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D E C I S I O N
of 8 May 1995

Case Number: T 0559/93 - 3.5.2

Application Number: 86200325.8

Publication Number: 0195472

IPC: H01R 13/56

Language of the proceedings: EN

Title of invention:
Electrical plug

Patentee:
Philips Electronics N.V.

Opponent:
Josef Feller und Karl Neumayer, Erzeugung und Vertrieb von Kabeln, Drähten, isolierten Leitungen und Elektromaterial, Gesellschaft mbH.

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Public prior use not contested"
"Inventive step - no"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0559/93 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 8 May 1995

Appellant: (Proprietor of the patent)
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Respondent: (Opponent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office dated 8 April 1993 revoking European patent No. 0 195 472 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: W. J. L. Wheeler
Members: A. G. Hagenbucher
C. Holtz

Summary of Facts and Submissions

I. The Appellant contests the decision of the Opposition Division to revoke the European patent No. 0 195 472 on the ground that the subject-matter of Claim 1 filed during the oral proceedings on 18 January 1993 did not involve an inventive step.

II. Claim 1 is worded as follows:

"1. An electrical plug, comprising a base (1) and a plurality of substantially parallel connection pins (3) which project from the front thereof and which are connected to conductors (7) of a connection cable (9) via connection points (5), said cable extending from the base in a direction substantially perpendicular to the connection pins, the base being accommodated in a plastics plug body (21) which leaves free the portions of the connection pins which project from the front of the base, **characterized in that**

(a) the base (1) and plug body (21) are flexible so that, when the plug is in an appropriate socket, a tensile force in the cable exerted approximately perpendicularly to the pins would distort the plug,

(b) the minimum tensile force required for distorting the plug being less than the tensile strength of the cable and

(c) in that the tensile strength of the cable is less than the break-out strength of a pin."

As filed, this claim is drafted as a single, continuous paragraph; the arrangement of the characterizing part in three sections and the letters (a), (b) and (c) have been introduced by the Board for ease of reference.

III. The reasons given in the decision under appeal were based on a prior use plug (type XVI, CEE7), for which the following evidence was submitted in the course of the proceedings before the Opposition Division:

A: Prüfbericht der Prüf- und Versuchsanstalt der Elektrizitätswerke Österreichs of 17 October 1990 for plug type XVI (CEE7).

B: Zeichengenehmigungs-Ausweis der VDE-Prüfstelle of 5 July 1979.

C: Thirteen invoices for plug type XVI.

D: Sectional view of plug type XVI (variant II:CEE7).

Public prior use of this plug type XVI (CEE7) has not been contested by the Appellant.

IV. The Appellant (Patentee) argued that the plug defined in the above Claim 1 differed from that of the prior use plug in that according to Claim 1 the cable extended from the plug base in a direction substantially perpendicular to the connection pins whereas in the prior use plug the cable extended parallel to the pins. A plug was often removed from the wall outlet by pulling its cable without bending. Since the cable of the prior use plug extended substantially parallel to the pins, one would pull in this direction. Hence, a person skilled in the art would consider the test results of the prior use plug for pulling perpendicular to this direction (cf. evidence (A)) as unrealistic. He would not draw any conclusion from the prior use plug for the construction of a plug according to the patent which may be pulled out by means of a cable extending in a direction substantially perpendicular to the connection pins.

V. The Appellant requested that the decision under appeal be set aside and auxiliarily offered to replace the words "approximately perpendicularly to the pins" in Claim 1 (column 4, line 50 of EP-B-195 472) by the expression "substantially in the longitudinal direction of the cable".

VI. According to the Respondent, laymen would pull the cable of a plug in various directions. Plugs could be stressed by household appliances hanging on them after an accidental fall. Designers of plugs had therefore to consider the worst case conditions. One of these conditions was when the cable of a plug was pulled in a direction substantially perpendicular to the connection pins. Testing the influence of a force vector perpendicular to the pins for measuring break-out strength of a pin was therefore a realistic test in which plug designers were interested irrespective of the specific kind of plug. A person skilled in the art would consider the relationships

- between the minimal tensile force required for distorting a plug and the tensile strength of the cable and
- between the tensile strength of the cable and the break-out strength of a pin

of the prior use plug for the design of other plug configurations, e.g. those indicated in the introduction of the description and in the preamble of Claim 1 of the patent in suit, if the insulating parts of such a plug should be flexible.

VII. In a communication accompanying an invitation to oral proceedings, the Board observed that public prior use of the plug shown in evidence (D) had not been contested by

the Appellant and would therefore be assumed. For language reasons, the Board referred to US-A-4 405 194, which concerns the same subject-matter as NL-A-8 006 481, cited as background art in the patent in suit, see column 1, lines 12 to 26 of EP-B-195 472. The provisional opinion was indicated that a person skilled in the art may consider the force and strength relationships of the prior use plug also for plugs as known from US-A-4 405 194, if such plugs should have flexible insulating parts.

VIII. Both parties informed the Board that they would not attend the oral proceedings. The Respondent requested that the decision of the Opposition Division to revoke the patent be confirmed and the appeal dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request*

2.1 According to the introduction of the present patent, Claim 1 starts in its preamble from an electric plug with the features known from NL-A-8 006 481. That plug is also disclosed in US-A-4 405 194.

2.2 It is explained in the patent in suit that although a plug body is preferably shaped so that it can be easily held by hand for insertion into or withdrawal from a wall outlet, some users tend to remove the plug from the wall outlet by pulling the cable. When the pulling force is directed approximately perpendicularly to the longitudinal direction of the connection pins, one of

the connection pins could be pulled out of the base and left behind in the wall outlet. Designers of plugs have to consider such possibilities.

2.3 It is therefore an object of the invention to design a plug of the kind set forth in the preamble of Claim 1 with flexible insulating material in which it is impossible to break a connection pin out of the base by pulling the cable. In view of the general desire to make plugs as safe as possible, this is an obvious thing to want to do.

2.4 According to Claim 1 this problem is solved by features (a), (b) and (c) (cf. para. II above).

2.5 NL-A-8 006 481 does not describe a plug with all these features so that the claimed subject-matter is new.

2.6 However, the claimed subject-matter is not inventive for the following reasons:

It is inherently obvious that the object of the invention can only be achieved by making the plug connection pin assembly stronger than the cable.

Regarding feature (a) of Claim 1:

The plug known from NL-A-8 006 481 is made of plastic material around its rear portion. It has been shown by the Respondent that the base and plug body of the prior use plug is made of PVC and therefore flexible. It follows from evidence (A) that a tensile force between 38 N and 50 N in the cable exerted approximately perpendicularly to the pins of the plug would distort the plug when it is in an appropriate socket.

Regarding feature (b) of Claim 1:

As already indicated above the minimum tensile force required for distorting the prior use plug lies between 38 N and 50 N. It is furthermore clear from this evidence that the tensile strength of the cable lies between 270 N and 290 N. Consequently, the minimum tensile force required for distorting the plug is less than the tensile strength of the cable in the prior use plug.

Regarding feature (c) of Claim 1:

According to evidence (A), the break-out strength of a pin of the prior use plug lies between 684 N and 742 N. The tensile strength of the cable (between 270 N to 290 N) is therefore less than the break-out strength.

2.7 It follows from paragraph 2.6 above that the prior use plug has all the properties indicated in the characterising part of Claim 1. The prior use plug differs from the plug according to Claim 1 in that in the prior use plug the cable extends parallel to the pins, whereas in the claimed plug the cable extends from the plug base in a direction substantially perpendicular to the connection pins.

Now, although - as explained in the patent in suit - the plug body is normally shaped so that it can be easily held by hand for insertion into of withdrawal from a wall outlet, nevertheless some users tend to remove the plug from the wall outlet by pulling its cable. The Board agrees with the Respondent that this is not the only abnormal stress situation. Laymen pull the cable of a plug in various directions. The cable may be pulled along the wall of a wall outlet in connection with the use of household appliances. Designers of plugs have

always to consider worst case conditions. One of the critical stress situations is undoubtedly caused by a force perpendicular to the pins because such a force tends to break-out the pins. Insulating parts of plugs are often made of plastic material. The base and plug body of the prior use plug are made of PVC. A person skilled in the art who wants to manufacture a safe plug of the type where the cable extends from the base in a direction substantially perpendicular to the connection pins as described in NL-A-8 006 481 with a flexible base and plug body in which the connection pins could not be broken out by pulling the cable would measure the tensile strength of the cable and the break-out strength of the pins of known flexible plugs, including the cited prior use plug, and arrive at the relationships according to features (a), (b) and (c) of the present Claim 1.

2.8 For the above reasons the Board finds the subject-matter of Claim 1 (main request) to be lacking an inventive step as defined in Article 56 EPC.

3 *Auxiliary request*

3.1 According to the Appellant's auxiliary request to replace in Claim 1 (column 4, line 50 of EP-B-195 472) the expression "approximately perpendicularly to the pins" by the expression "substantially in the longitudinal direction of the cable" was meant to exclude pulling at arbitrary angles with respect to the longitudinal direction of the cable. The test according to evidence (A) has been performed by stressing the cable in its longitudinal direction in a direction perpendicular to the direction of the pins so that the arguments set out in paragraphs 2.6 to 2.8 apply also to the subject-matter of the auxiliary request.

3.2 The subject-matter of Claim 1 according to the auxiliary request does not involve an inventive step, either.

4. Consequently, the patent in suit cannot be maintained with Claim 1 according to the main or auxiliary request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl W. J. L. Wheeler