



**Planet Depos**<sup>®</sup>  
We Make It *Happen*<sup>™</sup>

---

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

**Date:** September 10, 2021

**Case:** PEAG LLC, et al -v- VARTA Microbattery GMBH. (PTAB)

**Planet Depos**

**Phone:** 888.433.3767

**Email:** [transcripts@planetdepos.com](mailto:transcripts@planetdepos.com)

**www.planetdepos.com**

WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2 BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

5 Petitioner,

6 v.

7 VARTA MICROBATTERY GMBH,

8 Patent Owner.

9 Case IPR2020-01211 Case IPR2020-01212  
10 USP 9,496,581 USP 9,153,835

11 Case IPR2020-01213 Case IPR2020-01214  
12 USP 9,799,858 USP 9,799,913

13  
14 VIDEOTAPED DEPOSITION OF MARTIN C. PECKERAR, PH.D.

15 VOLUME 3

16 Conducted Virtually

17 Friday, September 10, 2021

18 8:56 a.m. EDT

19  
20 Job No.: 395274

21 Pages: 351 - 445

22 Reported by: Monique Vouthouris, CCR, RPR, CRR

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22

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.

1 A P P E A R A N C E S

2

3 ON BEHALF OF PETITIONER PEAG LLC,

4 AUDIO PARTNERSHIP LLC and AUDIO PARTNERSHIP PLC:

5 BAKER BOTTS LLP

6 BY: NICK PALMIERI, ESQ.

7 PAUL A. RAGUSA, ESQ.

8 30 Rockefeller Plaza

9 New York, New York 10112

10 212.408.2500

11

12 ON BEHALF OF PATENT OWNER,

13 VARTA MICROBATTERY GMBH:

14 LEYDIG VOIT & MAYER, LTD.

15 BY: WESLEY O. MUELLER, ESQ.

16 ROBERT T. WITTMANN, ESQ.

17 Two Prudential Plaza

18 180 N. Stetson Avenue, Suite 4900

19 Chicago, Illinois 60601

20 312.616.5600

21

22

PLANET DEPOS

888.433.3767 | WWW.PLANETDEPOS.COM

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22

ALSO PRESENT:

JEAN-LOUIS ZIESCH, Planet Depos Videographer

SARAH LOILER, Planet Depos Technician

PLANET DEPOS

888.433.3767 | WWW.PLANETDEPOS.COM

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22

C O N T E N T S

EXAMINATION OF MARTIN C. PECKERAR, PH.D.	PAGE
By Mr. Palmieri	357
By Mr. Mueller	439

E X H I B I T S

(Attached to transcript.)

DEPOSITION EXHIBIT	PAGE
Exhibit 1005 U.S. Patent Application	376
Pub. No. US 2005/0233212, Kaun.	
Exhibit 1039 Publication of Unexamined	386
Patent Application (A), Kannou.	
Exhibit 1040 U.S. Patent Application,	399
Pub. No. US 2007/0218356, Kawamura.	
Exhibit 2050 Supplemental Declaration of	360
Martin C. Peckerar, Ph.D.	

1	P R O C E E D I N G S	
2		08:55:45
3	THE VIDEOGRAPHER: This is the beginning of	08:55:45
4	Media Number 1, Volume Number 3 of the continuation of	08:55:48
5	the videotaped deposition of Dr. Martin Peckerar, in	08:55:52
6	the matter of PEAG LLC, et al., versus VARTA	08:55:56
7	Microbattery, et al., in the U.S. Patent and Trademark	08:56:03
8	Office, Case Number IPR 2020-01211, -12, -13, and -14.	08:56:08
9	Today's date is Friday, September the 10th,	08:56:18
10	2021. The time on the video monitor is 8:56 a.m.	08:56:23
11	Eastern Standard Time. The certified videographer	08:56:30
12	today is Jean-Louis Ziesch representing Planet Depos.	08:56:33
13	This video deposition is taking place remotely.	08:56:37
14	Would counsel please identify yourself and	08:56:40
15	state whom you represent.	08:56:42
16	MR. PALMIERI: On behalf of the petitioners	08:56:45
17	PEAG LLC, Audio Partnership LLC and Audio Partnership	08:56:50
18	PLC, my name is Nick Palmieri, with Baker Botts. Here	08:56:55
19	with me is Paul Ragusa, also with Baker Botts.	08:56:59
20	MR. MUELLER: This is Wes Mueller from	08:57:03
21	Leydig Voit & Mayer in Chicago, on behalf of the	08:57:09
22	patent owner VARTA Microbattery GmbH.	08:57:11

PLANET DEPOS

888.433.3767 | WWW.PLANETDEPOS.COM

1 THE VIDEOGRAPHER: The court reporter today 08:57:16  
2 is Monique Vouthouris representing Planet Depos. 08:57:17  
3 Would the court reporter please swear in the witness. 08:57:20  
4 MARTIN C. PECKERAR, PH.D., 08:57:41  
5 being first duly sworn or affirmed by the Notary, 08:57:41  
6 testifies as follows: 08:57:41  
7 EXAMINATION 08:57:41  
8 BY MR. PALMIERI: 08:58:00  
9 Q Good morning, Dr. Peckerar. How are you 08:58:00  
10 doing today? 08:58:03  
11 A Doing well. Hopefully you are, too. 08:58:04  
12 Q So before we get started, I just wanted to 08:58:06  
13 ask is there anyone else in the room with you right 08:58:10  
14 now? 08:58:12  
15 A Yes. Mr. Mueller and Mr. Wittmann. 08:58:13  
16 Q So as a preliminary matter, you've prepared 08:58:21  
17 two declarations in this case so far. Is that 08:58:25  
18 correct? 08:58:28  
19 A Yes, there are two transcripts here. 08:58:28  
20 Q Well, so the transcripts I believe are 08:58:35  
21 referring to previous depositions. But for the IPRs 08:58:42  
22 at issue, you prepared two expert declarations? 08:58:45





1 Q And so -- who provided this assistance to 08:59:42  
2 you? 08:59:46  
3 A Well, that was done by Leydig. They have a 08:59:46  
4 drafting office. 08:59:49  
5 Q But you prepared the substantive content of 08:59:52  
6 each section. That's correct? 08:59:56  
7 A Yes. 08:59:58  
8 Q And in preparing this declaration, did you 08:59:59  
9 review any particular materials? 09:00:05  
10 A Yes, of course, and those are listed in one 09:00:09  
11 of the sections of my -- of my supplemental report. 09:00:12  
12 Q And if -- if we could bring onto the screen, 09:00:17  
13 I circulated a copy of the supplemental declaration. 09:00:22  
14 And on pages 1 and 2 of that declaration, you list the 09:00:27  
15 materials that you considered? 09:00:34  
16 A Yes, Section III. 09:00:37  
17 Q Section III, that's right. And did you 09:00:38  
18 review any other materials not listed in that section? 09:00:41  
19 A Those are the materials that I spent most 09:00:45  
20 time on and they're -- 09:00:48  
21 THE TECHNICIAN: Mr. Palmieri, would you 09:00:52  
22 like this marked as an exhibit? 09:00:54

1 MR. PALMIERI: Yes. Could you mark it as 09:01:01  
2 Exhibit 2050. It should already be physically marked 09:01:05  
3 in the copy, but... 09:01:09  
4 (Exhibit 2050, Supplemental Declaration of 09:01:09  
5 Martin C. Peckerar, Ph.D., marked for identification.) 09:01:18  
6 Q Okay. And so if you used any reference or 09:01:18  
7 reviewed any -- any materials for this declaration 09:01:22  
8 for -- in any substantive manner, they will be listed 09:01:26  
9 in that Section III. Is that correct? 09:01:30  
10 A Yes. Yes. 09:01:32  
11 Q And before we go on, are there any errors or 09:01:34  
12 corrections that you're aware of in your supplemental 09:01:38  
13 declaration that you would like to resolve? 09:01:42  
14 A I have none. I don't -- it is possible that 09:01:45  
15 I missed a typo or two. I would apologize for that. 09:01:50  
16 Q So you were previously deposed on June 2nd 09:01:55  
17 and 3rd. Is that correct? 09:01:59  
18 A I believe that was the case. 09:02:02  
19 Q Did you review those deposition transcripts? 09:02:04  
20 A Yes. 09:02:09  
21 Q Did you review them in anticipation for 09:02:09  
22 today's deposition or did you just generally review 09:02:12

1 them? 09:02:16

2 A Just generally reviewed them. 09:02:16

3 Q All right. Did you discuss your deposition 09:02:19

4 testimony with anyone? 09:02:22

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

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

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

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

9 A No. 09:02:41

10 Q You did not discuss with anyone at VARTA 09:02:41

11 directly. Is that correct? 09:02:45

12 A No. Well, I met with -- with VARTA 09:02:47

13 personnel. Not in conjunction with these -- with 09:02:52

14 these records and proceedings. 09:02:56

15 Q So you didn't -- you did not -- just to 09:02:59

16 clarify, you did not discuss your deposition 09:03:02

17 transcript with any VARTA personnel? 09:03:04

18 A No. 09:03:09

19 Q And did you discuss whether any of your 09:03:09

20 previous testimony in those depositions was contrary 09:03:12

21 to any of VARTA's positions? 09:03:15

22 A No. 09:03:17

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

3 A No. 09:03:27

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

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

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

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

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

20 A No. 09:04:37

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

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

1 was -- was my own reading and review of all the -- of 09:04:48  
2 the supplemental and the cited materials in the 09:04:54  
3 supplemental. I did have some conversation with -- 09:04:57  
4 with Leydig. 09:05:03  
5 Q And do you know when you met with VARTA's 09:05:05  
6 counsel? 09:05:10  
7 A I would have to go back to my hours log. I 09:05:10  
8 don't have that with me. 09:05:14  
9 Q Do you have an approximate period of time 09:05:15  
10 that you met with them? 09:05:19  
11 A Well, yeah, I would -- well, certainly 09:05:20  
12 between -- between the deposition in June and today 09:05:25  
13 there have been a couple of conversations, yeah. 09:05:28  
14 Q But in preparation specifically for this 09:05:31  
15 deposition have you met with them? 09:05:34  
16 A Well, I certainly met with them before this 09:05:36  
17 deposition and we discussed issues relating to it. 09:05:40  
18 Q Okay. And do you know about how -- at least 09:05:43  
19 how many times you've met with them, just a rough 09:05:46  
20 idea? 09:05:49  
21 A I would say maybe three or four times. As I 09:05:49  
22 said, I'd have to look at my hours log. I'm not sure. 09:06:03

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

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

9 A Yes. 09:06:49

10 Q Do you recall that? 09:06:49

11 A Yes. Yes. 09:06:50

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

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

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

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

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

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



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

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

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

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

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

22 A Okay. 09:11:12

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

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

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

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

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

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

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

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

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

9 A Yes. 09:13:18

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

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

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

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

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

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

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

1 Q So the nucleating sites could form on the 09:14:07  
2 electrode layers of Kaun? 09:14:10  
3 MR. MUELLER: Objection to form. 09:14:12  
4 A And in the separators as well. Anywhere. 09:14:14  
5 Q So could they form in the gap between the 09:14:20  
6 separator layers? 09:14:23  
7 MR. MUELLER: Objection to form. 09:14:24  
8 A As I said, I do have a section on this in my 09:14:32  
9 supplemental report, but let me say yes, they could 09:14:36  
10 form in those regions. 09:14:40  
11 Q And if they form in the gap regions, would 09:14:45  
12 there be anything to inhibit their growth? 09:14:48  
13 MR. MUELLER: Objection to form. 09:14:51  
14 A What would inhibit their growth would be the 09:14:52  
15 rate of arrival of the -- of the ion that constitutes 09:14:58  
16 the dendrite, and -- and what that arrival rate is 09:15:03  
17 depends on a number of things. And I wouldn't say 09:15:11  
18 that there's any reason to believe that that arrival 09:15:15  
19 rate or the density of nucleating sites would be 09:15:19  
20 different in either the gap or in the region over 09:15:24  
21 the -- beneath the separator. 09:15:28  
22 In fact, as I mentioned earlier, there's 09:15:31

1 reason to believe that the separator might serve as a 09:15:33  
2 scaffolding that support the growth of the tree. 09:15:36  
3 Q So does the separator then form to -- 09:15:42  
4 apologies, let me rephrase that. 09:15:48  
5 Does the separator then act to inhibit the 09:15:50  
6 growth of dendrites so that they cannot form a 09:15:53  
7 connection between the electrode layers? 09:15:58  
8 MR. MUELLER: Objection to form. 09:16:00  
9 A There's no reason to believe that. 09:16:02  
10 Q So it's your testimony that the separator 09:16:06  
11 does not inhibit -- 09:16:08  
12 A It could actually -- it could actually speed 09:16:11  
13 it up, but you'd have to -- there's a tremendous 09:16:13  
14 amount of literature on this. I believe we've 09:16:19  
15 included some of that in our -- I've included that in 09:16:23  
16 my report and -- but as I said, you can get little 09:16:27  
17 trees forming anywhere. 09:16:34  
18 Q And so you have another section here, and 09:16:37  
19 it's on pages 8 to 9 of Exhibit 2050, that describes 09:16:40  
20 the use of a polyvinylidene fluoride, also known as 09:16:48  
21 Kynar, that's described in the Kaun reference. 09:16:56  
22 A Right. 09:16:59

1           Q     Can you -- can you describe what this Kynar           09:16:59  
2     is doing?  And apologies if I'm saying that wrong.           09:17:03  
3     I'm happy to take a corrected pronunciation if you           09:17:07  
4     have it.   09:17:11  
5           A     Yeah, no, it is Kynar.  I believe he           09:17:12  
6     pronounces his name Kaun.                                   09:17:15  
7                     If -- if the butt joint is too large, of           09:17:21  
8     course there's a danger that you could -- there are           09:17:29  
9     certain deleterious effects that could occur, but --       09:17:33  
10    and so if you're worried about that, according to           09:17:37  
11    Kaun, you can put Kynar, which is a resin, an           09:17:42  
12    insulating resin, and solve the problem.                   09:17:47  
13           Q     And this Kynar would prevent dendrite           09:17:53  
14    formation?   09:17:58  
15           A     I think that that -- I don't -- that           09:18:01  
16    certainly wouldn't eliminate the dendrite problem, no.     09:18:07  
17    But it -- it would prevent the formation of other           09:18:11  
18    types of deleterious effects, and I believe that was       09:18:19  
19    the main issue.   09:18:26  
20           Q     So you've noted a couple times the -- the           09:18:28  
21    effects that can be caused from a gap forming.  Could       09:18:33  
22    you describe some of those deleterious effects?           09:18:38

1           A     Obviously you've got a separator, right, and           09:18:42  
2     on top of and on bottom under the active electrodes.           09:18:49  
3     And if you've got this huge gap, when you squeeze           09:18:54  
4     things together, you short the electrodes out.           09:19:00  
5                     Also, we make a big deal -- okay. We make a           09:19:02  
6     big deal about particle sizes, okay. We choose the           09:19:12  
7     particle sizes to be large enough in the active           09:19:17  
8     material so that -- just large enough so that they           09:19:23  
9     won't penetrate the separator material themselves and           09:19:26  
10    also they wouldn't fall into any -- to create shorts           09:19:29  
11    in themselves.           09:19:37  
12                     So we -- so we -- as a matter of fact, in           09:19:39  
13    one of my companies we had a very expensive particle           09:19:46  
14    size sorter and we would choose specific particle           09:19:51  
15    sizes that wouldn't crash through the separator and at           09:19:54  
16    the same token wouldn't fill up the pores of the           09:20:00  
17    materials that we were using. They would be -- they           09:20:03  
18    wouldn't be too small, they wouldn't be too big;           09:20:06  
19    they'd be just right. But these are all the           09:20:11  
20    considerations that go into battery manufacturing.           09:20:14  
21                     So those are some of the issues; there will           09:20:16  
22    be shorting out of the layer and what all, which I           09:20:19

1 think would be rare, even in Kaun's case. Or the 09:20:21  
2 particles which would pierce the layer for -- well, 09:20:26  
3 those are the main issues, so that would outline. 09:20:35  
4 Q And so -- so going back to this Kynar 09:20:39  
5 material, if we assume that it's being used as an 09:20:44  
6 adhesive to fill that gap, what differentiates it from 09:20:49  
7 the separator material? 09:20:55  
8 MR. MUELLER: Objection to form. 09:20:56  
9 A Well, Kynar is non-conductive resin. Now, 09:20:57  
10 the separator materials -- as I've testified 09:21:19  
11 previously, the separator materials are highly 09:21:24  
12 engineered structures and they're aimed at passing 09:21:27  
13 ions of a certain type. Now, clearly the Kynar isn't 09:21:31  
14 an engineered material that was designed to do that. 09:21:38  
15 So it might lead to some effective area reduction of 09:21:42  
16 the battery plate. Not a lot. 09:21:50  
17 Q So the -- 09:21:50  
18 A Small amount. 09:22:01  
19 (Court Reporter clarification.) 09:22:01  
20 A Not a lot, small amount. 09:22:04  
21 Q So the Kynar doesn't facilitate ionic 09:22:04  
22 conduction the way that the separator material does? 09:22:10





1 discusses the central fastener of Kaun. Is that 09:23:35  
2 correct? 09:23:41  
3 A Yes. 09:23:41  
4 Q And you reproduce on the next page, page 13, 09:23:46  
5 you reproduce a number of figures from Kaun. Do you 09:23:52  
6 see those? 09:23:56  
7 A Yes. 09:23:57  
8 Q If we're looking only at Figure 7A, is the 09:24:00  
9 central fastener shown in that figure? 09:24:07  
10 A No. 09:24:10  
11 Q And then moving on to Figure 7C, do those 09:24:14  
12 figures show -- does Figure 7C show a central 09:24:20  
13 fastener? 09:24:24  
14 A Yes and yes. 09:24:25  
15 Q And if we could move into Kaun itself, and 09:24:27  
16 that's Exhibit -- apologies, I don't remember the 09:24:33  
17 exact exhibit number for Kaun. Sorry, just one 09:24:41  
18 second. 09:24:56  
19 So Kaun is Exhibit 1005 of these IPR 09:25:35  
20 proceedings. 09:25:41  
21 A Yes. 09:25:42  
22 MR. PALMIERI: And, Sarah, could we bring 09:25:48

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

2 THE TECHNICIAN: Is that the document ending 09:26:02

3 in U.S. 2005/0233212? 09:26:04

4 MR. PALMIERI: That's correct, yeah. Yes, 09:26:10

5 starts with K-a-u-n. Great. Thank you. 09:26:11

6 (Exhibit 1005, U.S. Patent Application Pub. 09:26:11

7 No. US 2005/0233212, Kaun, marked for identification.) 09:26:11

8 BY MR. PALMIERI: 09:26:20

9 Q So I want to look at paragraph 69 of 0069, 09:26:20

10 which corresponds with those figures that we were just 09:26:29

11 looking at, 7A through 7D. 09:26:33

12 A You just passed it. 09:26:38

13 Q It should be on page 4 -- page 15 of this 09:26:40

14 PDF, overall? 09:26:44

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

16 Q Yeah. So those are the figures, and then if 09:26:49

17 we can go to paragraph 0069 on this specific language. 09:26:52

18 THE TECHNICIAN: I'm sorry, I'm not entirely 09:27:04

19 sure where to go. 09:27:06

20 MR. PALMIERI: Sorry. So within Kaun, if 09:27:07

21 you could go to page -- page 15 of the PDF, and on 09:27:11

22 that page is paragraph 69, on the left there, yeah. 09:27:18

1 Perfect. Thanks. 09:27:29

2 Q Okay. So in paragraph 69 we can see there's 09:27:31

3 a description of Figure 7C that says it "depicts the 09:27:38

4 outer pan of the housing for the electrochemical 09:27:43

5 device, including the central [sic] fastener, 09:27:46

6 polymeric tube." Do you see that portion, 09:27:50

7 Dr. Peckerar? 09:27:55

8 A Yes, I do. 09:27:56

9 Q And so does this imply to you that there's 09:27:57

10 an embodiment that doesn't have a central fastener as 09:28:00

11 well -- 09:28:04

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

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

14 A Well, as I've testified before, the center 09:28:08

15 fastener is an essential part of this construct, and 09:28:13

16 what you said doesn't contradict that. 09:28:16

17 Q So can you describe the purpose of the 09:28:20

18 center fastener in Kaun? 09:28:23

19 A Sure. Okay. Most of the cells that have 09:28:26

20 been discussed in the past all had beaded -- what 09:28:36

21 we've been terming beaded over seals, beaded over 09:28:44

22 closure, and these present a mechanical impediment to 09:28:48

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1 Q Is it used in the pressure-release mechanism 09:30:42  
2 of Kaun? 09:30:47  
3 MR. MUELLER: Objection to form. 09:30:47  
4 A No. 09:30:48  
5 Q I'd like to look now at Figure 12B of Kaun, 09:30:49  
6 and this is up on page 8 of -- of the PDF. 09:31:00  
7 A The Kaun patent? 09:31:06  
8 Q Yes, page 8 of the Kaun patent. 09:31:08  
9 A Yup. 09:31:12  
10 Q And can you describe what this figure is 09:31:14  
11 showing? 09:31:16  
12 A Yeah. It's spring-load. It's an additional 09:31:17  
13 method of ensuring closure of the can, of the housing. 09:31:23  
14 You've got little springs, 38, that screw down and 09:31:30  
15 hold the cells together. Kaun was greatly afraid of 09:31:37  
16 the cells blowing apart, and so he used a number of 09:31:42  
17 approaches to ensure that that didn't happen. 09:31:45  
18 Q And is there a central fastener in this 09:31:48  
19 figure? 09:31:52  
20 MR. MUELLER: Objection to form. 09:31:53  
21 A Honestly, of course, that would appear in 09:31:54  
22 the -- in those central regions full of rectangles. 09:32:00

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

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

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

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

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

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

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

8 120, which is on page 20 of this PDF -- 09:32:32

9 A Okay. 09:32:38

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

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

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

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

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

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

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

17 A Yes. 09:33:10

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

19 require a central fastener? 09:33:14

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1 speculation. I don't think we have any evidence that 09:39:53  
2 that would be the case. He's citing it's a potential. 09:39:57  
3 Q Okay. So now I'd like to move on to 09:40:05  
4 another -- another piece of prior art, and this is 09:40:08  
5 Exhibit 1039. I will refer to it as Kannou, and this 09:40:11  
6 is a Japanese -- 09:40:21  
7 A Yes. 09:40:21  
8 Q -- patent application, which we provided a 09:40:24  
9 translation for. 09:40:27  
10 MR. PALMIERI: And, Sarah, so that should be 09:40:32  
11 marked as Exhibit 1039 and it's -- 09:40:34  
12 THE TECHNICIAN: Is the exhibit entitled 09:40:39  
13 K-w-o-n? 09:40:44  
14 MR. PALMIERI: No. 09:40:45  
15 THE WITNESS: No. Kannou. 09:40:45  
16 MR. PALMIERI: This is JP2003-031266. 09:40:46  
17 THE TECHNICIAN: I'm sorry, sir, I don't 09:40:52  
18 have that exhibit. 09:40:54  
19 THE WITNESS: Excuse me, may I take a brief 09:40:57  
20 break? 09:41:01  
21 MR. PALMIERI: Yeah, of course. Do you want 09:41:01  
22 to take -- 09:41:01

1 THE WITNESS: 60 seconds. 09:41:02

2 MR. PALMIERI: Yeah, can we go off the 09:41:03

3 record, please. 09:41:04

4 THE VIDEOGRAPHER: It is 9:41 a.m. We go 09:41:05

5 off the record. 09:41:10

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

7 THE VIDEOGRAPHER: It is 9:44 a.m. We are 09:44:45

8 back on the record. 09:44:49

9 (Exhibit 1039, Publication of Unexamined 09:44:49

10 Patent Application (A), Kannou, marked for 09:44:49

11 identification.) 09:44:51

12 BY MR. PALMIERI: 09:44:51

13 Q All right. So, Dr. Peckerar, I want to move 09:44:59

14 on to Exhibit 1039, and that's Kannou, which is a 09:45:02

15 Japanese application. Let's -- first, when did you 09:45:07

16 first see this -- this piece of art? 09:45:16

17 A This is relatively recent. I mean, the 09:45:19

18 name -- the first wave of patents that I analyzed was 09:45:31

19 Kobayashi and Kaun and others, of course. But I 09:45:39

20 believe that Kannou came in with these -- with these 09:45:46

21 additional -- with the most recent set of patents that 09:45:58

22 we've been discussing here in the supplemental claims. 09:46:07

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

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

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

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

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

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

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

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

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

8           A     Okay.           09:48:18

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

8 A Yes. 09:51:42

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

11 A Yes. 09:51:51

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

14 A Yes, they do. 09:52:07

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

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

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

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

3 Q So it uses a beaded over closure, in your 09:53:10

4 opinion, but is there any force-fit connection in this 09:53:18

5 cell? 09:53:21

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

7 A Can you be a bit more clear? I mean, I'm 09:53:23

8 not sure what you mean by force-fit connection, the 09:53:29

9 latter. 09:53:38

10 Q So do you remember providing a definition 09:53:41

11 for a force-fit connection in your supplemental 09:53:44

12 declaration? 09:53:48

13 A I describe all of the -- all of the sealing 09:53:49

14 mechanisms and certainly in those relating to these 09:54:02

15 patents in the supplemental and I'm just looking for 09:54:08

16 the place in which I do. And, you know, if you look 09:54:11

17 at 47, for example, paragraph 47, we see 09:54:16

18 force-fitting -- an example, force-fitting connection 09:54:21

19 in which the can casings, the sides of the can overlap 09:54:26

20 and -- and form a friction fit to the -- between the 09:54:36

21 can top and the can cup. Yeah, I think I address 09:54:46

22 that. 09:54:52

1 Q So how would a -- apologies, please 09:54:54  
2 continue. 09:54:57  
3 A Yeah. I was just wondering, you know, how 09:54:58  
4 you were referring to this. 09:54:59  
5 Q Well, so -- so how would a person of 09:55:01  
6 ordinary skill understand the term "force-fit 09:55:05  
7 connection"? 09:55:10  
8 A Well, of course, I -- I didn't consider in 09:55:10  
9 my original discussion, you know, how a person of 09:55:18  
10 ordinary -- or a layperson, for example, would view 09:55:21  
11 force-fit connection. But what I would say is, you 09:55:27  
12 know, it would be obvious -- what's obvious is that 09:55:32  
13 you force the can top into the can -- into the can cup 09:55:36  
14 and there would be some friction, which would oppose 09:55:40  
15 axial separation. 09:55:46  
16 Q Okay. 09:55:46  
17 A But that's not -- but that's not -- let me 09:55:50  
18 just point out. That's not what's happening here. I 09:55:52  
19 mean, you do see the mechanical impediment, which is 09:55:56  
20 the curled over can, cup on the left and the right of 09:55:58  
21 the drawing. 09:56:03  
22 Q And is -- so is that mechanical impediment 09:56:05

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

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

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

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

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

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

7 impediment. 09:56:35

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

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

10 this, of the PDF. 09:56:53

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

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

13 a notch" -- 09:57:07

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

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

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

17 Kannou -- 09:57:33

18 A Yes. 09:57:33

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

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

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

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

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

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

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

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

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

1 an important issue; you don't want to have high 09:59:52  
2 internal resistance. By placing multiple contacts 09:59:55  
3 that peel off current from -- from different lengths 09:59:58  
4 along the winding, you reduce the internal resistance. 10:00:01  
5 And you see in 42 he's discussing internal resistance, 10:00:05  
6 okay. 10:00:11  
7 Am I being clear here? 10:00:13  
8 Q Yeah, no, I'm understanding you. Thank you. 10:00:15  
9 A Okay. What he's saying is you've got one 10:00:18  
10 lousy instantiation with one peel-off, and he's 10:00:22  
11 showing -- I think it's kind of an elegant experiment; 10:00:26  
12 it's probably worth a letter at least in some 10:00:29  
13 respected journal -- that if you peel off the current 10:00:32  
14 from various points along the winding, you do two 10:00:35  
15 things; you create a radial spring action that allows 10:00:39  
16 for good contact between the plates and the top and 10:00:44  
17 bottom and the cup floor and the top ceiling, and -- 10:00:49  
18 and you -- and the current paths are smaller, so you 10:00:59  
19 get lower internal resistance. 10:01:06  
20 So Kannou is reciting here the need for 10:01:08  
21 lowering internal resistance. That's, I think, the 10:01:10  
22 main gist of 42. 10:01:13

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

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

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

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

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

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

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

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

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

1 electrode layers? 10:02:43

2 A Yes. 10:02:44

3 Q And do you recall by -- by what mechanism 10:02:45

4 they are connected? 10:02:50

5 A I can think of a number of mechanisms that 10:02:54

6 come to my mind. 10:03:03

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

8 A They could be welded. 10:03:10

9 Q Does Kannou, to your recollection, describe 10:03:17

10 them being welded? 10:03:19

11 A In my -- let's see. I -- I recall the 10:03:24

12 mention of these being welded, welded to the -- to the 10:03:43

13 electrode. 10:03:50

14 Q And then do you recall any means of 10:03:52

15 connection to the cell housing from these output 10:03:56

16 conductors? 10:04:00

17 A The assumption was that this would be a 10:04:00

18 spring-load, but it was -- remember, Figure 7 -- okay, 10:04:03

19 let me just state again what my position on these 10:04:07

20 single contacts were. 10:04:12

21 This was a strawman that was set up to 10:04:13

22 demonstrate the importance -- and I'm quite certain 10:04:16



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

12 A Yeah. 10:07:59

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

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

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

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

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

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

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

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

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

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

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

2 A There is a nice mechanical impediment 510 10:10:25

3 that represents -- 10:10:32

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

5 (Court Reporter clarification.) 10:10:47

6 THE WITNESS: Say that one more time, 10:10:47

7 please. 10:10:47

8 THE COURT REPORTER: I didn't hear the end 10:10:47

9 of your answer. "There was a nice mechanical 10:10:47

10 impediment, 510, that represents..." 10:10:49

11 A That represents the -- that provides the 10:10:49

12 force that prevents the cell from flying apart. 10:10:53

13 Q And so is that a force-fit connection as you 10:10:57

14 understand it? 10:11:03

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

16 A I wouldn't define it that way. We have 10:11:05

17 been -- yes, I wouldn't define it that way. 10:11:10

18 Q Okay. And so now I'd like to move back into 10:11:13

19 your -- your supplemental declaration. And I would 10:11:19

20 like to beginning in Section VI, which begins on page 10:11:23

21 19 of the PDF, I'd like to discuss the substitute 10:11:31

22 claims that you've -- that we've briefly touched on 10:11:38

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

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

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

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

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

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

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

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

17 A Yeah, okay. 10:12:48

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

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

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

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

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

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

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

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

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

1 cut edge terminates and yet the cup continues, the cup 10:14:36

2 cut edge of the top. 10:14:41

3 Q Okay. So if there's -- if they overlap 10:14:43

4 completely, then this claim term would not be met? 10:14:47

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

6 A I don't believe I said that in the report. 10:14:55

7 And I don't -- I have no opinion on that right now. 10:15:01

8 Q So does this -- this overlap would occur in 10:15:06

9 the lateral direction, along the casing of the housing 10:15:11

10 components? 10:15:17

11 A Let's get definitions straight here. You 10:15:18

12 have a cup and a can, they both start out looking like 10:15:23

13 cups, or glasses. They've got what becomes a floor. 10:15:29

14 I think I defined elsewhere that the can cup provides 10:15:36

15 a floor, which is adjacent to the casing housing, and 10:15:42

16 then the can top has a ceiling, and that's the anatomy 10:15:48

17 of the cell. 10:15:58

18 Q And so both the cup casing and the top 10:16:06

19 casing contain a lateral portion? 10:16:11

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

21 Q And those -- those side walls are what 10:16:20

22 overlap? 10:16:24





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

3 835 as it came out had -- had a conical cup 10:18:06  
4 and it served the same purpose. And so this was an 10:18:12  
5 additional mechanism that helped in creating the seal, 10:18:19  
6 which was as I -- if you read the report over and over 10:18:24  
7 again, you know, I make the point that one mechanism 10:18:29  
8 is rarely enough. You've got to think of a number of 10:18:32  
9 mechanisms; in the case of the VARTA patents, ensure 10:18:36  
10 they achieve the first force-fit by simple insertion 10:18:44  
11 and then they jazz it up a bit by -- by changing the 10:18:48  
12 shape of the can and cup. 10:18:54

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

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

1           A       There's a -- the forces that come about as           10:19:34  
2           you do this insertion I discuss, okay. Yeah, I mean,           10:19:42  
3           you can get friction, simple friction. Even in Kaun           10:19:46  
4           there was a little bit of friction, but that wasn't           10:19:52  
5           the dominant mechanism of closing or sealing the can.           10:19:55  
6           In the case of the VARTA patents, yeah, there will be           10:20:02  
7           some radial force simply developed by the -- by           10:20:09  
8           friction between the gasket and the top and the can,           10:20:14  
9           yeah.           10:20:22  
10                        But VARTA goes beyond this. They discuss           10:20:24  
11           flat bottom area, disposed radially inward of the           10:20:31  
12           second part that overlaps the top casing. I mean,           10:20:35  
13           these are secondary mechanisms, and these supply -- by           10:20:38  
14           the way, okay, let me clarify one other thing, okay.           10:20:45  
15           The radial force per se isn't what holds the cell           10:20:48  
16           together. It's axial force. So what you end up with           10:20:55  
17           is an improvement in friction, increase in the           10:20:59  
18           friction using these -- using these different           10:21:06  
19           techniques that are listed in -- in -- by 7B, 7A and           10:21:09  
20           7B, all of 7, okay. So I don't know what else I can           10:21:16  
21           say.           10:21:24  
22           Q       Okay. So just to continue along this vein,           10:21:26

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2 Q So let me repeat. "'The cup casing includes 10:25:06

3 a first proximal" -- "first part proximal to the flat 10:25:09

4 bottom area and a second part disposed in the 10:25:12

5 overlapping area, the first part of the cup casing 10:25:15

6 being disposed radially inward with respect to the 10:25:18

7 second part.'" 10:25:22

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

9 A Yes, right, that's what I've been 10:25:25

10 describing. 10:25:29

11 Q Sure. And can you describe the advantages 10:25:29

12 that are achieved by using this additional method? 10:25:32

13 A Yeah. The fact that you're kind of 10:25:35

14 strangling -- I think in my -- I don't know if this 10:25:47

15 is -- should be part of this discussion. It was 10:25:54

16 mentioned I believe in my original declaration report, 10:25:56

17 there's something which we've been calling a swage 10:26:05

18 fitting, okay. Without a blackboard it's hard to show 10:26:10

19 these things. 10:26:17

20 But the idea is that you've got this kind of 10:26:18

21 drawn-in region at the bottom of the can and then 10:26:20

22 you've got the sloping wall on top. And what you're 10:26:25

1 doing when you force-fit the can cup and the can top 10:26:31  
2 is you're -- the stress. If you have a given amount 10:26:37  
3 of displacement, you're going to have to push apart 10:26:46  
4 the first part of the cell. I'm sorry, that's 10:26:51  
5 speculation here, okay. But having made these things, 10:26:53  
6 I think I can tell you that the idea is that -- that 10:26:58  
7 you probably will even deform the bottom of the can a 10:27:03  
8 bit, forming what we call the swage fitting, which is 10:27:08  
9 different than a simple -- than a simple friction 10:27:14  
10 fitting because you're actually just forming material. 10:27:20  
11 And so these -- this bottom portion over 10:27:23  
12 here is going to -- going to serve to increase the -- 10:27:25  
13 the frictive force, and what that does is that raises 10:27:32  
14 the threshold in which the can prises apart from the 10:27:36  
15 top. 10:27:43  
16 Q And so this -- this would provide a radial 10:27:44  
17 pressure that assists with the sealing? 10:27:47  
18 A There is going to be some radial pressure, 10:27:54  
19 right, and that radial pressure helps define the 10:27:57  
20 critical axial force. 10:28:03  
21 Q And so could this -- this radial deformation 10:28:07  
22 cause damage to the cell interior? 10:28:13

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

2 A I don't see that as happening. I don't see 10:28:20

3 any evidence for that. None of these patents show -- 10:28:27

4 well, I can't state that that would occur with any 10:28:31

5 degree of certainty. You'd have to show me examples 10:28:39

6 and I'd have to look them over and evaluate them. 10:28:43

7 Q But in your opinion would it be possible 10:28:46

8 that this radial force could cause damage to the 10:28:49

9 interior -- 10:28:54

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

11 A I don't -- I wouldn't care to speculate on 10:28:56

12 that. I would like to see specific examples. 10:29:03

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

14 to paragraph 38. 10:29:10

15 THE VIDEOGRAPHER: Is it a good time to 10:29:14

16 change our media? 10:29:16

17 MR. PALMIERI: Yeah, do we want to take a 10:29:21

18 quick break, come off the record? 10:29:24

19 THE VIDEOGRAPHER: Yes. Thank you. It is 10:29:30

20 10:29 a.m. We go off the record. 10:29:31

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

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



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

4 BY MR. PALMIERI: 10:42:40

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

14 Do you see that feature? 10:48:27

15 A Yes, I do. 10:48:27

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

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

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

1 those. 10:49:00

2 Q Could other shapes be considered generally 10:49:03

3 round; for example, an octagonal shape be considered 10:49:06

4 generally round? 10:49:11

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

6 A Show me an example of an octagonal cell. If 10:49:13

7 you like, we can walk through CVS together. 10:49:19

8 Q So is there a certain point at which an oval 10:49:23

9 wouldn't be considered generally round? 10:49:27

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

11 A Well, if you remember, an ellipse can be 10:49:31

12 derived from a circle. You know, you just take the 10:49:39

13 two -- both sides join them together you get a circle 10:49:42

14 and then you move them apart from their original 10:49:49

15 ellipse, and that's why you have a derivative circle, 10:49:50

16 okay. I don't know if there are other shapes or forms 10:49:54

17 that do that. 10:49:56

18 Q And this new feature recites "providing a 10:49:58

19 force-fit connection therebetween to form a 10:50:02

20 leak-tight, button cell housing." Is it possible to 10:50:05

21 have a force-fit connection that isn't leak-tight? 10:50:08

22 A Sure. 10:50:14

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

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

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

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

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

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

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

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



1       which I believe is element 103 in that figure? Yeah,       10:54:05  
2       I agree, it is -- it is a little hard to see it.       10:54:12  
3             A       It's hard to see, right, yeah. Right.       10:54:14  
4             Q       And so -- so, you know, this force-fit       10:54:26  
5       connection does require having a gasket between those       10:54:30  
6       two lateral surface areas. Is that correct?       10:54:33  
7             A       Yes.       10:54:35  
8             Q       All right. And now moving onto the next       10:54:36  
9       page, paragraph 40, which is at the very top, we'll       10:54:50  
10       move on to a new feature. And let me just read that       10:54:54  
11       feature out. It's "'the first metal conductor and the       10:55:00  
12       second metal conductor are respectively shielded from       10:55:05  
13       the lateral end sides of the spiral winding by a first       10:55:10  
14       insulating element and a second insulating element.'"       10:55:13  
15       Do you see that feature?       10:55:16  
16             A       Yeah, I see the paragraph.       10:55:17  
17             Q       Sorry, yeah, do you see that paragraph.       10:55:20  
18                     So does shielded there mean that the       10:55:27  
19       conductors have no contact with the spiral winding due       10:55:31  
20       to the insulating elements?       10:55:35  
21             A       Are shielded from the lateral end sides of       10:55:39  
22       the spiral winding. I mean, the idea in the VARTA       10:55:53



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

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

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

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

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



1 additional separate insulator and the at least one 10:58:43  
2 second additional separate insulator respectively 10:58:48  
3 preventing direct electrical contact between the 10:58:51  
4 lateral end sides of the spiral winding and the first 10:58:54  
5 metal conductor and the second metal conductor.'" 10:58:59  
6 Do you see that paragraph? 10:59:02  
7 A Yeah, right, it's describing what we just 10:59:03  
8 talked about, yes. 10:59:06  
9 Q So this is directed to another claim. This 10:59:08  
10 is directed to claim -- substitute Claim 15. Is that 10:59:13  
11 correct? 10:59:18  
12 A Substitute -- 15, you say? 10:59:18  
13 Q Correct, yeah, sorry, one five. 10:59:21  
14 A Okay. Well, I hate to do this, but can you 10:59:24  
15 pull that up and I could make a better determination. 10:59:28  
16 Q Yeah. Yes. 10:59:33  
17 MR. PALMIERI: And, Sarah, I will just 10:59:36  
18 circulate real quick the appropriate document to bring 10:59:39  
19 that up. 10:59:42  
20 Q Yes, and so this is in -- this will be in 10:59:49  
21 VARTA's revised contingent motion to amend for the 10:59:52  
22 '858 patent, and this will be -- Claim 15 is on page 11:00:01

1 43 of this document. 11:00:07

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

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

4 claim. 11:00:17

5 THE TECHNICIAN: Would you like this to be 11:00:17

6 marked as an exhibit? 11:00:18

7 MR. PALMIERI: Yes, let's mark it as an 11:00:24

8 exhibit for this. So it's already filed in this case, 11:00:27

9 so, actually, I don't know if we need to mark it as an 11:00:39

10 exhibit if it's already been filed. It's one of the 11:00:42

11 papers. 11:00:45

12 Sarah, could you possibly just zoom in a 11:00:52

13 little bit more, too. I'm just having some trouble 11:00:57

14 seeing the text. Yeah. 11:01:01

15 BY MR. PALMIERI: 11:01:11

16 Q And so is that what you wanted to review, 11:01:12

17 Dr. Peckerar? 11:01:15

18 A Yeah. So there's an additional separate 11:01:15

19 insulating layer that's called for here associated 11:01:19

20 with the first metal and one second insulating layer 11:01:22

21 associated with the second metal, right? 11:01:26

22 Q Correct. 11:01:28





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

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

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

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

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

1 this far, but the tape itself holds the output 11:05:46  
2 conductor flat, prevents wrinkling. But that wouldn't 11:05:51  
3 be -- that goes beyond the scope of what I said 11:05:55  
4 before. I'm just sharing that right now. 11:05:58  
5 Q And so in your opinion, would a person of 11:06:01  
6 ordinary skill in the art understand the term 11:06:04  
7 "shielded" to have the same meaning as the term 11:06:07  
8 "preventing direct electrical contact"? 11:06:11  
9 MR. MUELLER: Objection to form. 11:06:13  
10 A I mean, I hate to be obstinate on this. I 11:06:15  
11 mean, if there are linguistic differences between 11:06:21  
12 those two terms, I would open -- be open to that, 11:06:26  
13 okay. In my interpretation, I took "shielding" and 11:06:32  
14 "insulation" in isolation, insulate, to have the same 11:06:36  
15 function in this case. But that doesn't mean in other 11:06:41  
16 cases they might have different implication. 11:06:45  
17 Q Okay. So -- so based on that understanding, 11:06:48  
18 both -- the insulators in both Claim 10 as well as the 11:06:53  
19 separate insulators in Claim 15 perform the same 11:06:57  
20 function? 11:07:02  
21 A Well, the global function is isolation, 11:07:06  
22 okay. The second insulator as stated improves it, the 11:07:13



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

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

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

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

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

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

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

1 Q That may be so, but in terms of the claim 11:08:47  
2 scope, the functions and purposes set forth and 11:08:52  
3 covered by this claim, those other functions are not 11:08:55  
4 recited by the claim? 11:09:01  
5 A But they would be suggested to a POSA by 11:09:03  
6 looking at the cross section. 11:09:06  
7 Q Perhaps. But just as a yes or no, those 11:09:08  
8 functions are not recited in these claims? 11:09:10  
9 MR. MUELLER: Objection to form. 11:09:12  
10 A I would repeat what I just said. 11:09:13  
11 Q So can you provide a yes or no answer to 11:09:21  
12 whether those additional functions, whether or not 11:09:24  
13 considered by a person of ordinary skill, are those 11:09:28  
14 functions recited in these claims? 11:09:31  
15 A They're suggested by the claims. 11:09:35  
16 Q But they are not recited by the claims? 11:09:38  
17 A I think a POSA, if you see two materials, 11:09:42  
18 you might scratch your head and say why are you doing 11:09:49  
19 this, and I would take it from there. I mean, to me, 11:09:53  
20 as a POSA, it became clear, especially on looking at, 11:09:57  
21 studying the diagrams provided, that there would be a 11:10:04  
22 secondary function, and I provided what that function 11:10:07

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

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

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

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

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

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

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

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

22 A Yup. 11:11:16

1 Q And I want to move on to paragraph 44, and 11:11:16  
2 this is another -- another new feature recited by the 11:11:21  
3 substitute claims. It's -- paragraph 44 starts on 11:11:25  
4 page 27 of the PDF and then bleeds over to -- 11:11:31  
5 A I've got it. 11:11:35  
6 Q -- 28. 11:11:35  
7 A Yes, I've got it. 11:11:36  
8 Q Okay. And so this feature is "(i) the 11:11:38  
9 first housing half or the second housing half to which 11:11:43  
10 the metal foil connects, (ii) the metal foil, and 11:11:46  
11 (iii) one of the first insulating element or the 11:11:50  
12 second insulating element form a sequence of three 11:11:52  
13 flat layers in direct contact with one another in 11:11:56  
14 which the metal foil is interposed between the other 11:11:59  
15 two layers.'" 11:12:02  
16 A Yes. 11:12:05  
17 Q Okay. 11:12:07  
18 A Yeah, got it. 11:12:08  
19 Q So according to this claim language, the 11:12:09  
20 metal foil connects to the housing. Is that correct? 11:12:11  
21 A The metal foil has to connect somewhere to 11:12:14  
22 the housing, otherwise you wouldn't get electricity 11:12:18

1 out. 11:12:22

2 Q And it would also have -- it would also be 11:12:22

3 in contact with the insulating elements? 11:12:25

4 A It lies flat on the -- the output conductor 11:12:28

5 lies flat on the insulating elements. 11:12:33

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

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

8 Q Is the output conductor -- apologies. Is 11:12:42

9 the metal foil connected to the insulating element? 11:12:45

10 A It lies flat thereon. 11:12:48

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

12 A If it lies flat, I don't see how it can't -- 11:12:58

13 it can't be in contact with. If you want to get into 11:13:02

14 the linguistics of the meaning of connection, we can 11:13:05

15 be here all day, but -- 11:13:08

16 Q Would you consider it to be connected to the 11:13:10

17 insulating element? 11:13:12

18 A It's not an essential feature here. It lies 11:13:14

19 flat thereon. 11:13:19

20 Q So just a yes or no, is the metal foil 11:13:21

21 connected to the insulating element? 11:13:24

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

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

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

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

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

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

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

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

20          A     Yeah.           11:14:30

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

1           A     It eventually is in direct contact with --           11:14:37  
2     electrical contact with the floor or ceiling.           11:14:42  
3           Q     I'm discussing the electrode assembly           11:14:47  
4     itself, the spiral, the spiral winding.           11:14:50  
5           A     Well, the spiral winding by itself is never           11:14:53  
6     in contact, okay. It's shielded from, okay. But what           11:14:56  
7     is in contact with the housing is the output           11:15:01  
8     conductor.           11:15:07  
9           Q     Yeah, so the metal foil, which is what I'm           11:15:09  
10    discussing, has to be in contact with the electrode           11:15:14  
11    assembly. Is that correct?           11:15:17  
12           A     The metal foil eventually has to be in           11:15:19  
13    electrical contact with the assembly, yes.           11:15:24  
14           Q     So the entire metal foil can't be interposed           11:15:28  
15    between the insulating element and the housing. Is           11:15:33  
16    that correct?           11:15:45  
17           A     That's not what the patent says. I mean,           11:15:45  
18    the patent just says that you've got these two           11:15:47  
19    insulating layers which rest on the end face and --           11:15:50  
20    and the output conductor lies flat on the uppermost           11:15:56  
21    insulating layer. By that I mean the one that's           11:16:01  
22    closest to the floor and ceiling.           11:16:05

1 Q So I just want to point you to some -- the 11:16:08  
2 specific language of this substitute claim, which 11:16:11  
3 states that, you know, these three layers -- the 11:16:15  
4 housing half, metal foil and insulating element -- 11:16:18  
5 form a sequence of three layers in direct contact with 11:16:21  
6 one another in which the metal foil is interposed 11:16:24  
7 between the other two layers. Do you see that 11:16:27  
8 language? 11:16:31  
9 A Yeah. 11:16:32  
10 Q So the entire metal foil cannot be 11:16:35  
11 interposed between those layers in order for the 11:16:39  
12 battery to function? 11:16:41  
13 MR. MUELLER: Objection to form. 11:16:42  
14 A I'm not sure where we're going with it. 11:16:43  
15 Q So let me clarify. At least some portion of 11:16:51  
16 the metal foil has to connect to the electrode 11:16:54  
17 assembly. Is that correct? 11:16:57  
18 A Yes, yeah, it's pulled out from the line, 11:16:59  
19 yeah. 11:17:02  
20 Q And that portion would not be -- that 11:17:02  
21 portion which connects to the electrode assembly would 11:17:05  
22 not be interposed between the housing and the 11:17:09



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

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

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

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

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

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

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

8 configuration. 11:17:41

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

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

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

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

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

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

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

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

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

18 A Yes. 11:18:12

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

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

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

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

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

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

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

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

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

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

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

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

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

22 EXAMINATION 11:42:01

1 BY MR. MUELLER: 11:42:02

2 Q Dr. Peckerar, I'd like to touch on one topic 11:42:02

3 you talked about this morning, and I would refer you 11:42:02

4 to paragraph 13 of your supplemental expert 11:42:03

5 declaration at page 9. Do you see that? 11:42:06

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

7 Q Now, can you explain whether Kaun discloses 11:42:23

8 that gaps will exist between an adjacent separator 11:42:32

9 layers? 11:42:39

10 THE TECHNICIAN: Doctor, could you please 11:42:39

11 center yourself in frame? I think you're -- 11:42:40

12 THE WITNESS: Sorry. 11:42:43

13 THE TECHNICIAN: Thank you. 11:42:44

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

15 MR. PALMIERI: Objection to form, just 11:42:48

16 before you... 11:42:50

17 A Okay. Kaun by himself doesn't disclose the 11:42:52

18 formation of gaps, no. There's no language -- 11:42:58

19 BY MR. MUELLER: 11:43:04

20 Q In fact, Kaun discloses that the separator 11:43:04

21 layers will abut each other, correct? 11:43:07

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

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

2 Q Now, if you even assume that there are small 11:43:18

3 gaps between adjacent separator layers in Kaun's 11:43:21

4 electrolytes -- or in Kaun's battery cell, will that 11:43:27

5 affect or impact the operation of the battery? 11:43:34

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

7 A As I expressed in my original report, my 11:43:39

8 declaration, no. During the processing of the cell 11:43:47

9 itself, the layers would squeeze together under the -- 11:43:54

10 as they were -- as they were wound, and there would be 11:44:03

11 no appreciable gap. And as I said, there's no verbal 11:44:10

12 mention of that, nor any in Kaun, nor is there any 11:44:15

13 illustration of a gap per se. 11:44:23

14 Q Now, earlier today you also talked about the 11:44:26

15 use of Kynar disclosed by Kaun to glue adjacent 11:44:30

16 separator edges together. Do you recall that? 11:44:35

17 A Yes. 11:44:38

18 Q Now, is it your understanding that dendrites 11:44:38

19 would be more likely to form where there was Kynar -- 11:44:44

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

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

22 Q And why is that? 11:44:50

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

2 A Kynar would make the region less likely to 11:44:56

3 form the dendrites. It's a -- it's a kind of a 11:45:00

4 plastic resin and it wouldn't allow the dendrite 11:45:04

5 growth. 11:45:10

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

7 A As I said, it's density and there are no 11:45:14

8 exposed nucleating sites through the Kynar. 11:45:18

9 Q Can you compare that to whether there would 11:45:23

10 be nucleating sites in the separator material? 11:45:26

11 A Yes -- 11:45:29

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

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

14 There are two things, the -- the separators 11:45:34

15 can contain many nucleating sites because of their 11:45:43

16 ambient surface area; that's one thing. And the 11:45:47

17 second issue associated with the -- with the -- with 11:45:51

18 the separators themselves is they can act as a 11:46:00

19 scaffolding on which the incoming flow of lithium ions 11:46:03

20 would aggregate and would prevent the absorption of 11:46:10

21 those in the intercalating sites in the underlying 11:46:16

22 layer. 11:46:20

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

3 A No. 11:46:25

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

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

8 THE VIDEOGRAPHER: Okay. So it is the end 11:46:37  
9 of the testimony of Martin Peckerar, Dr. Martin 11:46:40

10 Peckerar. It is 11:46 a.m. We are off the record. 11:46:45

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

12

13 \*\*\*\*\*

14

15

16

17

18

19

20

21

22

1 CERTIFICATE OF CERTIFIED SHORTHAND REPORTER

2  
3 I, MONIQUE VOUTHOURIS, Certified Court  
4 Reporter and Notary Public within and for the States  
5 of New Jersey and New York, do hereby certify:

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

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

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

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

PLANET DEPOS

888.433.3767 | WWW.PLANETDEPOS.COM

1 of this matter.

2

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

5

6

7

*Monique Vouthouris*

8

Monique Vouthouris, CCR, RPR, CRR

9

Notary Public of the State of New Jersey

10

My commission expires: April 8, 2024

11

12

13

14

15

16

17

18

19

20

21

22



<b>A</b>			
<b>able</b>	<b>actually</b>	<b>adverse</b>	406:19, 408:20,
415:20	366:1, 370:12,	444:12	419:6, 421:8,
<b>about</b>	377:13, 412:10,	<b>affect</b>	422:5, 432:1,
363:18, 364:16,	419:19, 425:9	441:5	434:15
365:16, 371:10,	<b>added</b>	<b>affirmed</b>	<b>alleged</b>
372:6, 381:1,	409:21, 426:11,	357:5	403:8
401:9, 408:1,	426:18, 428:20	<b>affix</b>	<b>allow</b>
414:19, 415:3,	<b>addition</b>	378:16	382:6, 382:7,
416:14, 416:17,	362:10, 393:1,	<b>affixed</b>	384:3, 442:4
417:21, 420:19,	393:11, 393:20,	378:11	<b>allowed</b>
423:9, 424:8,	410:9	<b>afraid</b>	398:4
432:4, 432:15,	<b>additional</b>	379:15	<b>allowing</b>
440:3, 441:14	379:12, 384:1,	<b>after</b>	389:15
<b>above</b>	384:14, 386:21,	361:5	<b>allows</b>
415:5	389:17, 389:18,	<b>again</b>	381:16, 395:15,
<b>absolutely</b>	407:5, 411:12,	381:19, 383:5,	419:14
441:20	423:19, 423:21,	383:20, 384:16,	<b>along</b>
<b>absorb</b>	424:1, 424:2,	397:19, 398:22,	378:6, 395:4,
365:2	425:18, 426:10,	400:1, 407:7,	395:14, 405:9,
<b>absorption</b>	426:11, 430:8,	415:1, 415:19,	408:22
442:20	431:12, 432:5,	416:16, 427:21	<b>already</b>
<b>abut</b>	432:6	<b>against</b>	360:2, 425:8,
440:21	<b>additives</b>	380:21, 404:18	425:10, 426:5
<b>accomplished</b>	367:18	<b>aggregate</b>	<b>also</b>
401:14	<b>address</b>	442:20	354:1, 356:19,
<b>according</b>	367:12, 391:21	<b>agree</b>	365:14, 370:20,
371:10, 414:7,	<b>addressed</b>	421:2	372:5, 372:10,
433:19	401:6	<b>ahead</b>	380:13, 382:19,
<b>achieve</b>	<b>addressing</b>	367:14	388:1, 389:22,
407:10, 428:18,	374:8	<b>aimed</b>	409:18, 434:2,
430:1	<b>adhesive</b>	373:12	435:21, 441:14
<b>achieved</b>	373:6, 380:13,	<b>airtight</b>	<b>alternative</b>
411:12	382:2, 383:1,	384:20	396:5, 438:2
<b>across</b>	383:3, 384:1,	<b>al</b>	<b>altogether</b>
366:13, 388:4	389:17, 399:5	356:6, 356:7	384:4
<b>act</b>	<b>adhesives</b>	<b>align</b>	<b>ambient</b>
370:5, 394:1,	389:22	404:18	442:16
442:18	<b>adjacent</b>	<b>all</b>	<b>amend</b>
<b>acted</b>	405:15, 422:22,	358:7, 358:20,	424:21
394:13	440:8, 441:3,	361:3, 362:15,	<b>amount</b>
<b>action</b>	441:15	363:1, 366:11,	370:14, 373:18,
395:15, 444:19,	<b>adjust</b>	368:4, 372:19,	373:20, 406:11,
444:21	409:14	372:22, 374:22,	412:2, 416:6
<b>active</b>	<b>admit</b>	377:20, 382:13,	<b>amounts</b>
372:2, 372:7,	381:6	383:18, 386:13,	416:14
401:7	<b>admits</b>	389:3, 390:1,	<b>amplifies</b>
	381:13	391:13, 394:17,	380:22, 381:9
	<b>advantages</b>	401:14, 403:22,	<b>analysis</b>
	411:11, 428:16		428:19

<p><b>analyzed</b> 386:18, 387:5</p> <p><b>anatomy</b> 405:16</p> <p><b>angle</b> 389:15</p> <p><b>angles</b> 416:14</p> <p><b>anode</b> 396:13</p> <p><b>another</b> 366:14, 370:18, 385:4, 394:14, 399:10, 404:18, 417:2, 417:9, 423:16, 424:9, 428:14, 433:2, 433:13, 437:6, 438:2, 438:4</p> <p><b>answer</b> 366:19, 398:9, 402:9, 430:14, 431:11, 432:6</p> <p><b>anticipation</b> 360:21</p> <p><b>any</b> 358:17, 359:9, 359:18, 360:6, 360:7, 360:8, 360:11, 361:17, 361:19, 361:21, 362:2, 362:18, 364:16, 369:18, 372:10, 381:12, 381:22, 385:1, 387:6, 387:20, 389:17, 389:22, 391:1, 391:4, 397:14, 401:13, 413:3, 413:4, 414:9, 414:15, 416:10, 426:13, 427:4, 435:3, 439:3, 439:4, 441:12, 444:19, 444:20</p> <p><b>anyone</b> 357:13, 361:4,</p>	<p>361:8, 361:10, 362:21</p> <p><b>anything</b> 362:4, 369:12, 439:11</p> <p><b>anywhere</b> 367:4, 368:22, 369:4, 370:17</p> <p><b>apart</b> 379:16, 381:5, 402:12, 409:4, 409:8, 409:14, 412:3, 412:14, 418:14</p> <p><b>apologies</b> 370:4, 371:2, 375:16, 392:1, 393:15, 419:20, 434:8</p> <p><b>apologize</b> 360:15, 383:20</p> <p><b>appeal</b> 351:2</p> <p><b>appear</b> 379:21, 394:10</p> <p><b>appears</b> 417:19</p> <p><b>application</b> 355:12, 355:16, 355:17, 376:6, 385:8, 386:10, 386:15, 387:14, 399:15, 399:19</p> <p><b>applications</b> 403:9, 428:5</p> <p><b>appreciable</b> 441:11</p> <p><b>appreciate</b> 439:6</p> <p><b>approach</b> 378:7</p> <p><b>approaches</b> 367:20, 379:17, 399:2</p> <p><b>appropriate</b> 424:18</p> <p><b>approximate</b> 363:9</p>	<p><b>approximately</b> 400:2</p> <p><b>april</b> 445:10</p> <p><b>area</b> 373:15, 394:1, 404:7, 404:16, 408:11, 410:18, 410:19, 411:4, 411:5, 416:18, 442:16</p> <p><b>areas</b> 366:8, 367:11, 367:13, 416:18, 421:6</p> <p><b>aren't</b> 430:19</p> <p><b>around</b> 389:1, 394:14, 394:17, 400:4</p> <p><b>arranged</b> 390:4</p> <p><b>arrival</b> 364:22, 369:15, 369:16, 369:18</p> <p><b>art</b> 385:4, 386:16, 398:7, 399:11, 403:8, 414:15, 428:17, 429:6, 430:6, 435:12</p> <p><b>asking</b> 432:4</p> <p><b>aspect</b> 430:16</p> <p><b>assembly</b> 368:6, 368:18, 390:4, 390:5, 422:6, 422:8, 422:21, 423:13, 435:22, 436:3, 436:11, 436:13, 437:17, 437:21</p> <p><b>assistance</b> 358:17, 359:1</p> <p><b>assisted</b> 366:15</p> <p><b>assists</b> 412:17</p>	<p><b>associated</b> 406:19, 423:19, 423:21, 425:19, 425:21, 442:17</p> <p><b>assume</b> 373:5, 441:2</p> <p><b>assumption</b> 397:17</p> <p><b>assurance</b> 428:20</p> <p><b>attached</b> 355:10</p> <p><b>attempts</b> 393:22</p> <p><b>attorney</b> 444:20</p> <p><b>attractive</b> 365:7</p> <p><b>audio</b> 351:4, 351:5, 353:4, 356:17</p> <p><b>avenue</b> 353:18</p> <p><b>avoid</b> 367:19</p> <p><b>aware</b> 360:12</p> <p><b>axial</b> 392:15, 400:16, 408:16, 409:4, 409:13, 412:20</p> <p><b>axis</b> 378:6, 394:14</p> <hr/> <p style="text-align: center;"><b>B</b></p> <hr/> <p><b>back</b> 363:7, 368:17, 373:4, 386:8, 396:2, 398:17, 402:18, 414:2, 419:3, 432:20, 439:21</p> <p><b>baker</b> 353:5, 356:18, 356:19</p> <p><b>barer</b> 367:11, 367:13</p> <p><b>based</b> 427:15, 429:17,</p>
--	--	--	---

<p>430:6  <b>batteries</b>  365:18  <b>battery</b>  364:16, 364:17,  372:20, 373:16,  374:3, 388:17,  394:4, 409:22,  414:20, 422:8,  437:12, 441:4,  441:5  <b>bead</b>  388:18, 391:2,  393:6, 410:5,  410:12  <b>beaded</b>  377:20, 377:21,  390:1, 390:10,  390:22, 391:3,  393:4, 401:19  <b>beading</b>  410:1, 410:10  <b>bears</b>  415:22  <b>became</b>  387:5, 431:20  <b>because</b>  365:2, 367:12,  381:13, 382:15,  388:9, 412:10,  416:3, 422:6,  432:13, 442:15  <b>becomes</b>  405:13  <b>been</b>  362:2, 362:12,  363:13, 377:20,  377:21, 380:22,  386:22, 402:17,  410:4, 411:9,  411:17, 414:19,  416:5, 425:10,  430:7  <b>before</b>  351:2, 352:6,  357:12, 360:11,  363:16, 377:14,  398:13, 414:5,</p>	<p>429:4, 440:16,  444:8, 444:9  <b>begin</b>  366:5  <b>beginning</b>  356:3, 402:20,  403:18, 404:4,  413:22, 439:18  <b>begins</b>  364:6, 365:22,  374:12, 402:20  <b>behalf</b>  353:3, 353:12,  356:16, 356:21,  358:11  <b>being</b>  357:5, 373:5,  390:10, 395:7,  397:10, 397:12,  401:19, 409:17,  411:6, 417:8  <b>believe</b>  357:20, 360:18,  362:15, 364:1,  369:18, 370:1,  370:9, 370:14,  371:5, 371:18,  386:20, 387:16,  389:3, 396:4,  398:20, 401:10,  405:6, 411:16,  421:1  <b>beneath</b>  365:2, 369:21  <b>benefit</b>  415:21  <b>bent</b>  390:19, 390:20,  393:12, 393:21,  393:22  <b>better</b>  382:2, 383:1,  383:22, 384:8,  424:15  <b>between</b>  363:12, 368:7,  368:12, 369:5,  370:7, 389:18,</p>	<p>390:7, 391:20,  394:1, 395:16,  398:19, 399:6,  407:1, 408:8,  409:9, 420:7,  420:12, 420:18,  420:22, 421:5,  424:3, 426:19,  427:18, 427:22,  429:11, 433:14,  436:15, 437:7,  437:11, 437:22,  438:10, 438:20,  440:8, 441:3  <b>beyond</b>  401:5, 408:10,  429:3  <b>big</b>  372:5, 372:6,  372:18  <b>bit</b>  391:7, 407:11,  408:4, 412:8,  414:11, 425:13,  430:4  <b>blackboard</b>  411:18  <b>bleeds</b>  416:21, 433:4  <b>blood</b>  444:19  <b>blowing</b>  379:16  <b>board</b>  351:2  <b>body</b>  380:4  <b>bombs</b>  382:18  <b>bond</b>  389:18, 399:6  <b>both</b>  384:12, 405:12,  405:18, 418:13,  428:3, 429:18,  430:12  <b>bottom</b>  372:2, 378:13,</p>	<p>380:10, 381:6,  388:12, 389:13,  395:17, 408:11,  410:17, 411:4,  411:21, 412:7,  412:11, 417:12,  420:15  <b>botts</b>  353:5, 356:18,  356:19  <b>break</b>  385:20, 413:18,  414:5, 439:9,  439:11  <b>brief</b>  385:19, 439:9  <b>briefly</b>  402:22  <b>brightener</b>  367:18  <b>bring</b>  359:12, 375:22,  410:20, 424:18  <b>bringing</b>  368:16  <b>broader</b>  428:5  <b>build</b>  381:3, 381:4,  414:22  <b>builds</b>  414:19  <b>bulge</b>  390:18  <b>burden</b>  419:5, 419:6  <b>business</b>  388:3, 414:22  <b>butt</b>  371:7  <b>button</b>  393:4, 417:12,  418:20  <b>buy</b>  417:22  <hr/> <p style="text-align: center;"><b>C</b></p> <hr/> <b>call</b>  365:9, 366:8,</p>
--	---	--	---

<p>367:14, 396:19, 409:7, 412:8 <b>called</b> 365:9, 425:19 <b>calling</b> 411:17 <b>cambridge</b> 351:5 <b>came</b> 386:20, 407:3 <b>can't</b> 365:2, 380:2, 387:3, 398:9, 413:4, 422:5, 434:12, 434:13, 436:14 <b>cannot</b> 370:6, 437:10 <b>capacity</b> 394:5 <b>care</b> 413:11 <b>carries</b> 420:5 <b>case</b> 351:11, 351:13, 356:8, 357:17, 360:18, 364:17, 373:1, 378:4, 378:9, 378:10, 378:12, 385:2, 407:9, 408:6, 425:8, 429:15, 438:12, 438:13, 438:15 <b>cases</b> 428:3, 428:13, 429:16 <b>casing</b> 404:5, 404:6, 404:8, 404:10, 404:11, 404:15, 404:16, 405:9, 405:15, 405:18, 405:19, 408:12, 410:16, 411:2, 411:5 <b>casings</b> 391:19, 404:18</p>	<p><b>cathode</b> 364:18, 364:21, 396:13 <b>cause</b> 412:22, 413:8 <b>caused</b> 371:21, 420:21 <b>ccr</b> 351:25, 352:7, 445:8 <b>ceiling</b> 395:17, 405:16, 422:2, 426:20, 430:2, 435:10, 436:2, 436:22 <b>cell</b> 365:16, 378:15, 378:20, 380:14, 381:3, 381:4, 381:11, 381:12, 382:11, 382:14, 382:17, 383:3, 383:8, 388:18, 389:5, 389:14, 390:12, 390:13, 390:18, 390:22, 391:5, 393:4, 394:15, 394:22, 396:17, 397:15, 400:15, 400:18, 401:7, 401:17, 402:12, 405:17, 406:5, 406:8, 408:15, 409:14, 412:4, 412:22, 414:10, 415:1, 415:6, 415:7, 416:4, 416:5, 417:12, 417:21, 418:6, 418:20, 419:8, 420:20, 426:11, 435:18, 441:4, 441:8 <b>cells</b> 365:15, 377:19, 378:2, 379:15, 379:16, 381:21, 393:5</p>	<p><b>center</b> 377:14, 377:18, 378:10, 380:5, 383:4, 383:18, 384:3, 384:18, 419:7, 440:11 <b>central</b> 374:13, 375:1, 375:9, 375:12, 377:5, 377:10, 378:19, 379:18, 379:22, 380:2, 380:19, 383:13 <b>certain</b> 371:9, 373:13, 397:22, 404:9, 418:8, 419:14, 419:15 <b>certainly</b> 363:11, 363:16, 371:16, 391:14, 427:5, 432:2 <b>certainty</b> 387:3, 413:5 <b>certificate</b> 444:1 <b>certified</b> 356:11, 444:1, 444:3 <b>certify</b> 444:5, 444:12, 444:14, 444:18 <b>chain</b> 432:1 <b>change</b> 413:16 <b>changing</b> 407:11 <b>characteristic</b> 414:7 <b>charge</b> 394:17 <b>chemistry</b> 401:7 <b>chicago</b> 353:19, 356:21 <b>choose</b> 367:11, 372:6,</p>	<p>372:14 <b>chosen</b> 367:7 <b>circle</b> 417:22, 418:12, 418:13, 418:15 <b>circulate</b> 424:18 <b>circulated</b> 359:13 <b>circumstances</b> 419:14, 419:15 <b>cite</b> 374:8, 381:22, 382:1, 383:2 <b>cited</b> 362:12, 363:2, 378:4, 378:8, 399:11 <b>cites</b> 374:6, 406:17, 414:17 <b>citing</b> 382:19, 385:2 <b>claim</b> 380:6, 403:22, 405:4, 409:19, 417:2, 424:9, 424:10, 424:22, 425:2, 425:4, 426:2, 426:3, 426:17, 426:21, 427:2, 427:15, 428:10, 429:18, 429:19, 431:1, 431:3, 431:4, 432:7, 432:18, 433:19, 437:2 <b>claimed</b> 430:19 <b>claims</b> 382:21, 384:17, 386:22, 402:22, 403:4, 403:5, 403:7, 403:21, 404:2, 404:9, 409:18, 414:8, 428:9, 430:12,</p>
---	--	--	--

<p>431:8, 431:14, 431:15, 431:16, 433:3 <b>clarification</b> 373:19, 402:5 <b>clarify</b> 361:16, 366:1, 387:20, 390:3, 400:20, 407:20, 408:14, 426:21, 437:15, 438:14 <b>clear</b> 391:7, 393:4, 395:7, 431:20 <b>clearly</b> 373:13, 396:7, 399:4 <b>closed</b> 381:12, 381:13, 381:21, 390:9, 401:19, 406:5, 406:8 <b>closest</b> 436:22 <b>closing</b> 408:5 <b>closure</b> 377:22, 379:13, 381:2, 381:11, 391:3 <b>color</b> 358:22 <b>come</b> 388:4, 397:6, 408:1, 413:18 <b>comfortable</b> 414:12 <b>commencement</b> 444:8 <b>commencing</b> 444:17 <b>commission</b> 445:10 <b>companies</b> 372:13 <b>company</b> 388:3 <b>compare</b> 442:9</p>	<p><b>compared</b> 396:14 <b>completely</b> 405:4 <b>components</b> 396:10, 405:10 <b>composition</b> 401:8 <b>concerned</b> 414:20, 428:1 <b>conducted</b> 351:19 <b>conduction</b> 373:22 <b>conductor</b> 421:11, 421:12, 422:22, 423:12, 423:20, 423:22, 424:5, 426:6, 429:2, 434:4, 434:8, 435:7, 436:8, 436:20, 438:7 <b>conductors</b> 396:16, 396:19, 396:22, 397:16, 398:19, 399:6, 421:19, 422:7, 423:11 <b>cone</b> 416:14 <b>configuration</b> 366:4, 423:8, 423:10, 438:8 <b>confirm</b> 423:11 <b>conflict</b> 427:5 <b>conical</b> 407:3 <b>conjunction</b> 361:13 <b>connect</b> 433:21, 437:16 <b>connected</b> 396:22, 397:4, 401:2, 423:12, 434:9, 434:11,</p>	<p>434:16, 434:21, 435:13, 435:16 <b>connection</b> 370:7, 389:18, 391:1, 391:4, 391:8, 391:11, 391:18, 392:7, 392:11, 393:1, 397:15, 401:21, 402:13, 407:17, 407:19, 407:20, 409:2, 410:8, 417:11, 418:19, 418:21, 419:11, 419:13, 420:7, 420:12, 420:21, 421:5, 434:14, 435:4 <b>connections</b> 404:12, 409:6, 414:18 <b>connects</b> 433:10, 433:20, 437:21 <b>consider</b> 392:8, 432:5, 434:16, 438:19 <b>considerations</b> 366:10, 372:20 <b>considered</b> 359:15, 364:2, 418:2, 418:3, 418:9, 427:21, 431:13 <b>constitute</b> 364:20 <b>constitutes</b> 369:15 <b>construct</b> 377:15 <b>contact</b> 389:5, 389:13, 394:1, 395:16, 396:14, 398:4, 398:18, 401:10, 421:19, 422:2, 422:6, 422:7, 422:20, 424:3,</p>	<p>426:7, 426:19, 427:3, 427:9, 427:11, 427:19, 428:4, 428:21, 429:8, 433:13, 434:3, 434:6, 434:13, 435:9, 435:15, 435:22, 436:1, 436:2, 436:6, 436:7, 436:10, 436:13, 437:5 <b>contacts</b> 395:2, 396:12, 397:20, 401:17 <b>contain</b> 405:19, 442:15 <b>container</b> 394:2 <b>content</b> 358:20, 359:5 <b>contingent</b> 424:21 <b>continuation</b> 356:4 <b>continue</b> 392:2, 408:22 <b>continues</b> 405:1 <b>contradict</b> 377:16 <b>contrary</b> 361:20 <b>conversation</b> 363:3 <b>conversations</b> 363:13 <b>copy</b> 359:13, 360:3 <b>correct</b> 357:18, 358:12, 358:13, 359:6, 360:9, 360:17, 361:11, 364:8, 368:8, 374:14, 375:2, 376:4, 380:3, 382:6, 382:11, 388:21,</p>
--	---	---	---

<p>389:6, 389:9, 396:4, 400:21, 403:10, 421:6, 424:11, 424:13, 425:3, 425:22, 426:8, 430:20, 433:20, 435:22, 436:11, 436:16, 437:17, 438:1, 438:15, 440:21 <b>corrected</b> 371:3 <b>corrections</b> 360:12 <b>corresponds</b> 376:10 <b>could</b> 359:12, 360:1, 366:10, 369:1, 369:5, 369:9, 370:12, 371:8, 371:9, 371:21, 375:15, 375:22, 376:21, 381:22, 382:2, 382:18, 383:1, 384:13, 397:8, 398:10, 409:21, 410:1, 410:8, 410:22, 412:21, 413:8, 414:9, 418:2, 419:2, 424:15, 425:12, 430:6, 440:10 <b>counsel</b> 356:14, 361:7, 363:6, 387:15, 444:13 <b>counts</b> 382:14 <b>couple</b> 363:13, 371:20, 406:17 <b>course</b> 359:10, 362:22, 366:11, 371:8, 379:21, 385:21, 386:19, 388:5,</p>	<p>392:8, 406:9, 438:13 <b>court</b> 357:1, 357:3, 373:19, 402:5, 402:8, 444:3 <b>covered</b> 431:3 <b>crash</b> 372:15 <b>create</b> 372:10, 381:7, 381:10, 395:15 <b>creating</b> 407:5 <b>critical</b> 409:7, 412:20 <b>cross</b> 431:6 <b>crr</b> 351:25, 352:7, 445:8 <b>cup</b> 390:12, 391:21, 392:13, 392:20, 395:17, 404:5, 404:8, 404:10, 404:11, 404:15, 404:17, 404:21, 405:1, 405:12, 405:14, 405:18, 407:3, 407:12, 407:16, 409:10, 410:16, 411:2, 411:5, 412:1, 415:7, 415:16, 415:20, 416:5, 420:8, 420:15, 426:20, 430:2 <b>cups</b> 405:13 <b>curl</b> 390:20 <b>curled</b> 392:20 <b>current</b> 394:16, 395:3, 395:13, 395:18,</p>	<p>400:22 <b>cut</b> 390:12, 405:1, 405:2, 438:5 <b>cvs</b> 417:22, 418:7 <b>cylinder</b> 400:15, 400:19 <hr/><b>D</b><hr/><b>d</b> 351:4, 351:5 <b>damage</b> 412:22, 413:8, 414:9, 414:14, 414:16, 415:1 <b>danger</b> 371:8 <b>data</b> 381:22 <b>date</b> 356:9 <b>dates</b> 387:5, 387:19 <b>day</b> 434:15, 445:4 <b>deal</b> 372:5, 372:6 <b>declaration</b> 355:20, 358:3, 358:4, 358:7, 358:8, 358:11, 358:15, 358:18, 359:8, 359:13, 359:14, 360:4, 360:7, 360:13, 362:11, 362:19, 364:4, 391:12, 398:2, 402:19, 403:6, 411:16, 415:5, 419:22, 432:21, 440:5, 441:8 <b>declarations</b> 357:17, 357:22 <b>define</b> 402:16, 402:17, 412:19</p>	<p><b>defined</b> 405:14 <b>definitely</b> 383:21 <b>definition</b> 391:10 <b>definitions</b> 405:11 <b>deform</b> 412:7 <b>deformation</b> 412:21, 414:6, 415:12, 416:12, 416:15 <b>deformed</b> 415:16, 416:6 <b>degeneration</b> 365:3 <b>degree</b> 383:2, 413:5, 415:11, 415:15 <b>degrees</b> 406:3 <b>delay</b> 374:21 <b>deleterious</b> 371:9, 371:18, 371:22 <b>demonstrate</b> 397:22 <b>demonstrated</b> 398:3 <b>dendrite</b> 364:7, 365:15, 365:22, 366:4, 367:7, 367:21, 369:16, 371:13, 371:16, 442:4 <b>dendrites</b> 364:13, 364:14, 365:19, 367:10, 368:16, 368:17, 368:20, 370:6, 441:18, 442:3 <b>density</b> 369:19, 442:7 <b>depend</b> 426:2</p>
---	--	---	--

<p><b>depends</b> 369:17</p> <p><b>depicts</b> 377:3</p> <p><b>depos</b> 354:2, 354:3, 356:12, 357:2</p> <p><b>deposed</b> 360:16, 362:2</p> <p><b>deposition</b> 351:17, 352:5, 355:11, 356:5, 356:13, 358:5, 360:19, 360:22, 361:3, 361:5, 361:16, 362:1, 362:5, 362:15, 363:12, 363:15, 363:17, 387:2, 444:7, 444:9, 444:13, 444:14</p> <p><b>depositions</b> 357:21, 361:20, 410:5</p> <p><b>derivative</b> 418:15</p> <p><b>derive</b> 427:14</p> <p><b>derived</b> 398:10, 418:12</p> <p><b>describe</b> 364:12, 365:20, 366:3, 371:1, 371:22, 377:17, 379:10, 388:14, 389:11, 391:13, 397:7, 397:9, 400:13, 401:13, 401:18, 409:18, 411:11, 419:1, 420:6, 420:11</p> <p><b>described</b> 370:21, 423:14</p> <p><b>describes</b> 370:19, 416:11, 419:3</p> <p><b>describing</b> 411:10, 424:7</p>	<p><b>description</b> 377:3</p> <p><b>designed</b> 373:14</p> <p><b>despite</b> 439:1</p> <p><b>detail</b> 387:4, 403:2</p> <p><b>determination</b> 424:15</p> <p><b>determine</b> 416:11</p> <p><b>develop</b> 365:17, 368:21, 368:22</p> <p><b>developed</b> 398:13, 408:7</p> <p><b>device</b> 377:5</p> <p><b>diagrams</b> 431:21</p> <p><b>diameter</b> 400:17</p> <p><b>difference</b> 427:4, 427:17, 427:22</p> <p><b>differences</b> 389:11, 429:11</p> <p><b>different</b> 369:20, 389:10, 395:3, 408:18, 412:9, 423:3, 429:16, 432:14</p> <p><b>differentiates</b> 373:6</p> <p><b>difficult</b> 420:17</p> <p><b>difficulty</b> 439:3</p> <p><b>direct</b> 424:3, 427:3, 427:8, 427:19, 429:8, 433:13, 436:1, 437:5</p> <p><b>directed</b> 383:8, 398:11, 424:9, 424:10</p> <p><b>direction</b> 405:9</p>	<p><b>directly</b> 361:11</p> <p><b>disassembly</b> 428:13, 430:6</p> <p><b>discharge</b> 394:4</p> <p><b>disclose</b> 440:17</p> <p><b>disclosed</b> 441:15</p> <p><b>discloses</b> 440:7, 440:20</p> <p><b>discount</b> 384:15</p> <p><b>discounting</b> 383:17</p> <p><b>discuss</b> 361:3, 361:6, 361:8, 361:10, 361:16, 361:19, 364:7, 366:12, 368:1, 389:2, 402:21, 403:1, 404:1, 408:2, 408:10, 409:20, 415:11</p> <p><b>discussed</b> 363:17, 377:20, 394:12, 407:18, 419:4, 419:5, 426:5</p> <p><b>discusses</b> 374:13, 375:1</p> <p><b>discussing</b> 383:11, 386:22, 395:5, 396:6, 414:6, 414:8, 426:3, 426:15, 436:3, 436:10</p> <p><b>discussion</b> 368:11, 368:15, 392:9, 403:7, 411:15, 417:19</p> <p><b>disk</b> 423:3</p> <p><b>displacement</b> 412:3</p> <p><b>disposed</b> 408:11, 410:18,</p>	<p>411:4, 411:6, 415:8</p> <p><b>doctor</b> 440:10</p> <p><b>document</b> 376:2, 398:16, 419:21, 424:18, 425:1</p> <p><b>documents</b> 374:20, 387:19, 388:4</p> <p><b>doing</b> 357:10, 357:11, 371:2, 412:1, 428:2, 431:18</p> <p><b>dominant</b> 408:5</p> <p><b>done</b> 359:3, 362:4, 382:1, 387:17, 410:12, 416:5</p> <p><b>double</b> 422:15</p> <p><b>down</b> 379:14, 380:7, 380:10, 396:2, 410:22, 419:16, 438:6</p> <p><b>dr</b> 356:5, 357:9, 368:5, 377:7, 386:13, 388:15, 399:20, 411:8, 414:2, 414:5, 425:17, 432:4, 439:7, 439:20, 440:2, 443:9</p> <p><b>drafting</b> 359:4</p> <p><b>drawing</b> 392:21, 441:1</p> <p><b>drawings</b> 389:21, 438:3</p> <p><b>drawn</b> 401:15</p> <p><b>drawn-in</b> 411:21</p> <p><b>draws</b> 440:22</p>
---	--	--	---

<p><b>drives</b> 409:12</p> <p><b>due</b> 421:19</p> <p><b>duly</b> 357:5, 444:7</p> <p><b>dupont</b> 380:14, 381:22, 384:13, 384:20</p> <p><b>during</b> 441:8</p> <hr/> <p style="text-align: center;"><b>E</b></p> <hr/> <p><b>each</b> 359:6, 417:5, 417:8, 440:21</p> <p><b>earlier</b> 369:22, 381:1, 381:9, 406:12, 417:20, 441:14</p> <p><b>early</b> 406:18</p> <p><b>ease</b> 358:2</p> <p><b>easily</b> 394:1</p> <p><b>eastern</b> 356:11</p> <p><b>easy</b> 367:12</p> <p><b>edge</b> 393:12, 393:20, 394:2, 405:1, 405:2, 410:2</p> <p><b>edges</b> 390:12, 441:16</p> <p><b>edt</b> 351:21, 444:17</p> <p><b>effect</b> 407:22</p> <p><b>effective</b> 373:15, 415:13, 415:17</p> <p><b>effects</b> 371:9, 371:18, 371:21, 371:22</p> <p><b>egress</b> 381:16</p>	<p><b>either</b> 358:3, 366:12, 369:20, 382:20, 422:2, 439:4, 441:1, 443:7</p> <p><b>electrical</b> 424:3, 427:3, 427:8, 427:11, 427:19, 428:3, 429:8, 435:9, 436:2, 436:13</p> <p><b>electrically</b> 417:9</p> <p><b>electricity</b> 433:22</p> <p><b>electrochemical</b> 377:4</p> <p><b>electrode</b> 366:2, 366:3, 367:2, 368:6, 368:7, 368:17, 369:2, 370:7, 388:19, 389:4, 389:5, 390:3, 390:7, 397:1, 397:13, 400:20, 401:1, 422:6, 422:7, 422:13, 422:21, 423:7, 423:12, 435:22, 436:3, 436:10, 437:16, 437:21</p> <p><b>electrodes</b> 372:2, 372:4</p> <p><b>electrolytes</b> 441:4</p> <p><b>elegant</b> 395:11</p> <p><b>element</b> 389:3, 421:1, 421:14, 433:11, 433:12, 434:9, 434:17, 434:21, 435:13, 436:15, 437:4, 438:1</p> <p><b>elements</b> 407:15, 421:20, 434:3, 434:5,</p>	<p>435:3, 438:17</p> <p><b>elevated</b> 381:16</p> <p><b>eliminate</b> 367:20, 371:16</p> <p><b>ellipse</b> 418:11, 418:15</p> <p><b>else</b> 357:13, 361:8, 408:20, 410:13</p> <p><b>elsewhere</b> 382:17, 405:14</p> <p><b>embodiment</b> 377:10, 380:18, 382:4, 382:10, 383:7, 383:8, 383:14, 384:5, 396:5</p> <p><b>embodiments</b> 383:10, 389:9</p> <p><b>employed</b> 444:20</p> <p><b>end</b> 387:7, 394:16, 402:8, 408:16, 417:6, 421:13, 421:21, 422:1, 422:12, 422:21, 424:4, 426:7, 426:20, 428:1, 428:4, 430:2, 436:19, 443:8</p> <p><b>ending</b> 376:2</p> <p><b>ends</b> 422:10</p> <p><b>energy</b> 365:11</p> <p><b>engineered</b> 373:12, 373:14</p> <p><b>enhanced</b> 394:5</p> <p><b>enough</b> 372:7, 372:8, 378:7, 407:8</p> <p><b>ensure</b> 379:17, 407:9</p> <p><b>ensuring</b> 379:13</p>	<p><b>entire</b> 358:14, 436:14, 437:10</p> <p><b>entirely</b> 376:18</p> <p><b>entitled</b> 385:12</p> <p><b>envisionable</b> 430:17</p> <p><b>errors</b> 360:11</p> <p><b>especially</b> 431:20</p> <p><b>esq</b> 353:6, 353:7, 353:15, 353:16</p> <p><b>essential</b> 377:15, 434:18</p> <p><b>et</b> 356:6, 356:7</p> <p><b>evaluate</b> 413:6</p> <p><b>even</b> 358:21, 373:1, 394:22, 408:3, 409:8, 412:7, 441:2</p> <p><b>event</b> 403:4</p> <p><b>eventually</b> 423:14, 435:9, 436:1, 436:12</p> <p><b>every</b> 365:16, 382:14</p> <p><b>everybody</b> 414:19</p> <p><b>everything</b> 410:13</p> <p><b>evidence</b> 385:1, 413:3</p> <p><b>exact</b> 375:17, 387:18</p> <p><b>exactly</b> 398:22, 416:16</p> <p><b>examination</b> 355:2, 357:7, 439:22</p> <p><b>example</b> 367:22, 368:6,</p>
--	--	---	---



<p>391:17, 391:18, 392:10, 414:13, 415:2, 418:3, 418:6, 419:1, 419:10 <b>examples</b> 413:5, 413:12, 427:14 <b>excuse</b> 367:16, 374:15, 385:19 <b>exerted</b> 407:22 <b>exhibit</b> 355:11, 355:12, 355:15, 355:17, 355:20, 359:22, 360:2, 360:4, 364:6, 368:2, 368:3, 370:19, 374:12, 374:17, 375:16, 375:17, 375:19, 376:6, 385:5, 385:11, 385:12, 385:18, 386:9, 386:14, 399:12, 399:15, 425:6, 425:8, 425:10 <b>exist</b> 440:8 <b>existed</b> 398:13 <b>exit</b> 394:18 <b>expectation</b> 414:15 <b>expensive</b> 372:13 <b>experiment</b> 395:11 <b>expert</b> 357:22, 440:4 <b>expires</b> 445:10 <b>explain</b> 378:17, 440:7, 442:6</p>	<p><b>exposed</b> 387:6, 442:8 <b>expressed</b> 384:16, 441:7 <b>extend</b> 390:13 <b>extensively</b> 416:13 <b>extent</b> 361:7, 362:9 <b>extra</b> 428:10, 428:11, 428:18</p> <hr/> <p style="text-align: center;"><b>F</b></p> <hr/> <p><b>face</b> 422:21, 426:20, 430:2, 436:19 <b>faces</b> 422:1, 428:4 <b>facetious</b> 435:2 <b>facilitate</b> 373:21, 435:4 <b>fact</b> 369:22, 372:12, 401:20, 411:13, 428:9, 439:1, 440:20 <b>fair</b> 398:15 <b>fall</b> 372:10 <b>far</b> 357:17, 400:16, 429:1 <b>fastener</b> 374:13, 375:1, 375:9, 375:13, 377:5, 377:10, 377:15, 377:18, 378:10, 378:19, 379:18, 380:2, 380:5, 380:19, 383:4, 383:13, 383:18, 384:3, 419:7 <b>feature</b> 404:5, 404:15,</p>	<p>410:15, 417:2, 417:4, 417:14, 418:18, 421:10, 421:11, 421:15, 423:16, 423:18, 433:2, 433:8, 434:18 <b>features</b> 404:10 <b>feel</b> 414:12 <b>felt</b> 394:19 <b>few</b> 407:20 <b>fibers</b> 366:13 <b>figure</b> 375:8, 375:9, 375:11, 375:12, 377:3, 378:18, 379:5, 379:10, 379:19, 380:3, 388:6, 388:15, 388:17, 389:3, 390:15, 396:2, 396:7, 396:15, 397:18, 398:3, 398:6, 398:12, 399:4, 400:11, 400:13, 415:6, 416:4, 421:1 <b>figures</b> 358:21, 375:5, 375:12, 376:10, 376:16, 398:13 <b>filed</b> 425:8, 425:10 <b>filings</b> 406:18 <b>fill</b> 372:16, 373:6 <b>financially</b> 444:22 <b>find</b> 387:21, 419:18, 439:3 <b>first</b> 357:5, 358:7,</p>	<p>382:13, 386:15, 386:16, 386:18, 387:10, 400:2, 404:4, 404:5, 404:14, 407:10, 410:16, 410:17, 411:3, 411:5, 412:4, 421:11, 421:13, 423:11, 423:18, 423:20, 423:22, 424:4, 425:20, 433:9, 433:11 <b>fit</b> 391:20, 415:20 <b>fitting</b> 411:18, 412:8, 412:10 <b>five</b> 424:13 <b>fixing</b> 401:12 <b>flat</b> 408:11, 410:17, 411:3, 422:14, 423:4, 423:7, 429:2, 430:7, 430:18, 433:13, 434:4, 434:5, 434:10, 434:12, 434:19, 435:8, 436:20 <b>floor</b> 395:17, 405:13, 405:15, 422:2, 426:20, 430:2, 435:10, 436:2, 436:22 <b>flow</b> 442:19 <b>fluoride</b> 370:20 <b>flying</b> 402:12 <b>focus</b> 407:15 <b>focusing</b> 403:15, 403:16</p>
---	--	--	--

<p><b>foil</b> 433:10, 433:14, 433:20, 433:21, 434:9, 434:20, 435:12, 435:21, 436:9, 436:12, 436:14, 437:4, 437:6, 437:10, 437:16, 438:9, 438:19, 439:1 <b>follow</b> 414:10 <b>follow-up</b> 443:6 <b>follow-ups</b> 366:21 <b>followed</b> 382:20 <b>following</b> 365:20 <b>follows</b> 357:6 <b>force</b> 378:6, 392:13, 393:21, 402:12, 406:11, 407:1, 408:7, 408:15, 408:16, 409:1, 409:4, 409:6, 409:7, 409:13, 409:17, 412:13, 412:20, 413:8 <b>force-fit</b> 378:14, 391:1, 391:4, 391:8, 391:11, 392:6, 392:11, 393:1, 401:21, 402:13, 407:10, 407:18, 407:20, 409:2, 409:22, 410:8, 412:1, 417:11, 418:19, 418:21, 419:4, 419:11, 419:13, 421:4 <b>force-fitting</b> 391:18, 404:12, 406:22, 407:17,</p>	<p>409:5, 414:17 <b>forces</b> 408:1 <b>form</b> 364:13, 366:6, 366:7, 367:4, 367:8, 368:10, 368:14, 368:17, 368:19, 368:20, 369:1, 369:3, 369:5, 369:7, 369:10, 369:11, 369:13, 370:3, 370:6, 370:8, 373:8, 374:5, 377:12, 378:21, 379:3, 379:20, 380:20, 382:12, 382:14, 383:12, 383:16, 384:7, 384:21, 388:16, 389:20, 391:6, 391:20, 393:2, 396:18, 398:8, 398:14, 399:8, 400:21, 402:1, 402:15, 405:5, 409:17, 409:19, 410:3, 410:11, 413:1, 413:10, 415:14, 416:7, 417:11, 417:18, 418:5, 418:10, 418:19, 419:12, 426:16, 427:20, 429:9, 430:13, 431:9, 432:8, 433:12, 434:22, 435:14, 437:5, 437:13, 440:15, 441:6, 441:19, 441:21, 442:3, 442:12 <b>format</b> 358:20 <b>formation</b> 365:15, 365:22, 366:4, 367:7,</p>	<p>367:21, 368:12, 371:14, 371:17, 440:18 <b>formed</b> 420:7 <b>forming</b> 367:14, 370:17, 371:21, 409:9, 412:8, 412:10 <b>forms</b> 409:21, 418:16 <b>forth</b> 431:2, 444:7 <b>found</b> 367:2, 403:5 <b>four</b> 363:21 <b>frame</b> 387:9, 440:11 <b>frank</b> 416:15 <b>free</b> 365:11 <b>friction</b> 391:20, 392:14, 408:3, 408:4, 408:8, 408:17, 408:18, 409:8, 409:16, 412:9, 419:8, 420:21 <b>frictive</b> 407:1, 412:13 <b>friday</b> 351:20, 356:9, 444:16 <b>front</b> 399:21 <b>full</b> 379:22, 430:1 <b>fully</b> 404:21 <b>function</b> 374:4, 396:16, 422:8, 426:14, 429:15, 429:20, 429:21, 430:11, 431:22, 435:19, 437:12</p>	<p><b>functionality</b> 414:21 <b>functions</b> 430:17, 430:19, 430:22, 431:2, 431:3, 431:8, 431:12, 431:14, 432:7 <b>further</b> 430:4, 441:1, 444:12, 444:14, 444:18</p> <hr/> <p style="text-align: center;"><b>G</b></p> <hr/> <p><b>gap</b> 369:5, 369:11, 369:20, 371:21, 372:3, 373:6, 441:11, 441:13, 443:2 <b>gaps</b> 368:12, 440:8, 440:18, 441:3 <b>gas</b> 381:3, 381:7, 381:16, 382:6, 382:7 <b>gasket</b> 380:12, 381:2, 381:6, 381:10, 381:17, 381:18, 382:7, 382:16, 383:9, 384:6, 390:19, 408:8, 409:11, 420:17, 420:22, 421:5 <b>gave</b> 394:20 <b>general</b> 432:12 <b>generally</b> 360:22, 361:2, 367:13, 417:5, 417:17, 418:2, 418:4, 418:9 <b>getting</b> 367:14 <b>gist</b> 395:22</p>
---	--	--	---

<p><b>given</b> 361:5, 412:2, 444:10 <b>glasses</b> 405:13 <b>global</b> 429:21 <b>glue</b> 441:15 <b>gmbh</b> 351:8, 353:13, 356:22 <b>go</b> 360:11, 363:7, 372:20, 376:17, 376:19, 376:21, 380:7, 386:2, 386:4, 396:1, 398:21, 413:20, 417:22, 419:3, 419:16, 428:22, 432:20, 438:19, 439:2, 439:13, 439:16, 440:22 <b>goes</b> 408:10, 420:19, 429:3 <b>going</b> 373:4, 398:17, 401:5, 412:3, 412:12, 412:18, 414:22, 415:1, 415:20, 426:19, 428:3, 428:21, 430:1, 437:14 <b>good</b> 357:9, 388:11, 395:16, 413:15 <b>gravy</b> 410:13 <b>great</b> 376:5 <b>greater</b> 400:16 <b>greatly</b> 379:15 <b>grow</b> 365:10</p>	<p><b>grows</b> 365:1, 365:7 <b>growth</b> 364:7, 369:12, 369:14, 370:2, 370:6, 442:5 <b>guess</b> 396:19, 426:18 <b>guidance</b> 416:10</p> <hr/> <p style="text-align: center;"><b>H</b></p> <hr/> <p><b>half</b> 433:9, 437:4 <b>halves</b> 417:5, 417:7 <b>hand</b> 445:4 <b>happen</b> 379:17 <b>happened</b> 401:4 <b>happening</b> 392:18, 413:2, 422:11 <b>happy</b> 371:3 <b>hard</b> 411:18, 421:2, 421:3, 423:1 <b>hate</b> 424:14, 429:10 <b>head</b> 431:18, 432:2 <b>hear</b> 402:8, 432:13 <b>held</b> 404:12, 407:17 <b>hell</b> 365:18 <b>helped</b> 407:5 <b>helps</b> 366:21, 412:19 <b>here</b> 356:18, 357:19, 366:7, 370:18, 374:9, 378:8,</p>	<p>382:9, 383:18, 383:21, 386:22, 387:4, 387:8, 388:10, 389:15, 390:1, 392:18, 395:7, 395:20, 398:21, 403:6, 403:14, 405:11, 407:15, 412:5, 412:12, 419:17, 419:18, 425:19, 430:7, 430:9, 430:20, 432:16, 434:15, 434:18 <b>hereby</b> 444:5 <b>hereinbefore</b> 444:7 <b>hereunto</b> 445:3 <b>hesitate</b> 416:8 <b>high</b> 395:1 <b>higher</b> 394:20, 394:22 <b>highlighted</b> 398:20 <b>highly</b> 373:11 <b>himself</b> 440:17 <b>hold</b> 378:15, 379:15, 406:14, 430:18 <b>holding</b> 390:1, 430:7 <b>holds</b> 408:15, 429:1, 435:7 <b>hole</b> 438:11, 438:16 <b>honestly</b> 379:21, 387:16, 401:3, 417:22 <b>hopefully</b> 357:11, 430:5 <b>hours</b> 363:7, 363:22</p>	<p><b>housing</b> 377:4, 379:13, 381:4, 381:15, 389:6, 389:19, 397:15, 398:19, 399:7, 401:2, 401:18, 404:11, 404:12, 405:9, 405:15, 407:16, 407:22, 417:5, 417:7, 417:12, 418:20, 433:9, 433:20, 433:22, 436:7, 436:15, 437:4, 437:22 <b>huge</b> 372:3</p> <hr/> <p style="text-align: center;"><b>I</b></p> <hr/> <p><b>idea</b> 363:20, 381:14, 411:20, 412:6, 421:22, 430:21 <b>identification</b> 360:5, 376:7, 386:11, 399:17 <b>identify</b> 356:14, 380:2 <b>ii</b> 433:10 <b>iii</b> 359:16, 359:17, 360:9, 433:11 <b>illinois</b> 353:19 <b>illustration</b> 441:13 <b>imagine</b> 365:17 <b>imagined</b> 374:7 <b>impact</b> 441:5 <b>impeded</b> 366:9 <b>impediment</b> 377:22, 392:19, 392:22, 393:7,</p>
--	--	--	---

<p>402:2, 402:10, 410:5, 410:6, 410:9 <b>implication</b> 429:16 <b>imply</b> 377:9 <b>importance</b> 397:22 <b>important</b> 395:1 <b>imposed</b> 410:9 <b>improve</b> 409:15 <b>improved</b> 394:3 <b>improvement</b> 408:17 <b>improvements</b> 398:12 <b>improves</b> 429:22 <b>improving</b> 401:6 <b>incident</b> 365:9 <b>include</b> 383:14, 428:10 <b>included</b> 362:13, 370:15, 403:21, 430:8 <b>includes</b> 410:16, 411:2 <b>including</b> 377:5, 417:5, 428:18 <b>incoming</b> 442:19 <b>increase</b> 408:17, 409:6, 412:12 <b>increased</b> 407:1 <b>increasing</b> 409:8 <b>independent</b> 387:21</p>	<p><b>indicate</b> 390:15 <b>indicated</b> 415:7 <b>indicates</b> 381:17, 416:2 <b>inhibit</b> 369:12, 369:14, 370:5, 370:11 <b>initial</b> 393:1, 428:19 <b>initially</b> 419:4 <b>inner</b> 394:2 <b>insert</b> 381:15, 381:16 <b>inserted</b> 400:18, 404:21 <b>insertion</b> 364:21, 407:10, 408:2 <b>inserts</b> 364:19 <b>instantiation</b> 395:10 <b>instantiations</b> 394:11 <b>insufficient</b> 406:12, 406:14 <b>insulate</b> 427:6, 429:14 <b>insulating</b> 371:12, 417:10, 421:14, 421:20, 422:11, 422:14, 423:4, 425:19, 425:20, 426:11, 433:11, 433:12, 434:3, 434:5, 434:9, 434:17, 434:21, 435:6, 435:13, 436:15, 436:19, 436:21, 437:4, 438:1, 438:5, 438:16 <b>insulation</b> 429:14</p>	<p><b>insulator</b> 422:15, 423:19, 423:21, 424:1, 424:2, 426:12, 428:10, 428:12, 428:14, 428:18, 429:22, 430:15, 430:17, 438:7 <b>insulators</b> 426:6, 427:7, 429:18, 429:19, 430:11 <b>insurance</b> 426:19 <b>intercalates</b> 364:18 <b>intercalating</b> 442:21 <b>interchangeable</b> 427:12 <b>interested</b> 444:22 <b>interior</b> 412:22, 413:9 <b>intermediary</b> 409:10 <b>intermittently</b> 381:13 <b>internal</b> 394:3, 394:20, 394:22, 395:2, 395:4, 395:5, 395:19, 395:21, 396:7, 398:4 <b>internals</b> 414:9 <b>interposed</b> 390:6, 433:14, 436:14, 437:6, 437:11, 437:22, 438:10, 438:12, 438:20 <b>interpretation</b> 429:13, 435:6 <b>interrupt</b> 442:13 <b>intervening</b> 423:6</p>	<p><b>introduced</b> 387:10 <b>invalid</b> 403:5 <b>involved</b> 409:1, 416:19 <b>inward</b> 408:11, 411:6, 415:8, 415:12 <b>inwards</b> 415:16 <b>ion</b> 365:1, 365:8, 365:12, 366:8, 369:15 <b>ionic</b> 366:17, 373:21 <b>ions</b> 364:22, 373:13, 442:19 <b>ipr</b> 351:11, 351:13, 356:8, 375:19 <b>iprs</b> 357:21, 368:3, 403:3 <b>isolation</b> 429:14, 429:21, 430:1, 430:11 <b>issue</b> 357:22, 371:19, 378:5, 395:1, 401:6, 432:10, 442:17 <b>issues</b> 363:17, 372:21, 373:3 <b>itself</b> 364:4, 364:19, 365:12, 375:15, 381:9, 381:18, 383:3, 390:18, 401:7, 406:12, 406:13, 416:11, 428:22, 429:1, 436:4, 436:5, 441:9</p> <hr/> <p style="text-align: center;"><b>J</b></p> <hr/> <p><b>japanese</b> 385:6, 386:15</p>
--	--	--	---

<p><b>jazz</b> 407:11</p> <p><b>jean-louis</b> 354:2, 356:12</p> <p><b>jersey</b> 352:8, 444:5, 445:9</p> <p><b>jlab</b> 351:4</p> <p><b>job</b> 351:23</p> <p><b>join</b> 418:13</p> <p><b>joined</b> 417:6</p> <p><b>joint</b> 371:7</p> <p><b>journal</b> 395:13</p> <p><b>jp</b> 385:16</p> <p><b>june</b> 360:16, 363:12</p> <hr/> <p style="text-align: center;"><b>K</b></p> <hr/> <p><b>k-a-u-n</b> 376:5</p> <p><b>k-w-o-n</b> 385:13</p> <p><b>kannou</b> 355:16, 385:5, 385:15, 386:10, 386:14, 386:20, 387:1, 387:6, 387:21, 388:7, 388:17, 389:19, 390:9, 391:1, 393:9, 393:17, 394:18, 394:19, 395:20, 397:9, 398:7, 398:11, 398:13, 399:3, 400:1, 400:5</p> <p><b>kannou's</b> 391:2, 398:16</p> <p><b>kaun</b> 355:14, 368:1, 368:5, 368:18,</p>	<p>369:2, 370:21, 371:6, 371:11, 374:6, 374:13, 375:1, 375:5, 375:15, 375:17, 375:19, 376:7, 376:20, 377:18, 379:2, 379:5, 379:7, 379:8, 379:15, 382:4, 384:22, 386:19, 387:12, 389:9, 389:12, 408:3, 419:3, 419:10, 440:7, 440:17, 440:20, 441:12, 441:15</p> <p><b>kaun's</b> 373:1, 441:3, 441:4</p> <p><b>kawamura</b> 355:19, 399:11, 399:16, 400:7, 401:22</p> <p><b>kind</b> 366:15, 389:7, 395:11, 411:13, 411:20, 417:21, 428:21, 442:3</p> <p><b>know</b> 363:5, 363:18, 382:13, 382:21, 383:10, 387:5, 387:6, 391:16, 392:3, 392:9, 392:12, 403:8, 404:2, 407:7, 407:19, 408:20, 409:16, 409:22, 411:14, 414:12, 414:13, 415:21, 418:12, 418:16, 421:4, 423:2, 425:9, 427:8, 428:5, 432:11, 432:13, 435:2, 435:5, 435:16, 437:3</p>	<p><b>known</b> 370:20</p> <p><b>kobayashi</b> 386:19, 387:13</p> <p><b>kynar</b> 370:21, 371:1, 371:5, 371:11, 371:13, 373:4, 373:9, 373:13, 373:21, 441:15, 441:19, 442:2, 442:8</p> <hr/> <p style="text-align: center;"><b>L</b></p> <hr/> <p><b>labels</b> 438:22</p> <p><b>lags</b> 364:22</p> <p><b>language</b> 376:17, 404:3, 409:20, 411:8, 427:15, 428:20, 433:19, 437:2, 437:8, 440:18</p> <p><b>large</b> 371:7, 372:7, 372:8, 387:4</p> <p><b>last</b> 380:11, 384:19</p> <p><b>later</b> 387:12, 409:20</p> <p><b>lateral</b> 405:9, 405:19, 417:6, 417:7, 417:10, 420:7, 420:12, 420:22, 421:6, 421:13, 421:21, 424:4</p> <p><b>latter</b> 391:9</p> <p><b>layer</b> 366:2, 366:3, 372:22, 373:2, 425:19, 425:20, 426:11, 428:18, 435:6, 436:21, 438:5, 438:11, 442:22</p>	<p><b>layers</b> 367:2, 368:7, 369:2, 369:6, 370:7, 388:20, 389:4, 389:5, 389:18, 390:4, 390:7, 397:1, 400:20, 401:1, 433:13, 433:15, 436:19, 437:3, 437:5, 437:7, 437:11, 438:10, 438:20, 438:22, 439:2, 440:9, 440:21, 441:3, 441:9</p> <p><b>layperson</b> 392:10</p> <p><b>lead</b> 373:15</p> <p><b>leads</b> 407:13, 407:14</p> <p><b>leak-tight</b> 417:12, 418:20, 418:21, 419:11</p> <p><b>leakage</b> 419:14</p> <p><b>least</b> 363:18, 395:12, 398:1, 417:8, 423:18, 423:20, 423:22, 424:1, 437:15</p> <p><b>leave</b> 366:14, 384:3, 415:2</p> <p><b>led</b> 432:15</p> <p><b>left</b> 376:22, 390:17, 392:20</p> <p><b>length</b> 400:16</p> <p><b>lengths</b> 395:3</p> <p><b>less</b> 442:2</p> <p><b>let's</b> 366:1, 366:7,</p>
--	--	--	---

<p>366:11, 380:11, 386:15, 397:11, 405:11, 419:17, 423:15, 425:7, 432:20, 439:10 <b>letter</b> 395:12 <b>leydig</b> 353:14, 356:21, 359:3, 361:7, 363:4 <b>lie</b> 422:13, 423:4, 423:7 <b>lies</b> 434:4, 434:5, 434:10, 434:12, 434:18, 436:20 <b>lifts</b> 419:9 <b>likelihood</b> 430:1 <b>likely</b> 366:9, 441:19, 442:2 <b>line</b> 401:15, 401:16, 420:6, 428:1, 437:18 <b>linguist</b> 428:6 <b>linguistic</b> 429:11 <b>linguistics</b> 434:14 <b>list</b> 359:14 <b>listed</b> 359:10, 359:18, 360:8, 362:16, 399:3, 408:19 <b>literature</b> 370:14, 388:2 <b>lithium</b> 364:17, 364:18, 365:1, 442:19 <b>little</b> 364:14, 364:19,</p>	<p>365:21, 366:1, 370:16, 379:14, 381:5, 390:20, 408:4, 414:10, 415:21, 421:2, 425:13, 430:4, 438:5 <b>llc</b> 351:4, 353:3, 353:4, 356:6, 356:17 <b>llp</b> 353:5 <b>loading</b> 378:22 <b>located</b> 368:7 <b>location</b> 388:11 <b>log</b> 363:7, 363:22 <b>loiler</b> 354:3 <b>long</b> 367:16 <b>look</b> 363:22, 367:22, 376:9, 378:3, 379:5, 381:12, 381:15, 388:6, 390:17, 391:16, 400:11, 413:6, 415:4, 416:16, 427:13 <b>looked</b> 362:7, 428:12 <b>looking</b> 375:8, 376:11, 380:11, 391:15, 405:12, 419:21, 431:6, 431:20 <b>lot</b> 365:3, 365:17, 373:16, 373:20, 387:17 <b>lousy</b> 395:10 <b>lower</b> 395:19</p>	<p><b>lowering</b> 395:21 <hr/><b>M</b><hr/><b>macular</b> 365:3 <b>made</b> 384:22, 401:17, 412:5, 428:11 <b>main</b> 371:19, 373:3, 395:22, 419:5, 419:6 <b>major</b> 365:16 <b>make</b> 372:5, 389:5, 389:13, 407:7, 424:15, 428:9, 442:2 <b>makes</b> 390:22 <b>making</b> 426:7 <b>manner</b> 360:8 <b>manufacturing</b> 372:20 <b>many</b> 363:19, 382:13, 442:15 <b>mark</b> 360:1, 425:7, 425:9 <b>marked</b> 359:22, 360:2, 360:5, 364:5, 376:7, 385:11, 386:10, 399:16, 425:6 <b>marriage</b> 444:20 <b>martin</b> 351:17, 352:5, 355:2, 355:21, 356:5, 357:4, 360:5, 414:2, 439:20, 443:9,</p>	<p>444:6, 444:15 <b>mast</b> 367:18 <b>material</b> 364:20, 365:2, 367:6, 372:8, 372:9, 373:5, 373:7, 373:14, 373:22, 374:3, 390:6, 401:7, 403:20, 409:11, 412:10, 442:10 <b>materials</b> 359:9, 359:15, 359:18, 359:19, 360:7, 362:8, 362:12, 362:18, 363:2, 364:2, 366:12, 366:18, 367:3, 367:11, 368:13, 372:17, 373:10, 373:11, 401:16, 431:17 <b>mating</b> 378:13 <b>matter</b> 356:6, 357:16, 372:12, 401:20, 445:1 <b>matters</b> 362:2 <b>maybe</b> 363:21, 365:21, 367:14, 381:21, 382:1, 383:1, 384:9, 401:4, 422:9, 435:1 <b>mayer</b> 353:14, 356:21 <b>mean</b> 365:15, 366:11, 367:12, 374:6, 378:3, 380:1, 381:11, 382:16, 383:19, 386:17, 388:1, 391:7, 391:8, 392:19, 393:3, 401:5,</p>
---	--	---	--

<p>404:20, 408:2, 408:12, 414:17, 417:17, 421:18, 421:22, 422:10, 428:3, 429:10, 429:11, 429:15, 430:15, 431:19, 435:1, 435:15, 435:16, 436:17, 436:21, 438:13, 438:21 <b>meaning</b> 366:13, 384:11, 429:7, 434:14 <b>meanings</b> 432:14, 432:16, 432:17 <b>means</b> 397:14, 398:18, 401:12, 403:22, 422:20, 423:4 <b>mechanical</b> 377:22, 392:19, 392:22, 393:6, 402:2, 402:9, 410:4, 410:6, 410:9 <b>mechanism</b> 379:1, 382:5, 384:2, 384:14, 397:3, 398:18, 407:5, 407:7, 408:5 <b>mechanisms</b> 391:14, 397:5, 397:7, 406:17, 407:9, 408:13 <b>media</b> 356:4, 413:16, 414:1, 439:19 <b>meetings</b> 417:20 <b>member</b> 378:13, 394:13, 394:15 <b>members</b> 394:14 <b>mention</b> 397:12, 401:12,</p>	<p>416:17, 441:12 <b>mentioned</b> 369:22, 396:21, 406:12, 409:15, 409:16, 411:16, 430:18 <b>met</b> 361:12, 363:5, 363:10, 363:15, 363:16, 363:19, 405:4 <b>metal</b> 401:9, 417:5, 420:8, 420:9, 421:11, 421:12, 423:12, 423:20, 423:22, 424:5, 425:20, 425:21, 433:10, 433:14, 433:20, 433:21, 434:9, 434:20, 435:12, 435:21, 436:9, 436:12, 436:14, 437:4, 437:6, 437:10, 437:16, 438:9, 438:17, 439:1 <b>method</b> 379:13, 411:12 <b>micro</b> 394:22 <b>microbattery</b> 351:8, 353:13, 356:7, 356:22 <b>might</b> 362:12, 366:14, 366:15, 370:1, 373:15, 388:9, 429:16, 431:18, 432:5 <b>mind</b> 397:6, 432:15 <b>minute</b> 439:11 <b>miracle</b> 401:4 <b>missed</b> 360:15, 365:21</p>	<p><b>misunderstanding</b> 438:16 <b>mixed</b> 388:10 <b>modified</b> 358:21 <b>moment</b> 403:14 <b>monique</b> 351:25, 352:6, 357:2, 444:3, 445:8 <b>monitor</b> 356:10 <b>more</b> 365:14, 366:1, 366:9, 391:7, 402:6, 403:2, 409:3, 423:16, 425:13, 441:19, 443:4 <b>morning</b> 357:9, 440:3 <b>most</b> 358:3, 359:19, 362:22, 377:19, 386:21, 393:5 <b>motion</b> 366:9, 378:1, 378:6, 389:16, 410:6, 424:21 <b>mounding</b> 367:19 <b>mounds</b> 367:14 <b>move</b> 375:15, 381:5, 385:3, 386:13, 399:10, 402:18, 410:14, 413:13, 416:20, 418:14, 421:10, 423:15, 433:1 <b>moving</b> 374:11, 375:11, 421:8 <b>much</b> 368:22, 378:5,</p>	<p>415:19 <b>mueller</b> 353:15, 355:4, 356:20, 357:15, 366:6, 367:8, 368:10, 368:14, 368:19, 369:3, 369:7, 369:13, 370:8, 373:8, 374:5, 377:12, 378:21, 379:3, 379:20, 380:20, 382:12, 383:12, 383:16, 384:7, 384:21, 388:16, 389:20, 391:6, 393:2, 394:8, 396:18, 398:8, 398:14, 399:8, 402:1, 402:15, 405:5, 410:3, 410:11, 413:1, 413:10, 415:14, 415:18, 416:7, 417:18, 418:5, 418:10, 419:12, 426:16, 427:20, 429:9, 430:13, 431:9, 432:8, 434:22, 435:14, 437:13, 439:10, 440:1, 440:19, 443:4 <b>multiple</b> 388:9, 394:14, 395:2, 396:15, 398:3, 399:2 <b>must</b> 398:13 <b>myself</b> 383:20</p> <hr/> <p style="text-align: center;"><b>N</b></p> <hr/> <p><b>nafion</b> 366:17 <b>name</b> 356:18, 371:6, 386:18</p>
--	--	--	--

<p><b>nature</b> 420:11</p> <p><b>near</b> 380:10, 388:12, 396:3</p> <p><b>necessarily</b> 380:18</p> <p><b>necessary</b> 378:14, 409:7</p> <p><b>need</b> 378:5, 380:5, 383:18, 384:8, 384:15, 395:20, 422:7, 425:9, 432:6</p> <p><b>negative</b> 364:15</p> <p><b>never</b> 436:5</p> <p><b>new</b> 352:8, 353:9, 406:16, 416:21, 417:1, 417:2, 418:18, 421:10, 433:2, 444:5, 445:9</p> <p><b>next</b> 375:4, 411:1, 421:8</p> <p><b>nice</b> 402:2, 402:9</p> <p><b>nick</b> 353:6, 356:18</p> <p><b>non-conductive</b> 373:9</p> <p><b>none</b> 360:14, 413:3</p> <p><b>normal</b> 389:14</p> <p><b>notary</b> 352:7, 357:5, 444:4, 445:9</p> <p><b>notch</b> 393:13, 393:21</p> <p><b>note</b> 396:1, 428:9, 428:11</p> <p><b>noted</b> 371:20, 443:11</p>	<p><b>notice</b> 352:6</p> <p><b>nuances</b> 428:5</p> <p><b>nucleating</b> 365:9, 365:10, 366:8, 367:1, 368:21, 369:1, 369:19, 442:8, 442:10, 442:15</p> <p><b>nucleation</b> 366:14</p> <p><b>number</b> 356:4, 356:8, 362:7, 362:13, 367:20, 369:17, 375:5, 375:17, 378:11, 378:16, 379:16, 387:4, 389:4, 397:5, 407:8, 414:1, 439:19</p> <p><b>numbers</b> 406:19</p> <hr/> <p style="text-align: center;"><b>O</b></p> <hr/> <p><b>objection</b> 366:6, 367:8, 368:10, 368:14, 368:19, 369:3, 369:7, 369:13, 370:8, 373:8, 374:5, 377:12, 378:21, 379:3, 379:20, 380:20, 382:12, 383:12, 383:16, 384:7, 384:21, 388:16, 389:20, 391:6, 393:2, 394:8, 396:18, 398:8, 398:14, 399:8, 402:1, 402:15, 405:5, 410:3, 410:11, 413:1, 413:10, 415:14, 415:18, 416:7, 417:18, 418:5,</p>	<p>418:10, 419:12, 426:16, 427:20, 429:9, 430:13, 431:9, 432:8, 434:22, 435:14, 437:13, 440:15, 441:6, 441:21, 442:1, 442:12</p> <p><b>obstinate</b> 429:10</p> <p><b>obvious</b> 392:12</p> <p><b>obviously</b> 372:1</p> <p><b>occur</b> 366:14, 371:9, 405:8, 413:4, 414:14, 414:16, 415:12, 419:2</p> <p><b>occurred</b> 444:15</p> <p><b>octagonal</b> 418:3, 418:6</p> <p><b>office</b> 351:1, 356:8, 359:4</p> <p><b>oh</b> 403:13, 410:21, 439:3</p> <p><b>okay</b> 360:6, 362:21, 363:18, 364:14, 364:15, 366:7, 366:22, 367:10, 372:5, 372:6, 374:11, 374:20, 374:21, 377:2, 377:19, 380:9, 381:18, 382:14, 383:7, 384:11, 385:3, 388:8, 390:21, 392:16, 394:9, 395:6, 395:9, 396:1, 396:10, 397:18, 398:17, 399:5, 400:10, 401:15, 401:21, 402:18,</p>	<p>403:15, 403:17, 405:3, 406:2, 407:13, 408:2, 408:14, 408:20, 408:22, 409:3, 409:4, 410:13, 410:14, 411:18, 412:5, 413:13, 418:16, 419:7, 419:16, 419:18, 420:1, 420:5, 422:5, 422:9, 423:2, 423:4, 423:15, 424:14, 428:6, 428:22, 429:13, 429:17, 429:22, 430:3, 430:15, 432:20, 433:8, 433:17, 434:6, 434:11, 435:7, 435:18, 436:6, 438:3, 439:5, 439:13, 439:15, 440:14, 440:17, 442:6, 443:4, 443:8</p> <p><b>once</b> 410:12, 427:21</p> <p><b>one</b> 359:10, 366:13, 368:11, 372:13, 374:6, 375:17, 376:15, 382:4, 384:14, 384:19, 387:6, 389:8, 394:12, 394:15, 395:9, 395:10, 399:2, 402:6, 404:18, 406:18, 407:7, 407:15, 408:14, 409:3, 417:9, 423:15, 423:18, 423:20, 423:22, 424:1, 424:13, 425:10, 425:20, 433:11, 433:13, 436:21, 437:6, 438:11,</p>
---	---	---	---



<p>438:16, 438:22, 439:2, 440:2, 442:16 <b>only</b> 375:8, 381:2, 381:12, 398:18 <b>open</b> 381:6, 429:12, 430:21 <b>operation</b> 441:5 <b>opinion</b> 384:10, 390:9, 391:4, 394:6, 398:6, 405:7, 413:7, 415:15, 417:16, 419:10, 428:6, 429:5, 430:10, 435:11, 438:10 <b>oppose</b> 392:14 <b>opposed</b> 367:2 <b>order</b> 374:3, 415:13, 435:18, 437:11 <b>ordinary</b> 392:6, 392:10, 414:14, 428:17, 429:6, 431:13, 435:12 <b>orientation</b> 389:8 <b>original</b> 358:8, 362:14, 388:10, 392:9, 393:22, 403:5, 403:9, 403:22, 411:16, 418:14, 441:7 <b>other</b> 359:18, 362:2, 362:11, 364:19, 366:17, 366:18, 371:17, 383:10, 383:19, 384:16, 399:6, 401:16,</p>	<p>404:22, 408:14, 409:20, 416:10, 417:8, 418:2, 418:16, 429:15, 430:16, 430:19, 430:22, 431:3, 432:15, 432:17, 433:14, 435:16, 437:7, 439:4, 440:21 <b>others</b> 386:19 <b>otherwise</b> 433:22, 444:22 <b>out</b> 372:4, 372:22, 392:18, 394:16, 401:10, 405:12, 407:3, 421:11, 422:13, 423:7, 428:19, 430:5, 434:1, 437:18 <b>outcome</b> 444:22 <b>outer</b> 377:4, 381:1 <b>outline</b> 373:3 <b>outlined</b> 358:21 <b>output</b> 396:16, 396:19, 396:21, 397:15, 398:19, 399:6, 422:6, 422:21, 426:6, 429:1, 434:4, 434:8, 435:7, 436:7, 436:20, 438:7 <b>outside</b> 362:19, 394:8 <b>oval</b> 417:21, 418:8 <b>over</b> 362:6, 369:20, 374:9, 377:21, 380:5, 380:6, 381:20, 383:5,</p>	<p>384:16, 390:10, 390:13, 390:19, 390:20, 390:22, 391:3, 392:20, 401:19, 403:12, 406:15, 407:6, 410:1, 410:10, 412:11, 413:6, 416:21, 420:5, 433:4 <b>overall</b> 376:14, 420:4 <b>overlap</b> 391:19, 404:10, 405:3, 405:8, 405:22, 406:7, 420:19 <b>overlapping</b> 404:6, 404:16, 406:10, 410:18, 411:5, 417:8, 420:7 <b>overlaps</b> 404:6, 404:8, 404:11, 404:15, 408:12 <b>own</b> 363:1, 432:13 <b>owner</b> 351:9, 353:12, 356:22, 358:11, 443:5</p> <hr/> <p style="text-align: center;"><b>P</b></p> <hr/> <p><b>page</b> 355:2, 355:11, 364:5, 374:12, 374:15, 374:16, 374:19, 375:4, 376:13, 376:21, 376:22, 379:6, 379:8, 380:8, 380:11, 388:7, 388:11, 388:12, 393:9, 396:2, 400:11, 402:20, 403:18, 403:19, 411:1, 415:4,</p>	<p>416:22, 419:17, 419:19, 420:5, 421:9, 423:17, 424:22, 433:4, 440:5, 440:6 <b>pages</b> 351:24, 359:14, 370:19 <b>palmieri</b> 353:6, 355:3, 356:16, 356:18, 357:8, 359:21, 360:1, 375:22, 376:4, 376:8, 376:20, 385:10, 385:14, 385:16, 385:21, 386:2, 386:12, 393:8, 399:13, 410:22, 413:17, 414:4, 424:17, 425:7, 425:15, 439:5, 439:13, 440:15, 441:6, 441:21, 442:1, 442:12, 443:6 <b>pan</b> 377:4 <b>papers</b> 425:11 <b>paragraph</b> 376:9, 376:17, 376:22, 377:2, 380:7, 380:22, 382:9, 383:8, 384:11, 389:1, 391:17, 393:9, 393:11, 393:14, 393:15, 393:16, 394:7, 404:4, 410:15, 413:14, 415:5, 416:21, 420:4, 421:9, 421:16, 421:17, 422:3, 422:4, 423:16, 424:6, 433:1, 433:3, 440:4</p>
---	--	---	---

<p><b>parallel</b> 417:13</p> <p><b>parlance</b> 432:12</p> <p><b>part</b> 364:1, 377:15, 393:22, 403:3, 403:5, 408:12, 410:17, 410:18, 411:3, 411:4, 411:5, 411:7, 411:15, 412:4, 415:9, 416:19, 420:8, 420:9</p> <p><b>partial</b> 381:2</p> <p><b>partially</b> 404:6, 404:10, 404:15, 404:20, 417:8</p> <p><b>particle</b> 372:6, 372:7, 372:13, 372:14</p> <p><b>particles</b> 373:2</p> <p><b>particular</b> 359:9, 378:9, 404:2</p> <p><b>particularly</b> 365:7</p> <p><b>parties</b> 444:19, 444:21</p> <p><b>partly</b> 404:8</p> <p><b>partnership</b> 351:4, 351:5, 353:4, 356:17</p> <p><b>parts</b> 416:19</p> <p><b>party</b> 444:12</p> <p><b>passages</b> 364:19</p> <p><b>passed</b> 376:12</p> <p><b>passing</b> 373:12</p> <p><b>past</b> 377:20</p>	<p><b>patent</b> 351:1, 351:2, 351:9, 353:12, 355:12, 355:16, 355:17, 356:7, 356:22, 358:11, 376:6, 379:7, 379:8, 380:4, 382:21, 383:6, 384:17, 385:8, 386:10, 387:7, 387:11, 387:14, 388:2, 394:12, 399:15, 399:18, 401:3, 401:6, 403:9, 415:10, 416:1, 416:11, 417:3, 422:1, 423:5, 424:22, 428:1, 428:20, 436:17, 436:18, 443:5</p> <p><b>patents</b> 378:4, 386:18, 386:21, 387:4, 391:15, 407:9, 408:6, 413:3, 422:13</p> <p><b>paths</b> 395:18</p> <p><b>paul</b> 353:7, 356:19</p> <p><b>pdf</b> 374:19, 376:14, 376:21, 379:6, 380:8, 388:7, 393:10, 400:11, 402:21, 403:19, 416:22, 417:1, 419:17, 419:19, 423:17, 433:4</p> <p><b>peag</b> 351:4, 353:3, 356:6, 356:17</p> <p><b>peckerar</b> 351:17, 352:6, 355:2, 355:21, 356:5, 357:4,</p>	<p>357:9, 360:5, 368:5, 377:7, 386:13, 388:15, 399:20, 411:8, 414:2, 414:5, 425:17, 432:4, 439:7, 439:20, 440:2, 443:9, 443:10, 444:6, 444:15</p> <p><b>peel</b> 395:3, 395:13</p> <p><b>peel-off</b> 395:10</p> <p><b>penetrate</b> 372:9</p> <p><b>penetrating</b> 378:18</p> <p><b>perfect</b> 377:1</p> <p><b>perform</b> 426:13, 429:19, 435:9</p> <p><b>performing</b> 430:11</p> <p><b>perhaps</b> 409:8, 426:21, 428:22, 431:7</p> <p><b>period</b> 363:9</p> <p><b>person</b> 392:5, 392:9, 414:14, 428:17, 429:5, 431:13, 435:11</p> <p><b>personnel</b> 361:13, 361:17</p> <p><b>petitioner</b> 351:6, 353:3</p> <p><b>petitioners</b> 356:16</p> <p><b>ph</b> 351:17, 352:6, 355:2, 355:21, 357:4, 360:5, 444:6, 444:15</p> <p><b>phrase</b> 404:19, 426:22,</p>	<p>427:2</p> <p><b>phraseology</b> 398:22</p> <p><b>physical</b> 389:11</p> <p><b>physically</b> 360:2, 389:10</p> <p><b>piece</b> 385:4, 386:16, 399:11, 422:13, 423:7, 438:4</p> <p><b>pieces</b> 422:12</p> <p><b>pierce</b> 373:2</p> <p><b>place</b> 356:13, 391:16, 419:18, 435:7</p> <p><b>placing</b> 395:2</p> <p><b>plane</b> 417:12, 417:13</p> <p><b>planet</b> 354:2, 354:3, 356:12, 357:2</p> <p><b>plastic</b> 423:3, 442:4</p> <p><b>plate</b> 366:9, 373:16</p> <p><b>plates</b> 364:16, 395:16</p> <p><b>plating</b> 367:18</p> <p><b>plaza</b> 353:8, 353:17</p> <p><b>plc</b> 351:5, 353:4, 356:18</p> <p><b>please</b> 356:14, 357:3, 386:3, 392:1, 396:4, 402:7, 438:15, 440:10</p> <p><b>poetic</b> 367:17</p> <p><b>point</b> 384:6, 389:4, 389:14, 392:18,</p>
--	--	--	---

<p>407:7, 418:8, 435:3, 437:1 <b>pointed</b> 428:19, 430:5 <b>points</b> 395:14, 396:14, 396:15, 398:3, 407:20 <b>polyethylene</b> 380:13 <b>polymer</b> 380:13, 384:1 <b>polymeric</b> 377:6, 378:11, 378:15 <b>polyvinylidene</b> 370:20 <b>poor</b> 394:19 <b>pore</b> 366:15 <b>pores</b> 366:14, 372:16 <b>portion</b> 377:6, 390:20, 390:21, 405:19, 412:11, 415:7, 437:15, 437:20, 437:21 <b>posa</b> 430:21, 431:5, 431:17, 431:20, 432:2, 432:5, 439:4 <b>position</b> 397:19 <b>positions</b> 361:21 <b>possible</b> 360:14, 374:7, 413:7, 416:3, 418:20, 427:7 <b>possibly</b> 425:12 <b>potential</b> 385:2 <b>potentially</b> 409:17</p>	<p><b>preclude</b> 383:4 <b>predates</b> 398:7 <b>preliminary</b> 357:16, 384:12 <b>preparation</b> 362:9, 362:18, 363:14 <b>prepare</b> 358:14, 362:4, 362:21 <b>prepared</b> 357:16, 357:22, 358:10, 359:5 <b>preparing</b> 358:17, 359:8 <b>present</b> 354:1, 377:22 <b>presented</b> 400:6, 400:7 <b>press</b> 438:6 <b>pressure</b> 378:22, 381:4, 382:15, 382:17, 407:21, 409:9, 412:17, 412:18, 412:19 <b>pressure-loading</b> 378:20, 378:22, 380:15 <b>pressure-release</b> 379:1, 380:15, 382:5, 382:10, 383:9, 383:15 <b>pressurization</b> 419:9 <b>pretty</b> 362:15, 367:4, 368:22 <b>prevent</b> 371:13, 371:17, 378:6, 422:5, 426:6, 435:8, 442:20 <b>preventing</b> 424:3, 427:3,</p>	<p>427:8, 427:10, 427:18, 429:8 <b>prevents</b> 402:12, 426:18, 429:2 <b>previous</b> 357:21, 361:20, 362:1, 387:2 <b>previously</b> 360:16, 373:11, 407:19 <b>primary</b> 358:5, 391:2, 409:17 <b>prior</b> 385:4, 387:1, 403:8 <b>prise</b> 409:4, 409:7 <b>prises</b> 409:14, 412:14 <b>probably</b> 395:12, 400:4, 412:7 <b>problem</b> 364:18, 365:16, 371:12, 371:16, 374:7, 374:8, 374:22, 400:10, 403:13 <b>proceedings</b> 361:14, 375:20 <b>process</b> 364:21 <b>processing</b> 441:8 <b>produced</b> 393:5 <b>produces</b> 416:3 <b>product</b> 428:2 <b>products</b> 428:12 <b>projections</b> 389:12 <b>pronounces</b> 371:6</p>	<p><b>pronunciation</b> 371:3 <b>proposed</b> 403:4, 417:2 <b>protrude</b> 388:20 <b>protruding</b> 393:12, 393:20, 394:2 <b>provide</b> 378:20, 384:14, 412:16, 431:11 <b>provided</b> 359:1, 384:20, 385:8, 387:14, 403:6, 431:21, 431:22 <b>provides</b> 381:2, 402:11, 405:14, 426:18, 435:8 <b>providing</b> 382:15, 391:10, 417:10, 418:18 <b>proximal</b> 410:16, 410:17, 411:3 <b>prudential</b> 353:17 <b>pub</b> 355:13, 355:18, 376:6, 399:15 <b>public</b> 352:7, 444:4, 445:9 <b>publication</b> 355:15, 386:9 <b>pull</b> 422:12, 422:13, 423:7, 424:15 <b>pulled</b> 394:16, 406:21, 437:18 <b>pulling</b> 401:9 <b>purpose</b> 377:17, 407:4 <b>purposes</b> 431:2, 432:5</p>
---	---	--	---

<p><b>pursuant</b> 352:6</p> <p><b>push</b> 412:3</p> <p><b>put</b> 358:19, 371:11, 438:22</p> <hr/> <p style="text-align: center;"><b>Q</b></p> <hr/> <p><b>quantification</b> 416:17</p> <p><b>question</b> 366:19, 384:19</p> <p><b>questions</b> 439:6, 443:4, 443:7</p> <p><b>quick</b> 413:18, 419:18, 424:18</p> <p><b>quite</b> 397:22, 416:15</p> <hr/> <p style="text-align: center;"><b>R</b></p> <hr/> <p><b>radial</b> 395:15, 400:17, 406:11, 407:21, 408:7, 408:15, 409:1, 409:13, 412:16, 412:18, 412:19, 412:21, 413:8, 414:6</p> <p><b>radially</b> 406:21, 408:11, 411:6, 415:8, 415:12, 415:16, 416:5</p> <p><b>radius</b> 400:17</p> <p><b>ragusa</b> 353:7, 356:19</p> <p><b>raises</b> 412:13</p> <p><b>rare</b> 373:1, 378:4</p> <p><b>rarely</b> 407:8</p> <p><b>rate</b> 364:22, 369:15,</p>	<p>369:16, 369:19</p> <p><b>read</b> 362:6, 388:1, 401:3, 407:6, 417:4, 421:10, 427:22</p> <p><b>reading</b> 363:1, 387:8, 387:17, 403:12</p> <p><b>real</b> 419:18, 424:18</p> <p><b>really</b> 381:2, 382:22, 428:6, 430:8</p> <p><b>reason</b> 369:18, 370:1, 370:9, 381:8</p> <p><b>reasonable</b> 414:15</p> <p><b>reasons</b> 378:2</p> <p><b>recall</b> 364:10, 368:13, 368:15, 387:9, 389:12, 397:3, 397:11, 397:14, 399:7, 399:9, 400:1, 400:6, 416:19, 441:16</p> <p><b>received</b> 387:19</p> <p><b>recent</b> 358:3, 386:17, 386:21, 387:7</p> <p><b>recess</b> 386:6, 413:21, 439:17</p> <p><b>rechargeable</b> 365:18, 365:19</p> <p><b>recite</b> 393:16, 404:5, 404:9, 423:17</p> <p><b>recited</b> 431:4, 431:8, 431:14, 431:16, 432:7, 432:17, 432:19, 433:2</p> <p><b>recites</b> 380:12, 393:11,</p>	<p>418:18</p> <p><b>reciting</b> 395:20</p> <p><b>recollection</b> 387:22, 397:9, 400:9, 400:22</p> <p><b>record</b> 386:3, 386:5, 386:8, 413:18, 413:20, 414:3, 439:14, 439:16, 439:21, 443:10, 444:10</p> <p><b>records</b> 361:14</p> <p><b>rectangle</b> 438:5</p> <p><b>rectangles</b> 379:22</p> <p><b>reduce</b> 367:7, 395:4</p> <p><b>reduced</b> 394:4</p> <p><b>reduction</b> 365:11, 373:15, 398:4</p> <p><b>refer</b> 358:2, 358:7, 358:8, 362:17, 385:5, 388:22, 389:22, 398:7, 440:3</p> <p><b>reference</b> 358:2, 360:6, 368:1, 368:12, 370:21, 393:19, 400:3</p> <p><b>referenced</b> 362:8</p> <p><b>references</b> 362:14</p> <p><b>referring</b> 357:21, 376:15, 392:4, 393:14, 394:7</p> <p><b>refers</b> 380:5, 383:5, 422:3, 422:4</p>	<p><b>regardless</b> 383:13</p> <p><b>region</b> 365:6, 369:20, 381:17, 406:20, 406:21, 406:22, 411:21, 417:6, 417:13, 420:18, 442:2</p> <p><b>regions</b> 369:10, 369:11, 379:22, 417:7, 417:10, 420:8, 420:13, 420:22</p> <p><b>relate</b> 406:7</p> <p><b>related</b> 406:4, 444:18</p> <p><b>relating</b> 363:17, 391:14, 399:1</p> <p><b>relatively</b> 367:12, 386:17, 387:6</p> <p><b>relevant</b> 362:11</p> <p><b>reliability</b> 414:20</p> <p><b>reliably</b> 406:14</p> <p><b>relief</b> 382:15, 382:17</p> <p><b>remedy</b> 374:7</p> <p><b>remember</b> 367:15, 375:16, 387:18, 391:10, 397:18, 398:22, 401:5, 406:19, 418:11</p> <p><b>remote</b> 352:5</p> <p><b>remotely</b> 356:13</p> <p><b>render</b> 384:10</p> <p><b>repeat</b> 411:2, 422:16,</p>
--	---	--	--

<p>431:10, 432:12  <b>rephrase</b>  370:4, 384:8  <b>report</b>  359:11, 362:6,  367:15, 368:2,  369:9, 370:16,  384:12, 384:13,  389:1, 394:10,  394:21, 398:21,  405:6, 406:13,  407:6, 411:16,  416:16, 441:7  <b>reported</b>  351:25  <b>reporter</b>  357:1, 357:3,  373:19, 402:5,  402:8, 444:1,  444:4  <b>reports</b>  419:6  <b>represent</b>  356:15, 396:11  <b>representation</b>  394:20  <b>represented</b>  396:12, 444:13  <b>representing</b>  356:12, 357:2  <b>represents</b>  366:16, 393:6,  402:3, 402:10,  402:11, 410:6  <b>reproduce</b>  375:4, 375:5  <b>repulsive</b>  393:21  <b>require</b>  380:19, 421:5  <b>required</b>  380:16, 382:10,  394:16  <b>requirement</b>  378:10  <b>requires</b>  382:14  <b>requisites</b>  365:5</p>	<p><b>resin</b>  371:11, 371:12,  373:9, 442:4  <b>resistance</b>  394:3, 394:20,  394:22, 395:2,  395:4, 395:5,  395:19, 395:21,  396:8, 398:5  <b>resolve</b>  360:13  <b>respect</b>  401:16, 403:7,  406:21, 411:6,  415:8  <b>respected</b>  395:13  <b>respective</b>  422:20  <b>respectively</b>  421:12, 424:2  <b>rest</b>  382:20, 436:19  <b>restate</b>  422:9  <b>result</b>  365:1, 394:3  <b>return</b>  393:22  <b>review</b>  359:9, 359:18,  360:19, 360:21,  360:22, 363:1,  425:16  <b>reviewed</b>  360:7, 361:2,  362:11, 387:4  <b>reviewing</b>  428:8  <b>revised</b>  403:21, 424:21  <b>rid</b>  367:9  <b>right</b>  357:13, 359:17,  361:3, 368:4,  370:22, 372:1,  372:19, 380:10,</p>	<p>382:7, 382:8,  386:13, 389:3,  390:17, 392:20,  396:3, 396:8,  403:15, 403:20,  404:3, 405:7,  411:9, 412:19,  415:5, 415:10,  415:22, 416:2,  416:6, 416:12,  420:19, 421:3,  421:8, 424:7,  425:21, 426:13,  429:4, 432:19  <b>robert</b>  353:16  <b>rockefeller</b>  353:8  <b>roll</b>  393:12, 393:20  <b>room</b>  357:13  <b>rough</b>  363:19  <b>round</b>  417:6, 417:17,  418:3, 418:4,  418:9  <b>rpr</b>  351:25, 352:7,  445:8</p> <hr/> <p style="text-align: center;"><b>S</b></p> <hr/> <p><b>said</b>  363:22, 369:8,  370:16, 377:16,  381:9, 384:12,  387:12, 387:16,  399:1, 405:6,  406:13, 422:10,  422:17, 429:3,  430:15, 431:10,  435:5, 441:11,  442:7  <b>same</b>  368:3, 372:16,  383:9, 400:4,  400:7, 407:4,</p>	<p>415:18, 429:7,  429:14, 429:19,  430:11, 442:1,  443:1  <b>sarah</b>  354:3, 375:22,  385:10, 399:13,  410:22, 424:17,  425:12  <b>saw</b>  400:2, 400:4,  428:13  <b>say</b>  363:21, 365:14,  366:2, 369:9,  369:17, 381:8,  387:3, 388:1,  392:11, 398:15,  402:6, 403:20,  408:21, 416:9,  424:12, 427:13,  431:18  <b>saying</b>  371:2, 380:22,  382:21, 383:18,  383:21, 395:9,  414:13, 423:2  <b>says</b>  377:3, 382:1,  426:17, 428:20,  436:17, 436:18  <b>scaffolding</b>  366:16, 370:2,  442:19, 443:2  <b>scope</b>  394:8, 403:22,  429:3, 431:2  <b>scratch</b>  431:18  <b>screen</b>  359:12, 376:1  <b>screw</b>  379:14  <b>scroll</b>  393:8, 410:22  <b>se</b>  408:15, 441:13  <b>seal</b>  380:14, 380:15,</p>
---	---	--	---

<p>381:1, 381:2, 381:18, 382:5, 382:10, 383:3, 383:4, 383:10, 383:15, 384:18, 384:20, 388:18, 390:2, 391:2, 407:5, 407:22, 417:10 <b>sealed</b> 409:22 <b>sealing</b> 383:22, 384:15, 391:13, 408:5, 409:17, 409:19, 409:21, 410:1, 412:17, 414:7, 419:5 <b>seals</b> 377:21 <b>searching</b> 387:21 <b>second</b> 366:3, 375:18, 407:14, 407:15, 408:12, 410:18, 411:4, 411:7, 415:8, 420:6, 421:12, 421:14, 423:11, 423:20, 423:22, 424:2, 424:5, 425:20, 425:21, 426:12, 429:22, 430:15, 430:17, 433:9, 433:12, 435:6, 442:17 <b>secondary</b> 365:15, 366:10, 408:13, 409:18, 409:21, 410:1, 414:7, 431:22 <b>seconds</b> 386:1 <b>section</b> 359:6, 359:16, 359:17, 359:18, 360:9, 364:2,</p>	<p>364:6, 364:7, 369:8, 370:18, 374:11, 374:13, 374:22, 381:5, 402:20, 403:11, 403:16, 431:6 <b>sections</b> 359:11 <b>see</b> 366:7, 367:13, 375:6, 377:2, 377:6, 380:1, 380:16, 381:8, 382:9, 386:16, 387:1, 388:19, 389:15, 390:16, 390:18, 391:17, 392:19, 395:5, 397:11, 399:22, 401:15, 404:7, 411:8, 413:2, 413:12, 415:9, 416:16, 417:14, 419:17, 420:17, 420:18, 421:2, 421:3, 421:15, 421:16, 421:17, 424:6, 428:17, 430:6, 431:17, 432:14, 434:12, 437:7, 440:5 <b>seeing</b> 425:14 <b>seek</b> 428:17 <b>seemed</b> 401:4 <b>semi-functioning</b> 388:2 <b>sense</b> 435:16 <b>sentence</b> 380:12 <b>separate</b> 378:14, 400:8, 423:19, 423:21, 424:1, 424:2, 425:18, 426:13,</p>	<p>428:14, 429:19 <b>separated</b> 366:12, 417:9 <b>separating</b> 378:1 <b>separation</b> 392:15 <b>separator</b> 366:2, 366:16, 367:3, 367:6, 367:11, 368:7, 368:13, 369:6, 369:21, 370:1, 370:3, 370:5, 370:10, 372:1, 372:9, 372:15, 373:7, 373:10, 373:11, 373:22, 374:2, 390:6, 440:8, 440:20, 441:3, 441:16, 442:10 <b>separators</b> 366:17, 369:4, 426:14, 442:14, 442:18 <b>september</b> 351:20, 356:9, 444:16, 445:4 <b>sequence</b> 433:12, 437:5 <b>serve</b> 370:1, 412:12 <b>served</b> 407:4, 414:6 <b>set</b> 386:21, 397:21, 431:2, 444:7, 445:3 <b>several</b> 388:19 <b>shape</b> 393:22, 407:12, 418:3 <b>shapes</b> 418:2, 418:16 <b>shared</b> 399:13</p>	<p><b>sharing</b> 429:4 <b>shield</b> 427:6, 427:8 <b>shielded</b> 421:12, 421:18, 421:21, 422:19, 426:22, 427:18, 429:7, 436:6 <b>shielding</b> 422:5, 422:18, 427:10, 429:13 <b>shoot</b> 364:15 <b>shooting</b> 365:13 <b>short</b> 372:4 <b>shorthand</b> 444:1 <b>shorting</b> 372:22 <b>shorts</b> 372:10 <b>should</b> 360:2, 376:13, 384:17, 385:10, 388:11, 396:2, 411:15, 422:9 <b>shouldn't</b> 384:9, 428:22 <b>show</b> 375:12, 400:18, 411:18, 413:3, 413:5, 415:2, 416:4, 418:6 <b>showing</b> 379:11, 395:11, 400:14 <b>shown</b> 375:9, 378:18, 380:3, 388:14 <b>shows</b> 396:7, 399:4 <b>sic</b> 377:5, 404:8, 439:20 <b>side</b> 405:20, 405:21</p>
---	--	---	---

<p><b>sides</b> 391:19, 418:13, 421:13, 421:21, 424:4, 426:7 <b>signature-plkal</b> 445:6 <b>similar</b> 389:8 <b>simple</b> 407:10, 408:3, 412:9 <b>simply</b> 408:7 <b>since</b> 358:4, 362:1, 388:9 <b>single</b> 378:7, 394:13, 394:15, 396:8, 396:14, 397:20, 399:3, 422:14 <b>sir</b> 385:17 <b>site</b> 365:6, 365:10, 365:11 <b>sites</b> 366:8, 367:1, 368:21, 368:22, 369:1, 369:19, 442:8, 442:10, 442:15, 442:21 <b>sits</b> 390:19, 401:16 <b>size</b> 372:14 <b>sizes</b> 372:6, 372:7, 372:15 <b>skill</b> 392:6, 414:15, 428:17, 429:6, 430:5, 431:13, 435:12 <b>slide</b> 404:17 <b>slight</b> 389:15</p>	<p><b>sloping</b> 411:22 <b>small</b> 372:18, 373:18, 373:20, 441:2 <b>smaller</b> 395:18 <b>solution</b> 365:8 <b>solve</b> 371:12 <b>some</b> 361:7, 363:3, 365:14, 366:21, 370:15, 371:22, 372:21, 373:15, 374:2, 374:7, 382:14, 383:19, 392:14, 395:12, 403:1, 403:4, 403:7, 406:11, 406:16, 408:7, 412:18, 416:17, 419:8, 425:13, 430:16, 435:16, 437:1, 437:15 <b>somehow</b> 417:20 <b>someone</b> 430:5 <b>something</b> 374:9, 382:19, 411:17 <b>sometimes</b> 364:21 <b>somewhere</b> 433:21 <b>sorry</b> 374:16, 374:21, 375:17, 376:18, 376:20, 385:17, 403:12, 410:17, 410:21, 412:4, 416:22, 419:17, 419:19, 421:17, 423:1, 424:13, 435:1, 435:17, 440:12, 442:13</p>	<p><b>sort</b> 374:2 <b>sorter</b> 372:14 <b>sources</b> 387:18 <b>space</b> 404:22 <b>specific</b> 367:22, 368:5, 372:14, 376:17, 387:9, 409:19, 413:12, 414:13, 437:2 <b>specifically</b> 362:5, 363:14, 374:8 <b>specifies</b> 377:13 <b>speculate</b> 413:11, 416:8 <b>speculates</b> 381:20 <b>speculating</b> 383:20 <b>speculation</b> 382:3, 385:1, 393:3, 412:5 <b>speed</b> 370:12 <b>spent</b> 359:19 <b>spiral</b> 368:6, 388:20, 390:4, 390:5, 394:11, 396:13, 400:21, 401:10, 421:13, 421:19, 421:22, 423:5, 424:4, 426:7, 436:4, 436:5 <b>spirally</b> 388:18 <b>spots</b> 388:9 <b>spring</b> 389:15, 395:15, 396:8</p>	<p><b>spring-load</b> 379:12, 389:7, 394:13, 397:18 <b>spring-loading</b> 398:18, 398:20 <b>springs</b> 379:14 <b>squeeze</b> 372:3, 441:9 <b>standard</b> 356:11 <b>start</b> 405:12 <b>started</b> 357:12 <b>starting</b> 388:6 <b>starts</b> 376:5, 433:3 <b>state</b> 356:15, 384:10, 394:9, 394:21, 397:19, 409:3, 413:4, 445:9 <b>stated</b> 398:1, 429:22, 434:7 <b>statement</b> 384:22 <b>states</b> 351:1, 352:8, 393:19, 423:18, 437:3, 444:4 <b>stay</b> 368:3 <b>stetson</b> 353:18 <b>stick</b> 382:22 <b>still</b> 388:2, 427:14, 438:9, 438:19 <b>storage</b> 364:20 <b>straight</b> 405:11, 406:10 <b>strangling</b> 411:14</p>
--	---	---	--

<p><b>strawman</b> 394:18, 397:21, 398:2 <b>stream</b> 387:7 <b>stress</b> 412:2 <b>structure</b> 406:14 <b>structures</b> 365:13, 367:13, 373:12, 428:2 <b>studying</b> 431:21 <b>stuff</b> 367:16 <b>submitted</b> 404:9 <b>substantive</b> 359:5, 360:8 <b>substitute</b> 402:21, 403:4, 403:21, 404:2, 404:9, 417:2, 424:10, 424:12, 425:2, 425:3, 426:17, 428:9, 428:10, 433:3, 437:2 <b>successful</b> 414:22 <b>sufficient</b> 381:18 <b>suggested</b> 431:5, 431:15, 438:3 <b>suite</b> 353:18 <b>super</b> 440:14 <b>superior</b> 399:4 <b>supplement</b> 394:21 <b>supplemental</b> 355:20, 358:4, 358:10, 358:15, 359:11, 359:13,</p>	<p>360:4, 360:12, 362:6, 362:10, 362:13, 362:16, 362:19, 363:2, 363:3, 364:3, 364:4, 369:9, 386:22, 391:11, 391:15, 394:10, 398:1, 402:19, 403:6, 406:13, 415:5, 419:22, 432:21, 440:4 <b>supplementary</b> 384:13, 389:1 <b>supplied</b> 358:20 <b>supply</b> 378:14, 408:13 <b>support</b> 370:2, 403:8 <b>suppose</b> 366:11 <b>sure</b> 363:22, 376:19, 377:19, 391:8, 398:10, 405:20, 411:11, 414:21, 418:22, 422:18, 437:14, 438:21, 439:11 <b>surely</b> 430:16 <b>surface</b> 367:10, 393:12, 393:20, 394:2, 417:6, 417:7, 417:10, 420:8, 420:12, 420:22, 421:6, 435:8, 442:16 <b>surfaces</b> 422:11 <b>surlyn</b> 380:14, 381:22, 384:13, 384:20 <b>swage</b> 411:17, 412:8 <b>swear</b> 357:3</p>	<p><b>sworn</b> 357:5, 444:8 <hr/><b>T</b><hr/><b>tab</b> 399:3 <b>table</b> 399:3 <b>tabs</b> 398:17, 399:2 <b>take</b> 371:3, 385:19, 385:22, 400:10, 403:14, 404:19, 413:17, 418:12, 431:19, 439:8, 439:9, 439:10 <b>taken</b> 387:17, 444:9 <b>taking</b> 356:13 <b>talk</b> 401:9, 415:3, 416:17 <b>talked</b> 417:21, 424:8, 440:3, 441:14 <b>talking</b> 381:1, 414:19, 423:8 <b>talks</b> 416:13, 416:14 <b>tape</b> 423:6, 428:14, 428:22, 429:1, 430:7, 430:18, 435:7, 438:4 <b>taught</b> 367:15 <b>teach</b> 380:21 <b>technical</b> 358:20 <b>technician</b> 354:3, 359:21, 376:2, 376:18, 385:12, 385:17, 425:5, 440:10,</p>	<p>440:13 <b>technique</b> 415:17 <b>techniques</b> 408:19, 409:15, 414:18, 414:22 <b>tell</b> 412:6 <b>term</b> 392:6, 404:20, 405:4, 410:4, 417:16, 422:19, 427:18, 429:6, 429:7 <b>terminal</b> 364:16 <b>terminates</b> 405:1 <b>terming</b> 377:21 <b>terms</b> 364:3, 427:4, 427:12, 427:22, 429:12, 431:1 <b>testified</b> 368:20, 373:10, 377:14 <b>testifies</b> 357:6 <b>testimony</b> 361:4, 361:20, 370:10, 414:1, 439:19, 443:9, 444:10 <b>text</b> 425:14, 430:9, 441:1 <b>th</b> 356:9, 445:4 <b>thank</b> 376:5, 395:8, 413:19, 432:20, 440:13 <b>thanks</b> 377:1 <b>themselves</b> 372:9, 372:11, 422:1, 442:18</p>
--	--	--	---



<p><b>therebetween</b> 417:11, 418:19</p> <p><b>therein</b> 362:8, 362:12</p> <p><b>thereon</b> 434:10, 434:19</p> <p><b>thereto</b> 417:13</p> <p><b>they'd</b> 372:19</p> <p><b>thing</b> 408:14, 409:12, 442:16</p> <p><b>things</b> 369:17, 372:4, 382:18, 382:22, 390:1, 394:9, 395:15, 411:19, 412:5, 430:7, 430:18, 432:14, 442:13, 442:14</p> <p><b>think</b> 371:15, 373:1, 385:1, 391:21, 395:11, 395:21, 397:5, 405:14, 406:16, 407:8, 407:13, 410:12, 411:14, 412:6, 416:20, 417:19, 430:14, 430:21, 431:17, 432:10, 432:11, 432:15, 439:4, 439:13, 440:11</p> <p><b>third</b> 407:14, 410:15</p> <p><b>thought</b> 432:1</p> <p><b>three</b> 363:21, 415:22, 433:12, 437:3, 437:5, 438:21, 438:22</p> <p><b>threshold</b> 412:14</p> <p><b>threw</b> 374:9</p>	<p><b>through</b> 372:15, 376:11, 381:16, 381:17, 382:16, 398:21, 401:3, 409:10, 416:16, 418:7, 428:1, 432:2, 438:17, 439:2, 442:8</p> <p><b>throughout</b> 368:2, 384:17, 410:5</p> <p><b>throwing</b> 381:20</p> <p><b>time</b> 356:10, 356:11, 359:20, 363:9, 365:18, 367:16, 387:9, 387:18, 393:6, 400:2, 400:4, 400:7, 400:8, 402:6, 406:15, 409:3, 413:15, 423:1, 439:6, 443:11</p> <p><b>times</b> 362:7, 363:19, 363:21, 371:20</p> <p><b>today</b> 356:12, 357:1, 357:10, 362:18, 363:12, 439:6, 441:14</p> <p><b>today's</b> 356:9, 360:22, 362:5</p> <p><b>together</b> 372:4, 378:15, 379:15, 382:22, 390:1, 406:14, 407:17, 408:16, 418:7, 418:13, 441:9, 441:16</p> <p><b>token</b> 372:16</p> <p><b>took</b> 429:13</p> <p><b>top</b> 372:2, 378:1,</p>	<p>378:7, 378:12, 378:17, 381:15, 389:13, 389:14, 390:13, 390:19, 390:21, 391:21, 392:13, 395:16, 395:17, 396:3, 404:6, 404:11, 404:12, 404:15, 405:2, 405:16, 405:18, 407:2, 407:16, 408:8, 408:12, 409:9, 411:1, 411:22, 412:1, 412:15, 417:13, 420:9, 420:14, 421:9, 423:4, 423:8, 438:5</p> <p><b>topic</b> 358:5, 440:2</p> <p><b>topics</b> 368:11</p> <p><b>touch</b> 440:2</p> <p><b>touched</b> 402:22</p> <p><b>towards</b> 398:11</p> <p><b>trademark</b> 351:1, 356:7</p> <p><b>transcript</b> 355:10, 361:17, 417:20</p> <p><b>transcripts</b> 357:19, 357:20, 360:19</p> <p><b>translation</b> 385:9, 388:10</p> <p><b>transport</b> 394:17</p> <p><b>traverse</b> 401:11</p> <p><b>treatments</b> 367:10</p> <p><b>tree</b> 365:1, 365:7, 365:10, 370:2</p>	<p><b>tree-forming</b> 365:6</p> <p><b>tree-like</b> 365:12</p> <p><b>trees</b> 364:14, 370:17</p> <p><b>tremendous</b> 370:13</p> <p><b>trial</b> 351:2</p> <p><b>triggered</b> 365:11</p> <p><b>trouble</b> 425:13</p> <p><b>true</b> 366:17, 381:10, 444:10</p> <p><b>truly</b> 381:11, 381:21</p> <p><b>trying</b> 365:17, 419:18</p> <p><b>tube</b> 377:6, 378:11, 378:16</p> <p><b>turn</b> 364:5</p> <p><b>twice</b> 432:12</p> <p><b>two</b> 353:17, 357:17, 357:19, 357:22, 360:15, 365:5, 394:9, 394:11, 395:14, 396:10, 399:1, 417:5, 418:13, 421:6, 427:12, 427:22, 429:12, 431:17, 433:15, 436:18, 437:7, 438:22, 442:13, 442:14</p> <p><b>two-thirds</b> 420:19</p> <p><b>type</b> 358:19, 373:13, 443:1</p> <p><b>types</b> 371:18</p>
---	--	--	---

<p><b>typo</b> 360:15</p> <hr/> <p style="text-align: center;"><b>U</b></p> <hr/> <p><b>u-shaped</b> 390:21</p> <p><b>under</b> 372:2, 419:8, 419:13, 419:15, 441:9</p> <p><b>underlying</b> 442:21</p> <p><b>understand</b> 392:6, 402:14, 407:21, 427:17, 429:6, 435:12</p> <p><b>understanding</b> 395:8, 403:10, 429:17, 441:18</p> <p><b>unexamined</b> 355:15, 386:9</p> <p><b>united</b> 351:1</p> <p><b>uppermost</b> 436:20</p> <p><b>use</b> 367:10, 367:18, 367:20, 370:20, 381:22, 382:2, 383:1, 422:18, 441:15</p> <p><b>uses</b> 391:3</p> <p><b>using</b> 372:17, 383:22, 408:18, 409:14, 410:4, 411:12, 414:18, 416:1</p> <p><b>usp</b> 351:12, 351:14</p> <p><b>usually</b> 367:6, 378:7, 380:12</p> <hr/> <p style="text-align: center;"><b>V</b></p> <hr/> <p><b>various</b> 364:22, 378:2, 387:19, 395:14,</p>	<p>401:12, 428:2</p> <p><b>varta</b> 351:8, 353:13, 356:6, 356:22, 358:11, 361:10, 361:12, 361:17, 403:3, 404:9, 406:17, 407:9, 408:6, 408:10, 414:17, 415:6, 416:3, 421:22, 422:12, 423:5</p> <p><b>varta's</b> 361:21, 363:5, 387:15, 409:18, 414:7, 424:21</p> <p><b>varying</b> 406:3</p> <p><b>vein</b> 408:22</p> <p><b>vent</b> 381:7, 384:5, 419:9</p> <p><b>vented</b> 382:6</p> <p><b>venting</b> 381:13, 382:7, 382:16, 384:1, 419:14</p> <p><b>verbal</b> 441:11</p> <p><b>versus</b> 356:6</p> <p><b>vi</b> 402:20, 403:15, 403:16</p> <p><b>via</b> 444:15</p> <p><b>video</b> 356:10, 356:13</p> <p><b>videoconference</b> 444:16</p> <p><b>videographer</b> 354:2, 356:3, 356:11, 357:1, 386:4, 386:7, 413:15, 413:19, 413:22, 439:15,</p>	<p>439:18, 443:8</p> <p><b>videotaped</b> 351:17, 352:5, 356:5</p> <p><b>view</b> 392:10</p> <p><b>virtually</b> 351:19, 444:15</p> <p><b>visualizing</b> 423:2</p> <p><b>voice</b> 432:14</p> <p><b>voit</b> 353:14, 356:21</p> <p><b>volume</b> 351:18, 356:4, 414:1, 439:19</p> <p><b>vouthouris</b> 351:25, 352:7, 357:2, 444:3, 445:8</p> <hr/> <p style="text-align: center;"><b>W</b></p> <hr/> <p><b>walk</b> 418:7</p> <p><b>wall</b> 374:10, 381:20, 389:14, 411:22</p> <p><b>walls</b> 405:20, 405:21, 406:9</p> <p><b>want</b> 367:22, 376:9, 381:21, 382:22, 385:21, 386:13, 388:12, 395:1, 399:10, 407:15, 407:19, 409:20, 413:17, 433:1, 434:13, 437:1, 439:8</p> <p><b>wanted</b> 357:12, 414:10, 415:11, 425:16</p> <p><b>wave</b> 386:18</p> <p><b>waxing</b> 367:16</p>	<p><b>way</b> 364:17, 373:22, 378:3, 381:3, 381:12, 394:17, 401:11, 401:14, 402:16, 402:17, 408:14, 409:5, 420:19, 423:14, 444:21</p> <p><b>ways</b> 378:12, 378:16</p> <p><b>we'll</b> 409:19, 421:9</p> <p><b>we're</b> 375:8, 403:15, 403:16, 423:8, 437:14</p> <p><b>we've</b> 370:14, 377:21, 380:22, 386:22, 402:22, 407:18, 411:17, 414:19, 423:3, 439:11</p> <p><b>weld</b> 409:9</p> <p><b>welded</b> 397:8, 397:10, 397:12</p> <p><b>welding</b> 401:13</p> <p><b>welds</b> 401:14</p> <p><b>well-defined</b> 435:9</p> <p><b>well-documented</b> 362:16</p> <p><b>went</b> 430:4, 432:2</p> <p><b>wes</b> 356:20, 439:8</p> <p><b>wesley</b> 353:15</p> <p><b>whereas</b> 427:2</p> <p><b>whereof</b> 445:3</p> <p><b>wherever</b> 368:21</p>
--	--	--	--

<p><b>whether</b> 361:19, 414:8, 414:13, 422:14, 428:4, 431:12, 440:7, 442:9</p> <p><b>whole</b> 401:11, 409:12</p> <p><b>wind</b> 394:12, 394:16, 394:17, 396:13, 401:11, 401:12</p> <p><b>winding</b> 388:20, 395:4, 395:14, 400:21, 421:13, 421:19, 421:22, 424:4, 426:8, 436:4, 436:5</p> <p><b>within</b> 366:15, 376:20, 390:19, 420:4, 444:4</p> <p><b>without</b> 380:14, 393:12, 393:21, 411:18, 414:13, 427:8</p> <p><b>witness</b> 357:3, 385:15, 385:19, 386:1, 402:6, 440:12, 440:14, 444:6, 444:11, 445:3</p> <p><b>wittmann</b> 353:16, 357:15</p> <p><b>wondering</b> 392:3</p> <p><b>word</b> 432:12</p> <p><b>words</b> 364:12, 364:19, 404:22, 416:12</p> <p><b>work</b> 362:22, 365:17, 388:5, 398:16, 409:6</p> <p><b>works</b> 381:3</p> <p><b>worried</b> 371:10</p>	<p><b>worth</b> 395:12</p> <p><b>wouldn't</b> 369:17, 371:16, 372:10, 372:15, 372:16, 372:18, 402:16, 402:17, 413:11, 418:9, 427:13, 429:2, 433:22, 442:4</p> <p><b>wound</b> 368:6, 388:18, 390:4, 390:5, 400:18, 441:10</p> <p><b>woven</b> 366:13</p> <p><b>wrinkling</b> 429:2, 435:8</p> <p><b>wrong</b> 371:2, 396:5</p> <hr/> <p style="text-align: center;"><b>Y</b></p> <hr/> <p><b>yeah</b> 358:22, 363:11, 363:13, 364:4, 367:4, 371:5, 374:20, 374:21, 376:4, 376:16, 376:22, 379:12, 385:21, 386:2, 388:17, 389:7, 389:12, 390:17, 391:21, 392:3, 395:8, 396:3, 396:8, 396:9, 396:20, 400:12, 400:22, 403:17, 403:18, 404:17, 405:20, 408:2, 408:6, 408:9, 411:13, 413:17, 421:1, 421:3, 421:16, 421:17, 422:18, 424:7, 424:13, 424:16, 425:2, 425:14, 425:18, 427:1, 428:14, 428:15,</p>	<p>433:18, 435:20, 436:9, 437:9, 437:18, 437:19, 438:13, 438:21, 439:10</p> <p><b>yield</b> 414:21</p> <p><b>yields</b> 419:9</p> <p><b>york</b> 352:8, 353:9, 444:5</p> <p><b>yourself</b> 356:14, 440:11</p> <p><b>yup</b> 379:9, 420:10, 427:16, 432:22</p> <hr/> <p style="text-align: center;"><b>Z</b></p> <hr/> <p><b>ziesch</b> 354:2, 356:12</p> <p><b>zinc</b> 365:18, 365:19</p> <p><b>zoom</b> 425:12, 444:15</p> <hr/> <p style="text-align: center;">.</p> <hr/> <p><b>.1</b> 364:6</p> <p><b>.2500</b> 353:10</p> <p><b>.5600</b> 353:20</p> <hr/> <p style="text-align: center;"><b>0</b></p> <hr/> <p><b>00</b> 376:9</p> <p><b>0069</b> 376:9, 376:17</p> <p><b>01211</b> 351:11, 356:8</p> <p><b>01212</b> 351:11</p> <p><b>01213</b> 351:13</p> <p><b>01214</b> 351:13</p> <p><b>0218356</b> 355:18, 399:16</p>	<p><b>0233212</b> 355:13, 376:3, 376:7</p> <p><b>031266</b> 385:16</p> <hr/> <p style="text-align: center;"><b>1</b></p> <hr/> <p><b>10</b> 351:20, 356:9, 413:20, 413:21, 414:2, 426:3, 426:22, 429:18, 439:10, 444:16</p> <p><b>1005</b> 355:12, 375:19, 376:6</p> <p><b>101</b> 420:8, 420:16</p> <p><b>10112</b> 353:9</p> <p><b>102</b> 420:9, 420:14, 420:16</p> <p><b>103</b> 421:1</p> <p><b>1039</b> 355:15, 385:5, 385:11, 386:9, 386:14</p> <p><b>1040</b> 355:17, 399:12, 399:15</p> <p><b>1041</b> 368:2</p> <p><b>11</b> 439:15, 439:17, 439:20, 443:10, 443:11, 444:17</p> <p><b>12</b> 356:8, 374:12, 374:16, 379:5, 445:4</p> <p><b>120</b> 380:8, 382:9, 383:8</p> <p><b>13</b> 356:8, 375:4, 440:4, 440:6</p>
---	--	---	--

Transcript of Martin C. Peckerar, Ph.D. (Volume 3)  
 Conducted on September 10, 2021

<p><b>14</b> 356:8, 396:8, 396:10, 396:22 <b>15</b> 376:13, 376:21, 389:1, 424:10, 424:12, 424:22, 427:2, 428:10, 429:19, 439:11 <b>16</b> 396:8, 396:11, 396:22 <b>18</b> 416:22 <b>180</b> 353:18 <b>19</b> 402:21, 403:19, 439:15, 439:17</p>	<p><b>22</b> 416:22 <b>23</b> 419:19, 420:3, 420:4 <b>26</b> 423:17 <b>27</b> 433:4 <b>28</b> 433:6 <b>29</b> 413:20, 413:21 <b>2nd</b> 360:16</p>	<p><b>41</b> 386:4, 386:6, 439:17 <b>42</b> 393:9, 393:15, 393:16, 395:5, 395:22, 413:21, 414:2, 423:16 <b>43</b> 374:16, 425:1 <b>439</b> 355:4 <b>44</b> 386:6, 386:7, 433:1, 433:3 <b>445</b> 351:24 <b>46</b> 443:10, 443:11, 444:17 <b>47</b> 391:17 <b>4900</b> 353:18</p>	<p>408:19 <b>7b</b> 408:19, 408:20 <b>7c</b> 375:11, 375:12, 377:3 <b>7d</b> 376:11</p>
<p style="text-align: center;"><b>2</b></p>	<p style="text-align: center;"><b>3</b></p>	<p style="text-align: center;"><b>5</b></p>	<p style="text-align: center;"><b>8</b></p>
<p><b>20</b> 380:8 <b>2003</b> 385:16 <b>2005</b> 355:13, 376:3, 376:7 <b>2007</b> 355:18, 399:16 <b>2020</b> 351:11, 351:13, 356:8 <b>2021</b> 351:20, 356:10, 444:16, 445:4 <b>2024</b> 445:10 <b>2050</b> 355:20, 360:2, 360:4, 364:6, 368:3, 370:19, 374:12 <b>21</b> 415:4, 416:22, 419:17 <b>212.408</b> 353:10</p>	<p><b>30</b> 353:8 <b>312.616</b> 353:20 <b>32</b> 380:12 <b>35</b> 404:4, 410:15, 416:13 <b>351</b> 351:24 <b>357</b> 355:3 <b>360</b> 355:20 <b>376</b> 355:12 <b>38</b> 379:14, 413:14, 415:5, 416:21 <b>386</b> 355:15 <b>39</b> 420:4 <b>395274</b> 351:23 <b>399</b> 355:17 <b>3rd</b> 360:17</p>	<p><b>41</b> 374:16, 425:1 <b>439</b> 355:4 <b>44</b> 386:6, 386:7, 433:1, 433:3 <b>445</b> 351:24 <b>46</b> 443:10, 443:11, 444:17 <b>47</b> 391:17 <b>4900</b> 353:18</p>	<p style="text-align: center;"><b>8</b></p> <p><b>8</b> 351:21, 356:10, 444:17 <b>835</b> 406:19, 407:3 <b>858</b> 417:3, 424:22</p> <p style="text-align: center;"><b>9</b></p> <p><b>9</b> 386:4, 386:6, 386:7 <b>9,153,835</b> 351:12 <b>9,496,581</b> 351:12 <b>9,799,858</b> 351:14 <b>9,799,913</b> 351:14</p>
<p style="text-align: center;"><b>4</b></p>	<p style="text-align: center;"><b>4</b></p>	<p style="text-align: center;"><b>6</b></p>	<p style="text-align: center;"><b>7</b></p>
<p><b>40</b> 421:9</p>	<p><b>40</b> 421:9</p>	<p><b>7a</b> 375:8, 376:11,</p>	