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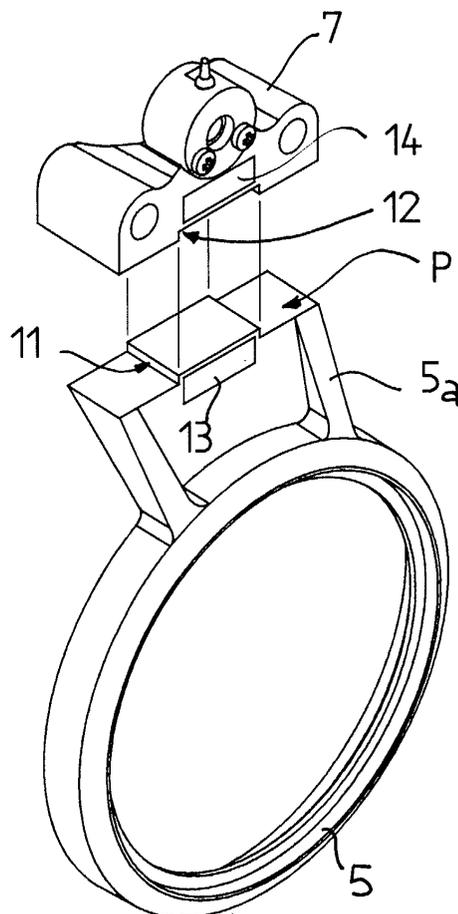
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(54) **Quick-release fastening device for braking units of weft suppliers to weaving machines**

(57) In a quick-release fastening device for the braking unit (4) in weft suppliers (1), the braking unit comprises a support ring (5) that is removably fastened, by means of an attachment foot (5a), to a support slide (7) that is axially movable with respect to the cylinder (2) of the supplier by a screw-based adjustment system (9). The disclosed device comprises a pair of keying members (11, 12), of which one is borne by the attachment foot (5a) of the ring and the other by the slide (7), and operating as means for constraining the foot and the slide to move along their mating plane (P). The device also comprises further magnetic constraining members (13, 14) having opposite polarities, of which one is borne by the foot (5a) of the support ring (5) and the other by the support slide (7), their purpose being to firmly fasten said ring and slide in mutual contact.

Fig. 3



## Description

**[0001]** The present invention is concerned with a quick-release fastening device for the braking assemblies of weft suppliers to weaving machines, particularly weaving looms, knitting machines and the like.

**[0002]** As well known, the weft suppliers for weaving machines typically comprise a stationary cylinder on which a weft winding arm, that swivels around the cylinder, winds a plurality of thread loops forming a weft reserve.

**[0003]** On request of the loom or other weaving machine, at each weft insertion, the loops of the reserve unwind from the cylinder and are supplied to the loom through a terminal thread-guiding eyelet, under control of a braking unit having the task of keeping the tension of the unwinding thread substantially constant. A monitoring system, which receives signals sent by sensors arranged to check the integrity of the weft reserve, controls the motion of the rotating arm and restores the weft reserve while the loops unwind as they supply the loom. The braking assembly typically comprises a support ring, bearing the braking means, which may be of any of several kinds. In particular, it is usual to employ braking means consisting of a crown of bristles radially projecting inwardly of the support ring, or braking means consisting of an assembly of metallic leaves supported by said ring and arranged along the generatrices of a solid of revolution or, alternatively, braking means comprising a continuous truncated-cone member which is elastically suspended at the centre of said support ring and is pushed against the cylinder, the most suitable braking means being selected in dependence of the features of the thread under processing. In all cases, such braking means engage the bevelled end portion, or delivery portion, of the cylinder, on which the unwinding thread loops slide, by applying a predetermined and adjustable elastic pressure on the thread, which pressure may be modulated in dependence of the changes of the sliding speed of the thread. According to a known and widely used arrangement, in order that the adjustment of the elastic pressure applied on the thread by the braking means may be allowed, the support ring of the braking unit is removably fastened to a support slide that is axially movable with respect to the cylinder of the supplier by means of a screw-based adjustment system.

**[0004]** Nowadays, the above support ring is connected to the respective support slide by means of conventional fasteners, typically consisting of retaining bolts acting through an attachment foot of the ring and engaging threaded holes provided in said support slide. Though such a conventional fastening system has a satisfactory mechanical rigidity, it is unsatisfactory from the point of view of the speed and convenience of maintenance in the case of removal and re-installation of the braking unit, said operations being necessary e. g. when replacing the unit in order to modify the weft supplier for different requirements.

**[0005]** The main object of the present invention is therefore to remove said drawback by providing a new quick-release fastening device for fastening the braking unit to the support slide, with the aims of considerably simplifying and easing the steps of fastening and releasing said braking unit and slide, and of assuring the rigidity and stability of the fastening device, so that it will be suitable as an advantageous replacement for the conventional fastening system.

**[0006]** Another important object of the present invention is to provide a fastening device allowing the braking unit to be angularly displaced, if required, around a rotation axis which is perpendicular to the axis of the cylinder; e. g., in order to ease the process of threading the supplier after accidental breaking of the thread during the weaving process.

**[0007]** According to the present invention, the above objects and other that will appear from the following detailed description are achieved by means of a quick-release fastening device having the specific features recited in the following claims.

**[0008]** Substantially, this invention is based on the innovative concept of providing said support ring and support slide with keying members that constrain them to move along their mating plane. In order to fasten said ring and slide, a pair of magnetic fastening members having opposite polarities is used, said magnetic fastening members being placed one in front of the other and being borne by the support ring and by the support slide, respectively.

**[0009]** According to a preferred embodiment, the keying members have a prismatic cross-section so that they also prevent the rotation of said ring with respect to the slide. According to another embodiment, achieving the same usefulness, the keying members have a cylindrical cross-section so that they enable, with the specified aim, the relative rotation of the support ring with respect to the support slide; said relative rotation being around an axis that is perpendicular to said mating plane.

**[0010]** The features, aims and advantages of the quick-release fastening according to the present invention will clearly appear from the following detailed description, with reference to the attached explicatory drawings, wherein:

Fig. 1 is a side view, partially broken away, of a weft supplying device with the release fastening device according to the invention,

Fig. 2 is a detail, to an enlarged scale, of Fig. 1,

Fig. 3 is an exploded perspective view showing in detail the fastening between the support ring of the braking unit and the support slide,

Fig. 4 is a view the like to Fig. 3 showing an alternative embodiment of said fastening, achieving the same usefulness.

[0011] With reference to the drawings, a weft supplier device 1 of a known kind comprises a stationary cylinder 2 on which a hollow weft-winding arm 3, swiveling around the cylinder, winds a plurality of thread loops (not drawn) to build up a weft reserve. On request of the loom or other weaving machine, the loops of the reserve unwind from cylinder 2 and run through a thread-guide eyelet G, under control of a braking unit 4 having the task of keeping substantially constant the mechanical tension in the thread F being unwound. The structure of the braking unit is outside the scope of the present invention. However, this description refers to a braking unit of a known kind comprising a ring support 5 bearing braking means consisting of a frustoconical member 6 which is elastically suspended at the centre of said support ring and is pushed into contact against stationary cylinder 2. Support ring 5 is removably attached, by means of an attachment foot 5a, to a support slide 7 that is supported by an arm 8 of supplying device 1, which is arranged parallel to cylinder 2. The slide is subjected - in order to regulate the pressure of braking means 6 against cylinder 2 - to an adjustment system comprising a screw 9 provided with a control knob, which screw is also arranged parallel to the axis of cylinder 2.

[0012] According to the present invention, and in order to achieve the stated objects, support ring 5 is provided with a quick-release fastening device which is sandwiched between its attachment foot 5a and support slide 7. Such a device comprises substantially a pair of keying members 11, 12 (Figg. 3 and 4), of which one is borne by attachment foot 5a, the other by slide 7. Such members constrain the foot and the slide to move in their mating plane. According to the embodiment of Fig. 3, keying members 11, 12 have a prismatic cross-section so that they prevent a relative rotation of the ring with respect to the slide. On the other hand, according to the embodiment of Fig. 4, keying members 11' and 12' have a cylindrical cross-section so that they allow a relative rotation of support ring 5 with respect to support slide 7, around a rotation axis that is perpendicular to mating plane P.

[0013] However, in either case, said ring and slide, in contact with each other, are firmly attached by at least one pair of magnetic fastening members 13 and 14, having opposite polarities, which are placed one in front of the other and are borne by foot 5a of support ring 5 and by support slide 7, respectively. Advantageously, according to the invention, said magnetic fastening members 13 and 14 consist of one or more pairs of high-performance permanent magnets such as the current Samarium/ Cobalt-based magnets and the like.

movably fastened, by means of an attachment foot (5a), to a support slide (7) that is axially movable with respect to the cylinder (2) of the supplier by a screw-based adjustment system (9), **characterized in that** it comprises a pair of keying members (11, 12), of which one is borne by the attachment foot (5a) of the ring and the other by the slide (7), and which operate as means for constraining said foot and slide to move in their mating plane (P); and further comprises magnetic fastening members (13 and 14) having opposite polarities, of which one is borne by the foot (5a) of the support ring (5) and the other by the support slide (7), and which have the task of firmly fastening said ring and slide in mutual contact.

2. The quick-release fastening device of claim 1, **characterized in that** said keying members (11, 12) have a prismatic cross-section whereby a relative rotation of the support ring (5) with respect to the support slide (5) is prevented.
3. The quick-release fastening device of claim 1, **characterized in that** said keying members (11, 12) have a cylindrical cross-section whereby a relative rotation of the support ring (5) with respect to support slide (7), around an axis at right angles to their mating plane (P), is allowed.
4. The quick-release fastening device of claims 2 or 3, **characterized in that** the magnetic fastening members consist of at least one pair of permanent magnets (13, 14) placed one in front of the other and of opposite polarities.

## Claims

1. A quick-release fastening device for a braking unit (4) for weft suppliers (1) to weaving machines, said braking unit comprising a support ring (5) that is re-

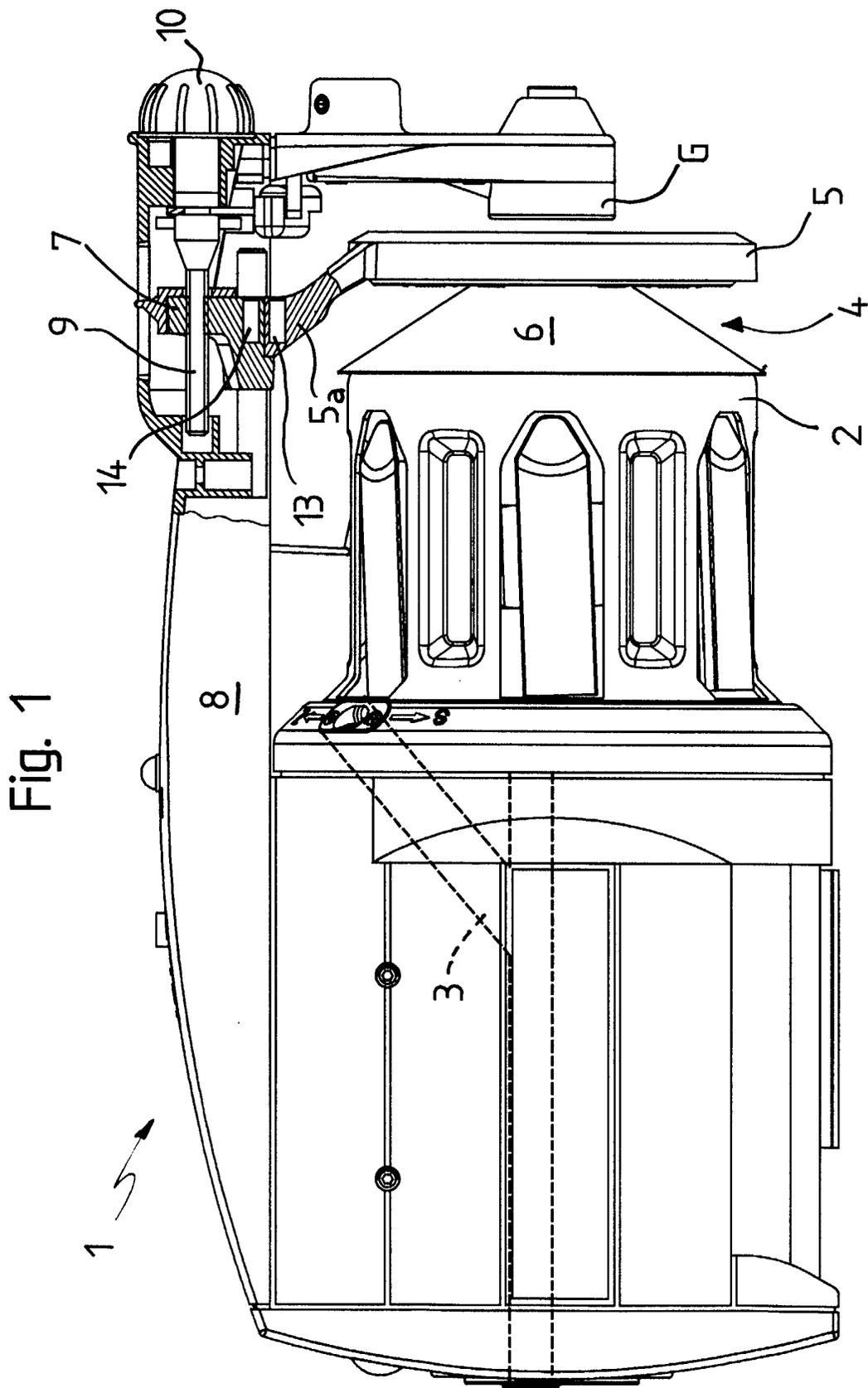


Fig. 2

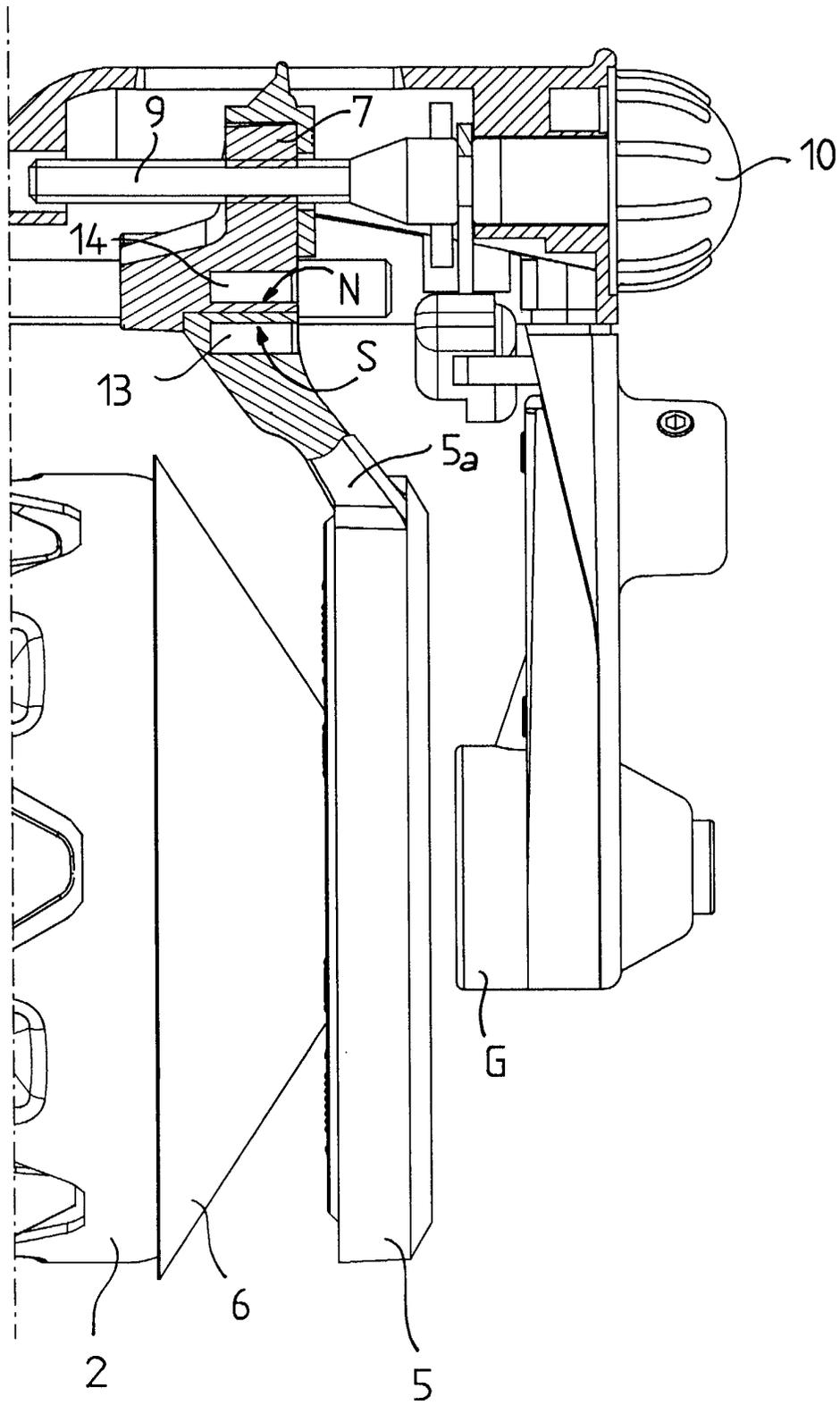


Fig. 3

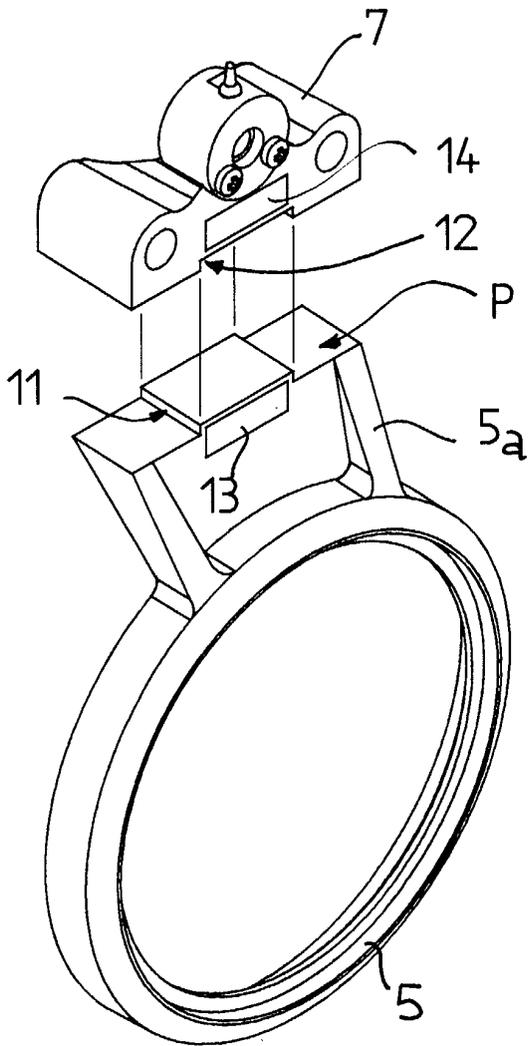
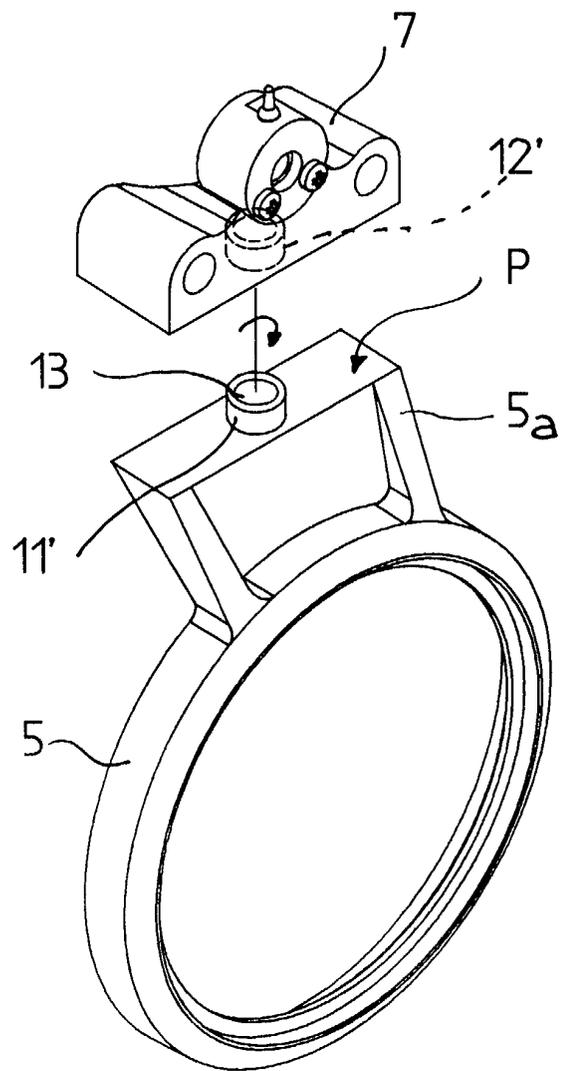


Fig. 4





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EUROPEAN SEARCH REPORT

Application Number  
EP 02 00 8614

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 754 645 A (LGL ELECTRONICS SPA) 22 January 1997 (1997-01-22) * abstract; figures 1-3 *	1-4	B65H51/22 D03D47/34
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65H D03D
The present search report has been drawn up for all claims			
Place of search <b>MUNICH</b>		Date of completion of the search <b>17 September 2002</b>	Examiner <b>Louter, P</b>
CATEGORY OF CITED DOCUMENTS		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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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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