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Datasheet for the decision of 25 September 2014

Case Number: T 1488/10 - 3.4.03

Application Number: 03731470.5

Publication Number: 1558404

IPC: B06B3/00, B23K20/10

Language of the proceedings: EN

Title of invention:
ULTRASONIC HORN ASSEMBLY STACK COMPONENT CONNECTOR

Applicant:
KIMBERLY-CLARK WORLDWIDE, INC.

Headword:

Relevant legal provisions:
EPC 1973 Art. 54, 56, 111(1)

Keyword:
Remittal to the department of first instance - (no)
Novelty - main request
(yes) determining the content of the prior art taking drawings into account
Inventive step -
(no) main request and first to fourth auxiliary requests

Decisions cited:
G 0010/93, T 0204/83

Catchword:
Determining the content of the prior art taking drawings into account (see point 3 of the Reasons).

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Case Number: T 1488/10 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 25 September 2014

Appellant: (Applicant)	KIMBERLY-CLARK WORLDWIDE, INC. 401 North Lake Street Neenah, WI 54956 (US)
Representative:	Hughes, Andrea Michelle Dehns St Bride's House 10 Salisbury Square London EC4Y 8JD (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 29 March 2010 refusing European patent application No. 03731470.5 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	G. Eliasson
Members:	T. M. Häusser
	P. Mühlens

Summary of Facts and Submissions

I. The appeal concerns the decision of the examining division refusing the European patent application No. 03 731 470 for lack of novelty in relation to the main and first auxiliary request then on file (Articles 52(1) and 54 EPC). The second auxiliary request then on file was "not further considered" (Article 114(2) and Rule 116(1) EPC).

II. Reference is made to the following documents:

D1: GB 2 140 345 A,
D2: GB 2 030 819 A,
D3: EP 1 050 347 A,
D4: US 5 171 387 A.

III. At the oral proceedings before the board the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request or on the basis of one of the first to third auxiliary requests, all filed with letter dated 20 August 2014, or on the basis of the fourth auxiliary request filed during the oral proceedings.

The appellant further requested to remit the case to the department of first instance for further prosecution, as the case had never been discussed in the first instance with D1 as a starting point.

The board decided not to remit the case to the department of first instance.

IV. The wording of independent claim 1 according to the main request and the auxiliary requests is as follows (board's labelling (i), (i)', (ii), (ii)' and (iii)):

Main request:

"1. An ultrasonic horn assembly (10) for transporting ultrasonic energy to an operating location to apply the ultrasonic energy to at least one article at the operating location, the horn assembly comprising:
a first stack component (12; 14; 16; 18) having at least one transfer face;
a second stack component (12; 14; 16; 18) having at least one transfer face adapted to engage the transfer face of the first stack component at an interface (26; 28; 30) for transmitting ultrasonic energy from one of the first and second stack components to the other;
characterized by a connector (20; 22; 24) which connects the first stack component to the second stack component by applying opposing clamping forces originating at locations within the first and second stack components, which opposing clamping forces oppose each other across the interface (26; 28; 30), and

(i) which connector is free of connection to at least one of the first and second stack components along a segment (32) of the connector passing through a plane defined by the interface

(ii) wherein the segment (32) of the connection which is free of connection constitutes between 50% and 75% of an overall length of the connector."

First auxiliary request:

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that feature (i) is replaced by the following feature:

(i)' "which connector is free of connection to at least one of the first and second stack components along a segment (32) of the connector passing through a plane defined by the interface such that no clamping forces are applied at the interface, and".

Second auxiliary request:

Claim 1 of the second auxiliary request differs from claim 1 of the main request in that the following feature is added:

(iii) "and wherein the connector comprises a stud that has an overall length of between 1.9 cm and 5 cm".

Third auxiliary request:

Claim 1 of the third auxiliary request differs from claim 1 of the second auxiliary request in that feature (i) is replaced by feature (i)'.

Fourth auxiliary request:

Claim 1 of the fourth auxiliary request differs from claim 1 of the main request in that feature (ii) is replaced by the following feature:

(ii)' "wherein the segment (32) of the connection which is free of connection has a length of 2 cm and wherein the connector comprises a stud that has an overall length of between 3 cm and 4 cm."

V. The appellant argued essentially as follows:

a) Procedural matters - request for remittal of the case to the department of first instance

Inventive step had never been discussed before the examining division with document D1 as a starting point. The case should therefore be remitted to the department of first instance in order to safeguard the assessment of inventive step over document D1 in two instances.

b) Main request - novelty / inventive step

The fact that the relative lengths of the slits as measured from the Figures of document D3 corresponded to the relative lengths as described was mere coincidence. Furthermore, the description of D3 only related to the relative lengths of the slits and provided no indication that this was relevant for the length of the threaded section of the stud relative to the smooth section. Moreover, the relative lengths of the threaded and smooth sections were different in Figures 1, 4, and 8 even though these Figures were described to depict identical transducers (except for the fastening to the cleaning tank). No technical teaching could thus be derived from measurements taken from the Figures of D3. Feature (ii) of claim 1 had therefore not been disclosed in D3. This feature had not been disclosed in documents D1 and D4, either.

Document D1 constituted the closest state of the art. The problem addressed by the invention was to mitigate the wear on the transfer faces of the stack components whilst ensuring good transfer of ultrasonic energy across the interface between the components. This was

solved by including feature (ii) which ensured that there was a substantial unconnected length in the region of the interface and that the clamping point was moved deeper into the components.

Documents D3 and D4 related to different arrangements, for example in D3 a bolt was needed at one end. Since neither document D3 nor document D4 disclosed feature (ii), it would not be possible to arrive at the present invention by combining D1 with either D3 or D4. Furthermore, as document D1 was concerned with different problems and had different aims, there would have been no reason to have selected the claimed construction. In particular, the structure of the thread in document D1 was selected to avoid fracturing the stud itself and to enhance its fatigue strength. The considerations in designing the thread were therefore necessarily different from those of the invention. Furthermore, in document D1 it was taught that the threaded portion had "at least" a certain length (page 3, line 123 - page 4, line 3) thus suggesting that a longer threaded portion was preferable. This pointed away from the invention.

The subject-matter of claim 1 of the main request was therefore new and involved an inventive step.

c) Auxiliary requests - novelty / inventive step

The additional feature (iii) in combination with feature (ii) achieved to solve the problem stated above by ensuring that the clamping faces were more uniformly distributed across the interface.

Feature (ii)' achieved the particular improvements as shown in the Figures. There were no indications in the

prior art documents to select a connector having these particular characteristics.

The subject-matter of claim 1 of each auxiliary request was therefore new and involved an inventive step.

Reasons for the Decision

1. The appeal is admissible.

2. Procedural matters - request for remittal of the case to the department of first instance

2.1 The appellant argued that inventive step had never been discussed before the examining division with document D1 as a starting point and that the case should therefore be remitted to the department of first instance in order to safeguard the assessment of inventive step over these documents in two instances.

2.2 According to Article 111(1) EPC 1973 a board of appeal "may either exercise any power within the competence of the department which was responsible for the decision appealed or remit the case to that department for further prosecution". This article confers the discretionary power on a board of appeal in charge of reviewing the decision of an examining division refusing an application either to rule on the case itself or to remit the matter for further prosecution to the examining division, depending on the circumstances of the case (see G 10/93, paragraph 5 of the Reasons).

Furthermore, in ex parte proceedings, where the departments of both instances must ensure that the conditions for patentability are met, the boards of appeal are restricted neither to examination of the grounds for the contested decision nor to the facts and evidence on which the decision is based (see G 10/93, paragraph 3 of the Reasons).

2.3 In the present case, the application was refused on the ground of lack of novelty in view of document D3 in relation to the main and first auxiliary requests then on file. However, during the examination proceedings the examining division expressed its opinion that the subject-matter of claim 1 filed with the letter dated 21 August 2007, which essentially corresponds to claim 1 of the main request, lacked inventive step in view of document D1 (see points 2. to 4. of the examining division's communication dated 31 August 2007). The same objection is also mentioned in the annex to the summons dated 16 October 2009 to attend the oral proceedings before the examining division (see point 7. of the annex).

The objection of lack of inventive step over D1 had therefore already been raised during the examination proceedings and there is no indication on file that the examining division had changed its opinion in this respect. The mere fact that this objection was not included as a further ground for refusal in the contested decision does not warrant remittal of the case to the department of first instance, especially as the outcome of the case before the board is - for the reasons provided in detail below - the same as that before the department of first instance.

2.4 Finally, it is also noted that the request for remittal was made for the first time at the oral proceedings before the board, i. e. after the appellant had made a written reply, including amended claims, to the inventive step objection raised by the board in its communication annexed to the summons to oral proceedings.

2.5 Therefore, in the interest of efficient proceedings, also in view of the fact that the board was already engaged in the oral proceedings when the request for remittal was first made, and in order to avoid keeping the public in uncertainty about the fate of the application for potentially several more years, the board judges that the case is not to be remitted to the department of first instance.

3. Main request - novelty in view of document D3

3.1 In the decision under appeal the examining division held that feature (ii) of claim 1 of the main request had been disclosed in document D3, namely in Figure 4 and certain parts of the description.

3.2 Figure 4 of document D3 illustrates the essential parts of the ultrasonic transducers 80 of document D3, such as masses 82, 84, piezoelectric ceramics 86, 88, stud 85, nut 87, and electrodes 81, 83. As such it is generally considered to be a schematic drawing commonly used in patent applications.

3.3 Also shown in Figure 4 are the longitudinal length L1 of the front mass 82 and the depth L2 of the slits 82a. In view of the fact that the ratio of these lengths as measured from Figure 4 coincides essentially with the ratio of these lengths as described in paragraph [0026]

of the description the examining division concluded in the contested decision that - at least in the longitudinal direction - the relative dimensions as shown in Figure 4 could be considered as conforming to the relative dimensions of the real device (point 3.1.3 of the Reasons of the contested decision).

3.4 The length L1 of the front mass 82 as well as the depth L2 and the width t of the slits 82a play a particular role in the ultrasonic transducers of document D3. This is reflected by the fact that the references "L1", "L2" and "t" are shown in Figure 4. In particular, the ratio of the lengths L1 and L2 is considered to be an important parameter allowing - when duly chosen - the mechanical quality factor ("Qmeff") of the ultrasonic transducer to be improved (see D3, paragraphs [0005] and [0010]). Therefore, it can be expected that these lengths are represented in such a way in Figure 4 that the ratio of their representations is in accordance with the ratio of the lengths mentioned in the description. As the ratio L2/L1 is described to have a value of between 1/3 and 1/2 (D3, paragraph [0010], claim 2), the ratio of the representations can be expected to fall into this range as well.

3.5 However, the dimensions of the other parts of the ultrasonic transducer shown in Figure 4 have to be distinguished from L1, L2, and t. First of all, they are not referred to by any reference signs in the Figure. Furthermore, they are not described as having any specific significance for the claimed invention. For example, no advantages are mentioned in the description concerning particular choices of the dimensions of these other parts.

Regarding the representation of the dimensions of these other parts of the device, factors like the clear visibility in the Figure of these parts may well have induced the draughtsman to represent their dimensions in a manner that does not correspond to their actual dimensions. Therefore, in relation to these other parts of the ultrasonic transducer, the board is of the opinion that dimensions obtained merely by measuring the schematic drawing in Figure 4 does not form part of the disclosure of document D3 (see T 204/83, point 7 of the Reasons).

Accordingly, the relative dimensions of the length of the stud 85 and the length of the connection-free part thereof, as obtained by carrying out measurements on Figure 4 does not constitute part of the disclosure of document D3. Hence, feature (ii) of claim 1 of the main request has not been disclosed in document D3.

3.6 The subject-matter of claim 1 of the main request is therefore considered to be new over document D3 (Article 52(1) EPC and Article 54(1) EPC 1973).

4. Main request - inventive step

4.1 Closest state of the art

Document D1 is conceived for the same purpose as the claimed invention, namely for providing an ultrasonic horn assembly for transporting ultrasonic energy to an operating location, and has the most relevant technical features in common with it, as will be shown in detail below. In agreement with the appellant's opinion, document D1 is therefore considered as the closest state of the art.

4.2 Distinguishing features

4.2.1 Document D1 discloses (page 2, line 102 - page 4, line 48; Figures 1-3) an ultrasonic heel attaching machine comprising a frame 10 on which is supported a shoe support 12 on which a shoe S can be supported. The shoe support 12 is hollow and accommodates a horn assembly 20 connected to an ultrasonic transducer 24 which is supported within the shoe support 12 and is operatively connected to a power source. The transducer 24 is rigidly secured to a booster member 26 at its lower end by means of a stud 46, opposite ends of which are received in threaded bores in abutting end faces of the booster member 26 and transducer 24. Similarly, at the upper end of the booster member 26, a further extension member 30 is similarly connected to the booster member 26. The extension member 30 has secured to its upper end a horn member 32 having a work-engaging surface.

The horn member 32 is secured to the extension member 30 by means of a stud 34 having two threaded portions 36, 38 and an intermediate, unthreaded portion 40, which has a diameter that does not exceed the core diameter of either of the threaded portions 36, 38. The lower threaded portion 36 is received in the upper end of the threaded bore 42 formed in the upper end of the extension member 30 and the upper threaded portion 38 is received in a threaded bore 44 formed in the horn member 32. In order to mitigate any tendency to fracture in the stud 34 or in the member 30, the thread of each of the threaded bores 42, 44 is spaced from the end surface of its member by a distance equal to not less than two turns of the thread. This has the effect of avoiding subjecting the members in the vicinity of their abutting surfaces to any distortion-creating

forces, so that the faces can lie flat and in intimate contact with one another.

4.2.2 Using the wording of claim 1 of the main request, document D1 discloses an ultrasonic horn assembly (horn assembly 20) for transporting ultrasonic energy to an operating location to apply the ultrasonic energy to at least one article (shoe S) at the operating location, the horn assembly comprising:
a first stack component (extension member 30) having at least one transfer face (upper face of extension member 30);
a second stack component (horn member 32) having at least one transfer face (lower face of horn member 32) adapted to engage the transfer face of the first stack component at an interface for transmitting ultrasonic energy from one of the first and second stack components to the other;
a connector (stud 34) which connects the first stack component (extension member 30) to the second stack component (horn member 32) by applying opposing clamping forces originating at locations (points of interaction of threaded portions 36, 38 of stud 34 with bores 42 and 44, respectively) within the first and second stack components, which opposing clamping forces oppose each other across the interface, and which connector (stud 34) is free of connection to at least one of the first and second stack components along a segment (intermediate, unthreaded portion 40) of the connector passing through a plane defined by the interface.

4.2.3 The subject-matter of claim 1 of the main request differs from the device of the closest prior art document D1 by feature (ii) specifying that the segment of the connection which is free of connection

constitutes between 50% and 75% of an overall length of the connector.

4.2.4 Objective technical problem

The appellant argued that the problem addressed by the invention was to mitigate the wear on the transfer faces of the stack components whilst ensuring good transfer of ultrasonic energy across the interface between the components.

From the description of the application it emerges that the clamping point has to be moved deep into the stack components in order to achieve a uniform distribution of clamping forces across the interface (see page 9, lines 14-17 of the description of the application). In this way fretting, spalling and oxidation is substantially reduced or eliminated at the interfaces and the energy transfer at the interface is improved (see the description, page 10, line 31 - page 11, line 7).

Therefore, the problem mentioned by the appellant of mitigating wear and ensuring good energy transfer depends on the clamping point being moved deep into the stack component. However, by merely specifying that the connection-free segment of the connector is between 50% and 75% of the overall length of the connector it is not ensured that the clamping point is in fact moved deep into the stack component. Rather, in order to achieve this the length of the connector and the dimension of the stack component would have to be specified as well. The problem mentioned by the appellant is therefore not solved over the entire extent of the claimed subject-matter. Hence, the problem has to be formulated in a less ambitious way.

In document D1 there is no disclosure regarding the length of the unthreaded portion 40 of the stud 34 in relation to the entire length of the stud 34. The objective technical problem is therefore considered to be to provide a concrete implementation of the connection between the stack components.

4.2.5 Obviousness

The appellant argued that the structure of the thread of the stud in document D1 was selected to avoid fracturing of the stud itself; the considerations in designing the thread were therefore different from those of the invention.

According to document D1, the object of mitigating any tendency to fracture in the stud is achieved by the stud having a smooth-surfaced intermediate portion having a diameter not exceeding the core diameter of either of the threaded portions of the stud (see document D1, page 1, lines 60-78). Providing a concrete implementation of the connection between the stack components is entirely compatible with this object of document D1 and will necessarily result in the stack components being connected by a stud having reduced tendency to fracture.

Furthermore, the appellant argued that in document D1 it was taught that the threaded portion had "at least" a certain length thus suggesting that a longer threaded portion was preferable, which pointed away from the invention.

Indeed, it is indicated in document D1 that the length of the threaded portion 36 of the stud 34 was

preferably at least 1.5 or 2 times the diameter thereof when the extension member 30 is made of titanium or aluminium, respectively (D1, page 3, lines 121-128). However, this preferable size of the threaded portion 36 is compatible with the connection-free segment of the connector constituting between 50% and 75% of the overall length of the connector. A longer threaded portion merely has to be compensated by a correspondingly longer unthreaded portion. Hence, the above indication in D1 is not considered to point away from the invention.

Moreover, it is also indicated in document D1 that the thread of each of the threaded bores 42, 44 is spaced from the end surface of its member by a distance equal to not less than two turns of the thread in order to avoid subjecting the members in the vicinity of their abutting surfaces to any distortion-creating forces (D1, page 4, lines 39-48), thus implying that the unthreaded portion 40 of the stud 34 has to have at least a certain length. In the board's judgment it would therefore be obvious for the skilled person to implement the stud 34 of document D1 in such a way that the unthreaded portion 40 of the stud 34 constitutes between 50% and 75% of the overall length of the stud thereby arriving at the claimed subject-matter.

Therefore, the subject-matter of claim 1 of the main request does not involve an inventive step (Article 52(1) EPC and Article 56 EPC 1973).

5. First auxiliary request - inventive step

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that feature (i) is replaced by feature (i)' (see point V. above), i. e. by

the indication that the connector passes through a plane defined by the interface "such that no clamping forces are applied at the interface".

In document D1 it has been disclosed that the unthreaded portion 40 of the stud 34 is at the interface between the extension member 30 and the horn member 32 (D1, page 1, lines 66-78; page 3, lines 109-121) and that the thread of each of the threaded bores 42, 44 is spaced from the end surface of its member by a distance equal to not less than two turns of the thread in order to avoid subjecting the members in the vicinity of their abutting surfaces to any distortion-creating forces (D1, page 4, lines 39-48).

Therefore, it has been disclosed in document D1 that the connector (stud 34) passes through a plane defined by the interface (abutting surfaces) such that no clamping forces (distortion-creating forces) are applied at the interface.

Hence, the subject-matter of claim 1 of the first auxiliary request differs from the device of the closest prior art document D1 by feature (ii) and does not involve an inventive step for the reasons mentioned under point 4 above (Article 52(1) EPC and Article 56 EPC 1973).

6. Second auxiliary request - inventive step

6.1 Claim 1 of the second auxiliary request differs from claim 1 of the main request in that feature (iii) relating to the connector comprising a stud having an overall length of between 1.9 cm and 5 cm is added.

The subject-matter of claim 1 of the second auxiliary request differs from the device of the closest prior art document D1 by features (ii) and (iii).

6.2 It follows from the above (see point 4.2.4) that the subject-matter of features (ii) and (iii) alone does not ensure that the clamping point is in fact moved deep into the stack component. The objective technical problem is therefore still considered as to provide a concrete implementation of the connection between the stack components.

6.3 It is considered to be obvious to arrive at the parameter range of feature (ii) for the reasons set out under point 4.2.5 above.

Moreover, document D1 relates to a machine for attaching the heel H of a shoe S, i. e. an object with dimensions on the order of tens of centimeters. The extension member 30 and the horn member 32 are therefore considered to have dimensions of the same order. It would thus be natural to choose the stud 34 for connecting these members to have an overall length of between 1.9 cm and 5 cm (see feature (iii)) in order to implement the connection between the members.

Therefore, the subject-matter of claim 1 of the second auxiliary request does not involve an inventive step (Article 52(1) EPC and Article 56 EPC 1973).

7. Third auxiliary request - inventive step

Claim 1 of the third auxiliary request differs from claim 1 of the second auxiliary request in that feature (i) is replaced by feature (i)', which is found to be disclosed in document D1 (see point 5 above).

Hence, the subject-matter of claim 1 of the third auxiliary request differs from the device of the closest prior art document D1 by features (ii) and (iii) and does not involve an inventive step for the reasons mentioned under point 6 above (Article 52(1) EPC and Article 56 EPC 1973).

8. Fourth auxiliary request - inventive step

Claim 1 of the fourth auxiliary request differs from claim 1 of the main request in that feature (ii) is replaced by feature (ii)' relating to the connection-free segment having a length of 2 cm and the connector comprising a stud having an overall length of between 3 cm and 4 cm, which is a concrete implementation of the subject-matter of claim 1 of the second auxiliary request in a somewhat narrower range of the overall length of the connector.

Hence, the subject-matter of claim 1 of the fourth auxiliary request differs from the device of the closest prior art document D1 by feature (ii)'. Since claim 1 of the fourth auxiliary request still does not specify any dimensions of the first and second stack components, it follows from the discussion under point 4.2.4 above that the objective technical problem is also here to provide a concrete implementation of the connection between the stack components. For the same reasons as set out under point 6 above, the board finds that the subject-matter of claim 1 of the fourth auxiliary request does not involve an inventive step (Article 52(1) EPC and Article 56 EPC 1973).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

S. Sánchez Chiquero G. Eliasson

Decision electronically authenticated