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D E C I S I O N
of 16 May 2001

Case Number: T 0620/00 - 3.4.2
Application Number: 93401377.2
Publication Number: 0572327
IPC: H01M 2/10, H01M 2/34

Language of the proceedings: EN

Title of invention:

Battery pack having recesses to detect proper attachment of the pack to a battery charger

Patentee:

SONY CORPORATION

Opponents:

- (01) Vivanco Gruppe AG
(02) Master Trade SA

Headword:

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Relevant legal provisions:

EPC Art. 54, 56, 83, 123

Keyword:

"Inventive step (main request: no; first auxiliary request: yes)"

"Proper construction of a claim directed to a battery pack having detection aperture means adapted to receive corresponding protruded portions formed on a battery pack accommodating portion of a battery charger or of an apparatus utilising the battery pack as a power source"

Decisions cited:

T 0458/96, T 1194/97

Catchword:

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Case Number: T 0620/00 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 16 May 2001

Appellant: SONY CORPORATION
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 20 April 2000
revoking European patent No. 0 572 327 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: E. Turrini
Members: A. G. Klein
B. J. Schachenmann

Summary of Facts and Submissions

I. The European patent No. 0 572 327 (application No. 93 401 377.2) was granted with a set of claims, of which claim 1, the only independent claim, reads as follows:

"1. A battery pack (10) having battery means accommodated therein, and adapted to cooperate with a battery charger (12) or electrical machinery or apparatus utilising the battery pack as a power source, said battery pack comprising:

a casing (14, 16) for accommodating said battery means therein;

detection aperture means (102, 104) formed along a center line (X - X) of a bottom surface of the casing, said bottom surface being defined as the surface by which said battery pack confronts a battery pack accommodating portion of said battery charger or electrical machinery or apparatus, said detection aperture means being adapted to receive corresponding protruded portions formed on said battery pack accommodating portion."

II. Following the filing of an opposition by a first opponent and the subsequent intervention into the opposition procedure of an assumed infringer within the meaning of Article 105 EPC, the patent was revoked by the Opposition Division.

The Opposition Division held that the subject-matter of claim 1 as granted lacked an inventive step in view of

the closest prior art constituted by the battery pack referred to as prior art in the specification of the patent in suit. The claimed battery pack was distinguished therefrom only by the provision of a recess or aperture in its bottom side, which did not solve any particular technical problem. It was only the interaction of such a recess with a protrusion on a battery charger or other piece of equipment which might result in a detection effect. Since however only the battery pack was defined in the claims of the patent in suit, but not a kit of parts consisting of a battery pack and a cooperating electrical device, the claimed recess had no conceivable function, at least no function which could possibly provide a patentable solution to a technical problem (see the paragraph bridging pages 6 and 7 of the Opposition Division's decision).

- III. The appellant (proprietor of the patent) filed an appeal against the decision revoking its patent.
- IV. Judiciary infringement procedures based on the patent in suit in Germany and in France have been stayed by the respective courts, pending the issuing of a final decision by the European Patent Office.
- V. Oral proceedings were held on 16 May 2001, at the end of which the appellant requested that the decision under appeal be set aside and, as its main request, that the patent be maintained as granted.

Auxiliarily, the appellant requested that the patent be maintained in amended form based on one of the sets of claims filed during the oral proceedings as auxiliary requests 1 to 5. Claim 1, the only independent claim of

the set of claims in accordance with the appellant's first auxiliary request reads as follows:

"1. A battery pack (10) having battery means accommodated therein, and adapted to cooperate with a battery charger (12) or electrical machinery or apparatus utilising the battery pack as a power source, said battery pack comprising: a casing (14, 16) for accommodating said battery means therein; detection aperture means (102, 104) formed along a center line (X - X) of a bottom surface of the casing, said bottom surface being defined as the surface by which said battery pack confronts a battery pack accommodating portion of said battery charger or electrical machinery or apparatus, said detection aperture means being adapted to receive corresponding protruded portions formed on said battery pack accommodating portion, columnar batteries being accommodated in two rows in said casing (14, 16) and said detection aperture means (102, 104) being disposed between the two rows of batteries along said center line (X - X) of said bottom surface."

The only independent claims of the appellant's auxiliary requests 2 to 5 comprise the features of claim 1 as granted, with different further limitations.

The respondents for their part requested that the appeal be dismissed.

VI. The appellant in support of its requests stressed that the invention provided a further development of the prior art battery pack described in the introduction of the patent specification, which already comprised detection apertures in its bottom surface disposed so

as to receive corresponding protruded portions formed on the battery pack accommodating portion of a battery charger or camcorder. The relative positioning of the detection apertures and protruded portions resulted in a discernable angular mismatch of the facing surfaces of the battery pack and battery charger or camcorder, when the battery pack was not properly inserted.

In order to improve the detectability of an improper attachment of the battery pack, the invention now provided a construction in which improper attachment caused a readily detectable rocking effect around the direction of insertion of the battery pack. Such rocking effect resulted from the arrangement of the detection aperture means along the longitudinal axis of the bottom surface of the battery pack, rather than at its edge like in the closest prior art construction where they achieved a much stabler mismatch position.

VII. The respondents denied that the claims actually defined the invention mentioned by the appellant, since they defined a battery pack only, whilst the alleged rocking effect was actually produced by protrusions formed on the battery pack accommodating surface of a separate electrical device. It was not even the cooperation between the detection apertures formed in the bottom surface of the battery pack and such protrusions which produced any relative tilting, but quite on the contrary the contact of the protrusions with a **non-recessed** portion of the bottom surface of the battery pack.

The patent was also objectionable under Article 100(b) EPC because it did not disclose the invention in a manner sufficiently clear and complete for it to be

carried out by a person skilled in the art. Claim 1 of the main request in particular neither specified the number of the battery cells mounted in the battery pack, nor the direction and precise location of the "center line" it referred to. In an embodiment comprising an odd number of battery cells arranged side by side, the center line would necessarily overlies a location actually occupied by a battery cell, where there was no space left for forming the claimed apertures.

In respect of the specific embodiment recited in claim 1 of the appellant's first auxiliary request, with two rows of columnar battery cells and detection aperture means being disposed along a center line extending therebetween, the respondents submitted that the use of two battery cells, or of an even number of such cells, instead of the five battery cells of the closest prior art directly resulted from the fact that at the filing date of the patent lithium ion battery cells had become available with an output voltage of about 3 V. Accordingly only two of these cells achieved the tension of about 6 V required by camcorders, instead of the five 1.2 V nickel cadmium battery cells of the closest prior art. Providing only two adjacent battery cells or two rows of battery cells in a battery pack resulted in an empty space being left therebetween. Arranging the detection apertures along this empty space was no more than an obvious design option. The respondents filed a number of citations showing that lithium ion battery cells had been made available at the filing date of the patent, and document US-A-3 887 394 to demonstrate that at the filing date of the patent in suit the skilled person was well aware of the strict constraints in terms of

space and weight requirement imposed on the design of battery cartridges for use in portable devices such as cameras and the like.

The respondents also filed a number of models of battery packs having recesses and apertures at various locations of their bottom surface, together with catalogues and copies of internal delivery notes to provide evidence of the availability of the models to the public at the filing date of the patent.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request*
 - 2.1 Proper construction of claim 1
 - 2.1.1 The Opposition Division held in the appealed decision that since the claims were directed to a battery pack only, rather than to its combination with an associated apparatus, the feature of a recess or aperture on its bottom side did not solve any particular technical problem.

The respondents also stressed that the technical effect relied upon by the appellant, namely the achieving of an increased inclination of the battery pack in relation to a battery pack accommodating portion, did not actually result from any cooperation between apertures in a bottom surface of the battery pack and corresponding protruded portions on the battery pack accommodating portion. An inclination could only result

from protruded portions on the battery pack accommodating portion facing portions of the bottom surface of the battery pack which were actually devoid of any aperture. Such protruded portions however were no part of the claimed battery pack. Also, the designation of the apertures as "detection" aperture means merely resulted from an arbitrary choice of terminology, which did not express any technical limitation and could not serve to distinguish the claimed apertures from apertures intended for some other purpose, e.g. for receiving a locking mechanism.

Claim 1 however explicitly states that the claimed battery pack is "adapted to cooperate with a battery charger or electrical machinery" and that its detection apertures as formed along a centre line of a bottom surface of the casing are "adapted to receive corresponding protruding portions formed on said battery pack accommodating portion" of such battery charger or electrical apparatus.

According to the specification "the detection apertures function to detect whether or not the battery pack is properly attached to the battery charger or the like". If not, "the battery pack is caused to rise from the bottom surface of the battery charger" by an amount corresponding to the height of the protruding portions formed on the other element, and then to incline (see column 3, lines 43 to 56 and column 4, lines 37 to 41). The specification further explains that the effect of providing the detection apertures along the centre line of the bottom surface is to increase the inclination angle of the battery pack when the latter is not properly attached (see the paragraph bridging columns 4 and 5 and column 9, lines 5 to 14).

In view of these clear and consistent statements, both in claim 1 and in the description of the patent in suit, the board considers that the relative arrangement of the claimed detection aperture means with corresponding protruded portions formed on a battery accommodating portion in such a way that the battery pack will come flush with the battery accommodating portion when properly attached to it but rise therefrom otherwise actually constitutes an essential technical feature of the invention for which protection is sought, which should therefore be taken into due account when assessing inventive step.

With respect to the construction of claims which define features of an invention by reference to an element not expressly encompassed by the claims, attention is also drawn e.g. to decision T 458/96 not published in the OJ EPO (see point 3 of the Reasons) or decision T 1194/97, OJ EPO 2000, 525 (see points 2.3 and 2.4 of the Reasons).

Incidentally, the respondents confirmed at the oral proceedings that battery packs of the type at issue here, when sold as separate spare parts, use to be provided with an indication of the specific models of camcorders or other apparatus they are intended for. This shows that in practice also a clear connection is usually established by such indication between individual battery packs and the configuration of the battery pack accommodating portion to which they shall be attached.

2.1.2 With respect to the definition of the center line referred to in claim 1, the board cannot find in the claim any limitation to the effect that the center line

should necessarily extend in the **longitudinal** direction of the bottom surface of the casing as was submitted by the appellant.

2.2 Novelty

None of the prior art battery pack configurations relied upon by the respondents comprises detection aperture means formed along a center line of a bottom surface of the casing arranged so as to cooperate with corresponding protruding portions of a battery accommodating portion within the meaning of claim 1. Accordingly, the subject-matter of claim 1 is novel within the meaning of Article 54 EPC.

2.3 Inventive step

2.3.1 The closest prior art is constituted by the battery pack described in the specification of the patent in suit in conjunction with Figures 1 to 4, as was accepted by all the parties.

2.3.2 As set out in paragraph 2.1.2 above, the scope of claim 1 is not limited to constructions with detection aperture means being formed along a **longitudinal** center line of the bottom surface.

Accordingly, in the prior art battery pack disclosed in the specification of the patent in suit with reference to Figure 4, which comprises five battery cells arranged side by side orthogonally to the longitudinal direction of the pack with detection aperture means 16G, 16I and 16J provided between adjacent cells, the detection aperture means 16G would also be "formed along a center line of a bottom surface of the case"

within the meaning of claim 1, if the battery pack did not comprise the fifth battery cell at its right end as shown on Figure 4, the interface between the second and third cells being then coincident with the **transversal** center line of the bottom surface.

For these reasons claim 1 as correctly construed in the board's view *inter alia* covers a battery pack which would be distinguished from the closest prior art embodiment of Figure 4 of the patent in suit only by the omitting of the fifth battery cell at the right end of the battery pack.

Such four-cell battery pack, with the detection aperture means at the same location as in the known five cell battery pack would behave in exactly the same way in respect of its inclination relatively to a battery pack accommodating portion if not correctly engaged thereon. As a matter of fact, the detection aperture means 16G, 16I or 16J being located close to a longitudinal edge of the bottom surface, the inclination angle of the battery pack, if incorrectly resting onto corresponding protruded portion of the battery pack accommodating portion, depends only on the width of the battery pack, which would remain unaffected by the reduction of the number of cells from five to four, but not at all on its length.

Thus, contrary to the submission made by the appellant, the features of present claim 1 do not achieve any increase of the inclination angle of the battery pack when incorrectly attached to its accommodating portion.

2.3.3 The battery cells in the closest prior art battery pack are of the nickel-hydrogen type (see column 2, lines 23

to 25 of the specification of the patent in suit). Five such cells must be connected in series to achieve the output voltage of 6 V as required by standard camcorders. The respondents convincingly demonstrated that at the filing date of the patent in suit, lithium-ion battery cells had become available, achieving a substantially higher output voltage of 3 V. The operating voltage of the camcorder could thus be achieved with only two such lithium-ion cells connected in series, or with an even number of such cells, if connected in series/parallel for a greater capacity.

Accordingly, striving at re-designing the five-cells battery pack configuration of the closest prior art into a four-cells configuration in the board's view constituted an obvious endeavour of the skilled person at the filing date of the patent in suit, so that the formulation of this technical problem, which is the sole to be actually solved by the subject-matter of claim 1, cannot as such positively contribute to inventive step.

- 2.3.4 Furthermore, since in the closest prior art embodiment the left side of the battery pack shown in Figures 3A and 4 of the patent in suit comprised connecting electrodes 36, 38 and an electrode 40 connected to a temperature detecting element 42, the most straightforward way for the skilled person to reduce the number of battery cells to four would be simply to remove the fifth battery cell at the opposite end of the battery pack and to shorten the casing accordingly. As an immediate result, detection aperture 16G would lie on a (transversal) center line of the bottom surface of the casing, within the meaning of claim 1.

Claim 1 of the appellant's main request for these reasons in the board's opinion defines a battery pack configuration which immediately results from an obvious re-designing of the closest prior art five-cells battery pack with a view of achieving the same 6 V output voltage using higher voltage battery cells.

The subject-matter of claim 1 of the appellant's main request thus lacks an inventive step within the meaning of Article 56 EPC.

3. *Appellant's first auxiliary request*

3.1 Compliance of the amendments with the requirements of Article 123(2) and (3) EPC

Claim 1 of the first auxiliary request corresponds in the substance to a combination of claims 1 and 3 as originally filed, with an additional explanatory statement of the way the battery pack is adapted to cooperate with a battery charger or electrical machinery or apparatus, protruding portions formed on the battery pack accommodating portion of which being received in the detection aperture means of the bottom surface of the battery pack casing.

These explanations are adequately supported e.g. by the passage on page 18, lines 14 to 22 of the description as originally filed, in accordance with the requirement of Article 123(2) EPC.

As compared to claim 1 as granted, claim 1 of the appellant's first auxiliary request was supplemented with the additional limitation of the columnar batteries being accommodated in two rows in the casing

with the detection aperture means being disposed between these two rows, which clearly limits the scope of the claim, as required under Article 123(3) EPC.

Dependent claims 2 to 8 of appellant's first auxiliary request correspond to claims 2, 3 and 5 to 9 as granted.

For these reasons, the amendments brought to the claims of the appellant's first auxiliary request meet the requirements of Article 123(2) and (3) EPC.

3.2 Sufficiency of the disclosure

Claim 1 is now expressly directed to the specific embodiment with two rows of columnar batteries as described in detail in the specification of the patent in suit in conjunction with Figures 7 to 16.

The respondents had raised objections under Article 100(b) EPC against the sufficiency of the disclosure in relation only with an independent claim which also covered embodiments comprising an odd number of batteries, for which they submitted it was not disclosed how detection aperture means could be performed along a center line of the bottom surface thereof.

Since present claim 1 now specifies that there are only two rows of columnar batteries, with the detection of aperture means being disposed along a center line between the two rows, as shown in the figures and described in the specification, these objections clearly no longer arise.

3.3 Inventive step

3.3.1 The board is satisfied that the additional limitation of the columnar batteries being accommodated in two rows in the casing with the detection aperture means being disposed therebetween (i.e. along a longitudinal center line of the bottom surface), actually results in an increased inclination angle when the battery pack is not properly attached to the accommodating portion of the receiving apertures. In such case, the battery pack would rest on correspondingly located protruded portion of the battery pack accommodating portion and be able to tilt around the longitudinal center line of the bottom surface of the battery pack until the longitudinal edges come into contact with the accommodating portion. The tilt angle varying in inverse relationship with the distance between the line of contact with the protruding portion on the accommodating portion and the longitudinal edge of the bottom surface of the battery pack, it will actually be greater in the claimed battery pack, where the distance is about half the width of the battery pack, than in the closest prior art embodiment where it is close to the total width, as a result of the detection aperture means being adjacent a longitudinal edge.

The board in this respect noticed at the oral proceedings that the wording of claim 1 did not exclude the battery pack comprising additional detection aperture means not formed along the longitudinal center line, with corresponding protruded portions being formed on the battery pack accommodation portion. This is confirmed in particular by dependent claim 2, which recites such additional aperture at a side portion of the casing. Such additional cooperating detection

aperture and protruded portion would certainly restrict the tilting of the battery pack to only one half of the tilting amplitude which would be available if there were detection apertures and protruded portions only along the center line, but the inclination angle in this half would still be greater than in the closest prior art embodiment.

Thus, the board can agree to the appellant's submission that the technical problem underlying the subject-matter defined in claim 1 of its first auxiliary request, beyond the designing of a battery pack for receiving an even number of batteries as considered already in connection with claim 1 of the main request, is to facilitate the detection by the user of an improper attachment of the battery pack to a corresponding accommodating portion, as is set out also in the introductory portion of the specification.

- 3.3.2 The respondents did not produce any evidence showing that a technical link had ever been established prior to the filing date of the patent in suit between the position of detection apertures in the bottom surface of a battery pack, with corresponding protruded portions being provided on a battery pack accommodating portion, and the ease of detecting misplacement of the battery pack. The only discussion in this respect can be found in the introductory portion of the patent in suit, in conjunction with the description of the prior art presented there. The board in this respect agrees to the appellant's submission that these explanations do not as such belong to the state of the art, since they have been elaborated by the drafter of the patent specification only with the knowledge of the invention.

The different models of prior art battery packs presented by the respondents all comprise apertures and recessed portions located at various places other than along a longitudinal center line of the bottom surface.

In particular, although comprising two rows of batteries arranged side by side at the bottom surface of the casing like in the claimed arrangement, the Vivanco BP1772 model exhibits two recesses, none of which is formed between the two rows of battery cells: one recess is formed at a side edge of the casing, at a distance from any center line and the other is formed at a position offset from the batteries. These models thus do not support the respondent's submission that the apertures could only be provided between the batteries like in the patent in suit, for practical reasons.

The respondents in this respect also cited document US-A-3 887 394, which discloses a battery cartridge with a casing having minimum thickness, weight and dimensions, to show that the skilled person was well aware of the limitations imposed on the design of such devices in terms of space and weight requirements (see the abstract). This document does not disclose any aperture in the bottom surface of the casing, and it was published in June 1975, which is about 17 years before the priority date of the patent in suit. This long period of time is in apparent contradiction with the respondents' submission that the claimed arrangement was an obvious result of elementary design considerations.

Neither did the respondents explain which obvious reason could have led the skilled person to depart from

the closest prior art construction with battery cells arranged side by side transversely of the battery pack to the claimed longitudinal arrangement of battery cells along two rows only, if not with the benefit of hindsight.

For these reasons, in view of the prior art brought to light, the subject-matter of claim 1 of the appellant's first auxiliary request is considered to involve an inventive step within the meaning of Article 56 EPC.

- 3.4 Since, taking into account the amendments made in accordance with the appellant's first auxiliary request, the patent and the invention to which it relates meet the requirements of the Convention, maintenance of the patent so amended can be decided (Article 102(3) EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to maintain the patent as amended in the following version:

Claims 1 to 8 filed as first auxiliary request during the oral proceedings of 16 May 2001;

Description and drawings of the patent specification.

The Registrar:

The Chairman:

P. Martorana

E. Turrini