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D E C I S I O N
of 22 October 2003

Case Number: T 0110/00 - 3.4.2

Application Number: 90102273.1

Publication Number: 0384204

IPC: H01M 2/34, H01M 6/50

Language of the proceedings: EN

Title of invention:
Cylindrical organic electrolyte battery with a PTC device

Patentee:
Hitachi Maxell Ltd.

Opponent:
Tyco Electronics Corporation

Headword:
-

Relevant legal provisions:
EPC Art. 107, 100(c), 56

Keyword:
"Opponent entitled party - yes"
"Main request - added subject-matter (yes)"
"Auxiliary request - added subject-matter (no)"
"Inventive step (yes)"

Decisions cited:
T 0298/87

Catchword:
-



Case Number: T 0110/00 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 22 October 2003

Appellant: Tyco Electronics Corporation
(Opponent) 2800 Fulling Mill Road
Middletown
Pennsylvania 17057 (US)

Representative: Jones, David Colin
Withers & Rogers
Goldings House
2 Hays Lane
London SE1 2HW (GB)

Respondent: Hitachi Maxell Ltd.
(Proprietor of the patent) No 1-1-88, Ushitora
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Osaka-fu (JP)

Representative: von Kreisler, Alek, Dipl.-Chem.
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
29 November 1999 concerning maintenance of
European patent No. 0384204 in amended form.

Composition of the Board:

Chairman: A. G. Klein
Members: M. A. Rayner
G. E. Weiss

Summary of Facts and Submissions

- I. Tyco Electronics Corporation (=appellant) appealed against the decision of the opposition division, following the opposition by Raychem Incorporated (the opponent), that taking account of the amendments made by the patent proprietor, Hitachi Maxell Ltd (=respondent), European patent 384 204 (application number 90102273.1) and the invention to which it relates meet the requirements of the EPC. The patent in dispute concerns a cylindrical organic battery with a PTC (=positive temperature coefficient) device.
- II. In its decision dated 29 November 1999, the opposition division made reference *inter alia* to the following documents:

D1 "Protection of Batteries with Polyswitch Devices", Raychem Brochure (US), January 1987, pages 1-6,

D2 "Polymer PTC Overcurrent Overheat Protection Device", Electronic Ceramics (JP), September 1986, pages 61-66 with English translation of the "applications" section bridging the two columns on page 65.

The opposition division considered there to be no infringement of Article 100(c) EPC in the combination of features specified in the independent claim before it and the subject matter of claim 1 to meet the requirements of Articles 52(1), 54 and 56 EPC.

III. In its notice of appeal of 27 January 2000, the appellant presented the following statement:

"Tyco Electronics Corporation, of 2800 Fulling Mill Road, Middletown, Pennsylvania 17057, incorporated in the State of Pennsylvania, USA, now owns all the assets, and is the successor in title of the Opponent, Raychem Corporation. Documents in support of this change are filed herewith. Accordingly, the Appellant is Tyco Electronics Corporation."

Copies of the following documents were enclosed:

- (a) Merger of Raychem Corporation, a Delaware corporation into Tyco International (PA) Inc, a Nevada corporation dated 12 August 1999 certified by the Secretary of State of Delaware on 18 August 1999,
- (b) General Deed of Contribution, Assignment and Assumption, dated 12 August 1999, sworn as a true copy by the assistant secretary of Tyco Electronics Corporation, formerly AMP Incorporated, on 14 October 1999 before a notary public transferring 100% of the assets of Raychem Corporation from Tyco International (PA) Inc to AMP Incorporated,
- (c) Articles of Amendment changing name of AMP Incorporated, to Tyco Electronics Corporation, dated 13 September 1999, certified by Secretary of State of Pennsylvania on 13 October 1999.

IV. The appeal file contains a communication dated 4 February 2000 to the respondent from the Registrar of the board advising of the appeal number and including a standardised text that a copy of the appeal is annexed.

In a communication dated 28 March 2000, the formalities officer in Directorate-General 2 of the European Patent Office charged with dealing with requests for entry of change in the Register of European Patents confirmed to the Representative of the appellant that the name of the opponent had been amended from 27 January 2000 to Tyco Electronics Corporation.

V. Both parties requested oral proceedings on an auxiliary basis and consequent to these requests the board appointed oral proceedings for 22 October 2003. In its letter dated 10 September 2003, the appellant informed the board that it did not intend to be represented at the oral proceedings and requested a decision on the basis of the written submissions.

In a telefax communication dated 19 September 2003, the Registrar transmitted to the respondent a copy of the letter of the opponent dated 27 January 2000 with enclosures and a copy of the letter dated 28 March 2000 from the formalities officer, remarking that these had apparently not been sent so far.

VI. The case of the appellant can be summarised as follows:

Requests

The appellant requests revocation of the patent in its entirety.

Arguments

Amendments

According to the appellant, each of the original independent claims falls within the broad statement of invention given in the application as filed. However features in the single independent claim as maintained by the opposition division were not disclosed in isolation, but only in combination with other technical features, different for the three embodiments. Thus for Embodiment 1, a disk shaped PTC device and metal plate are specified, for embodiment 2, a disc shaped PTC device and a folded rectangular plate, and for embodiment 3 a PTC device as embodiment 1 and a square shaped metal plate with a slit.

Substantive Patentability

A comparison of claim 1 of the patent in suit with the generalised teaching of document D1 shows that no feature taken on its own is novel. For example, figure 1 shows a PTC device and metal plate not extending the size of the bottom of the battery and positioned within the area of the bottom of the battery. To the extent that spot welding is not unambiguously disclosed in Figure 1 of document D1, it is obviously known as without excessive heat transfer. Not extending the size of the bottom of a single battery would be a mere design variation, especially in view of fitting into containers. In so far as document D2 specifically illustrates a PTC device welded by a metal plate to the bottom of a cylindrical battery, the combination with

the generalised teaching of document D1 renders claim 1 lacking in inventive step.

VII. The case of the respondent can be summarised as follows:

Requests

The respondent requests that the patent be maintained in amended form on the basis of its main request:

- claims 1 to 4 of the main request filed at the oral proceedings;
- description and drawings of the patent specification,

or if the board cannot comply with this request alternatively on the basis of its auxiliary request.

- claims 1 to 4 of the auxiliary request filed at the oral proceedings;
- description and drawings of the patent specification,

Wording of independent claims

Main request - Claim 1

Cylindrical organic electrolyte battery (1) with a PTC device (2) being externally bonded to the bottom (1a) of the battery by a metal plate (3) which is spot-welded to the bottom of the battery, the PTC device consisting essentially of a resin layer (2a) having a

Positive Thermal Coefficient (PTC) properties fixed between two metal layers (2b1, 2b2), whereby the PTC device (2) and the metal plate (3) have a size not extending the size of the bottom (1a) of the battery and are positioned within the area of the bottom (1a) of the battery."

Auxiliary request - Claim 1

This claim is worded as the main request but with the following feature added after the last word "battery" at the end of the claim:

"said metal plate (3) being connected to the bottom of the battery at a position remote from the PTC device."

Arguments

Admissibility of the appeal

In the written proceedings, the respondent challenged the status of the appellant as entitled, assuming, in the written procedure, for expediting the proceedings that appropriate substantiating evidence would be provided by the appellant. At the oral proceedings, the respondent informed the board that the documents supporting the change of name of opponent had been received for the first time with the telefax communication from the board before the oral proceedings. The appeal should be ruled inadmissible because the supporting documents were inadequate. While the respondent admitted there seemed to have been some sort of transfer, there was no definite identifying

link between as opponent before the first instance and the appellant because:

the opponent address of Raychem Incorporated was in Menlo Park, California, whereas the Merger document recites that Raychem Corporation is a Delaware corporation and Tyco International (PA), a Nevada corporation, the address of Tyco Electronics Corporation then being given as 2800 Fulling Mill Road, Middletown, Pennsylvania, the role of AMP incorporated, with an undefined address in Pennsylvania, as neither opponent nor appellant is obscure.

In view of the differing locations, it is not possible to tell whether the entities involved really received and passed on the assets of the opponent to the present appellant. All that it might be possible to assume is thus that there is some commercial interest on the part of Tyco Electronics Corporation. Thus the appeal should be dismissed as inadmissible following decision T 298/97, especially headnote 3. In addition, it cannot be considered satisfactory that the European Patent Office is prepared to admit copies of documents as adequate proof of change.

Amendments

Figure 6 and the corresponding parts of the specification of the original application (i.e. the paragraph following [2] in line 39 on page 3 of the "A" publication or in line 23 on page 3 of the patent) offer support for amended claim 1 in dispute. An objection that present claim 1 is not based on any of

the originally filed independent claims lacks any justification based on the EPC.

Substantive patentability

In the written proceedings, the respondent challenged the publication date of document D1, assuming for expediting the proceedings that appropriate substantiating evidence would be provided by the appellant. It is not clear that document D1 really was available to the public because only a photocopy had been provided, with the last page unnumbered, so that it could derive from another brochure, and bearing what could be a date but not necessarily that of publication, for example it may be the date of preparation. During the oral proceedings, the respondent submitted further, that this document too, as a copy which could have been manipulated, should not be admitted. The respondent stated that he could not remember raising the issue of the "copy" before the first instance, observing that this had not been minuted.

The introduction of document D1 points to an internally bonded PTC device, not external as claimed. The intercell connector strap devices of document D1 cannot possibly indicate anything about a position within the area of the bottom of the battery. Moreover, the specific feature of spot welding is not disclosed. As admitted by the appellant, the device and metal plate of document D2 are not sized and positioned as specified in claim 1 of the patent. The differing features are not design variations but realise each and every cell with its own PTC device. The subject matter

of claim 1 is thus new and inventive over the prior art references.

It is implicit in the teaching of the patent that the metal plate is connected to the bottom of the battery at a position remote from the PTC device as this avoids damage to the device when spot welding.

VIII. At the end of the oral proceedings, which took place in the absence of the appellant, the board gave its decision.

Reasons for the Decision

1. *Admissibility of the appeal*

The appeal meets the requirements as to time limit and form specified in Article 108 EPC. The respondent has, however, raised the question of whether the appellant is an entitled party in the sense of Article 107 EPC.

1.1 From the merger document (a), referred to in section III above, it can be seen that the constituent corporations to the merger are Raychem Corporation, a Delaware corporation and Tyco International (PA) Inc, a Nevada corporation. The surviving corporation is Tyco International (PA) Inc.

From the General Deed (b), referred to in section III above, it can be seen that the assets of Raychem Corporation were transferred from Tyco International (PA) Inc to AMP Incorporated.

From the Articles of Amendment (c), referred to in section III above, it can be seen that the name of Amp Inc was then changed to Tyco Electronics Corporation.

1.2 A chain of events in the correct sequence is therefore established from Raychem Incorporated via merger with Tyco International (PA) Inc to AMP incorporated, which changed its name to Tyco Electronics Corporation. The board does not have any difficulty understanding the role of AMP incorporated in this chain, because the General Deed (b) specifically recites that 100% of the assets of Raychem Incorporated are transferred to AMP Incorporated, which then changed its name to Tyco Electronics Corporation.

2. Headnote 3 of decision T 298/97 is worded as follows:

2.1 "3. Save in the limited situation of a transfer of the right to oppose a European patent (or to appeal or continue an opposition appeal) together with the related business assets of the opponent's business, a commercial interest in revocation of such patent is not a requirement for being an opponent. Nor is possession of such a commercial interest sufficient to allow a successor in business to take over and conduct opposition or opposition appeal proceedings in the absence of evidence of a transfer of the right to do so together with the related business assets of the opponent."

- 2.2 Since 100% of the assets of Raychem Incorporated, including therefore the right to conduct appeal proceedings, were transferred to Tyco Electronics Corporation, the board can see no reason offered by decision T 298/97 for ruling the appeal inadmissible.
- 2.3 Accordingly, the board does not doubt that Tyco Electronics Corporation is an entitled person within the meaning of Article 107 EPC.
- 2.4 In addition, a person involved with the present technical field can hardly fail to be aware from the press that Raychem Incorporated has changed to Tyco Electronics Corporation.
- 2.5 The difficulties experienced by the respondent therefore boil down to whether the different US states of incorporation of the corporations concerned and the addresses for their places of business could mean that there is in fact a case of mistaken identity with the appellant. However, the respondent has not provided any evidence which could raise doubts in this respect, for example by showing there is more than one Raychem Incorporated or AMP Incorporated or Tyco Electronics Corporation. The mere allegation that there could be a doubt is not sufficient to persuade the board. This is all the more so as the patent representative is the same for both the named opponent and appellant and this representative stated that the appellant is successor in title to the opponent. The representative of the respondent has not provided any evidence that the factual situation is not as given in the letter of the representative of the appellant. The respondent has not

therefore presented a convincing case that the appellant is not entitled.

- 2.6 Neither did the board find itself able to agree with the point of view of the respondent that accepting the filing of copies is in itself sufficient to lead to the change of name being considered unsubstantiated. This is because the documents appear to be in good form and no serious doubt was cast on the authenticity of the documents. The board therefore, in the context of the present case, saw no necessity for further investigation of the documents.

The board thus reached the conclusion that taken as a whole the appeal complies with the provisions mentioned in Rule 65(1) EPC in the present case and is therefore admissible.

3. *Amendments (Article 123(2)[100(c)], Article 123(3) EPC)*

Main request

- 3.1 Page 6, line 4 to page 8, line 5 of the application as filed (=lines 28 to 57 of page 3 of the "A" publication) contain the passage:

"The present invention is made to eliminate the various drawbacks such as limitation of the shape of the PTC device and deterioration of the sealing and internal short circuit and so on being inherent in the conventional batteries of this kinds and an essential object of the present invention is to provide a cylindrical organic electrolyte battery with PTC device having a tight sealing without inner short circuit.

In order to accomplish the object mentioned above, according to the present invention, a metal plate is attached to a PTC device, and the metal plate is bonded to the bottom of the battery.

The following examples [1] to [3] may be employed for embodying the above structure of the present invention.

[1] A metal plate which is larger than the PTC device is secured to one metal layer of the PTC device and the PTC device is attached to the bottom of the battery by welding the peripheral edge portions of the metal plate jutting from the PTC device.

[2] One end portion of the metal plate is secured to one of the metal layer of the PTC device with another end portion of the metal plate secured to the bottom of the battery by welding, in addition to forming an overlapped portion at the intermediate of the metal plate by folding it, so that the PTC device and the metal plate are positioned within an area defined by the outer periphery of the bottom of the battery or on a portion corresponding to the periphery thereof, so that the PTC device is not positioned outside of the area of the bottom of the battery.

[3] A slit is defined in the metal plate and one area of the metal plate defined by the slit is secured to one metal layer of the PTC device with another area of the metal plate defined by the slit is secured to the bottom of the battery by welding.

The PTC device essentially consists of a resin layer having a PTC property and metal layers attached to both opposite surfaces of the PTC layer and the metal layers acting as the connection terminals of the PTC device may be bonded to the metal plate normally by soldering. However, so far as the PTC property is not badly harmed, the metal layer of the PTC device may be secured to the metal plate by spot welding.

Usually, the metal plate is connected to the bottom of the battery by spot welding. This is because the spot welding enables to limit the heat of welding in an area to be connected as near as possible so as to decrease undesired effect of the heat against the PTC device.

The arrangements [1], [2] and [3] mentioned above enable to connect the metal plate to the bottom of the battery at a position remote from the PTC device, avoiding that the PTC resin layer is badly affected by the heat of welding."

Embodiments 1 to 3 are presented in the detailed description and drawings correspond to [1], [2] and [3] and claims 1 to 3 above.

3.2 Claims 1 to 3 as originally filed are worded as follows:

"1. In a cylindrical organic electrolyte battery with a PTC device, said PTC device essentially consisting of a PTC resin layer, metal layers formed on both opposite surfaces of the resin layer, the improvement comprising a metal plate which is larger than the PTC device and one end portion of the metal layer being bonded to one of the metal layers of the PTC device with another end

portion of the metal layer being bonded to the bottom of said battery.

2. In a cylindrical organic electrolyte battery with a PTC device, said PTC device essentially consisting of a PTC resin layer, metal layers formed on both opposite surfaces of the resin layer, the improvement comprising a metal plate one end portion of the metal layer being bonded to one of the metal layers of the PTC device with another end portion of the metal layer being bonded to the bottom of said battery and the metal plate being folded at the intermediate portion of the metal plate.

3. In a cylindrical organic electrolyte battery with a PTC device, said PTC device essentially consisting of a PTC resin layer, metal layers formed on both opposite surfaces of the resin layer, the improvement comprising a metal plate having a slit extending in one direction at the central portion in terms of any one of the longitudinal direction and lateral direction, and one half portion of the metal plate being divided along the slit being bonded to one of the metal layers of the PTC device with another half portion of the metal layer being bonded to the bottom of said battery."

- 3.3 Taken as a whole, these passages disclose to the skilled person that the invention is directed to enabling connection of the metal plate to the bottom of the battery at a position remote from the PTC device. This is because, either this statement is made explicitly as at the end of the passage quoted in point 3.1 above or the original claims include structure involved (claim 1 - metal plate larger, one end bonded to PTC, another end to bottom of the battery; claim 2 - one end bonded to PTC, another end to bottom

of the battery, metal plate folded; and claim 3 - metal plate slit, one half bonded to PTC, another half to bottom of the battery). Therefore, in order that subject matter not be added, the board considers it essential that the independent claim include corresponding subject matter. The wording of the independent claim of the main request does not exclude connection of the metal plate to the bottom of the battery at a position which is *not* remote from the PTC device - a possibility not disclosed in the documents as filed - so that the board, contrary to the position of the respondent, can see no reason why the skilled person should believe this feature to be implicit in all the putative configurations possible within the claimed wording. The board is therefore not persuaded by the submission of the respondent that the case of the appellant is not based on the requirements of the EPC, but on the contrary, agrees with the appellant that the subject matter of claim 1 of the main request contains an inadmissible amendment adding subject matter and thus cannot be considered to meet the requirements of Article 123(2) EPC.

4. *Auxiliary request*

- 4.1 Since claim 1 of the auxiliary request includes the feature "said metal plate (3) being connected to the bottom of the battery at a position remote from the PTC device", the objection occurring with respect to the main request and pertaining to inadmissible amendment for added subject matter does not exist and therefore, the board is satisfied that the requirements of Article 123(2) EPC are met.

4.2 Compared with claim 1 as granted, claim 1 of the main request has been restricted by this feature and also the feature pertaining to the metal plate being positioned within the area of the bottom of the battery. Moreover, compared with the claim attached to the decision of the first instance, the respondent, in addition to the feature mentioned in point 4.1, has also reintroduced the wording "of the battery" after the second recitation of the word "bottom" as occurred in the claim as granted. Therefore, the board is satisfied that no amendment contrary to Article 123(3) has been made.

5. *Novelty (Article 54 EPC)*

5.1 According to document D1, PTC products can be soldered or welded into a battery in confined spaces and can even be included as thin disks in the package of a cell. Commonly used products are very thin and have flat weldable tabs for internal connections. Figure 1 shows a strap device mounted in a NiCd battery. The type of geometry and lead is determined by the style of application device. Strap devices are welded onto cells. Close thermal coupling can be accomplished in a number of ways. Various strap devices can be welded as an intercell connector. PTC devices can also be incorporated in a number of ways into the cell (see Figures 7 and 8). Intercell connectors have a tab extending from the battery concerned to a PTC device which is attached between this tab and that of the other cell concerned, see for example Figure 6 and the related description.

5.2 In Figures 13 and 14 of document D2 there are shown examples of a Li battery and an NiCd battery block in which PPTC devices are applied. A PPTC (meaning presumably polymer positive temperature coefficient) device is welded where a bus bar is welded. The PPTC device is between the cells.

5.3 The PTC devices disclosed in document D1 are either in a cell or a cell connecting strap and those disclosed in document D2 are in interconnecting bus bars. The internal devices are plainly not externally bonded and the strap or bus bar versions do not meet the size and position requirements claimed because they extend between two cells.

5.4 One argument of the appellant is that Figure 1 of document D1 discloses the size and positioning feature of claim 1. The board can only make sense out of this argument by assuming it means that more than one cell constitute a battery. Should two or more cells in the teaching of document D1 or D2 be understood as a "single battery", then this would no longer be a cylindrical organic battery as claimed.

5.5 Therefore the subject matter of claim 1 is novel within the meaning of Article 54 EPC.

6. *Inventive step (Article 56 EPC)*

6.1 Location of PTC device inside the battery can lead to failure of the device as explained in detail in the introduction of the patent specification (limitations due to gas protection, leakage, damage due to crushing on assembly and so on, see also the passage mentioned

in section 3.1 above). Such batteries with an internal PTC device, which are also disclosed for example in document D1, are thus subject to problems of reliability and constitute the starting point for the present invention. The problem solved by the novel features of the invention is to provide a cylindrical organic electrolyte battery with its own reliable overcurrent protection. The construction offered permits spot welding without damage to the PTC device within size and positioning constraints of the battery.

- 6.2 Connecting straps or bus bars as shown in documents D1 or D2 have an intrinsic function of interconnecting, which means that these disclosures cannot suggest or render obvious the size and positioning configuration as defined in claim 1 of the patent in dispute. The board therefore cannot agree with the appellant that the structure claimed is an obvious design variation as no convincing reason for or specific suggestion towards "varying" the strap or bus bar away from its intrinsic interconnecting function has been provided. General remarks about use in a variety of ways is not adequate in this specific context. Furthermore, the fact that batteries should fit into standard casings simply means that straps and buses are ruled out as providing each battery with its own individual overcurrent protection. Equally, starting from the PTC connecting straps or bus bars, no convincing reason has been given for the interconnect concept to be dispensed with. Thus, since the prior art approaches are different yet complete within themselves, the board does not consider a combination of their teachings in a direction towards the subject matter of claim 1 obvious.

- 6.3 Moreover, should an artificial approach be taken in a hindsight motivated way, involving a pair of rectangular or cylindrical cells according to document D1 or D2 being understood as a single battery, there is even then no obvious way for the skilled person to consider that such a pair to be a cylindrical battery as claimed. Therefore, such an approach leads even further way from the subject matter of claim 1. The other documents in the file are no more relevant to the claimed subject matter than documents D1 and D2.
- 6.4 Accordingly, the board reached the conclusion that the subject matter of claim 1 can be considered to involve an inventive step within the meaning of Article 56 EPC. A similar conclusion applies to the dependent claims 2 to 4, which dependent from claim 1, by virtue of their dependence from claim 1.
7. Since the board like the first instance reached the conclusion that document D1 does not affect substantive patentability of the subject matter of claim 1, it was in a position to resolve the substantive issue within the framework of the appeal and without considering the issue of the "copy of document D1" first presented at the oral proceedings. There was therefore no reason either to delay the present decision to permit further submissions from the appellant nor to remit the case for further consideration by the first instance.

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 on the basis of the following documents:
 - claims 1 to 4 of the auxiliary request filed at the oral proceedings;
 - description and drawings of the patent specification.

The Registrar:

The Chairman:

P. Martorana

A. G. Klein