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**D E C I S I O N**  
**of 8 July 2003**

**Case Number:** T 0286/02 - 3.2.1

**Application Number:** 96908267.6

**Publication Number:** 0819222

**IPC:** F16B31/02, H01R 4/36,  
H01R 4/38

**Language of the proceedings:** EN

**Title of invention:**  
Fastener

**Patentee:**  
B & H (Nottingham) Limited

**Opponent:**  
Arcus Elektrotechnik Alois Schiffmann GmbH

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 54, 56, 123(2)

**Keyword:**  
"Novelty (yes)"  
"Inventive step (yes)"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0286/02 - 3.2.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.1  
of 8 July 2003

**Appellant:** Arcus Elektrotechnik  
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**Representative:** Sajda, Wolf E., Dipl.-Phys.  
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**Respondent:** B & H (Nottingham) Limited  
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**Representative:** Jones, Stephen Anthony  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 24 January 2002  
rejecting the opposition filed against European  
patent No. 0819222 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** S. Crane  
**Members:** M. Ceyte  
H. Preglau

## Summary of Facts and Submissions

- I. The respondent is proprietor of European patent No. 0 819 222 (application No. 96 908 267.6).
- II. The patent was opposed by the appellant on the grounds of lack of novelty and lack of inventive step.

The following state of the art was *inter alia* cited:

D3: GB-A-2 281 599,

D5: EP-A-692 643 (state of the art according to Article 54(3) EPC),

D6: EP-A-514 924.

- III. By their decision posted 24 January 2002 the opposition division rejected the opposition.

They held that:

- (i) the subject-matter of claim 1 for the Contracting States BE, DE, DK, ES, FR, IT, NL and SE was novel over the prior filed European patent application D5,
- (ii) the subject-matter of that claim and the subject-matter of claim 1 for the Contracting State IE were inventive over the combination of prior art documents D3 and D6.

IV. On 14 March 2002 the appellant (opponent) lodged an appeal against that decision and paid the prescribed appeal fee.

The statement of grounds of appeal was filed on 3 June 2002.

V. Oral proceedings before the Board were held on 7 July 2003.

The appellant (opponent) requested that the decision under appeal be set aside and that the European patent be revoked in its entirety.

The respondent (patent proprietor) requested that the appeal be dismissed and that the patent be maintained on the basis of the following documents:

- claims 1 to 20 for the Contracting State IE as granted,
- claims 1 to 19 for the Contracting States BE, DE, DK, ES, FR, IT, NL and SE as submitted at the oral proceedings,
- description and drawings as granted.

Claim 1 for the Contracting State IE reads as follows:

" A shearable fastener (8) having a treaded shank (10) adapted for engagement with a threaded bore (4a) and a head portion (12) formed for engagement with a drive tool, the shank (10) being formed with a series of

axially separated weakenings (14) defining a series of shear planes, characterised in that the weakenings (14) are formed such that the applied torque necessary to cause the shank (10) to shear increases progressively from the shear plane furthest from the head portion (12) to the shear plane nearest the head portion (12)."

Claim 1 for the Contracting States BE, DE, DK, ES, FR, IT, NL and SE reads as follows:

"1. An electrical connector (1) comprising first and second connector parts between which an electrical conductor (2,3) may be received, and a threaded fastener (8) engageable with a threaded bore (4a) in the first connector part such that the fastener (8) may engage the conductor (2,3), either directly or through an intermediate component, and secure the conductor (2,3) against the second connector part,

the fastener (8) having a threaded shank (10) adapted for engagement with a threaded bore (4a) and a head portion (12), the fastener having drive formations for engagement with a drive tool including drive formations on the head portion (12), the shank (10) being formed with axially separated weakenings defining a series of shear planes,

characterised in that said drive formations are formed such that, in use, a series of said weakenings (14) are incapable of being supported by the drive tool, and the weakenings in said series are formed such that the applied torque necessary to cause the shank (10) to shear increases progressively from the shear plane

furthest from the head portion (12) to the shear plane nearest the head portion (12)."

VI. In support of its request the appellant made essentially the following submissions:

(i) Claim 1 for the Contracting States BE, DE, DK, ES, FR, IT, NL and SE:

An electrical connector of the type stated in the pre-characterising part of claim 1 is disclosed in the prior filed European patent application D5. The fasteners that are disclosed for use in electrical connectors may have the claimed arrangement whereby the shear torques decrease from head to tip. At column 2, lines 14 to 18 it is namely said the shear torques necessary to cause shearing at the series of axially separated weakenings may increase or decrease from the head portion to the tip of the fastener. D5 goes on to state that in a preferred embodiment the required shear torques increase from the tip. However, in the case where the required shear torques decrease from head to tip, the fastener breaks directly at the last breaking point which protrudes above the cable shoe or connector ("Falls sie abnehmen bricht direkt die letzte über den Kabelschuh oder Verbinder vorstehende Sollbruchstelle", cf column 2, lines 22 to 24).

In this alternative which clearly relates to electrical connectors, the fastener is necessarily provided with drive formations by which it is engaged by a drive tool. Although the position of

these drive formations is not stated more precisely, it is readily apparent to the skilled reader that in the circumstances and in comparison with the preferred embodiment these drive formations need only be provided on the head portion, that is in a position where, as claimed, the series of said weakenings are incapable of being supported by the drive tool.

The prior filed application D5 then in column 2 lines 31 to 33 states the following (in English translation)

"The application of the multiply-shearable bolt according to the invention is in no way limited to use in cable shoes or connectors. They can also, for example, be used to fix security devices such as grilles mounted in front of windows".

The following lines 36 to 46 at column 2 of D5, refer to the situation where no drive formations are provided on the threaded portion, so that the fastener after being sheared cannot be unscrewed from the threaded bore. This clearly means that in such a case the drive formations are necessarily provided only on the head portion of the fastener and the series of weakenings provided on the threaded shank are thus incapable of being supported by the drive tool which engages the head of the fastener.

Hence this passage of the citation confirms that in the situation where the shearing torque of the series of weakenings increases towards the head

portion the drive formations are provided only in the head portion of the fastener.

There is accordingly no difference of substance between the fastener for an electrical connector disclosed in the European patent in suit and the fastener for an electrical connector envisaged at column 2 of D5. At column 2, lines 5 to 13 of the European patent it is stated:

"When rotation of the fastener is prevented, the fastener will shear at either the shear plane immediately external to the threaded bore or at a partially supported shear plane within but immediately adjacent to the external end of the threaded bore, depending on which requires the lower shear torque. In either case, the fastener will shear substantially flush with the external end of the threaded bore with minimal length of shank standing proud of the threaded bore"

This is exactly the way in which the fastener disclosed in column 2 of D5 works.

Therefore the subject-matter of claim 1 lacks novelty having regard to this state of the art according to Article 54(3) EPC.

- (ii) the subject-matter of claim 1 for the Contracting State IE and that of claim 1 for the Contracting States other than IE are not inventive over the combination of the prior art documents D3 and D6.



All the features of the pre-characterising portion of these claims are known from D3 and when using the tool of D3 the weakenings are incapable of being supported by the drive tool. The claimed fastener differs from that disclosed in D3 only in that the shear torque required increases progressively towards the head of the fastener. Such an arrangement, however, has already been suggested to the skilled person in D6, particularly in Figures 1 and 6 which show shear points of different diameters and which are also incapable of being supported by the drive tool. Like D3 only one drive tool is required to operate the fastener of D6.

VII. The respondent (patentee) rejected the arguments brought forward by the appellant. It submitted in detail the reasons for which the subject-matter of claim 1 for the Contracting States other than IE was novel over the prior filed European patent application D5 and inventive over the combination of prior art documents D3 and D6.

### **Reasons for the Decision**

1. The appeal is admissible
2. *Article 123 EPC*

There is no formal objection under Article 123(2) EPC to the current version of claim 1 for the Contracting States other than IE.

During the oral proceedings before the Board claim 1 has been amended so as to state that the fastener has drive formations "including drive formations on the head portion".

As to the head portion having drive formations, this is simply a restatement of the original wording "head portion formed for engagement with a drive tool". Anything which is "formed for engagement with a drive tool" necessarily has drive formations.

According to page 3, line 21 et seq. of the application as filed the fastener may be driven by engagement of a drive tool with either the external surfaces of the head of the fasteners or with an internal bore. In the latter it is explicitly stated that the bore should not extend so far that the drive tool supports internally any of the shear planes (see the paragraph bridging page 3 and 4 of the application as filed).

Thus it is implicit that the threaded shank of the fastener may also have drive formations which however are formed such that the shear planes are incapable of being supported by the drive tool.

Amended claim 1 for the Contracting States other than IE represents a limitation over the corresponding claim 1 as granted insofar as it is now stated that all drive formations present, and not just those on the head portion, are of the required form, so that the requirements of Article 123(3) are met.

3. *Novelty of the subject-matter of claim 1 for the Contracting States BE, DE, DK, ES, FR, IT, NL:*

The prior filed European patent application D5 concerns shearable fasteners that are for use in a number of quite different applications, including use in electrical connections. Contrary to the respondent's view, the fasteners that are disclosed for use in electrical connectors may have an arrangement whereby the shear torques necessary to cause shearing at the series of axially separated weakenings decrease from the head portion to the tip portion. Reference is made in this respect to column 2 line 14 to 18 where it is said that the shear torques in question may increase or decrease.

Thus in the context of an electrical connector, D5 contemplates the use of a fastener with a series of shear planes corresponding to that claimed in the European patent, i.e. which are formed such that the applied torque necessary to cause the shank to shear decreases progressively from the head portion to the tip of the fastener. Therefore the crucial issue for the assessment of novelty is whether D5 discloses that this fastener has drive formations which are "formed such that, in use, a series of weakenings are incapable of being supported by the drive tool", as is claimed in claim 1 under consideration.

The appellant submitted in essence that D5 in column 2, lines 36 to 39 contemplates the use of fasteners without any drive formations on the threaded shank. It is implicit in such fasteners that drive formations must be present on the head portion and thus must be

located outside the axially separated weakenings of the threaded shank. It follows that the shear planes cannot be supported by a drive tool which engages the drive formations of the head portion. In other words, such embodiment inevitably results in a fastener defined in the characterising part of claim 1.

The Board is unable to accept such reasoning. Firstly the embodiment under consideration is only referred to in connection with security devices. Reference is made to column 2, lines 41 to 46 (in English translation):

"In this application the first shear must take place directly at the last breaking point which projects above the security device. Therefore in this case the shear torque must decrease from the head portion to the farthest thread portion". (Emphasis added)

Thus the fastener disclosed at column 2, lines 36 to 50 is used in connection with a security device, not in connection with an electrical connector.

Clearly such security device cannot destroy the novelty of the claimed electrical connector which according to the pre-characterising portion of claim 1 comprises first and second connector parts between which an electrical conductor may be received.

Secondly, D5 nowhere proposes the provision of drive formations only on the head portion of the fastener used with an electrical connector. The drive formations disclosed in this context are preferably an internal bore (column 3, lines 36 to 40). Alternatively, the formations may be external formations such as parallel

surfaces provided in the threaded portion (column 3, lines 40 to 44). In such a case the external drive formations are on the head portion and on the threaded portions (column 5, lines 11, 12). In both cases, however, it is clear from the description of the fastener in D5 including Figures 1, 3a and 3b that the drive formations extend along substantially the full length of the fastener. Where the drive formations are present on or in each threaded portion of the fastener of D5, either in the form of a lengthy internal bore or external parallel surfaces, then the intervening shear planes are necessarily capable of being supported by a drive tool.

The appellant submitted that the skilled person would also consider what was implicitly disclosed in D5 and as such would not consider the content of lines 31 to 41 of column 2 as a separate teaching having no relevance for electrical connector; in considering this embodiment the skilled person would inevitably come to a fastener for use with an electrical connector whose weakenings are incapable of being supported by a drive tool.

As stated in the short passage under consideration, where drive formations are not present on the threaded portions, the fastener after being sheared cannot be anymore unscrewed with the aid of a tool. The fact that the remaining unscrewable part of the fastener cannot be removed from the threaded bore is of particular advantage in the case of a security device but may represent a drawback where a temporary electrical connection is required to be made and then subsequently changed. In view of this the Board cannot accept that

the person skilled in the art would automatically and inevitably be led to the conclusion that when a fastener for use with an electrical connector has a series of weakenings of shear strength increasing towards the head portion, as is contemplated by column 2, lines 22 to 24, of D5, he should only provide drive formations on the head portion.

Summarising, the provision in an electric connector of drive formations on or in the fastener which are formed such that in use, the series of weakenings are incapable of being supported by the drive tool is not either expressly or implicitly disclosed in D5 and is therefore not present in this document; it does not matter whether this feature may be obvious for the skilled person since the latter consideration goes beyond the determination of novelty and involves an assessment of inventive step and would conflict with the strict approach to novelty adopted in the case law of the Boards of Appeal.

Accordingly, in the Board's judgement, the subject-matter of claim 1 is novel over this prior art according to Article 54(3) EPC.

4. *Inventive step*

- 4.1 Document D3, which represents the closest prior art, is acknowledged and evaluated in the introductory part of the European patent in suit.

This citation discloses a fastener for use in an electric connector, having a threaded shank with a series of weakenings which define shear planes. A rather complex tool cooperates with the fastener to ensure that the fastener shears in the region between the tip of the drive tool and the top of the threaded bore in which the fastener is engaged, i.e. in the region at which it is unsupported. The weakenings in the fastener of D3 all appear to shear at the same applied torque.

- 4.2 Starting from prior art document D3 the problem to be solved by the present invention may be seen in providing a fastener adapted, without the use of any special tool to shear at a point substantially flush with the upper surface of the threaded bore of the electrical connector.

This problem is in essence solved by the claimed arrangement of shear planes which is such that the applied torque necessary to cause the shank to shear increases progressively from the tip to the head of the fastener. Such arrangement is defined in claim 1 for Contracting State IE as well as claim 1 for Contracting States BE, DE, DK, ES, FR, IT and NL.

- 4.3 In D6 the fastener is provided with two axially separated breaking points, a first one in the shape of a circumferential groove formed near the tip or lower portion of the fastener and a second one near its head portion.

The first breaking point breaks, in any event, before the second one, when a predetermined friction resistance is exceeded. The second breaking point breaks after breaking of the first one, when a predetermined pressure exerted by the broken fastener is exceeded. The purpose of this arrangement is to prevent damage to the electrical conductor by rotation of the lower portion of the fastener once a certain contact pressure has been reached. Thereafter the lower portion is merely advanced axially by rotation of the head portion until the final desired contact pressure is achieved, which is determined by the second breaking point. The arrangement is thus clearly not to allow the fasteners to selectively break at one or the other of the two breaking points i.e. that which is substantially flush with the upper end of the threaded bore.

It is true that the shear torques in D6 increase from the tip to the head of the fastener, but the problem solved by this arrangement is by no means comparable with the problem underlying the present invention, i.e. that of providing a fastener adapted without the use of any special tool, to shear preferentially at a point substantially flush with the upper surface of the threaded bore. The skilled person faced with this technical problem would not thus consider the teaching of D6. This citation namely gives the skilled person no incentive to modify the known fastener of D3 in such a way that the shear torques increase from the tip to the head.



4.4 Therefore, in the Board's judgement, the subject-matter of claim 1 for the Contracting State IE and that of claim 1 for the Contracting States BE, DE, DK, ES, FR, IT and NL cannot be derived in an obvious manner from the combination of prior art documents D3 and D6 and consequently involve an inventive step (Article 56 EPC). Accordingly the patent is to be maintained on the basis of this two main claims.

The opposition grounds thus do not prejudice the maintenance of the patent in amended form.

## **Order**

### **For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent with the documents specified in point V of this decision.

The Registrar:

The Chairman:

S. Fabiani

S. Crane