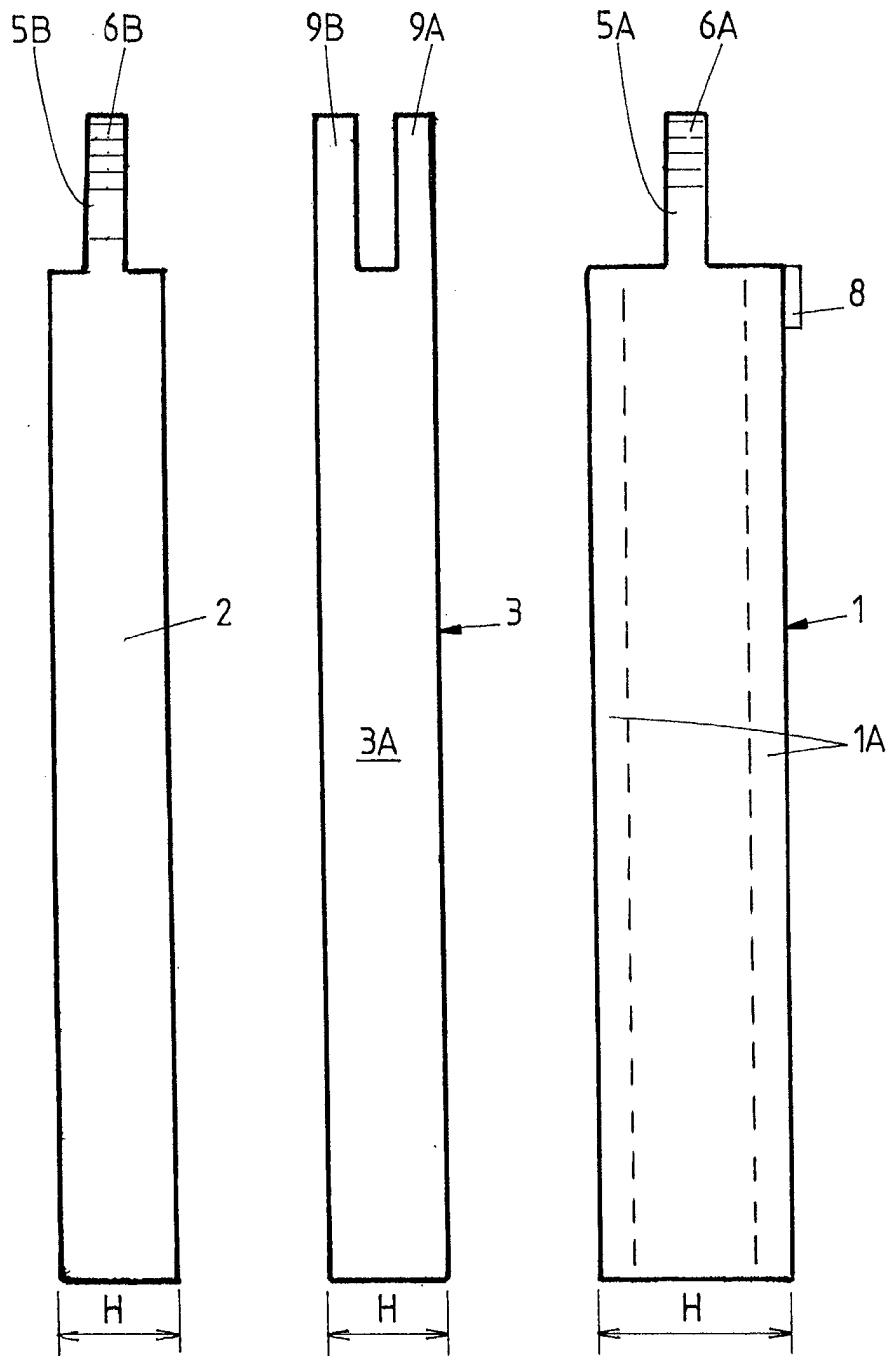


Fig.2

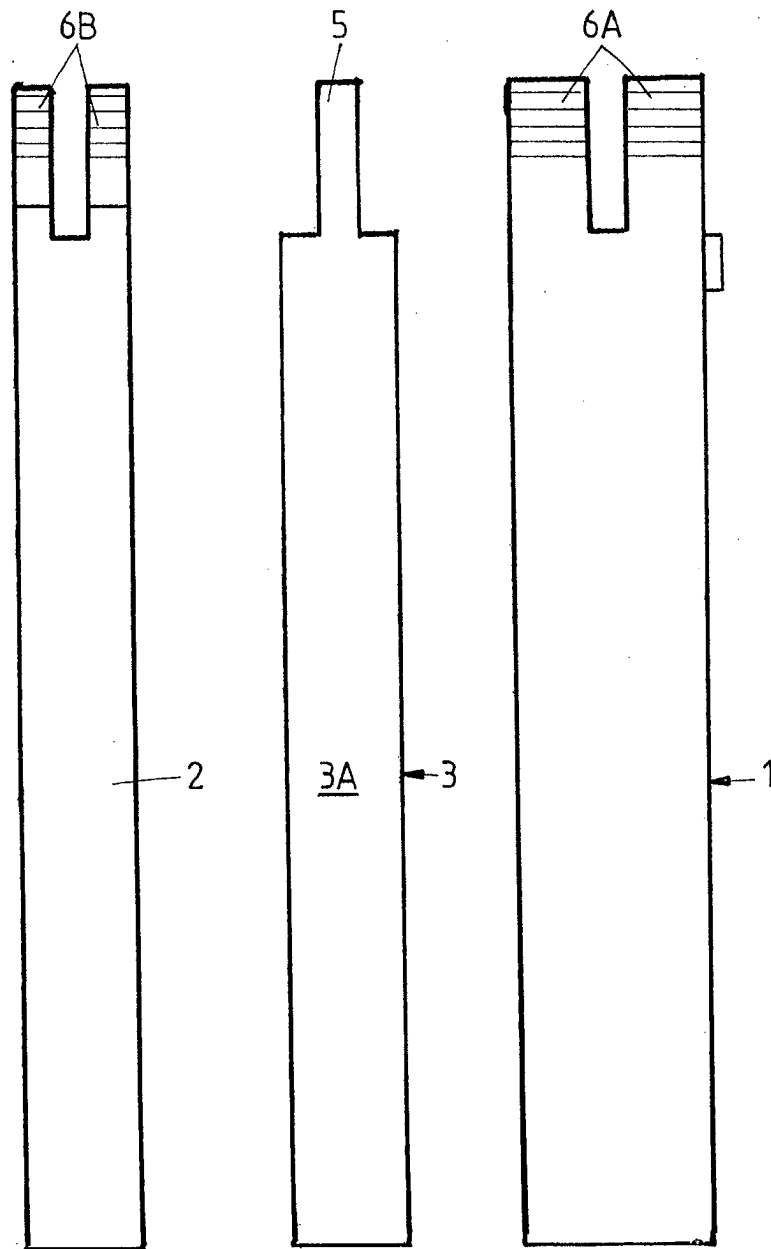


Fig.2A

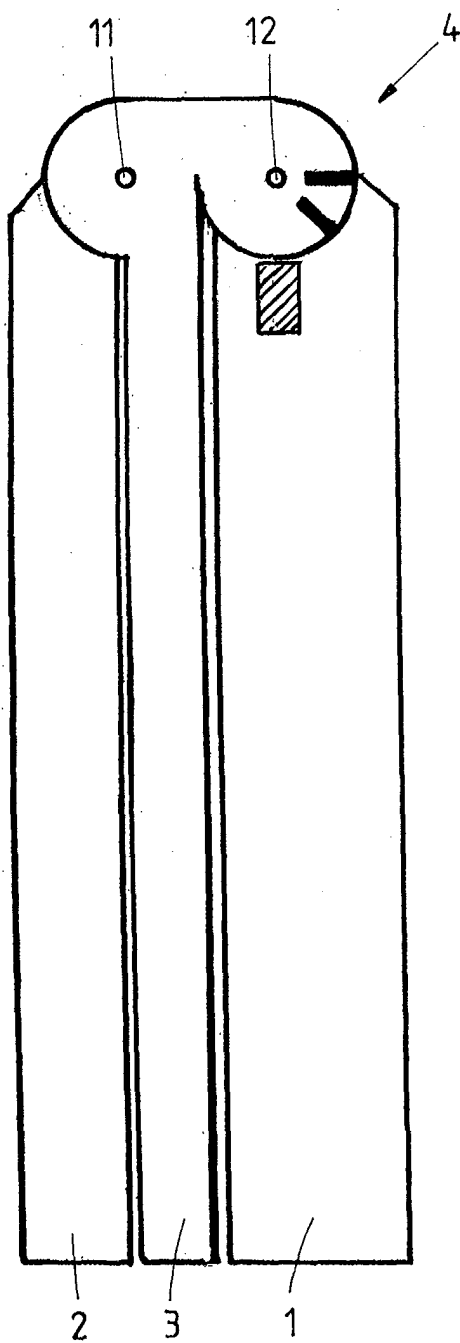


Fig.3

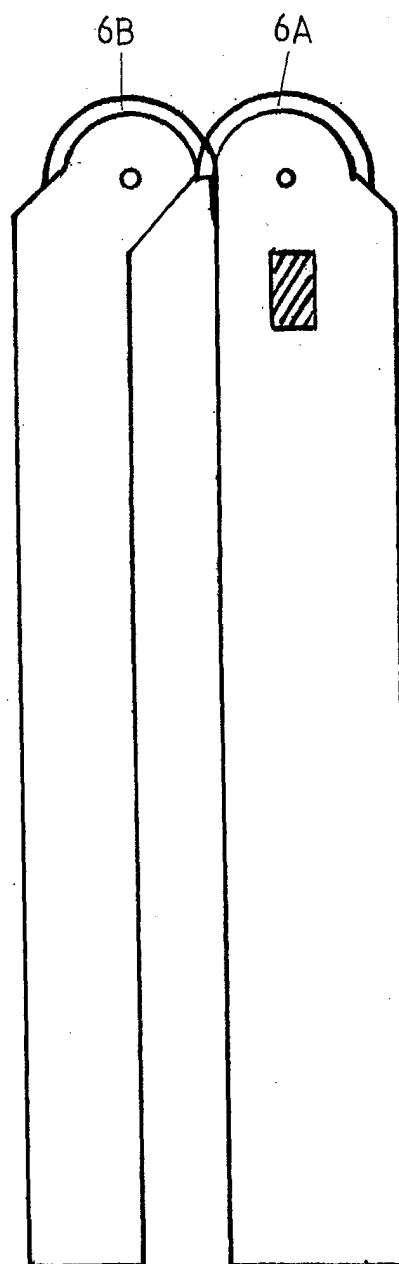


Fig.4



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EUROPEAN SEARCH REPORT

Application Number
EP 03 10 3992

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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B25H G01B B43L
Place of search		Date of completion of the search	Examiner
THE HAGUE		25 March 2004	Popma, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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