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Transcript of Martin C. Peckerar, Ph.D. (Volume 3)

Date: September 10, 2021
Case: PEAG LLC, et al -v- VARTA Microbattery GMBH. (PTAB)

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PEAG LLC (d/b/a JLab Audio), AUDIO PARTNERSHIP LLC and AUDIO PARTNERSHIP PLC (d/b/a Cambridge Audio),

Petitioner,

v.

VARTA MICROBATTERY GMBH,

Patent Owner.

Case IPR2020-01211 USP 9,496,581	Case IPR2020-01212 USP 9,153,835
Case IPR2020-01213 USP 9,799,858	Case IPR2020-01214 USP 9,799,913

VIDEOTAPED DEPOSITION OF MARTIN C. PECKERAR, PH.D.

VOLUME 3

Conducted Virtually

Friday, September 10, 2021

8:56 a.m. EDT

Job No.: 395274

Pages: 351 - 445

Reported by: Monique Vouthouris, CCR, RPR, CRR

REMOTE VIDEOTAPED deposition of MARTIN C. PECKERAR, PH.D., pursuant to notice, before Monique Vouthouris, CCR, RPR, CRR, Notary Public in and for the States of New Jersey and New York.

A P P E A R A N C E S

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C O N T E N T S

E X H I B I T S

(Attached to transcript.)

P R O C E E D I N G S

THE VIDEOGRAPHER: This is the beginning of Media Number 1, Volume Number 3 of the continuation of the videotaped deposition of Dr. Martin Peckerar, in the matter of PEAG LLC, et al., versus VARTA Microbattery, et al., in the U.S. Patent and Trademark Office, Case Number IPR 2020-01211, -12, -13, and -14. Today's date is Friday, September the 10th, 2021. The time on the video monitor is 8:56 a.m. Eastern Standard Time. The certified videographer today is Jean-Louis Ziesch representing Planet Depos. This video deposition is taking place remotely. Would counsel please identify yourself and state whom you represent. 08:55:45 08:55:45 08:55:48 08:55:52 08:55:56 08:56:03 08:56:08 08:56:18 08:56:23 08:56:30 08:56:33 08:56:37 08:56:40 08:56:42

MR. PALMIERI: On behalf of the petitioners PEAG LLC, Audio Partnership LLC and Audio Partnership PLC, my name is Nick Palmieri, with Baker Botts. Here with me is Paul Ragusa, also with Baker Botts. 08:56:45 08:56:50 08:56:55 08:56:59

MR. MUELLER: This is Wes Mueller from Leydig Voit & Mayer in Chicago, on behalf of the patent owner VARTA Microbattery GmbH. 08:57:03 08:57:09 08:57:11

THE VIDEOGRAPHER: The court reporter today is Monique Vouthouris representing Planet Depos. Would the court reporter please swear in the witness. 08:57:16 08:57:17 08:57:20

MARTIN C. PECKERAR, PH.D., 08:57:41

being first duly sworn or affirmed by the Notary, testifies as follows: 08:57:41 08:57:41

EXAMINATION 08:57:41

BY MR. PALMIERI: 08:58:00

Q Good morning, Dr. Peckerar. How are you doing today? 08:58:00 08:58:03

A Doing well. Hopefully you are, too. 08:58:04

Q So before we get started, I just wanted to ask is there anyone else in the room with you right now? 08:58:06 08:58:10 08:58:12

A Yes. Mr. Mueller and Mr. Wittmann. 08:58:13

Q So as a preliminary matter, you've prepared two declarations in this case so far. Is that correct? 08:58:21 08:58:25 08:58:28

A Yes, there are two transcripts here. 08:58:28

Q Well, so the transcripts I believe are referring to previous depositions. But for the IPRs at issue, you prepared two expert declarations? 08:58:35 08:58:42 08:58:45

A Yes. 08:58:49

Q Just for ease of reference, I'll refer to your most recent declaration as either your supplemental declaration or your declaration since that's the primary topic of this -- this deposition. 08:58:49 08:58:54 08:58:57 08:59:00

A Yes. 08:59:03

Q If I refer to the first declaration at all, I'll refer to it as your original declaration. 08:59:03 08:59:06

A Yes. 08:59:10

Q And you prepared this supplemental declaration on behalf of the patent owner VARTA. Is that correct? 08:59:10 08:59:15 08:59:18

A That's correct. 08:59:18

Q And you -- did you prepare the entire supplemental declaration? 08:59:19 08:59:20

A Yes. 08:59:23

Q Did you have any assistance in preparing this declaration? 08:59:24 08:59:27

A Well, I didn't type it up or put it in format. I supplied all the technical content, outlined the figures and even modified the figures with color, yeah. 08:59:28 08:59:31 08:59:37 08:59:40

Q And so -- who provided this assistance to you? 08:59:42 08:59:46

A Well, that was done by Leydig. They have a drafting office. 08:59:46 08:59:49

Q But you prepared the substantive content of each section. That's correct? 08:59:52 08:59:56

A Yes. 08:59:58

Q And in preparing this declaration, did you review any particular materials? 08:59:59 09:00:05

A Yes, of course, and those are listed in one of the sections of my -- of my supplemental report. 09:00:09 09:00:12

Q And if -- if we could bring onto the screen, I circulated a copy of the supplemental declaration. And on pages 1 and 2 of that declaration, you list the materials that you considered? 09:00:17 09:00:22 09:00:27 09:00:34

A Yes, Section III. 09:00:37

Q Section III, that's right. And did you review any other materials not listed in that section? 09:00:38 09:00:41

A Those are the materials that I spent most time on and they're -- 09:00:45 09:00:48

THE TECHNICIAN: Mr. Palmieri, would you like this marked as an exhibit? 09:00:52 09:00:54

MR. PALMIERI: Yes. Could you mark it as Exhibit 2050. It should already be physically marked in the copy, but... 09:01:01 09:01:05 09:01:09

(Exhibit 2050, Supplemental Declaration of Martin C. Peckerar, Ph.D., marked for identification.) 09:01:09 09:01:18

Q Okay. And so if you used any reference or reviewed any -- any materials for this declaration for -- in any substantive manner, they will be listed in that Section III. Is that correct? 09:01:18 09:01:22 09:01:26 09:01:30

A Yes. Yes. 09:01:32

Q And before we go on, are there any errors or corrections that you're aware of in your supplemental declaration that you would like to resolve? 09:01:34 09:01:38 09:01:42

A I have none. I don't -- it is possible that I missed a typo or two. I would apologize for that. 09:01:45 09:01:50

Q So you were previously deposed on June 2nd and 3rd. Is that correct? 09:01:55 09:01:59

A I believe that was the case. 09:02:02

Q Did you review those deposition transcripts? 09:02:04

A Yes. 09:02:09

Q Did you review them in anticipation for today's deposition or did you just generally review 09:02:09 09:02:12

them? 09:02:16

A Just generally reviewed them. 09:02:16

Q All right. Did you discuss your deposition testimony with anyone? 09:02:19 09:02:22

A After the deposition was given, yes, I did. 09:02:25

Q And that was -- with whom did you discuss? 09:02:31

A With Leydig counsel, to some extent. 09:02:34

Q Did you discuss with anyone else? 09:02:38

A No. 09:02:41

Q You did not discuss with anyone at VARTA directly. Is that correct? 09:02:41 09:02:45

A No. Well, I met with -- with VARTA personnel. Not in conjunction with these -- with these records and proceedings. 09:02:47 09:02:52 09:02:56

Q So you didn't -- you did not -- just to clarify, you did not discuss your deposition transcript with any VARTA personnel? 09:02:59 09:03:02 09:03:04

A No. 09:03:09

Q And did you discuss whether any of your previous testimony in those depositions was contrary to any of VARTA's positions? 09:03:09 09:03:12 09:03:15

A No. 09:03:17

Q Since your previous deposition, have you been deposed in any other matters? 09:03:18 09:03:23

A No. 09:03:27

Q And have you done anything to prepare for today's deposition specifically? 09:03:34 09:03:36

A Well, I read over my supplemental report a number of times, and I -- I looked -- looked at the materials that were referenced therein. That would be the extent of my preparation. 09:03:37 09:03:42 09:03:51 09:03:57

Q So in addition to the supplemental declaration, you reviewed other -- other relevant materials that might have been cited therein? 09:04:00 09:04:03 09:04:07

A Well, the supplemental included a number of -- of references that were not in the original deposition. But I believe those were all pretty well-documented and listed in the supplemental. 09:04:11 09:04:17 09:04:22 09:04:26

Q But you didn't -- you didn't refer, in preparation for today, to any materials that are outside of your supplemental declaration? 09:04:29 09:04:32 09:04:34

A No. 09:04:37

Q Okay. And did you prepare with anyone? 09:04:39

A Most of the work that I did, of course, 09:04:44

was -- was my own reading and review of all the -- of the supplemental and the cited materials in the supplemental. I did have some conversation with -- with Leydig. 09:04:48 09:04:54 09:04:57 09:05:03

Q And do you know when you met with VARTA's counsel? 09:05:05 09:05:10

A I would have to go back to my hours log. I don't have that with me. 09:05:10 09:05:14

Q Do you have an approximate period of time that you met with them? 09:05:15 09:05:19

A Well, yeah, I would -- well, certainly between -- between the deposition in June and today there have been a couple of conversations, yeah. 09:05:20 09:05:25 09:05:28

Q But in preparation specifically for this deposition have you met with them? 09:05:31 09:05:34

A Well, I certainly met with them before this deposition and we discussed issues relating to it. 09:05:36 09:05:40

Q Okay. And do you know about how -- at least how many times you've met with them, just a rough idea? 09:05:43 09:05:46 09:05:49

A I would say maybe three or four times. As I said, I'd have to look at my hours log. I'm not sure. 09:05:49 09:06:03

I don't believe that this was part of the -- of the materials considered section. 09:06:08 09:06:10

Q So in terms of your supplemental declaration -- yeah, supplemental declaration itself, I'd like to turn to what is marked as page 7 of Exhibit 2050, and that begins Section 5.A.1. In this section you discuss -- you discuss dendrite growth. Is that correct? 09:06:15 09:06:20 09:06:23 09:06:31 09:06:41 09:06:49

A Yes. 09:06:49

Q Do you recall that? 09:06:49

A Yes. Yes. 09:06:50

Q So can you describe in your words how dendrites form? 09:06:52 09:06:55

A Yes, okay. Dendrites are little trees, okay. They shoot up from -- from the negative terminal plates of a battery. Just about any battery, by the way. And in the case of a lithium battery, the problem is that lithium intercalates into the cathode; in other words, it inserts itself into little passages in the -- in the storage material that constitute the cathode. And sometimes that -- that insertion process lags the arrival rate of the -- of various ions, like 09:06:57 09:07:01 09:07:05 09:07:11 09:07:17 09:07:22 09:07:27 09:07:32 09:07:40

a lithium ion. And as a result, a tree grows up because the material beneath it can't absorb it. It's a lot like macular degeneration, but we won't get into that. 09:07:46 09:07:50 09:07:55 09:08:00

The -- and so there are two requisites for the -- for the tree-forming site. The region in which the tree grows has to be particularly attractive to the ion in solution, and that ion has to be incident -- what we call a -- it's called a nucleating site, and the tree will grow up from the nucleating site, which is triggered by a reduction in free energy of the ion itself. And so you get these tree-like structures shooting up. 09:08:03 09:08:07 09:08:13 09:08:19 09:08:26 09:08:30 09:08:37 09:08:40 09:08:45

Would you like some more? Let me also say, I mean, in secondary cells, dendrite formation is a major problem in just about every cell that you can imagine. I did a lot of work in trying to develop rechargeable zinc batteries. We had a hell of a time with dendrites in rechargeable zinc. 09:08:46 09:08:50 09:08:58 09:09:01 09:09:05 09:09:10

Q So following up on that, can you describe -- and maybe I just missed this a little -- where the dendrite formation begins at. So we have -- and, 09:09:15 09:09:19 09:09:24

actually, let me clarify that a little more. So let's say we have an electrode layer and a separator layer and a second electrode layer. Can you describe where in that configuration the dendrite formation would begin? 09:09:28 09:09:32 09:09:36 09:09:42 09:09:45

MR. MUELLER: Objection to form. 09:09:45

A Well, let's see here. Okay. It will form in what we call nucleating sites, areas where the ion motion is impeded and is more likely to plate, and that -- and there could be secondary considerations as well. I mean, let's suppose that -- of course, all of the separated materials that we discuss are either woven, meaning that they have fibers across one another which leave pores, the nucleation might occur within a pore, and it might be assisted by a kind of scaffolding that a separator represents. And that will be true in other ionic separators, like Nafion or other materials as well. 09:09:53 09:10:05 09:10:11 09:10:22 09:10:25 09:10:30 09:10:36 09:10:40 09:10:45 09:10:50 09:10:53 09:10:59

So, so does that answer your question, if you'd like? 09:11:01 09:11:09

Q That helps. I have some follow-ups on it. 09:11:10

A Okay. 09:11:12

Q So can -- can these nucleating sites be found on the electrode layers as opposed to the separator materials? 09:11:13 09:11:18 09:11:21

A Yeah, they can pretty well form anywhere, yes. 09:11:22 09:11:25

Q And so is the separator material usually chosen to reduce dendrite formation? 09:11:27 09:11:32

MR. MUELLER: Objection to form. 09:11:36

A Well, you do what you can to get rid of the dendrites, okay. You use surface treatments, you choose the separator materials. In the barer areas, I mean, that was relatively easy to address because in the barer areas you generally see -- see structures forming which we call mounds. Maybe I'm getting ahead of my report, but you have to remember I taught this stuff for a long time so you'll excuse me for waxing poetic. 09:11:40 09:11:45 09:11:49 09:11:57 09:12:01 09:12:05 09:12:11 09:12:14 09:12:19

We use brightener additives to plating mast to avoid mounding, and the -- and so there were a number of approaches that you would use to eliminate dendrite formation. 09:12:20 09:12:26 09:12:32 09:12:37

Q So I want to look at a specific example and 09:12:39

so this will be the Kaun reference, which you discuss throughout your report. It's Exhibit 1041 in these IPRs. We can stay on the same Exhibit 2050 as well, that's all right. 09:12:42 09:12:49 09:12:54 09:13:00

So, Dr. Peckerar, in Kaun we have a specific example of a spiral wound electrode assembly, with a separator located in between the electrode layers. Is that correct? 09:13:02 09:13:09 09:13:13 09:13:18

A Yes. 09:13:18

MR. MUELLER: Objection to form. 09:13:19

Q And one of the topics of discussion for that reference is the formation of gaps between the separator materials. Do you recall that? 09:13:22 09:13:26 09:13:30

MR. MUELLER: Objection to form. 09:13:33

A Yes, I recall that discussion. 09:13:35

Q And so bringing -- bringing the dendrites back in, would dendrites form in the electrode assembly of Kaun? 09:13:39 09:13:46 09:13:50

MR. MUELLER: Objection to form. 09:13:52

A As I just testified, dendrites can form wherever. Nucleating sites develop and nucleating sites can develop pretty much anywhere. 09:13:53 09:13:59 09:14:04

Q So the nucleating sites could form on the electrode layers of Kaun? 09:14:07 09:14:10

MR. MUELLER: Objection to form. 09:14:12

A And in the separators as well. Anywhere. 09:14:14

Q So could they form in the gap between the separator layers? 09:14:20 09:14:23

MR. MUELLER: Objection to form. 09:14:24

A As I said, I do have a section on this in my supplemental report, but let me say yes, they could form in those regions. 09:14:32 09:14:36 09:14:40

Q And if they form in the gap regions, would there be anything to inhibit their growth? 09:14:45 09:14:48

MR. MUELLER: Objection to form. 09:14:51

A What would inhibit their growth would be the rate of arrival of the -- of the ion that constitutes the dendrite, and -- and what that arrival rate is depends on a number of things. And I wouldn't say that there's any reason to believe that that arrival rate or the density of nucleating sites would be different in either the gap or in the region over the -- beneath the separator. 09:14:52 09:14:58 09:15:03 09:15:11 09:15:15 09:15:19 09:15:24 09:15:28

In fact, as I mentioned earlier, there's 09:15:31

reason to believe that the separator might serve as a scaffolding that support the growth of the tree. 09:15:33 09:15:36

Q So does the separator then form to -- apologies, let me rephrase that. 09:15:42 09:15:48

Does the separator then act to inhibit the growth of dendrites so that they cannot form a connection between the electrode layers? 09:15:50 09:15:53 09:15:58

MR. MUELLER: Objection to form. 09:16:00

A There's no reason to believe that. 09:16:02

Q So it's your testimony that the separator does not inhibit -- 09:16:06 09:16:08

A It could actually -- it could actually speed it up, but you'd have to -- there's a tremendous amount of literature on this. I believe we've included some of that in our -- I've included that in my report and -- but as I said, you can get little trees forming anywhere. 09:16:11 09:16:13 09:16:19 09:16:23 09:16:27 09:16:34

Q And so you have another section here, and it's on pages 8 to 9 of Exhibit 2050, that describes the use of a polyvinylidene fluoride, also known as Kynar, that's described in the Kaun reference. 09:16:37 09:16:40 09:16:48 09:16:56

A Right. 09:16:59

Q Can you -- can you describe what this Kynar is doing? And apologies if I'm saying that wrong. I'm happy to take a corrected pronunciation if you have it. 09:16:59 09:17:03 09:17:07 09:17:11

A Yeah, no, it is Kynar. I believe he pronounces his name Kaun. 09:17:12 09:17:15

If -- if the butt joint is too large, of course there's a danger that you could -- there are certain deleterious effects that could occur, but -- and so if you're worried about that, according to Kaun, you can put Kynar, which is a resin, an insulating resin, and solve the problem. 09:17:21 09:17:29 09:17:33 09:17:37 09:17:42 09:17:47

Q And this Kynar would prevent dendrite formation? 09:17:53 09:17:58

A I think that that -- I don't -- that certainly wouldn't eliminate the dendrite problem, no. But it -- it would prevent the formation of other types of deleterious effects, and I believe that was the main issue. 09:18:01 09:18:07 09:18:11 09:18:19 09:18:26

Q So you've noted a couple times the -- the effects that can be caused from a gap forming. Could you describe some of those deleterious effects? 09:18:28 09:18:33 09:18:38

A Obviously you've got a separator, right, and on top of and on bottom under the active electrodes. And if you've got this huge gap, when you squeeze things together, you short the electrodes out. 09:18:42 09:18:49 09:18:54 09:19:00

Also, we make a big deal -- okay. We make a big deal about particle sizes, okay. We choose the particle sizes to be large enough in the active material so that -- just large enough so that they won't penetrate the separator material themselves and also they wouldn't fall into any -- to create shorts in themselves. 09:19:02 09:19:12 09:19:17 09:19:23 09:19:26 09:19:29 09:19:37

So we -- so we -- as a matter of fact, in one of my companies we had a very expensive particle size sorter and we would choose specific particle sizes that wouldn't crash through the separator and at the same token wouldn't fill up the pores of the materials that we were using. They would be -- they wouldn't be too small, they wouldn't be too big; they'd be just right. But these are all the considerations that go into battery manufacturing. 09:19:39 09:19:46 09:19:51 09:19:54 09:20:00 09:20:03 09:20:06 09:20:11 09:20:14

So those are some of the issues; there will be shorting out of the layer and what all, which I 09:20:16 09:20:19

think would be rare, even in Kaun's case. Or the particles which would pierce the layer for -- well, those are the main issues, so that would outline. 09:20:21 09:20:26 09:20:35

Q And so -- so going back to this Kynar material, if we assume that it's being used as an adhesive to fill that gap, what differentiates it from the separator material? 09:20:39 09:20:44 09:20:49 09:20:55

MR. MUELLER: Objection to form. 09:20:56

A Well, Kynar is non-conductive resin. Now, the separator materials -- as I've testified previously, the separator materials are highly engineered structures and they're aimed at passing ions of a certain type. Now, clearly the Kynar isn't an engineered material that was designed to do that. So it might lead to some effective area reduction of the battery plate. Not a lot. 09:20:57 09:21:19 09:21:24 09:21:27 09:21:31 09:21:38 09:21:42 09:21:50

Q So the -- 09:21:50

A Small amount. 09:22:01

(Court Reporter clarification.) 09:22:01

A Not a lot, small amount. 09:22:04

Q So the Kynar doesn't facilitate ionic conduction the way that the separator material does? 09:22:04 09:22:10

A No. 09:22:14

Q So you have to have some sort of separator material in there in order for the battery to function? 09:22:16 09:22:20 09:22:23

MR. MUELLER: Objection to form. 09:22:23

A Well, I mean, Kaun cites that as one possible remedy to some imagined problem. He didn't specifically cite the problem that he was addressing here, but it was just something he threw over the wall. 09:22:27 09:22:34 09:22:38 09:22:42 09:22:45

Q Okay. So now moving on into Section 5B1, which begins on page 12 of Exhibit 2050, this -- this section discusses the central fastener of Kaun. Is that correct? 09:22:51 09:23:00 09:23:08 09:23:15

A Excuse me, what was the page? 09:23:15

Q Sorry. So it's page 12 of 43 on the exhibit. 09:23:17 09:23:21

A I got it. 09:23:21

Q Page 9 of the -- on the PDF. 09:23:22

A Okay. Yeah, I got it in my documents. Okay, yeah. Sorry for the delay. 09:23:26 09:23:29

Q No problem at all. So this section 09:23:32

discusses the central fastener of Kaun. Is that correct? 09:23:35 09:23:41

A Yes. 09:23:41

Q And you reproduce on the next page, page 13, you reproduce a number of figures from Kaun. Do you see those? 09:23:46 09:23:52 09:23:56

A Yes. 09:23:57

Q If we're looking only at Figure 7A, is the central fastener shown in that figure? 09:24:00 09:24:07

A No. 09:24:10

Q And then moving on to Figure 7C, do those figures show -- does Figure 7C show a central fastener? 09:24:14 09:24:20 09:24:24

A Yes and yes. 09:24:25

Q And if we could move into Kaun itself, and that's Exhibit -- apologies, I don't remember the exact exhibit number for Kaun. Sorry, just one second. 09:24:27 09:24:33 09:24:41 09:24:56

So Kaun is Exhibit 1005 of these IPR proceedings. 09:25:35 09:25:41

A Yes. 09:25:42

MR. PALMIERI: And, Sarah, could we bring 09:25:48

that up as well on the screen. 09:25:51

THE TECHNICIAN: Is that the document ending in U.S. 2005/0233212? 09:26:02 09:26:04

MR. PALMIERI: That's correct, yeah. Yes, starts with K-a-u-n. Great. Thank you. 09:26:10 09:26:11

(Exhibit 1005, U.S. Patent Application Pub. No. US 2005/0233212, Kaun, marked for identification.) 09:26:11 09:26:11

BY MR. PALMIERI: 09:26:20

Q So I want to look at paragraph 69 of 0069, which corresponds with those figures that we were just looking at, 7A through 7D. 09:26:20 09:26:29 09:26:33

A You just passed it. 09:26:38

Q It should be on page 4 -- page 15 of this PDF, overall? 09:26:40 09:26:44

A Is that the one you're referring to? 09:26:47

Q Yeah. So those are the figures, and then if we can go to paragraph 0069 on this specific language. 09:26:49 09:26:52

THE TECHNICIAN: I'm sorry, I'm not entirely sure where to go. 09:27:04 09:27:06

MR. PALMIERI: Sorry. So within Kaun, if you could go to page -- page 15 of the PDF, and on that page is paragraph 69, on the left there, yeah. 09:27:07 09:27:11 09:27:18

Perfect. Thanks. 09:27:29

Q Okay. So in paragraph 69 we can see there's a description of Figure 7C that says it "depicts the outer pan of the housing for the electrochemical device, including the central [sic] fastener, polymeric tube." Do you see that portion, Dr. Peckerar? 09:27:31 09:27:38 09:27:43 09:27:46 09:27:50 09:27:55

A Yes, I do. 09:27:56

Q And so does this imply to you that there's an embodiment that doesn't have a central fastener as well -- 09:27:57 09:28:00 09:28:04

MR. MUELLER: Objection to form. 09:28:05

Q -- and actually specifies -- 09:28:06

A Well, as I've testified before, the center fastener is an essential part of this construct, and what you said doesn't contradict that. 09:28:08 09:28:13 09:28:16

Q So can you describe the purpose of the center fastener in Kaun? 09:28:20 09:28:23

A Sure. Okay. Most of the cells that have been discussed in the past all had beaded -- what we've been terming beaded over seals, beaded over closure, and these present a mechanical impediment to 09:28:26 09:28:36 09:28:44 09:28:48

the motion the can separating from the top. 09:28:51

These cells, for various reasons, don't 09:28:54

and -- but this is -- by the way, I mean, if you look 09:28:57

at the patents cited, that's a rare case now. What -- 09:29:02

what the -- what the issue is is you need as much 09:29:11

force that would prevent motion along the axis of the 09:29:17

top and can. Usually a single approach isn't enough, 09:29:25

and that's what's cited here. 09:29:30

In this particular case, there is a 09:29:35

requirement for that center fastener, in this case the 09:29:38

polymeric tube, which can be affixed in a number of 09:29:42

ways to the can, in this case the can top, and then 09:29:47

there would be a mating member on the bottom. And 09:29:55

these would supply the necessary force-fit separate, 09:30:01

hold the cell together. And if this is a polymeric 09:30:08

tube, there are a number of ways to affix that tube to 09:30:13

the can top, and that would explain why it doesn't -- 09:30:16

it isn't shown in Figure A as penetrating. 09:30:19

Q And so is this central fastener used to 09:30:25

provide pressure-loading to the cell? 09:30:31

MR. MUELLER: Objection to form. 09:30:33

A Pressure loading? No, not pressure-loading. 09:30:36

Q Is it used in the pressure-release mechanism of Kaun? 09:30:42 09:30:47

MR. MUELLER: Objection to form. 09:30:47

A No. 09:30:48

Q I'd like to look now at Figure 12B of Kaun, and this is up on page 8 of -- of the PDF. 09:30:49 09:31:00

A The Kaun patent? 09:31:06

Q Yes, page 8 of the Kaun patent. 09:31:08

A Yup. 09:31:12

Q And can you describe what this figure is showing? 09:31:14 09:31:16

A Yeah. It's spring-load. It's an additional method of ensuring closure of the can, of the housing. You've got little springs, 38, that screw down and hold the cells together. Kaun was greatly afraid of the cells blowing apart, and so he used a number of approaches to ensure that that didn't happen. 09:31:17 09:31:23 09:31:30 09:31:37 09:31:42 09:31:45

Q And is there a central fastener in this figure? 09:31:48 09:31:52

MR. MUELLER: Objection to form. 09:31:53

A Honestly, of course, that would appear in the -- in those central regions full of rectangles. 09:31:54 09:32:00

While I don't see it, it doesn't mean it's not there. 09:32:08

Q But you can't identify a central fastener 09:32:11

that's shown in this figure. Is that correct? 09:32:15

A Yes. But in the body of the patent he 09:32:18

refers to the need for the center fastener over and 09:32:20

over, as well as the claim. 09:32:23

Q And I'd like to go now down to paragraph 09:32:28

120, which is on page 20 of this PDF -- 09:32:32

A Okay. 09:32:38

Q -- down near the bottom, bottom right of the 09:32:38

page. So let's looking -- looking at the last 09:32:41

sentence there, it recites, "The gasket 32, usually a 09:32:49

polyethylene, can also be an adhesive polymer such as 09:32:54

DuPont Surlyn, to seal the cell without 09:32:59

pressure-loading where a pressure-release seal is not 09:33:03

required." Do you see that? 09:33:09

A Yes. 09:33:10

Q And so does this embodiment necessarily 09:33:10

require a central fastener? 09:33:14

MR. MUELLER: Objection to form. 09:33:16

A He doesn't teach against it in this 09:33:17

paragraph. What he's saying amplifies what we've been 09:33:28

talking about earlier, that -- that that outer seal, the gasket seal, really only provides partial closure of the cell. The way that works is as the gas build up, pressure build up in the cell, the housing will -- will move apart and the -- and a little section at the bottom of the gasket will open up and that will admit gas to create a vent. 09:33:33 09:33:41 09:33:45 09:33:52 09:33:59 09:34:09 09:34:17

But, you see, the reason I say that that amplifies what we said earlier is that by itself the gasket doesn't create a true -- while it -- true closure of the cell. I mean, and this isn't a truly closed cell any way you look at it; it's only intermittently closed because it admits venting. 09:34:19 09:34:22 09:34:27 09:34:31 09:34:36 09:34:40

But the idea is that the -- well, if you look at the -- the housing insert, the top housing insert, it's elevated, it allows gas egress through -- through the gasket region. So that indicates that the gasket by itself isn't a sufficient seal, okay. 09:34:43 09:34:45 09:34:50 09:34:56 09:34:59

And so, now, he, again -- he, again, speculates, throwing this over the wall that, well, if you want these cells to be truly closed, maybe you could use DuPont Surlyn. He doesn't cite any data, he 09:35:04 09:35:12 09:35:15 09:35:19

doesn't cite he's done this, but he says, well, maybe you could use a better adhesive. But that is speculation. 09:35:22 09:35:26 09:35:30

Q So -- so in one embodiment of Kaun then, there's a pressure-release mechanism where the seal will allow gas to be vented. Is that correct? 09:35:32 09:35:37 09:35:41

A Right. The gasket will allow gas venting, right. 09:35:44 09:35:47

Q And -- but in paragraph 120 here, we see an embodiment where pressure-release seal is not required in the cell. Is that correct? 09:35:47 09:35:52 09:35:56

MR. MUELLER: Objection to form. 09:35:58

A No -- first of all, you know, on so many counts, okay, every cell requires some form of pressure relief. Just because you're not providing that venting through the gasket doesn't mean he doesn't have pressure relief elsewhere in the cell. These things could be bombs. 09:35:59 09:36:08 09:36:12 09:36:14 09:36:17 09:36:20

What he's also citing is something that -- that isn't followed up on either of the rest of the patent or in the claims. He's saying, well, you know, if you really want to stick these things together, 09:36:27 09:36:30 09:36:33 09:36:36

maybe you could use a better -- a better adhesive. 09:36:39
But he doesn't cite the degree to which that -- that 09:36:44
adhesive by itself would seal the cell. That doesn't 09:36:50
preclude the center seal -- the center fastener which 09:36:54
he -- which he refers to over and over again in the 09:36:59
patent. 09:37:02
Q Okay. But in -- in this embodiment in 09:37:04
paragraph 120, this embodiment is directed to a cell 09:37:09
that doesn't have the same pressure-release gasket 09:37:17
seal as, you know, the other embodiments that we were 09:37:24
discussing? 09:37:28
MR. MUELLER: Objection to form. 09:37:29
Q Regardless of the central fastener or not, 09:37:29
this, this embodiment doesn't include a 09:37:33
pressure-release seal? 09:37:36
MR. MUELLER: Objection to form. 09:37:38
A But he is not -- he's not discounting the 09:37:42
need for the center fastener here. All he's saying is 09:37:50
that if you have some other -- I mean, this is 09:37:55
again -- I apologize myself for speculating. But 09:37:57
what -- what he is definitely saying here is that -- 09:38:02
that you can do -- you can get better sealing using an 09:38:05

adhesive polymer and then the additional venting mechanism and -- but that does -- that does not -- it doesn't allow you to leave this center fastener off altogether. 09:38:10 09:38:14 09:38:24 09:38:29

Q And the vent in this embodiment then would not be at the point -- at the gasket? 09:38:32 09:38:38

MR. MUELLER: Objection to form. 09:38:40

Q I can rephrase that if you need a better -- 09:38:42

A Well, it's my -- well, maybe I shouldn't render an opinion on this, but let me just state that, that -- okay. The meaning of this paragraph is that -- as I've said both in my preliminary report and the supplementary report is DuPont Surlyn could be used to provide a one additional mechanism for sealing. It doesn't discount the need that's expressed over and over again in the other -- throughout the patent and claims that there should be a center seal. 09:38:46 09:38:54 09:38:59 09:39:03 09:39:10 09:39:14 09:39:23 09:39:27 09:39:30 09:39:32

Q And so one last question on this. Would the seal provided by this DuPont Surlyn be airtight? 09:39:36 09:39:39

MR. MUELLER: Objection to form. 09:39:43

A If Kaun made that statement, it would be 09:39:45

speculation. I don't think we have any evidence that that would be the case. He's citing it's a potential. 09:39:53 09:39:57

Q Okay. So now I'd like to move on to another -- another piece of prior art, and this is Exhibit 1039. I will refer to it as Kannou, and this is a Japanese -- 09:40:05 09:40:08 09:40:11 09:40:21

A Yes. 09:40:21

Q -- patent application, which we provided a translation for. 09:40:24 09:40:27

MR. PALMIERI: And, Sarah, so that should be marked as Exhibit 1039 and it's -- 09:40:32 09:40:34

THE TECHNICIAN: Is the exhibit entitled K-w-o-n? 09:40:39 09:40:44

MR. PALMIERI: No. 09:40:45

THE WITNESS: No. Kannou. 09:40:45

MR. PALMIERI: This is JP2003-031266. 09:40:46

THE TECHNICIAN: I'm sorry, sir, I don't have that exhibit. 09:40:52 09:40:54

THE WITNESS: Excuse me, may I take a brief break? 09:40:57 09:41:01

MR. PALMIERI: Yeah, of course. Do you want to take -- 09:41:01 09:41:01

THE WITNESS: 60 seconds. 09:41:02

MR. PALMIERI: Yeah, can we go off the record, please. 09:41:03 09:41:04

THE VIDEOGRAPHER: It is 9:41 a.m. We go off the record. 09:41:05 09:41:10

(Recess 9:41 a.m. - 9:44 a.m.) 09:41:11

THE VIDEOGRAPHER: It is 9:44 a.m. We are back on the record. 09:44:45 09:44:49

(Exhibit 1039, Publication of Unexamined Patent Application (A), Kannou, marked for identification.) 09:44:49 09:44:49 09:44:51

BY MR. PALMIERI: 09:44:51

Q All right. So, Dr. Peckerar, I want to move on to Exhibit 1039, and that's Kannou, which is a Japanese application. Let's -- first, when did you first see this -- this piece of art? 09:44:59 09:45:02 09:45:07 09:45:16

A This is relatively recent. I mean, the name -- the first wave of patents that I analyzed was Kobayashi and Kaun and others, of course. But I believe that Kannou came in with these -- with these additional -- with the most recent set of patents that we've been discussing here in the supplemental claims. 09:45:19 09:45:31 09:45:39 09:45:46 09:45:58 09:46:07

Q So you did not see Kannou prior to your previous deposition? 09:46:15 09:46:18

A I'm -- I can't say with certainty. I reviewed in detail a large number of patents here. I don't know the dates in which I analyzed or became exposed to any one. I know Kannou is relatively recent in the patent stream. There's no end of reading here. 09:46:20 09:46:28 09:46:32 09:46:39 09:46:43 09:46:46

Q So you don't recall the specific time frame when you -- when you were first introduced to the patent? 09:46:47 09:46:49 09:46:52

A As I said, it was later -- later than Kaun and Kobayashi. 09:46:52 09:46:55

Q And was this patent application provided to you by -- by VARTA's counsel? 09:46:57 09:47:02

A I believe so. But as I said, honestly, I have done a lot of reading, this has taken a lot of time, and I don't remember the sources or the exact dates on which I received the various documents. 09:47:09 09:47:15 09:47:18 09:47:22

Q So just to clarify, you didn't do any independent searching to find Kannou, to your recollection? 09:47:26 09:47:29 09:47:32

A No. But let me also say, I mean, I read the patent literature. I still have a semi-functioning company in this business, so I -- so that -- those documents I do come across -- I do come across in the course of my work, so... 09:47:34 09:47:41 09:47:46 09:47:54 09:47:58

Q So I'd like to look starting with Figure 1 of Kannou and that will be on page 7 of the PDF. 09:48:07 09:48:10

A Okay. 09:48:18

Q It might be in multiple spots because since the translation is mixed with the original here, but page 7 should be a good location for it. And then -- near the bottom of the page if you want -- there it is. 09:48:18 09:48:22 09:48:26 09:48:35 09:48:40

So can you describe this, what's shown in Figure 1, Dr. Peckerar? 09:48:44 09:48:48

MR. MUELLER: Objection to form. 09:48:51

A Yeah. Figure 1 is the Kannou battery. It is a spirally wound cell with a bead seal. 09:48:55 09:49:03

Q And so those -- so we see several electrode layers that protrude from the spiral winding. Is that correct? 09:49:09 09:49:14 09:49:19

A Yes. And you can refer to my -- my 09:49:19

supplementary report in and around paragraph 15 in which I discuss this. 09:49:21 09:49:25

Q All right. So I believe figure -- element number 6 and 7 point to the electrode layers, and those electrode layers make contact with the cell housing. Is that correct? 09:49:27 09:49:31 09:49:35 09:49:38

A Yeah, they kind of spring-load, yes. 09:49:40

Q And that's similar to the orientation in one of the embodiments of Kaun. Is that correct? 09:49:44 09:49:48

A No, it's physically different. 09:49:52

Q Can you describe those physical differences? 09:49:57

A Yeah. As I recall, the Kaun projections, which do make contact with the top and bottom -- the top can of the cell, point normal to the cell wall. Here we see a slight angle allowing for the spring motion. 09:50:00 09:50:07 09:50:11 09:50:17 09:50:23

Q But there's no additional adhesive or any additional bond or connection between those layers and the housing in Kannou? 09:50:23 09:50:30 09:50:33

MR. MUELLER: Objection to form. 09:50:36

A Well, no, in these drawings you don't, and also, I don't refer to any -- any adhesives of what 09:50:37 09:51:03

all holding things together here. This is a beaded seal. 09:51:13 09:51:17

Q And then just to clarify, the electrode layers are arranged in a spiral wound assembly? 09:51:19 09:51:26

A Yes, this is a spiral wound assembly. 09:51:30

Q And there's a separator material interposed between those electrode layers? 09:51:36 09:51:39

A Yes. 09:51:42

Q And in your opinion, is Kannou closed by being beaded over? 09:51:42 09:51:49

A Yes. 09:51:51

Q Do -- do the cut edges of the cell cup extend over the cell top? 09:51:52 09:52:01

A Yes, they do. 09:52:07

Q Can you indicate where on this figure you see that? 09:52:09 09:52:14

A Yeah. Look to the left and to the right of the cell itself and you see this bulge in which the can top sits within the gasket, and then bent over that, bent over that little U portion of the curl, U-shaped portion of the can -- of the can top, okay, that makes -- that's a beaded over cell. 09:52:14 09:52:17 09:52:22 09:52:30 09:52:35 09:52:40

Q Is there any force-fit connection in Kannou? 09:52:46

A Kannou's primary seal is this bead. 09:52:54

Q So it uses a beaded over closure, in your opinion, but is there any force-fit connection in this cell? 09:53:10 09:53:18 09:53:21

MR. MUELLER: Objection to form. 09:53:22

A Can you be a bit more clear? I mean, I'm not sure what you mean by force-fit connection, the latter. 09:53:23 09:53:29 09:53:38

Q So do you remember providing a definition for a force-fit connection in your supplemental declaration? 09:53:41 09:53:44 09:53:48

A I describe all of the -- all of the sealing mechanisms and certainly in those relating to these patents in the supplemental and I'm just looking for the place in which I do. And, you know, if you look at 47, for example, paragraph 47, we see force-fitting -- an example, force-fitting connection in which the can casings, the sides of the can overlap and -- and form a friction fit to the -- between the can top and the can cup. Yeah, I think I address that. 09:53:49 09:54:02 09:54:08 09:54:11 09:54:16 09:54:21 09:54:26 09:54:36 09:54:46 09:54:52

Q So how would a -- apologies, please continue. 09:54:54 09:54:57

A Yeah. I was just wondering, you know, how you were referring to this. 09:54:58 09:54:59

Q Well, so -- so how would a person of ordinary skill understand the term "force-fit connection"? 09:55:01 09:55:05 09:55:10

A Well, of course, I -- I didn't consider in my original discussion, you know, how a person of ordinary -- or a layperson, for example, would view force-fit connection. But what I would say is, you know, it would be obvious -- what's obvious is that you force the can top into the can -- into the can cup and there would be some friction, which would oppose axial separation. 09:55:10 09:55:18 09:55:21 09:55:27 09:55:32 09:55:36 09:55:40 09:55:46

Q Okay. 09:55:46

A But that's not -- but that's not -- let me just point out. That's not what's happening here. I mean, you do see the mechanical impediment, which is the curled over can, cup on the left and the right of the drawing. 09:55:50 09:55:52 09:55:56 09:55:58 09:56:03

Q And is -- so is that mechanical impediment 09:56:05

in addition to an initial force-fit connection? 09:56:11

MR. MUELLER: Objection to form. 09:56:13

A That would be speculation. I mean, what's 09:56:16

clear is this is a button -- this is a beaded cell, 09:56:19

and there is a -- as with most of the cells produced 09:56:23

at the time, and the bead represents a mechanical 09:56:30

impediment. 09:56:35

MR. PALMIERI: So if we can, can we scroll 09:56:38

up to paragraph 42 of Kannou, and that's on page 5 of 09:56:42

this, of the PDF. 09:56:53

Q So this paragraph recites, "In addition, the 09:57:01

edge protruding from the roll surface is bent without 09:57:03

a notch" -- 09:57:07

A Which paragraph are you referring to? 09:57:08

Q Apologies. It's paragraph 42. And so I can 09:57:11

recite it as well. And this is paragraph 42 of 09:57:26

Kannou -- 09:57:33

A Yes. 09:57:33

Q -- just for reference. So it states, "In 09:57:34

addition, the edge protruding from the roll surface is 09:57:37

bent without a notch, so a repulsive force that 09:57:41

attempts to return the bent part to the original shape 09:57:44

can easily act, and thus the contact area between the protruding edge of the inner surface of the container can be improved. As a result, the internal resistance of the battery can be reduced and the discharge capacity can be enhanced." 09:57:47 09:57:47 09:57:47 09:57:54 09:57:56

Can you -- in your opinion, what is this paragraph referring to? 09:58:02 09:58:06

MR. MUELLER: Objection, outside the scope. 09:58:06

A Well, okay, let me state two things that appear in my supplemental report. The -- there were two -- there were two instantiations of the spiral wind that were discussed in the patent. One had it at a single member which acted as a spring-load and another which had multiple members around the axis of the cell. And the one member, the single member pulled current out the end of the wind and required transport of charge all the way around the wind to exit. That -- that was the strawman which Kannou -- which Kannou felt was -- was -- was a poor representation. It gave higher internal resistance. 09:58:19 09:58:26 09:58:38 09:58:46 09:58:54 09:59:00 09:59:06 09:59:14 09:59:19 09:59:22 09:59:31 09:59:40

And as I state in my supplement report, the higher internal resistance, even in a micro cell, is 09:59:44 09:59:48

an important issue; you don't want to have high internal resistance. By placing multiple contacts that peel off current from -- from different lengths along the winding, you reduce the internal resistance. And you see in 42 he's discussing internal resistance, okay. 09:59:52 09:59:55 09:59:58 10:00:01 10:00:05 10:00:11

Am I being clear here? 10:00:13

Q Yeah, no, I'm understanding you. Thank you. 10:00:15

A Okay. What he's saying is you've got one lousy instantiation with one peel-off, and he's showing -- I think it's kind of an elegant experiment; it's probably worth a letter at least in some respected journal -- that if you peel off the current from various points along the winding, you do two things; you create a radial spring action that allows for good contact between the plates and the top and bottom and the cup floor and the top ceiling, and -- and you -- and the current paths are smaller, so you get lower internal resistance. 10:00:18 10:00:22 10:00:26 10:00:29 10:00:32 10:00:35 10:00:39 10:00:44 10:00:49 10:00:59 10:01:06

So Kannou is reciting here the need for lowering internal resistance. That's, I think, the main gist of 42. 10:01:08 10:01:10 10:01:13

Q Okay. And so on that note, I'd like to go back down to Figure 7, which is on page 8. It should be near the top on the right. Yeah, there it is. 10:01:16 10:01:20 10:01:28

And I believe -- and please correct me if I'm wrong -- that this is the alternative embodiment that you were just discussing? 10:01:32 10:01:34 10:01:39

A 6, Figure 6 clearly shows internal resistance, yeah. Single spring, right. 14 and 16, yeah. 10:01:40 10:01:44 10:01:49

Q Okay. And so -- so those two components, 14 and 16, what did those represent? 10:01:51 10:01:54

A They represented contacts to the -- to the -- to the anode and cathode, the spiral wind, single points of contact as in -- as compared to Figure 5 in which you have multiple points. 10:01:58 10:02:07 10:02:11 10:02:15

Q So they would function as output conductors in this cell? 10:02:17 10:02:21

MR. MUELLER: Objection to form. 10:02:22

A I guess you can call them output conductors, yeah. 10:02:24 10:02:32

Q And as you mentioned, these -- these output conductors, 14 and 16, they're connected to the 10:02:33 10:02:39

electrode layers? 10:02:43

A Yes. 10:02:44

Q And do you recall by -- by what mechanism they are connected? 10:02:45 10:02:50

A I can think of a number of mechanisms that come to my mind. 10:02:54 10:03:03

Q Can you describe those mechanisms? 10:03:07

A They could be welded. 10:03:10

Q Does Kannou, to your recollection, describe them being welded? 10:03:17 10:03:19

A In my -- let's see. I -- I recall the mention of these being welded, welded to the -- to the electrode. 10:03:24 10:03:43 10:03:50

Q And then do you recall any means of connection to the cell housing from these output conductors? 10:03:52 10:03:56 10:04:00

A The assumption was that this would be a spring-load, but it was -- remember, Figure 7 -- okay, let me just state again what my position on these single contacts were. 10:04:00 10:04:03 10:04:07 10:04:12

This was a strawman that was set up to demonstrate the importance -- and I'm quite certain 10:04:13 10:04:16

that that was at least stated in my supplemental declaration, that this was a strawman that demonstrated how -- how Figure 5 with multiple points of contact allowed for reduction in internal resistance. 10:04:21 10:04:25 10:04:29 10:04:34 10:04:40

Q So -- so, in your opinion, Figure 6 and 7 refer to art that predates Kannou? 10:04:44 10:04:49

MR. MUELLER: Objection to form. 10:04:51

A No. No. The answer is no. I can't -- I'm not sure how that could be derived. 10:04:54 10:05:03

Q So if Kannou is directed towards improvements on -- on Figure 6 and 7, then those figures must have existed before Kannou was developed? 10:05:06 10:05:09 10:05:15

MR. MUELLER: Objection to form. 10:05:18

Q Is that fair to say? 10:05:19

A No. This is a document of Kannou's work. 10:05:21

Q Okay. And so going back to those tabs, the spring-loading mechanism is the only means of contact between those output conductors and the housing? 10:05:27 10:05:34 10:05:38

A I believe the spring-loading is highlighted here. But -- and I'd have to go through my report again to remember exactly what phraseology I used 10:05:42 10:05:49 10:05:57

relating to that. But as I said, you've got two approaches, one which has multiple tabs, one which has a single tab. The table that was listed in Kannou shows clearly that Figure 5 is superior. 10:05:59 10:06:03 10:06:08 10:06:15

Q Okay. But there's -- there's no adhesive or other -- other bond between the output conductors and the housing, that you recall? 10:06:21 10:06:24 10:06:27

MR. MUELLER: Objection to form. 10:06:29

A I don't recall that, no. 10:06:31

Q And so now I want to move on to another piece of art that was cited, and this is Kawamura. It is Exhibit 1040. 10:06:40 10:06:44 10:06:53

MR. PALMIERI: And, Sarah, I just shared it with you as well. 10:06:56 10:06:59

(Exhibit 1040, U.S. Patent Application, Pub. No. US 2007/0218356, Kawamura, marked for identification.) 10:06:59 10:06:59 10:07:00

Q And this -- this is a U.S. patent application. 10:07:00 10:07:04

And so, Dr. Peckerar, do you have it in front of you? 10:07:19 10:07:22

A I see it, yes. 10:07:22

Q And again, like Kannou, do you recall approximately the first time that you saw this, this reference? 10:07:25 10:07:28 10:07:32

A It was probably around the same time I saw Kannou. 10:07:32 10:07:36

Q Do you recall if these were presented to you at the same time or was Kawamura presented at a separate time? 10:07:36 10:07:39 10:07:45

A No, I don't have that recollection. 10:07:46

Q Okay. No problem. And now I'd like to take a look at Figure 5, and this is on page 6 of the PDF. 10:07:47 10:07:51

A Yeah. 10:07:59

Q Can you describe what this figure is showing? 10:08:01 10:08:03

A Well, this is a cylinder cell. It's not a -- the axial length is far greater than the -- than the radial, than the radius or the diameter, and it -- but it does show a wound cell inserted into the cylinder can. 10:08:05 10:08:15 10:08:21 10:08:29 10:08:33

Q So just to clarify, the electrode layers are in the form of a spiral winding, correct? 10:08:36 10:08:40

A Yeah, that's my current recollection. 10:08:44

Q And then how are the electrode layers then connected to the housing? 10:08:48 10:08:52

A Honestly, I read through this, this patent, and it seemed to me that a miracle happened. Maybe I'm going beyond, but remember, I mean, this was a patent that addressed the issue of improving the chemistry of the cell itself, the active material composition. 10:08:56 10:09:02 10:09:08 10:09:14 10:09:18 10:09:23

And while I do talk about pulling a metal contact -- I believe it's 513 -- out of the spiral wind, which, by the way, would traverse the whole wind, and they did mention various means of fixing that, like welding, but they didn't describe in any way how those welds would be accomplished. All they've drawn is a line, okay, and you don't see how that line sits with respect to the other materials in the cell to which the contacts have to be made. 10:09:25 10:09:30 10:09:35 10:09:40 10:09:44 10:09:50 10:09:53 10:09:57 10:10:01

Q And so would you describe this housing as closed by being beaded over? 10:10:06 10:10:09

A As a matter of fact, yes. 10:10:12

Q Okay. Is there a force-fit connection in Kawamura? 10:10:18 10:10:21

MR. MUELLER: Objection to form. 10:10:23

A There is a nice mechanical impediment 510 that represents -- 10:10:25 10:10:32

Q So there -- so there's not -- 10:10:47

(Court Reporter clarification.) 10:10:47

THE WITNESS: Say that one more time, please. 10:10:47 10:10:47

THE COURT REPORTER: I didn't hear the end of your answer. "There was a nice mechanical impediment, 510, that represents..." 10:10:47 10:10:47 10:10:49

A That represents the -- that provides the force that prevents the cell from flying apart. 10:10:49 10:10:53

Q And so is that a force-fit connection as you understand it? 10:10:57 10:11:03

MR. MUELLER: Objection to form. 10:11:04

A I wouldn't define it that way. We have been -- yes, I wouldn't define it that way. 10:11:05 10:11:10

Q Okay. And so now I'd like to move back into your -- your supplemental declaration. And I would like to beginning in Section VI, which begins on page 19 of the PDF, I'd like to discuss the substitute claims that you've -- that we've briefly touched on 10:11:13 10:11:19 10:11:23 10:11:31 10:11:38

some of them, but I'd like to discuss them in some more detail. 10:11:43 10:11:46

So as part of -- as part of the IPRs, VARTA has proposed some substitute claims in the event that their original claims are found invalid. And as part of your supplemental declaration here, you've provided some discussion of those claims with respect to the prior art, as well as, you know, alleged support in their original patent applications. 10:11:49 10:11:54 10:12:00 10:12:04 10:12:07 10:12:10 10:12:15

Is that correct? Is that your understanding of this section? 10:12:18 10:12:21

A I'm sorry, I was just reading over the -- 10:12:23

Q Oh, no, no problem. 10:12:26

A Let me take a moment here. 10:12:30

Okay. Now we're focusing on VI, right? 10:12:40

Q We're focusing on Section VI -- 10:12:45

A Yeah, okay. 10:12:48

Q -- for now, yeah, beginning on page -- on page 19 of the PDF. 10:12:48 10:12:50

A Right. And as I say, the material of the -- of the revised substitute claims is included in the scope of the original claim. That's all that means. 10:12:52 10:12:58 10:13:05

Q And so I would like to just discuss the particular, you know, substitute claims and the language that you've used right now. 10:13:11 10:13:15 10:13:18

So beginning the first -- in paragraph 35, the first feature you recite is "'the cup casing partially overlaps the top casing in an overlapping area.'" Do you see that? 10:13:20 10:13:25 10:13:30 10:13:34

A "The cup casing partly [sic] overlaps" -- "Certain substitute claims submitted by VARTA recite the features of 'the cup casing partially overlap" -- "overlaps the top casing, and the housing cup and the housing top are held by force-fitting connections,'" yes. 10:13:39 10:13:39 10:13:47 10:13:55 10:14:00 10:14:05

Q So -- so just that first -- that first feature, "'the cup casing partially overlaps the top casing in an overlapping area.'" 10:14:07 10:14:10 10:14:16

A Yeah, you slide the cup in the can. The casings align against one another. 10:14:18 10:14:21

Q In that -- in that phrase, what do you take the term "partially" to mean? 10:14:24 10:14:26

A They're not -- the cup isn't fully inserted into the can. In other words, there's space -- the 10:14:28 10:14:32

cut edge terminates and yet the cup continues, the cup cut edge of the top. 10:14:36 10:14:41

Q Okay. So if there's -- if they overlap completely, then this claim term would not be met? 10:14:43 10:14:47

MR. MUELLER: Objection to form. 10:14:50

A I don't believe I said that in the report. And I don't -- I have no opinion on that right now. 10:14:55 10:15:01

Q So does this -- this overlap would occur in the lateral direction, along the casing of the housing components? 10:15:06 10:15:11 10:15:17

A Let's get definitions straight here. You have a cup and a can, they both start out looking like cups, or glasses. They've got what becomes a floor. I think I defined elsewhere that the can cup provides a floor, which is adjacent to the casing housing, and then the can top has a ceiling, and that's the anatomy of the cell. 10:15:18 10:15:23 10:15:29 10:15:36 10:15:42 10:15:48 10:15:58

Q And so both the cup casing and the top casing contain a lateral portion? 10:16:06 10:16:11

A Sure, they've got side walls, yeah. 10:16:17

Q And those -- those side walls are what overlap? 10:16:20 10:16:24

A Yes. 10:16:24
Q Okay. 10:16:26
A To varying degrees. 10:16:26
Q And is this related to the -- to how the cell is closed? 10:16:27
A Yes. 10:16:32
Q And how -- how does the overlap relate to -- to how the cell is closed? 10:16:35
A What -- of course, you have -- if the walls are overlapping and straight, you'll have -- you'll have some -- some amount of radial force. But that by itself is insufficient. As I mentioned earlier, I've said in my supplemental report, that by itself is insufficient to hold the structure together reliably over time. 10:16:41
And so you've got to think of some new mechanisms, and there are a couple that VARTA cites. One is that -- an early one, which was in the filings associated with 835; I don't remember all the numbers. But if you -- there was a region 1 and a region 2, and a region 1 was pulled in radially with respect to region 2 and that -- and on force-fitting, that 10:16:51 10:16:57 10:17:04 10:17:08 10:17:12 10:17:17 10:17:18 10:17:20 10:17:27 10:17:32 10:17:35 10:17:46 10:17:51

increased the force, frictive force between the can and the top. 10:17:58 10:18:04

835 as it came out had -- had a conical cup and it served the same purpose. And so this was an additional mechanism that helped in creating the seal, which was as I -- if you read the report over and over again, you know, I make the point that one mechanism is rarely enough. You've got to think of a number of mechanisms; in the case of the VARTA patents, ensure they achieve the first force-fit by simple insertion and then they jazz it up a bit by -- by changing the shape of the can and cup. 10:18:06 10:18:12 10:18:19 10:18:24 10:18:29 10:18:32 10:18:36 10:18:44 10:18:48 10:18:54

Q Okay. And so I think that that leads into the second -- well, it leads into the second and third elements here, but I want to focus on the second one now, and that's "'the housing cup and the housing top are held together by a force-fitting connection.'" 10:18:57 10:19:01 10:19:06 10:19:08 10:19:12

And so we've discussed the force-fit connection previously, but, you know, I just want to clarify a few points. In a force-fit connection, as you understand it, is there a radial pressure that's exerted on the housing to effect that seal? 10:19:14 10:19:18 10:19:21 10:19:24 10:19:28

A There's a -- the forces that come about as you do this insertion I discuss, okay. Yeah, I mean, you can get friction, simple friction. Even in Kaun there was a little bit of friction, but that wasn't the dominant mechanism of closing or sealing the can. In the case of the VARTA patents, yeah, there will be some radial force simply developed by the -- by friction between the gasket and the top and the can, yeah. 10:19:34 10:19:42 10:19:46 10:19:52 10:19:55 10:20:02 10:20:09 10:20:14 10:20:22

But VARTA goes beyond this. They discuss flat bottom area, disposed radially inward of the second part that overlaps the top casing. I mean, these are secondary mechanisms, and these supply -- by the way, okay, let me clarify one other thing, okay. The radial force per se isn't what holds the cell together. It's axial force. So what you end up with is an improvement in friction, increase in the friction using these -- using these different techniques that are listed in -- in -- by 7B, 7A and 7B, all of 7, okay. So I don't know what else I can say. 10:20:24 10:20:31 10:20:35 10:20:38 10:20:45 10:20:48 10:20:55 10:20:59 10:21:06 10:21:09 10:21:16 10:21:24

Q Okay. So just to continue along this vein, 10:21:26

that there may be a radial force involved in a force-fit connection? 10:21:36 10:21:40

A Let me state one more time, okay, that you prise the can apart with axial force, okay. Now, the way these -- the way these -- these force-fitting connections work is they -- they increase the force -- you can call it the critical force necessary to prise the can apart, by increasing friction and perhaps even forming a pressure weld between the can top and the can cup through the intermediary of the -- of the gasket material. 10:21:45 10:21:53 10:21:59 10:22:07 10:22:14 10:22:19 10:22:23 10:22:28 10:22:35

And so you -- so what drives the whole thing is radial -- is axial force. It's axial force that prises the cell apart, but you adjust that using the techniques that I just mentioned. You improve it. 10:22:36 10:22:43 10:22:49 10:22:53

Q And so you mentioned, you know, friction force being potentially a primary form of sealing and then in VARTA's claims they also describe a secondary form of sealing, and we'll get to that specific claim language later. But I want to discuss now other secondary forms of sealing that could be added to a, you know, battery that is sealed with a force-fit. 10:22:59 10:23:03 10:23:08 10:23:13 10:23:17 10:23:21 10:23:27

Could that secondary sealing be a beading over of the edge? 10:23:33 10:23:37

MR. MUELLER: Objection to form. 10:23:38

A I -- I have been using the term "mechanical impediment" throughout these depositions, the bead represents a mechanical impediment to motion, and it's -- yes. 10:23:40 10:23:50 10:23:53 10:24:00

Q So you could have a force-fit connection in addition to this mechanical impediment imposed by a beading over? 10:24:08 10:24:15 10:24:19

MR. MUELLER: Objection to form. 10:24:19

A I think once you've done the bead, everything else is gravy, okay. 10:24:21 10:24:32

Q Okay. And so now, now I'll move on to that third feature in paragraph 35, and that's the feature of the "'cup casing includes a first proximal" -- "a first part" -- sorry -- "proximal to the flat bottom area and a second part disposed in the overlapping area" -- 10:24:38 10:24:41 10:24:44 10:24:49 10:24:52 10:24:56

A Can you bring that up? 10:24:57

Q Oh, yes, I'm sorry. 10:24:58

MR. PALMIERI: Sarah, could you scroll down 10:25:00

to the next page and it's at the very top. 10:25:02

Q So let me repeat. "'The cup casing includes a first proximal" -- "first part proximal to the flat bottom area and a second part disposed in the overlapping area, the first part of the cup casing being disposed radially inward with respect to the second part.'" 10:25:06 10:25:09 10:25:12 10:25:15 10:25:18 10:25:22

And do you see that language, Dr. Peckerar? 10:25:23

A Yes, right, that's what I've been describing. 10:25:25 10:25:29

Q Sure. And can you describe the advantages that are achieved by using this additional method? 10:25:29 10:25:32

A Yeah. The fact that you're kind of strangling -- I think in my -- I don't know if this is -- should be part of this discussion. It was mentioned I believe in my original declaration report, there's something which we've been calling a swage fitting, okay. Without a blackboard it's hard to show these things. 10:25:35 10:25:47 10:25:54 10:25:56 10:26:05 10:26:10 10:26:17

But the idea is that you've got this kind of drawn-in region at the bottom of the can and then you've got the sloping wall on top. And what you're 10:26:18 10:26:20 10:26:25

doing when you force-fit the can cup and the can top is you're -- the stress. If you have a given amount of displacement, you're going to have to push apart the first part of the cell. I'm sorry, that's speculation here, okay. But having made these things, I think I can tell you that the idea is that -- that you probably will even deform the bottom of the can a bit, forming what we call the swage fitting, which is different than a simple -- than a simple friction fitting because you're actually just forming material. 10:26:31 10:26:37 10:26:46 10:26:51 10:26:53 10:26:58 10:27:03 10:27:08 10:27:14 10:27:20

And so these -- this bottom portion over here is going to -- going to serve to increase the -- the frictive force, and what that does is that raises the threshold in which the can prises apart from the top. 10:27:23 10:27:25 10:27:32 10:27:36 10:27:43

Q And so this -- this would provide a radial pressure that assists with the sealing? 10:27:44 10:27:47

A There is going to be some radial pressure, right, and that radial pressure helps define the critical axial force. 10:27:54 10:27:57 10:28:03

Q And so could this -- this radial deformation cause damage to the cell interior? 10:28:07 10:28:13

MR. MUELLER: Objection to form. 10:28:16

A I don't see that as happening. I don't see any evidence for that. None of these patents show -- well, I can't state that that would occur with any degree of certainty. You'd have to show me examples and I'd have to look them over and evaluate them. 10:28:20 10:28:27 10:28:31 10:28:39 10:28:43

Q But in your opinion would it be possible that this radial force could cause damage to the interior -- 10:28:46 10:28:49 10:28:54

MR. MUELLER: Objection to form. 10:28:55

A I don't -- I wouldn't care to speculate on that. I would like to see specific examples. 10:28:56 10:29:03

Q Okay. And so now, now I'd like to move on to paragraph 38. 10:29:07 10:29:10

THE VIDEOGRAPHER: Is it a good time to change our media? 10:29:14 10:29:16

MR. PALMIERI: Yeah, do we want to take a quick break, come off the record? 10:29:21 10:29:24

THE VIDEOGRAPHER: Yes. Thank you. It is 10:29 a.m. We go off the record. 10:29:30 10:29:31

(Recess 10:29 a.m. - 10:42 a.m.) 10:29:35

THE VIDEOGRAPHER: It is the beginning of 10:42:25

Media Number 2 of Volume Number 3 of the testimony of Dr. Martin Peckerar. It is 10:42 a.m. We are back on the record. 10:42:29 10:42:33 10:42:40

BY MR. PALMIERI: 10:42:40

Q So, Dr. Peckerar, before the break we were discussing this radial deformation that served as a secondary sealing characteristic according to VARTA's claims, and we were discussing whether -- whether there could be any damage to the internals of the cell. I just wanted to follow up on that a little bit. 10:42:41 10:42:43 10:42:49 10:42:54 10:42:56 10:42:59 10:43:03

So, you know, you did not feel comfortable without a, you know, a specific example saying whether damage would occur. But would a person of ordinary skill in the art have any reasonable expectation that that damage would occur? 10:43:03 10:43:06 10:43:10 10:43:13 10:43:21

A Well, I mean, VARTA cites force-fitting connections using the -- using the techniques that we've been talking about. Everybody who builds a battery is concerned with reliability and functionality and yield, and you can be sure you're not going to build a successful business on techniques 10:43:24 10:43:35 10:43:38 10:43:45 10:43:48 10:43:55

that are going to damage the cell. So, again, let me just leave it at that, show me an example and I'll talk about it. 10:43:59 10:44:02 10:44:06

Q And then if we look on page 21 of the supplemental declaration, right above paragraph 38, there's a figure of the VARTA cell, and you've indicated a portion where -- where the cell cup is disposed radially inward with respect to the second part. Do you see that? 10:44:08 10:44:16 10:44:20 10:44:26 10:44:31 10:44:34

A Yes. That's -- that's in the patent, right. 10:44:36

Q And so I wanted to discuss the degree of radially inward deformation that would have to occur in order for this to be -- to be effective. 10:44:40 10:44:48 10:44:53

MR. MUELLER: Objection to form. 10:44:57

Q In your opinion, to what degree would the cup have to be radially deformed inwards for this technique to be effective? 10:45:00 10:45:05 10:45:09

MR. MUELLER: Same objection. 10:45:11

A Again, if you do it too much, you're not going to be able to fit the can into the cup. If you do it too little, you get no benefit, you know. It's like the three bears; you've got to do it just right. 10:45:12 10:45:22 10:45:26 10:45:31

And now, in using the -- and what this patent indicates is that you've got to do it just right, and it is possible because VARTA produces this. 10:45:35 10:45:45 10:45:48

Q And so does this figure show a cell where it's been done -- where the cell cup has been radially deformed just the right amount? 10:45:54 10:45:59 10:46:05

MR. MUELLER: Objection to form. 10:46:07

A I'd hesitate to speculate, but I would -- I would say yes. 10:46:08 10:46:18

Q And is there any other guidance in the patent itself that describes how to determine when that deformation is just right, in your words? 10:46:19 10:46:22 10:46:26

A Well, A35 does that extensively. It talks about the cone angles. It talks about the amounts of deformation. And I'll be quite frank, I'd have to look through the report again to see exactly what they talk about. They do mention some quantification of it, of the area, of the -- of the areas that are involved in these parts 1 and part 2, as I recall. 10:46:30 10:46:35 10:46:41 10:46:50 10:46:53 10:46:57 10:47:02

Q And so now, now I think I'd like to move on to a new paragraph, paragraph 38, which bleeds over from page 18 -- sorry, page 21 of the PDF to page 22 10:47:17 10:47:22 10:47:28

of the PDF. And so this is -- this is a new -- another new substitute claim feature which is proposed for the '858 patent. 10:47:35 10:47:39 10:47:44

And just to read it off, the feature is "'two metal housing halves, each including a generally round end surface joined to a lateral surface region, the lateral surface regions of the housing halves at least partially overlapping each other and being separated from one another by an electrically insulating seal, the lateral surface regions providing a force-fit connection therebetween to form a leak-tight, button cell housing having a plane bottom region and a plane top region parallel thereto.'" 10:47:48 10:47:52 10:47:56 10:47:59 10:48:05 10:48:07 10:48:10 10:48:13 10:48:18 10:48:23

Do you see that feature? 10:48:27

A Yes, I do. 10:48:27

Q So in your opinion what does the term "generally round" mean? 10:48:28 10:48:31

MR. MUELLER: Objection to form. 10:48:32

A I think that was a discussion that appears in the transcript of our earlier meetings. Somehow they talked about an oval cell which is a kind of a circle, but honestly, if you go into CVS you don't buy 10:48:33 10:48:37 10:48:45 10:48:49

those. 10:49:00

Q Could other shapes be considered generally round; for example, an octagonal shape be considered generally round? 10:49:03 10:49:06 10:49:11

MR. MUELLER: Objection to form. 10:49:12

A Show me an example of an octagonal cell. If you like, we can walk through CVS together. 10:49:13 10:49:19

Q So is there a certain point at which an oval wouldn't be considered generally round? 10:49:23 10:49:27

MR. MUELLER: Objection to form. 10:49:29

A Well, if you remember, an ellipse can be derived from a circle. You know, you just take the two -- both sides join them together you get a circle and then you move them apart from their original ellipse, and that's why you have a derivative circle, okay. I don't know if there are other shapes or forms that do that. 10:49:31 10:49:39 10:49:42 10:49:49 10:49:50 10:49:54 10:49:56

Q And this new feature recites "providing a force-fit connection therebetween to form a leak-tight, button cell housing." Is it possible to have a force-fit connection that isn't leak-tight? 10:49:58 10:50:02 10:50:05 10:50:08

A Sure. 10:50:14

Q Can you describe an example of how that could occur? 10:50:18 10:50:21

A Go back to Kaun. Kaun describes, as we discussed, he's got a force-fit initially. The main -- the burden of sealing is, as we discussed, and it's in all these reports, that the main burden is on their center, their center fastener, okay, but -- but you can have some friction and yet the cell under pressurization lifts and yields a vent. 10:50:22 10:50:37 10:50:42 10:50:47 10:50:53 10:50:58 10:51:05

Q So, in your opinion, Kaun is an example of a force-fit connection that isn't -- isn't leak-tight? 10:51:11 10:51:15

MR. MUELLER: Objection to form. 10:51:17

A It's a force-fit connection which under certain circumstances allows venting or leakage, if you will, under certain circumstances. 10:51:18 10:51:24 10:51:29

Q Okay. And if we go -- if we go down to, let's see here, page 21 of the PDF. I'm sorry, I'm just trying to find my place here real quick. Okay, I'm sorry, it's page 23 of the PDF, actually. Apologies for that. 10:51:31 10:51:40 10:51:59 10:52:19 10:52:24

A Which document are we looking at? 10:52:25

Q In your supplemental declaration -- 10:52:28

A Okay. 10:52:30

Q -- for that. 10:52:31

A 23. 10:52:33

Q 23 overall. It's within paragraph 39, which carries over onto the page. Okay. 10:52:36 10:52:41

So you describe there in that second line "the connection formed between the overlapping lateral surface regions of the metal cup part 101 and the metal top part 102." 10:52:46 10:52:51 10:52:56 10:53:01

A Yup. 10:53:04

Q Can you describe the nature of that connection between -- between those lateral surface regions? 10:53:05 10:53:06 10:53:09

A So you've got the can top, which is 102. You've got the can bottom which the -- or the cup which is 101. So you've got 101, 102 and -- well, it's difficult to see. There has to be a gasket between. And I see the -- I see the region of overlap, right. It goes about two-thirds of the way up the cell. 10:53:10 10:53:18 10:53:28 10:53:37 10:53:40 10:53:50 10:53:53

Q So the connection is caused by friction between those lateral surface regions and the gasket, 10:53:56 10:54:00

which I believe is element 103 in that figure? Yeah, I agree, it is -- it is a little hard to see it. 10:54:05 10:54:12

A It's hard to see, right, yeah. Right. 10:54:14

Q And so -- so, you know, this force-fit connection does require having a gasket between those two lateral surface areas. Is that correct? 10:54:26 10:54:30 10:54:33

A Yes. 10:54:35

Q All right. And now moving onto the next page, paragraph 40, which is at the very top, we'll move on to a new feature. And let me just read that feature out. It's "'the first metal conductor and the second metal conductor are respectively shielded from the lateral end sides of the spiral winding by a first insulating element and a second insulating element.'" Do you see that feature? 10:54:36 10:54:50 10:54:54 10:55:00 10:55:05 10:55:10 10:55:13 10:55:16

A Yeah, I see the paragraph. 10:55:17

Q Sorry, yeah, do you see that paragraph. 10:55:20

So does shielded there mean that the conductors have no contact with the spiral winding due to the insulating elements? 10:55:27 10:55:31 10:55:35

A Are shielded from the lateral end sides of the spiral winding. I mean, the idea in the VARTA 10:55:39 10:55:53

patent is that -- that the end faces by themselves don't contact either the floor or ceiling. That's what that paragraph refers to. That's what that paragraph refers to. 10:56:01 10:56:05 10:56:09 10:56:12

Q Okay. So the shielding can't prevent all contact with the electrode assembly because the output conductors would need to contact the electrode assembly for the battery to function? 10:56:17 10:56:21 10:56:26 10:56:30

A Yes, but -- okay, maybe you should restate what you said. I mean -- I mean, what ends up happening is you've got these insulating surfaces on the end pieces, and then you pull -- in the VARTA patents you pull out a piece of the electrode and lie it flat on the insulating, whether it's a single insulator or a double insulator. 10:56:33 10:56:38 10:56:42 10:56:45 10:56:48 10:56:51 10:56:54

So what did you -- if you can repeat what you said, I can... 10:56:56 10:56:59

Q Yeah, sure. So the shielding where you use the term -- where the term "shielded" is used there, it means that there's no contact with the respective end face of the electrode assembly that the output conductor is adjacent to. 10:57:00 10:57:04 10:57:07 10:57:12 10:57:18

A I'm sorry, I'm having a hard time visualizing what you're saying, okay. You know, you've got a plastic disk, we've got different insulating means, okay, they lie flat on the top of the spiral and then -- and then in the VARTA patent, and there may be a tape intervening there and then you pull out a piece of the electrode and you lie it flat on top. That's the configuration that we're talking about. 10:57:20 10:57:23 10:57:27 10:57:30 10:57:34 10:57:37 10:57:41 10:57:44 10:57:47

Q And in that configuration -- just to confirm -- the -- the conductors, the first and second metal conductor are connected to the electrode assembly? 10:57:48 10:57:50 10:57:54 10:57:58

A Eventually in the way I described. 10:57:59

Q Okay. Okay. And so let's move on to one more -- or another feature on paragraph 42, and that's on page 26 of the PDF. And so just to recite what this feature is, it states, "'least one first additional separate insulator associated with the first metal conductor and at least one second additional separate insulator associated with the second metal conductor, the at least one first 10:58:04 10:58:09 10:58:15 10:58:25 10:58:29 10:58:31 10:58:34 10:58:38

additional separate insulator and the at least one second additional separate insulator respectively preventing direct electrical contact between the lateral end sides of the spiral winding and the first metal conductor and the second metal conductor.'" 10:58:43 10:58:48 10:58:51 10:58:54 10:58:59

Do you see that paragraph? 10:59:02

A Yeah, right, it's describing what we just talked about, yes. 10:59:03 10:59:06

Q So this is directed to another claim. This is directed to claim -- substitute Claim 15. Is that correct? 10:59:08 10:59:13 10:59:18

A Substitute -- 15, you say? 10:59:18

Q Correct, yeah, sorry, one five. 10:59:21

A Okay. Well, I hate to do this, but can you pull that up and I could make a better determination. 10:59:24 10:59:28

Q Yeah. Yes. 10:59:33

MR. PALMIERI: And, Sarah, I will just circulate real quick the appropriate document to bring that up. 10:59:36 10:59:39 10:59:42

Q Yes, and so this is in -- this will be in VARTA's revised contingent motion to amend for the '858 patent, and this will be -- Claim 15 is on page 10:59:49 10:59:52 11:00:01

43 of this document. 11:00:07

A This is the substitute claim, yeah. 11:00:11

Q Correct. Correct, this will be a substitute claim. 11:00:14 11:00:17

THE TECHNICIAN: Would you like this to be marked as an exhibit? 11:00:17 11:00:18

MR. PALMIERI: Yes, let's mark it as an exhibit for this. So it's already filed in this case, so, actually, I don't know if we need to mark it as an exhibit if it's already been filed. It's one of the papers. 11:00:24 11:00:27 11:00:39 11:00:42 11:00:45

Sarah, could you possibly just zoom in a little bit more, too. I'm just having some trouble seeing the text. Yeah. 11:00:52 11:00:57 11:01:01

BY MR. PALMIERI: 11:01:11

Q And so is that what you wanted to review, Dr. Peckerar? 11:01:12 11:01:15

A Yeah. So there's an additional separate insulating layer that's called for here associated with the first metal and one second insulating layer associated with the second metal, right? 11:01:15 11:01:19 11:01:22 11:01:26

Q Correct. 11:01:28

A What was --
Q So this -- this claim would depend from Claim 10 which we were just discussing?
A Yes.
Q And as we just discussed, there's already insulators that would prevent the output conductor from making contact with the end sides of the spiral winding. Is that correct?
A Yes.
Q So these would be an additional -- an additional insulating layer added to the cell.
A Yes, for the second insulator.
Q Right. Would this perform any separate function than the separators that we were just discussing?
MR. MUELLER: Objection to form.
A Well, the substitute claim says that it prevents -- I guess it's -- it provides added insurance that you're not going to get contact between the end face and the cup or can ceiling or floor.
Q So -- so just perhaps to clarify, in Claim 10, the phrase "shielded" is used --

A Yeah. 11:02:55

Q -- whereas in Claim 15 the phrase 11:02:55

"preventing direct electrical contact" is used. Is 11:02:58

there any difference in those terms? 11:03:03

A They certainly don't conflict. You can 11:03:06

shield and you can insulate. 11:03:10

Q Is it possible for these insulators to 11:03:13

shield, you know, without preventing direct electrical 11:03:15

contact? 11:03:20

A They are shielding. They're preventing 11:03:24

electrical contact. 11:03:27

Q So the two terms are interchangeable? 11:03:28

A I wouldn't say that. I'd have to look at 11:03:31

the examples that derive from this. But still -- 11:03:36

Q So just based on this claim language -- 11:03:45

A Yup. 11:03:47

Q -- what do you understand the difference 11:03:48

between the term "shielded" and the term "preventing 11:03:51

direct electrical contact" to be? 11:03:54

MR. MUELLER: Objection to form. 11:03:55

A Once again, I hadn't considered the 11:04:00

difference between these two terms. When I read 11:04:07

through the patent, I was concerned with the end line product and what the various structures were doing. I mean, in both cases you're not going to get electrical contact in the end faces. Whether or not there are broader applications or nuances in the -- you know, I'm not a linguist, okay, so I really have no opinion on that. 11:04:11 11:04:16 11:04:20 11:04:29 11:04:33 11:04:38 11:04:43

Q So while reviewing -- while reviewing these substitute claims, did you make note of the fact that substitute Claim 15 would include an extra insulator? 11:04:43 11:04:47 11:04:55

A Well, I made note that there was an extra insulator there, and when I looked at the products in the disassembly, I saw there were cases in which there was a separate -- another insulator, yeah, a tape, yeah. 11:05:00 11:05:02 11:05:06 11:05:10 11:05:12

Q And so what -- what advantages would a person of ordinary skill in the art see or seek to achieve by including this extra insulator layer? 11:05:13 11:05:16 11:05:19

A In my initial analysis I pointed out what the patent language says, that it's an added assurance that you're not going to get that kind of contact. But the tape itself, okay -- perhaps I shouldn't go 11:05:28 11:05:36 11:05:40 11:05:43

this far, but the tape itself holds the output conductor flat, prevents wrinkling. But that wouldn't be -- that goes beyond the scope of what I said before. I'm just sharing that right now. 11:05:46 11:05:51 11:05:55 11:05:58

Q And so in your opinion, would a person of ordinary skill in the art understand the term "shielded" to have the same meaning as the term "preventing direct electrical contact"? 11:06:01 11:06:04 11:06:07 11:06:11

MR. MUELLER: Objection to form. 11:06:13

A I mean, I hate to be obstinate on this. I mean, if there are linguistic differences between those two terms, I would open -- be open to that, okay. In my interpretation, I took "shielding" and "insulation" in isolation, insulate, to have the same function in this case. But that doesn't mean in other cases they might have different implication. 11:06:15 11:06:21 11:06:26 11:06:32 11:06:36 11:06:41 11:06:45

Q Okay. So -- so based on that understanding, both -- the insulators in both Claim 10 as well as the separate insulators in Claim 15 perform the same function? 11:06:48 11:06:53 11:06:57 11:07:02

A Well, the global function is isolation, okay. The second insulator as stated improves it, the 11:07:06 11:07:13

likelihood that you're going to achieve full isolation of the end face from the cup, the ceiling or floor, okay. 11:07:23 11:07:27 11:07:33

I went a little bit further in that in which I pointed out what I, as hopefully someone with skill in the art, would see based on disassembly could have been a tape here that's holding things flat. So there is an additional -- but that's not really included in the text here. 11:07:34 11:07:37 11:07:44 11:07:52 11:07:55 11:07:59

Q So -- so it's your opinion that the insulators are performing the same isolation function in both claims? 11:08:02 11:08:04 11:08:07

MR. MUELLER: Objection to form. 11:08:09

A No. What I was -- I think the answer is no, okay. As I just said, I mean, the second insulator surely it does have some aspect, but there are other envisionable functions for that second insulator. As I mentioned, it's a tape, hold things flat. 11:08:11 11:08:15 11:08:20 11:08:25 11:08:29

Q But those other functions aren't claimed here. Is that correct? 11:08:33 11:08:35

A I think a POSA would be open to the idea that there are other functions. 11:08:38 11:08:44

Q That may be so, but in terms of the claim scope, the functions and purposes set forth and covered by this claim, those other functions are not recited by the claim? 11:08:47 11:08:52 11:08:55 11:09:01

A But they would be suggested to a POSA by looking at the cross section. 11:09:03 11:09:06

Q Perhaps. But just as a yes or no, those functions are not recited in these claims? 11:09:08 11:09:10

MR. MUELLER: Objection to form. 11:09:12

A I would repeat what I just said. 11:09:13

Q So can you provide a yes or no answer to whether those additional functions, whether or not considered by a person of ordinary skill, are those functions recited in these claims? 11:09:21 11:09:24 11:09:28 11:09:31

A They're suggested by the claims. 11:09:35

Q But they are not recited by the claims? 11:09:38

A I think a POSA, if you see two materials, you might scratch your head and say why are you doing this, and I would take it from there. I mean, to me, as a POSA, it became clear, especially on looking at, studying the diagrams provided, that there would be a secondary function, and I provided what that function 11:09:42 11:09:49 11:09:53 11:09:57 11:10:04 11:10:07

is. And so all of this was a chain of thought that went through my head, and I'm -- I am certainly a POSA in this, so... 11:10:10 11:10:13 11:10:18

Q So -- so Dr. Peckerar, I'm not asking about what a POSA might consider additional purposes are. I just need a yes or no answer to are those additional functions recited in this claim? 11:10:19 11:10:21 11:10:26 11:10:30

MR. MUELLER: Objection to form. 11:10:32

Q Just a yes or no. 11:10:34

A I don't think it's a yes or no issue. I think -- I think if you, you know, it's -- it's like in general parlance if you repeat a word twice, you know, it's not just because you like to hear your own voice, but you see things that have different meanings and so you are led in your mind to think about other meanings here, so... 11:10:37 11:10:40 11:10:45 11:10:50 11:10:55 11:11:00 11:11:04

Q Other meanings that are not recited in the claim? 11:11:05 11:11:07

A That are not recited, right. 11:11:07

Q Okay. Thank you. Now, let's go back to the supplemental declaration. 11:11:09 11:11:13

A Yup. 11:11:16

Q And I want to move on to paragraph 44, and this is another -- another new feature recited by the substitute claims. It's -- paragraph 44 starts on page 27 of the PDF and then bleeds over to -- 11:11:16 11:11:21 11:11:25 11:11:31

A I've got it. 11:11:35

Q -- 28. 11:11:35

A Yes, I've got it. 11:11:36

Q Okay. And so this feature is "'(i) the first housing half or the second housing half to which the metal foil connects, (ii) the metal foil, and (iii) one of the first insulating element or the second insulating element form a sequence of three flat layers in direct contact with one another in which the metal foil is interposed between the other two layers.'" 11:11:38 11:11:43 11:11:46 11:11:50 11:11:52 11:11:56 11:11:59 11:12:02

A Yes. 11:12:05

Q Okay. 11:12:07

A Yeah, got it. 11:12:08

Q So according to this claim language, the metal foil connects to the housing. Is that correct? 11:12:09 11:12:11

A The metal foil has to connect somewhere to the housing, otherwise you wouldn't get electricity 11:12:14 11:12:18

out. 11:12:22

Q And it would also have -- it would also be in contact with the insulating elements? 11:12:22 11:12:25

A It lies flat on the -- the output conductor lies flat on the insulating elements. 11:12:28 11:12:33

Q Okay. So it's in contact with them? 11:12:35

A There's that too, as stated. 11:12:37

Q Is the output conductor -- apologies. Is the metal foil connected to the insulating element? 11:12:42 11:12:45

A It lies flat thereon. 11:12:48

Q Okay. But is it connected to it? 11:12:52

A If it lies flat, I don't see how it can't -- it can't be in contact with. If you want to get into the linguistics of the meaning of connection, we can be here all day, but -- 11:12:58 11:13:02 11:13:05 11:13:08

Q Would you consider it to be connected to the insulating element? 11:13:10 11:13:12

A It's not an essential feature here. It lies flat thereon. 11:13:14 11:13:19

Q So just a yes or no, is the metal foil connected to the insulating element? 11:13:21 11:13:24

MR. MUELLER: Objection to form. 11:13:27

A Maybe. I'm sorry, I don't mean to be facetious, but, you know. 11:13:28 11:13:32

Q Can you point me to any elements that would facilitate that connection? 11:13:36 11:13:39

A Well, as I said, you know, in my interpretation of the second insulating layer is a tape, okay. It holds the output conductor in place to prevent wrinkling and provides a flat surface to eventually perform a well-defined electrical contact with the can floor and ceiling. 11:13:41 11:13:44 11:13:47 11:13:53 11:13:56 11:14:00

Q And so, in your opinion, would a person of ordinary skill in the art understand the metal foil to be connected to the insulating element? 11:14:05 11:14:07 11:14:11

MR. MUELLER: Objection to form. 11:14:12

A It would be in contact with. I mean, if you mean connected in some other sense, I don't know. Sorry. 11:14:13 11:14:18 11:14:24

Q Okay. And so in order for this cell to function -- 11:14:26 11:14:30

A Yeah. 11:14:30

Q -- the metal foil would have to also be in contact with the electrode assembly. Is that correct? 11:14:32 11:14:34

A It eventually is in direct contact with -- electrical contact with the floor or ceiling. 11:14:37 11:14:42

Q I'm discussing the electrode assembly itself, the spiral, the spiral winding. 11:14:47 11:14:50

A Well, the spiral winding by itself is never in contact, okay. It's shielded from, okay. But what is in contact with the housing is the output conductor. 11:14:53 11:14:56 11:15:01 11:15:07

Q Yeah, so the metal foil, which is what I'm discussing, has to be in contact with the electrode assembly. Is that correct? 11:15:09 11:15:14 11:15:17

A The metal foil eventually has to be in electrical contact with the assembly, yes. 11:15:19 11:15:24

Q So the entire metal foil can't be interposed between the insulating element and the housing. Is that correct? 11:15:28 11:15:33 11:15:45

A That's not what the patent says. I mean, the patent just says that you've got these two insulating layers which rest on the end face and -- and the output conductor lies flat on the uppermost insulating layer. By that I mean the one that's closest to the floor and ceiling. 11:15:45 11:15:47 11:15:50 11:15:56 11:16:01 11:16:05

Q So I just want to point you to some -- the specific language of this substitute claim, which states that, you know, these three layers -- the housing half, metal foil and insulating element -- form a sequence of three layers in direct contact with one another in which the metal foil is interposed between the other two layers. Do you see that language? 11:16:08 11:16:11 11:16:15 11:16:18 11:16:21 11:16:24 11:16:27 11:16:31

A Yeah. 11:16:32

Q So the entire metal foil cannot be interposed between those layers in order for the battery to function? 11:16:35 11:16:39 11:16:41

MR. MUELLER: Objection to form. 11:16:42

A I'm not sure where we're going with it. 11:16:43

Q So let me clarify. At least some portion of the metal foil has to connect to the electrode assembly. Is that correct? 11:16:51 11:16:54 11:16:57

A Yes, yeah, it's pulled out from the line, yeah. 11:16:59 11:17:02

Q And that portion would not be -- that portion which connects to the electrode assembly would not be interposed between the housing and the 11:17:02 11:17:05 11:17:09

insulating element. Is that correct? 11:17:13

A There is another alternative, which is 11:17:17

suggested by the drawings, okay. If you have -- if 11:17:21

you have a piece of tape and then you have another 11:17:26

insulating layer on top and you cut a little rectangle 11:17:29

in that and then you press down on it, then you have 11:17:33

an insulator -- output conductor insulator 11:17:36

configuration. 11:17:41

Q But then would that metal foil still be, in 11:17:42

your opinion, interposed between those layers then, if 11:17:47

there's now a hole in one layer? 11:17:50

A In that case it would be interposed, yes, of 11:17:52

course, yeah. I mean, there's -- yes, in that case. 11:17:56

Q So -- so let me just clarify that. In that 11:17:59

case where there's -- and please correct me if I'm 11:18:04

misunderstanding -- a hole in one of the insulating 11:18:08

elements through which the metal -- 11:18:12

A Yes. 11:18:12

Q -- foil would go, you would still consider 11:18:14

that to be interposed between the layers? 11:18:17

A Sure, yeah. I mean, you got the three 11:18:19

layers. I can put labels on it; one, two, three. 11:18:22

Q Despite the fact that the metal foil would have to go through one of those layers? 11:18:27 11:18:30

A Oh, yes. I don't find any difficulty with that. I don't think any other POSA would either. 11:18:33 11:18:37

MR. PALMIERI: Okay. So that is it for -- for my questions today. I appreciate your time, Dr. Peckerar. 11:18:44 11:18:47 11:18:51

Do we want to take a -- Wes, do you want to take a brief break? 11:18:51 11:18:55

MR. MUELLER: Yeah, let's take like a 10, 15-minute break. I'm not sure if we've got anything or not. 11:18:57 11:18:59 11:19:02

MR. PALMIERI: Okay. I think we can go off the record then. 11:19:03 11:19:04

THE VIDEOGRAPHER: Okay. It is 11:19 a.m. We go off the record. 11:19:06 11:19:09

(Recess 11:19 a.m. - 11:41 a.m.) 11:19:10

THE VIDEOGRAPHER: It is the beginning of Media Number 3, Volume Number 3 of the testimony of Dr. Martin Peckerar. It is 11:51 [sic] a.m. We are back on the record. 11:41:41 11:41:43 11:41:47 11:41:52

EXAMINATION 11:42:01

BY MR. MUELLER: 11:42:02

Q Dr. Peckerar, I'd like to touch on one topic you talked about this morning, and I would refer you to paragraph 13 of your supplemental expert declaration at page 9. Do you see that? 11:42:02 11:42:02 11:42:03 11:42:06

A 13 on page 9, yes. 11:42:19

Q Now, can you explain whether Kaun discloses that gaps will exist between an adjacent separator layers? 11:42:23 11:42:32 11:42:39

THE TECHNICIAN: Doctor, could you please center yourself in frame? I think you're -- 11:42:39 11:42:40

THE WITNESS: Sorry. 11:42:43

THE TECHNICIAN: Thank you. 11:42:44

THE WITNESS: Yes. Is that okay? Super. 11:42:45

MR. PALMIERI: Objection to form, just before you... 11:42:48 11:42:50

A Okay. Kaun by himself doesn't disclose the formation of gaps, no. There's no language -- 11:42:52 11:42:58

BY MR. MUELLER: 11:43:04

Q In fact, Kaun discloses that the separator layers will abut each other, correct? 11:43:04 11:43:07

A Well, that's what he draws and he doesn't go 11:43:10

further than that either in the drawing or the text. 11:43:14

Q Now, if you even assume that there are small gaps between adjacent separator layers in Kaun's electrolytes -- or in Kaun's battery cell, will that affect or impact the operation of the battery? 11:43:18 11:43:21 11:43:27 11:43:34

MR. PALMIERI: Objection to form. 11:43:36

A As I expressed in my original report, my declaration, no. During the processing of the cell itself, the layers would squeeze together under the -- as they were -- as they were wound, and there would be no appreciable gap. And as I said, there's no verbal mention of that, nor any in Kaun, nor is there any illustration of a gap per se. 11:43:39 11:43:47 11:43:54 11:44:03 11:44:10 11:44:15 11:44:23

Q Now, earlier today you also talked about the use of Kynar disclosed by Kaun to glue adjacent separator edges together. Do you recall that? 11:44:26 11:44:30 11:44:35

A Yes. 11:44:38

Q Now, is it your understanding that dendrites would be more likely to form where there was Kynar -- 11:44:38 11:44:44

A No, no, absolutely not. 11:44:48

MR. PALMIERI: Objection to form. 11:44:49

Q And why is that? 11:44:50

MR. PALMIERI: Same objection. 11:44:54

A Kynar would make the region less likely to form the dendrites. It's a -- it's a kind of a plastic resin and it wouldn't allow the dendrite growth. 11:44:56 11:45:00 11:45:04 11:45:10

Q Okay. And can you explain why that is? 11:45:11

A As I said, it's density and there are no exposed nucleating sites through the Kynar. 11:45:14 11:45:18

Q Can you compare that to whether there would be nucleating sites in the separator material? 11:45:23 11:45:26

A Yes -- 11:45:29

MR. PALMIERI: Objection to form. 11:45:29

A Well, two things -- sorry to interrupt. 11:45:31

There are two things, the -- the separators can contain many nucleating sites because of their ambient surface area; that's one thing. And the second issue associated with the -- with the -- with the separators themselves is they can act as a scaffolding on which the incoming flow of lithium ions would aggregate and would prevent the absorption of those in the intercalating sites in the underlying layer. 11:45:34 11:45:43 11:45:47 11:45:51 11:46:00 11:46:03 11:46:10 11:46:16 11:46:20

Q And would you have that same type of scaffolding if there were a gap? 11:46:20 11:46:22

A No. 11:46:25

MR. MUELLER: Okay. No more questions from patent owner. 11:46:25 11:46:28

MR. PALMIERI: We have no -- no follow-up questions either. 11:46:31 11:46:35

THE VIDEOGRAPHER: Okay. So it is the end of the testimony of Martin Peckerar, Dr. Martin Peckerar. It is 11:46 a.m. We are off the record. 11:46:37 11:46:40 11:46:45

(Time noted: 11:46 a.m.) 11:46:51

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CERTIFICATE OF CERTIFIED SHORTHAND REPORTER

I, MONIQUE VOUTHOURIS, Certified Court Reporter and Notary Public within and for the States of New Jersey and New York, do hereby certify:

That MARTIN C. PECKERAR, Ph.D., the witness whose deposition is hereinbefore set forth, was duly sworn by me before the commencement of such deposition, and that such deposition was taken before me and is a true record of the testimony given by such witness.

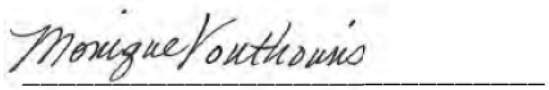
I further certify that the adverse party was represented by counsel at the deposition.

I further certify that the deposition of MARTIN C. PECKERAR, PH.D., occurred virtually via Zoom Videoconference, on Friday, September 10, 2021, commencing at 8:56 a.m. to 11:46 a.m. EDT.

I further certify that I am not related to any of the parties to this action by blood or marriage, I am not employed by or an attorney to any of the parties to this action, and that I am in no way interested, financially or otherwise, in the outcome

of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand this 12th day of September 2021.



Monique Vouthouris, CCR, RPR, CRR

Notary Public of the State of New Jersey

My commission expires: April 8, 2024

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