

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Eve Energy Co., Ltd.
Petitioner

v.

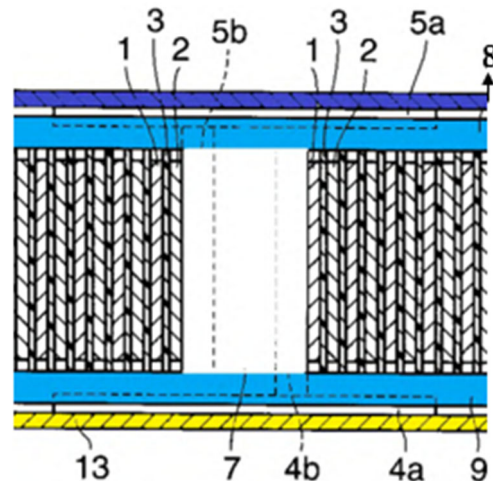
Varta Microbattery Gmbh
Patent Owner

Case No. IPR2022-01484

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 9,153,835**

Claims 14-25

the positive electrode case and the electrode group, between the negative electrode case and the electrode group, or both.” Ex1004, [0019], FIG. 1.



See Ex1002, ¶¶143-145.

(k) Obviousness Over Kobayashi, Kaun, and Brenner

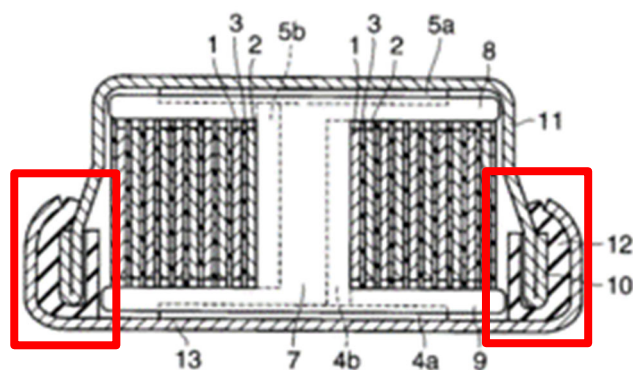
Kobayashi, Brenner, and Kaun all relate to button cells with a spiral wound electrode assembly. See Ex1004, [0008]; Ex1023, [0017], [0091].

Instead of beading, Kaun uses an insert molded gasket placed between housing top 28p and cup 28n to provide a gas-tight seal. Ex1023, [0116]. As discussed above, Kaun provides a sealing mechanism that closes the button cell without being beaded over (no portion of housing cup 28n edge being deformed or crimped radially inward). *Supra* §VI.A.1.f. Using insulator/gasket 32 allows for sealing of the button cell using a housing cup whose edge remains essentially perpendicular to its flat bottom area. Ex1023, FIG. 7.

As can be seen clearly in Figure 1 of Kobayashi (annotated below), a

significant portion of the available space within the cell is reduced by the process of crimping the cell closed. The process of crimping the cell closed can require significant extra space for the cell housing, but such space cannot be used for active materials, thus reducing the overall capacity of the cell.

FIG. 1



Because of the unbeaded nature of Kaun's sealing mechanism, Kaun increases the effective volume and capacity within the cell housing. The increased volume allows for a corresponding increase to the number of electrode layers in the electrode assembly of Kobayashi and Brenner, which would improve energy density of the cell. As such, a POSITA would have been further motivated to combine the cell taught in Kobayashi with the unbeaded sealing mechanism of Kaun to improve the energy density of the cell. A POSITA, therefore, would have been motivated to use the unbeaded sealing mechanism taught in Kaun to seal the cell housing of Kobayashi. *See KSR*, 550 U.S. at 400 ("mere application of a known technique to a

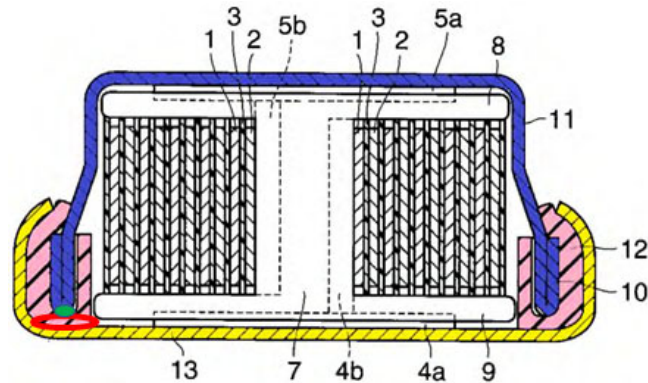
piece of prior art ready for the improvement” supports a conclusion of obviousness). Such modifications would have been well within the skill of a POSITA.

Furthermore, a POSITA would have understood that the expansion of the electrode mainly causes radial forces. *See* Ex1007 (Higuchi), p.4; Ex1023 (Kaun) at [0062]. As a result, crimping would not be needed since it is not necessary to crimp in the axial direction for constraint. The quality of the curled edge can then be omitted so as to improve the energy density.

A POSITA would have known that using metal foils that are connected to the positive and negative electrodes before the priority date of the '835 patent. *See* Ex1020 (Arai), Ex1021 (Okochi). The metal foils are configured such that they rest flat between an end face of the spiral winding and the flat top or bottom of the housing to which it is connected. Using metal foils to replace 4a and 4b to connect the electrodes to the housing would have helped the goal of maximizing the use of the interior volume of the housing, reduced the weight of the battery, and thus increased the energy density of the battery, as known to a POSITA. Thus, a POSITA would have found that using the metal foils is within the knowledge of a POSITA, and substituting metal foils would have involved the simple substitution of one known element for another to obtain predictable results. *KSR* at 401.

For the overlapping area as discussed above, there is good sealing due to the force-fitting connection. For non-overlapping area near the edge of the overlapping

area (as seen below in red) that includes insulation (pink), there will likely be sealing and leakage issues.



Brenner discloses that indentation 104 would improve the sealing characteristics of cup 105 and top 101 in this area by allowing radial pressure to be exerted, which is exactly what is needed to address the leakage and sealing issue as discussed above. Ex1005, [0030]. It would be natural and obvious for a POSITA to improve radial sealing in button cells closed without being beaded over by looking to Brenner to improve the sealing characteristics and leakage behavior.

Given both Kobayashi with the modification of Kaun and Brenner are in the same field using similar technology and structure, substituting the relevant structure in Kobayashi with the modification of Kaun with the slightly “radially inward” structure in Brenner would have involved the simple substitution of one known element for another to obtain predictable results. *KSR* at 401.

See Ex1002, ¶¶146-160.

2. *Claim 15*