

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [X] To Chairmen
(D) [] No distribution

D E C I S I O N
of 6 May 2004

Case Number: T 0380/02 - 3.2.1

Application Number: 95933516.7

Publication Number: 0786062

IPC: F16L 37/084

Language of the proceedings: EN

Title of invention:
Connector

Patentee:
Hawkins, David Frederick

Opponent:
John Guest Limited

Headword:

-

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

Keyword:
"Added subject-matter (no)"
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 0380/02 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 6 May 2004

Appellant: John Guest Limited
(Opponent) Horton Road
West Drayton, Middlesex UB7 8JL (GB)

Representative: Bayliss, Geoffrey Cyril
BOULT WADE TENNANT
Verulam Gardens
70 Gray's Inn Road
London WC1X 8BT (GB)

Respondent: Hawkins, David Frederick
(Proprietor of the patent) 5 Warwick Place
Ealing,
London W5 5PS (GB)

Representative: Hutchins, Michael Richard
M.R. Hutchins & Co.
33 Connaught Way
Tunbridge Wells, Kent TN4 9QP (GB)

Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 21 February 2002
rejecting the opposition filed against European
patent No. 0786062 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: S. Crane
Members: Y. A. F. Lemblé
G. E. Weiss

Summary of Facts and Submissions

- I. The appeal is directed against the decision of the Opposition Division to reject the opposition against European patent No. 0 786 062. The patent had been opposed on the grounds that the subject-matter of the patent extended beyond the content of the application as filed (Article 100(c) EPC) and on the grounds of lack of novelty and lack of inventive step (Article 100(a) EPC).
- II. The Opposition Division held that the grounds for opposition mentioned in Articles 100(a) and (c) EPC did not prejudice the maintenance of the patent unamended, having regard to the following documents:
- E1: US-A-4 097 129
- E5: EP-A-0 363 188
- E6: "Hawke cable glands" catalogue, July 1994
- III. On 8 April 2002 the appellant (opponent) lodged an appeal against that decision and paid the required appeal fee.
- IV. During the oral proceedings held on 6 May 2004 the appellant requested that the decision to reject the opposition be set aside and the patent revoked in its entirety. The respondent (patent proprietor) requested that the appeal be dismissed and that the patent be maintained as granted (main request) or alternatively the maintenance of the patent in amended form on the basis of one of the sets of claims according to

auxiliary requests 1,1A,2,2A and 3 filed with letter dated 6 April 2004 and auxiliary request AA filed with letter dated 7 April 2004.

V. Independent claims 1, 13, 17, 18 and 19 as granted read as follows:

1. "A connector having connected to the ends thereof a pair of conduit tubes (T) of the type which carry fibre-optics communications cables; the connector comprising a body (1, 2) having a through bore in which is disposed a fibre-optics cable (C); each end of the body having received therein an end of a conduit tube (T) for carrying the cable (C); the body having a pair of first resilient sealing means (30,34, 35) each of which encircles one of the conduit tubes (T), and compression means (1, 2, 3, 19, 24) for compressing each first resilient sealing means (30, 34, 35) against a conduit tube (T) around the circumference thereof so as to provide a substantially gas-tight seal between the body and the conduit tube (T); and a second resilient sealing means (30, 33) disposed axially between the pair of first resilient sealing means (30, 34, 35) for sealing against the fibre-optics cable (C); characterised in that the body has two main body portions (1, 2) arranged for relative axial movement therebetween, and means (3) for drawing the two main body portions (1, 2) together; and in that the second resilient sealing means (30, 33) is disposed axially between two confronting surfaces (19, 24) of the two main body portions (1, 2); the second resilient sealing means (3,33) having a through bore through which the fibre-optics cable (C) can pass when the two main body portions (1, 2) have been connected together and the

second resilient sealing means (30, 33) is in an uncompressed or lightly compressed state, the second resilient sealing means (30, 33) being compressible thereafter by tightening the two main body portions (1, 2) together so as to deform the second resilient sealing means (30, 33) radially inwardly and into sealing contact with the fibre-optic cable (C), thereby to form a substantially gas-tight seal between the body and the fibre-optic cable (C)."

13. "A connector for connecting to an end of a conduit tube of the type which carries fibre-optics communication cables; the connector comprising a body having a through bore through which a fibre-optics cable (C) may pass; at least one end of the body being arranged to receive therein an end of a conduit tube (T) for carrying the cable (C); the body having two main body portions (1, 2) arranged for relative axial movement therebetween, the two main body portions (1, 2) together defining an annular recess therebetween in which is disposed a unitary sealing member (30), the unitary sealing member (30) comprising first resilient sealing means (34, 35) for encircling the conduit tube (T), and second resilient sealing means (33), the arrangement being such that tightening the two main body portions (1, 2) together causes compression of the sealing member (30) between confronting surfaces of the respective body portions (1, 2) such that the first resilient sealing means (34, 35) is deformed radially inwardly and into sealing contact with the conduit tube (T) and the second resilient sealing means (33) is deformed radially inwardly and into sealing contact with the fibre-optic cable (C) thereby to form a substantially gas-tight seal between the body and the

conduit tube (T) and a substantially gas-tight seal between the body and the fibre-optics cable C)." ."

17. "A sealing member for use in a connector for connecting to an end of a conduit tube (T) which carries fibre-optic communication cables (C) as defined in claim 1; the sealing member (30) being formed of an elastomeric material and having a generally cylindrical shape; the sealing member having at least one end thereof an enlarged bore portion (34, 35) for encircling and receiving an end of a conduit tube (T), and a reduced diameter bore portion (33) through which a fibre-optics cable (C) may pass; the axial end surfaces (31, 32) of the sealing member (30) being inclined rearwardly from the radially inner edge thereof so as to form a frustoconical abutment surface."

18. "A sealing means for use in a connector for connecting to an end of a conduit tube (T) of the type which carries fibre-optics communication cables (C); the sealing means comprising a pair of sealing members (438, 439), each said sealing member having an enlarged bore portion for receiving an end of a conduit therein, and a reduced diameter bore portion (438c, 439c) through which a fibre-optics cable (C) may pass, and having an axial end surface (438a, 439a) which is inclined rearwardly from a radial inner edge thereof; and an annular member (490) of more rigid material than the two said sealing members (438, 439), the annular member (490) being arranged to be disposed axially between the two sealing members (438, 439), the annular member (490) being of a general bi-concave form to

assist compression and radial inward deformation of the sealing members (438, 439)."

19. "A method of forming a gas block in a fibre-optics communication line comprising a fibre-optics cable (C) disposed within a conduit tube (T), which method comprises connecting to an end of a length of conduit tube (T) a connector as defined in any one of the preceding claims, inserting a fibre-optics cable (C) into the conduit tube (T) and connector and drawing the two body portions (1, 2) of the connector together such that the first resilient sealing means (30, 34, 35) of the connector is compressed against the conduit tube (T) around its circumference to provide a substantially gas-tight seal between the connector body and the conduit tube, and the second resilient sealing means (30, 33) of the connector is compressed against the fibre-optic cable (C) so as to form a substantially gas-tight seal between the connector body and the fibre-optic cable (C)."

VI. The appellant's submissions made in writing and at the oral proceedings can be summarised as follows:

Granted claim 1 contained subject-matter which extended beyond the content of the application as originally filed. The following features of claim 1 of the patent as granted were not disclosed specifically in the application as filed:

- (i) "...a pair of first resilient sealing means each of which encircles one of the conduit tubes ..." and

- (ii) "...and compression means for compressing each first resilient sealing means against a conduit tube around the circumference thereof...".

Claim 1 as filed defined the first resilient sealing means, the conduit tube and the compression means in the singular, one sealing means and one compressing means being defined in connection with one tube. There was no suggestion that, if another tube was received in the connector body, there would be another first resilient sealing means and another compression means for compressing this first resilient sealing means against this additional conduit tube. There was no specific disclosure anywhere in the application as filed of a pair of first resilient sealing means of unspecified form each of which encircled one of a pair of conduit tubes and a compression means of unspecified form for compressing each first sealing means against a conduit tube.

The interpretation made by the Opposition Division in the passage bridging pages 3 and 4 of its decision that the arrangement comprising the collet 8, the washer 7 and the O-ring 6, as shown for example in the left-hand side of Figure 1, was a first sealing means with compression means which worked in a passive manner, was not supported by the original disclosure. As mentioned in the first paragraph of page 11 of the application as published, this arrangement was only described as constituting a "means for retaining the conduit tube within the connector body". No sealing function was intended to be provided by this arrangement, since,

when such a sealing function was required, it was explicitly mentioned as such in the original disclosure.

Granted claim 1 was not novel having regard to the prior art document E1. Figure 5A of E1 disclosed a coupling device for fibre-optics communication cables having all of the features of claim 1. The protective jackets 716,718 of E1 were clearly tubular and received fibres passing through them, they therefore constituted conduits. The body parts 712,734 constituted the claimed two main body portions arranged for relative axial movement therebetween and the thread between them the claimed means for drawing these portions together. The angled shoulder of the part 734 and the angled part of body 712 constituted the claimed two confronting surfaces. The body 712 had a pair of first resilient sealing means 712b,712c, each of which encircled one of the conduit tubes with compression means 738,740 for compressing each first resilient sealing means against a conduit tube, and a second resilient sealing means 720 for sealing against the fibre-optics cable. The body 712 had a through bore through which the fibre-optics cable could pass. The second resilient sealing means were compressible by tightening the two main body portions 712,734 together so as to deform the second resilient sealing means radially inwardly and into sealing contact with the fibre-optic cable. Screwing of the body part 734 and of the compression means 738,740 would inevitably achieve some sealing effect which would be gas tight at a certain pressure.

Granted claim 1 did not involve an inventive step. As correctly indicated by the Opposition Division, E5 represented the nearest prior art and showed all of the

features of claim 1 of the patent except for the arrangement for compressing the second resilient sealing means against the fibre-optic cable. The known deflectable seal arrangement of E5 had the drawback that there was no guarantee for the user that it worked effectively, since it was not possible to know for sure whether or not a positive engagement had taken place between the deflectable seal and the cable. Such a drawback would be noticed by a person skilled in the art seeking a seal that operated effectively over a longer period of time. Had the skilled person been asked how this drawback could be overcome, he would undoubtedly draw on knowledge from E6 which, although associated with electrical cables, was in the same general field. E6 disclosed cable glands, for example the double-headed arrangement HAWKE TYPE 153, 153T on page 34 or the HAWKE TYPE P 500 on page 38 of the catalogue, which provided a positive engagement between the seal and the electrical cable. The technical teaching given by E6 was simply to provide in two parts a body and to displace or screw them together to compress a seal arranged between them, the seal tightly engaging the cable passing through the body. Given the problem, it would be obvious to a skilled person to provide a positive engagement by adapting the second resilient seal arrangement of E5 in the manner shown in E6.

VII. The submissions of the respondent may be summarized as follows:

The appellant's contention under Article 100(c) EPC was unfounded. Features (i) and (ii) identified by the appellant were fair generalisations covered by the

embodiments disclosed in the originally filed application document.

The subject-matter of claim 1 was new over the prior art document E1. The jackets around the fibre were not conduit tubes within the meaning of claim 1. The central bore extending axially through the coupling of E1 was not of the type capable of carrying a fibre optics communication cable. There was neither an explicit nor an implicit disclosure of a substantially gas-tight seal between the body of the coupling and the fibre passing through the central bore.

The subject-matter of claim 1 involved an inventive step. Starting from a connector as known from E5, it was not obvious to replace the flexible seal in the central part of the known connector by a resilient sealing ring clamped down on the fibre-optics communications cable.

Reasons for the Decision

1. *Extension of subject-matter*

- 1.1 Claim 1 of the application as originally filed (WO-A-96/11 355, hereinafter called AF) specifies that at least an end of the connector body receives a conduit tube and that a first resilient means and compression means for compressing the resilient sealing means against that conduit tube are provided. Besides, according to the characterising part of the claim, a second compressible resilient sealing means for sealing against the fibre-optic cable is defined.

It is true that, as contended by the appellant, claim 1 as filed covers a connector body with one conduit tube connected to the connector body and one first resilient sealing means and compression means for compressing the resilient sealing means against that one conduit only. The term "at least one end of the body ... an end of a conduit tube" does not, however, limit claim 1 as filed to this sole embodiment and also covers connectors having two conduits tubes. Page 7, lines 2 to 4 of the original disclosure explicitly mentions the possibility for the connector body to have "two ends arranged to receive therein the ends of two respective conduit tubes" and the figures 1, 9, 10 and 12 of the original disclosure are all examples of connectors receiving the respective ends of two conduit tubes.

The first and second sealing means have been disclosed in several different forms in AF. With respect to one conduit tube only, AF specifies that the first and second resilient sealing means may be unitary (claim 2 as filed) or may be separate entities (claim 6 as filed).

In the case of a pair of conduit tubes respectively received in two ends of the connector body the question arises whether the features (i) "a pair of first resilient sealing means each of which encircles one of the conduit tubes" and (ii) "compression means for compressing each first resilient sealing means against a conduit tube around the circumference thereof" are disclosed in such general terms or not.

When considering the embodiment of Figure 1 of AF, the skilled reader would recognize that the radially inner

wall of the larger diameter region 34,35 of the sealing member 30 of Figure 1 correspond to the "first resilient sealing means" mentioned in claim 1 of AF and the radially inner wall of the reduced diameter region 33 of the sealing member 30 (page 13, second paragraph; page 14, last paragraph) to the "second resilient sealing means". There is a pair of such first resilient sealing means 34,35 which each encircles one of the conduit tubes T. The "compression means" of claim 1 as filed takes here the form of the axial faces 19,23 of the two connector body portions 1,2. The axial faces 19,23 are able to simultaneously compress the pair of first resilient sealing means 34,35 and the second resilient sealing means 33 constituted by a unitary sealing member.

In Figure 10 of AF, the first and second resilient sealing means are separate entities disposed at different locations and each having their respective compressing means (page 19, last paragraph of AF). On the side of the body portion 201 which can receive a first conduit tube (left-hand side of Figure 10) the first resilient sealing means are in the form of O-rings 258,259 to be compressed by the axial end surface 261 of a collet 260 (page 18, second paragraph of AF, especially the end thereof). The second resilient sealing means takes the form of a unitary sealing member 230 which also fulfils the function of a "first resilient sealing means" against the other conduit tube (not shown), the sealing member 230 providing a seal against both this other conduit tube and the fibre optic cable.

Body portion 202 on the right-hand side of Figure 10 is provided with a push-fit collet 208 (page 18, last but one line) which was already used in connection with the body portions of the previous embodiments of figures 1 to 7, 9 and which is described in AF as a conventional way of fitting a conduit tube to be received into the connector (page 11, second paragraph, especially two last lines thereof). AF mentions in page 2, last but one paragraph that such known conventional push-fit connections were not always absolutely air-tight and were replaced by screw collar compression mechanisms, in which a resilient sealing member such as an O-ring is clamped down onto the conduit tube, to give the necessary gas-tight seal between tube wall and connector wall (page 3, lines 1 to 8 of the last paragraph). It is such a screw collar compression mechanism which is used as "first resilient sealing means" on the left-hand side of Figure 10 of AF (see also claim 8 of AF). The last paragraph of page 22 of AF notes that, among the numerous alterations to be made without departing from the principles of the invention, the push-fit connection mechanism at either end of the connector could be replaced by a compression mechanism involving screw collars. Consequently, the push fit collet mechanisms of the figures 1 to 11 of AF may be replaced by compression collar mechanisms which, as seen above, can be considered as "first resilient sealing means" and "compression means" within the meaning of the preamble of claim 1 as filed.

It follows that there is at least an implicit disclosure in AF of a pair of first resilient sealing means each of which encircles one of the conduit tubes and individual compression means for compressing each

first resilient sealing means against its respective conduit tube. The contention of the appellant that the above mentioned features (i) and (ii) of granted claim 1 were not disclosed in the application as filed is therefore not founded.

1.2 With respect to claim 1 as filed, the addition of the supplementary feature that the second resilient means are disposed axially between a pair of first resilient means has also been objected to by the appellant in his notice of appeal. This feature is clearly a further restriction of the subject-matter defined by claim 1 as filed. Since the appellant did not dispute that there is a positive basis for it in the originally filed documents, it cannot be seen in which way the introduction of the feature in question represents added subject-matter.

1.3 Similar considerations apply to the feature "the second resilient sealing means has a through bore through which the fibre-optics cable can pass when the two main body portions have been connected together and the second resilient sealing means is in an uncompressed or lightly compressed state". The appellant did not contest that this feature was not disclosed in the description as originally filed. Since the feature is clearly a further restriction of the subject-matter defined by claim 1 as filed and applies for all of the embodiments disclosed, the introduction of that feature in granted claim 1 does not represent added subject-matter.

1.4 The Board concludes from the above that granted claim 1 does not contravene Article 123(2) EPC.

2. *Novelty*

The Board cannot follow the contention of the appellant that all of the features of granted claim 1 were recognizable in the coupling device of E1.

E1 discloses a coupling device for splicing a pair of individual optical fibres having each a protective jacket around them (column 1, lines 6 to 65). The jackets of each fibre cannot be considered as "conduit tubes" within the meaning of claim 1 because they are fixed around each optical fibre to only fulfil a protective function and are not capable of letting the optical fibre move and pass through them, as the word "conduit" in the context of claim 1 implies.

The coupling of E1 is not of the type capable of carrying a fibre optics communication cable, the word "cable" implying the provision of multiple fibres assembled in a bundle. With respect to the size of the coupling and under consideration of the order of magnitude mentioned in column 2, lines 63 to 68 of E1, the size of the bore 720 must be of the order of a tenth of a millimetre. This is not a size adapted for letting a fibre optics communications cable pass through it (compare the size of the bore 20 in Figure 1 to that of the multiple fibres forming the communication cable mentioned on column 2, lines 32 to 33 and shown in Figure 4 of E1). The coupling device of E1 is therefore not a connector of the type capable of carrying fibre-optics communications cables as required by the introductory part of claim 1.

The coupling device of E1 is entirely formed of a flexible and resilient moulded plastic material, such as polyethylene or polypropylene. A central bore extending axially through the device is shaped to receive one end of one single optical fibre to be placed in end to end abutment with the end of another single optical fibre, the protective jacketing material of each fibre having been removed for that purpose. A threaded nut 34 with a tapered part is mounted for rotation on the central portion of the coupling in order to compress that central portion. The aim of this compression is to ensure a good alignment and minimize lateral separation of both fibre tips in order to obtain a good transmission of the optical signal from one optical fibre to the other (column 1, lines 9 to 29). There is neither an explicit nor an implicit disclosure of a substantially gas-tight seal between the body and the fibre. The assertion of the appellant, that some gas tight sealing effect would be achieved, is pure conjecture.

It follows from the above considerations that the subject-matter of claim 1 is novel with respect to E1 (Article 54 EPC).

3. *Inventive step*

The Board agrees with the Opposition Division and the parties that the nearest prior art for the evaluation of inventive step is represented by the document E5 which discloses the features of the preamble of independent claim 1.

The argumentation of the appellant in support of its contention of lack of inventive step relies in the first place on the assumption that the known deflectable seal arrangement of E5 had a drawback (no guarantee for the user that it worked effectively) and that this drawback would be noticed by a person skilled in the art.

Within the context of the installation of fibre-optics communication lines of the type mentioned in the preamble of claim 1 (tubes carrying fibre-optics cables), the Board is not convinced that the skilled person would consider the seal arrangement of E5 as having the mentioned drawback. In E5, emphasis is put on the flexibility of the second seal leaving the transmission cable intact in order to permit its insertion by a pneumatic, a pulling or drawing method and its further re-installation or replacement (see claim 1 and column 1, lines 15 to 25). It is questionable whether the skilled person would depart from the fundamental idea taught by E5, which is to use an "automatic" flexible second seal. There seems therefore to be no incentive to modify the connector of E5, especially by departing from the idea of an "automatic" sealing.

Even if it was assumed that the skilled person had sought a more effective alternative to the "automatic" second seal of E5, the Board is not convinced that he would consider the catalogue E6 as the solution to this problem. The cable gland "HAWKE TYPE 153, 153T" of E6 is intended for armoured cables and has a compressible seal for engaging an outer sheath of the cable and a compressible seal for engaging the inner sheath thereof.

This type of gland is used to seal an electrical cable passing through a bulkhead or wall. In the opinion of the Board, equating of the outer sheath of the electrical cable to a conduit for a fibre optics cable and of the inner sheath to that fibre optics cable is inappropriate. In practice the outer and inner sheaths of an electrical cable are firmly associated with each other and will normally be deployed together, it being necessary to remove a section of the outer sheath of the cable to give access to the inner sheath. As indicated above the claimed invention relates however to an arrangement which allows the subsequent installation of a fibre optics cable within a separate conduit made up of lengths of conduit tube joined by connectors.

Furthermore, the diameter of the fibre optic cable is typically substantially smaller than the internal diameter of the conduit tube in which the cable is carried. A fibre optics cable is a fine, relatively fragile line which may be easily kinked or damaged in a way which is detrimental to the passage of light along it. No equivalent difficulties are associated with electrical cables.

The appellant asserted that the technical teaching contained in E6 was to displace axially apart two portions of a body in order to compress a seal arranged between them. Such a formulation of the teaching of E6 is not an objective one and relies on an *ex-post facto* analysis. The sealing mechanism disclosed by the glands of catalogue E6 is a so-called screw collar compression mechanism which is well known and consists of a resilient sealing ring carried by a gland body and

compressed down by a screw collar fitted inside the gland body from one end thereof. Screwing of the collar deforms the ring onto a cable passing through it, giving the necessary tightness between cable and the body of the gland. This is all that can be seen in the "HAWKE TYPE P500 " gland. A mechanism based on the same principle is mentioned for example on column 2, lines 9 to 14 of the patent.

An obvious application of the teaching of E6 on the sealing arrangement of E5 would be to replace the push-fit connections 5,6 by such screw collar compression mechanisms in order to obtain a more effective gas-tight seal between tube wall 7 and connector wall 1. Starting from a connector of the type carrying fibre-optics communication cables as known from E5, the Board is unable to recognise as obvious the replacement of the second flexible seal in the not easily accessible central portion of the unitary body 1 by a screw collar compression sealing mechanism. In the Board's view, the idea of splitting the body 1 of the connector of E5 into two axially movable portions which should not be allowed to rotate relative to each other, for the purpose of compressing a seal arranged between them, implies a capacity of abstraction which goes beyond the field of normal practice of the average skilled person and is a thought process which is not devoid of creativity.

In view of the series of intellectual hurdles a person skilled in the art starting from the connector of E5 would have had to overcome in order to come to the subject-matter of claim 1, the latter cannot be considered as obvious.

The Board concludes that the subject-matter of claim 1 as granted involves an inventive step (Article 56 EPC).

4. The independent claims 13, 17 , 18 and 19 were not objected to by the appellant. The above conclusions regarding novelty and inventive step apply equally to these claims. The dependent claims 2 to 12 and 14 to 16 relate to further developments of the inventive concept disclosed in the respective independent claim and likewise meet the requirements of the EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

S. Fabiani

S. Crane