

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2 -----
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD
4 -----

5
6 ADC SOLUTIONS AUTO LLC

7 Petitioner

8
9 v.

10
11 THE NOCO COMPANY

12 Patent Owner

13 -----
14 IPR2024-00577 (Patent 11,447,023)

15 IPR2024-00671 (Patent 11,584,243)
16 -----

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18
19 DEPOSITION OF DR. C. ARTHUR MacCARLEY

20 TAKEN ON BEHALF OF THE PATENT OWNER

21 OCTOBER 29, 2024
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I N D E X

WITNESSES

ALL WITNESSES PAGE

For Patent Owner

DR. C. ARTHUR MacCARLEY

Examination by Mr. Sauer

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EXHIBITS

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(Exhibits retained by counsel.)

1 STENOGRAPHER'S NOTE: All quotations from exhibits
2 are reflected in the manner in which they were read
3 into the record and do not necessarily denote an
4 exact quote from the document.
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DEPOSITION OF WITNESS, DR. C. ARTHUR
MacCARLEY, produced, sworn and examined on the 29th
day of October, 2024, at the offices of Husch
Blackwell, 8001 Forsyth Boulevard, St. Louis,
Missouri, before Tara Schwake, a Registered
Professional Reporter, Certified Realtime Reporter,
Certified Shorthand Reporter (IL), Certified Court
Reporter (MO), and Notary Public within and for the
State of Missouri.

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1 IT IS HEREBY STIPULATED AND AGREED by
2 and between Counsel for Petitioner and Counsel for
3 Patent Owner that this deposition may be taken by
4 Tara Schwake, Notary Public and Certified Realtime
5 Reporter, thereafter transcribed into typewriting,
6 with the signature of the witness being expressly
7 reserved.

8 DR. C. ARTHUR MacCARLEY,
9 Of lawful age, having been produced, sworn, and
10 examined on the part of Patent Owner, testified as
11 follows:

12 * * * * *

13 (Deposition commenced at 8:58 AM.)

14 EXAMINATION

15 QUESTIONS BY MR. SAUER:

16 Q Sir, can you state your name for the
17 record, please?

18 A Carl Arthur MacCarley. I go by Art.

19 Q Do you understand that the testimony
20 you're providing today is under oath?

21 A Yes.

22 Q Is there anything that would prevent
23 you from giving truthful and accurate testimony
24 today such as medications you might be taking or
25 anything else?

1 A Nope.

2 Q So it's important that we don't talk
3 over each other so the court reporter can
4 accurately report what you're saying. So if you
5 would, please let me finish my questions, and
6 before you answer, and then I'll try and make sure
7 that I don't speak over you. Is that fair?

8 A Understood.

9 Q Today we're discussing Inter Partes
10 Review Proceedings for US Patent Numbers 11,447,023
11 and 11,584,243. Is that your understanding?

12 A Yes.

13 Q Is it okay if we refer to these
14 patents as the '023 and the '243 patents?

15 A No problem.

16 Q ADC's counsel has agreed that this
17 deposition will cover your testimony in both IPR
18 proceedings. Is that your understanding?

19 A I understand. I'll speak louder.

20 Q Sir, what did you do to prepare for
21 your deposition today?

22 A Well, I reviewed my Declarations for
23 both the patents. I reviewed my existing knowledge
24 of the USB specifications. I reviewed the exhibits
25 that I cited in the Declarations. And I reviewed

1 both of the original NOCO patents.

2 Q Did you speak with anybody in
3 preparation for your deposition?

4 A Well, yes. I spoke quite a bit with
5 Paul Smelcer, the lead attorney on the case.

6 Q Anybody else?

7 A Briefly I spoke with Daisy Manning,
8 another attorney on the case who briefly joined us
9 in a summary meeting yesterday.

10 Q Did you have discussions with -- in
11 preparation for your deposition with anybody who
12 was not a lawyer?

13 A No.

14 Q Okay. If you could, I handed you
15 earlier your Declaration from IPR2024-00577 which
16 is marked as Exhibit 1003. Could you pull that
17 out, please? This is the one from your '023 patent
18 first.

19 For the record, the exhibit numbers
20 are going to be the same here for both IPRs for
21 most everything except his Declarations, which are
22 different. So if I'm referring to his Declarations
23 and I don't say which one I'm referring to, please
24 let me know.

25 We're talking about the '023

1 Declaration now.

2 A I understand.

3 Q And do you recognize this as the
4 Declaration you submitted in IPR2024-00577 on the
5 '023 patent?

6 A Yes.

7 Q And we can refer to this as your '023
8 Declaration; is that okay?

9 A I prefer that.

10 Q Can you look at page 104, last page?

11 A Okay.

12 Q Is that your signature, sir?

13 A Yes, it is.

14 Q Did you write this Declaration?

15 A Not entirely, but most of it.

16 Q Who else wrote it?

17 A Much of the legal input, which is
18 outside of my area of expertise but was necessary,
19 was provided by Mr. Smelcer.

20 Q Which parts did you write?

21 A All of the technical content I can
22 take first person authorship for. There is quite a
23 bit of legal content, especially from the
24 prosecution history, that was originally authored
25 by Mr. Smelcer and I imported. I can assure you

1 that I take full responsibility for everything in
2 the Declaration.

3 Q You say "imported," what do you mean
4 by "imported"?

5 MR. SMELCER: Object as -- on the
6 basis of work product and privilege.

7 Q (BY MR. SAUER) I just wanted to
8 understand what you meant by the word "imported."

9 A The -- the original written content
10 was provided by Mr. Smelcer.

11 Q Oh, imported into your Declaration?

12 A And I put it in the Declaration. Or
13 sometimes, since this was a collaborative effort,
14 he might have inserted it at the appropriate
15 position.

16 Q Understood. Understood. About how
17 much time did you spend preparing your Declaration?

18 A Going back to the original work on
19 it, you know, it's been a while.

20 Q Approximately.

21 A I think maybe about three, four days
22 were dedicated to my work on this. But it wasn't
23 necessarily contiguous. This is a little back and
24 forth.

25 Q Sure.

1 A But I think that's a fair assessment
2 of the original work I did on it.

3 Q Are there any changes you'd like to
4 make at this time?

5 A Not that I can think of at the
6 moment, but I would like to reserve the opportunity
7 to, if I see something in the course of your
8 questioning that I have second thoughts about, I
9 will certainly let you know.

10 Q Sure. There's no mistakes you're
11 aware of at this point?

12 A No.

13 Q Okay. If you can pull from the pile
14 the other Declaration, the one for the '243 patent?

15 A Mm-hmm.

16 Q And this is Exhibit 1003 in
17 IPR2024-00671.

18 A Yes.

19 Q Do you recognize this as the
20 Declaration you submitted in IPR2024-00671?

21 A Yes.

22 Q And we can refer to this one as your
23 '243 Declaration?

24 A That'd be fine.

25 Q And if you look on page 91 in the

1 back? Is that your signature, sir?

2 A Yes.

3 Q And did you also write this
4 Declaration?

5 A This is a photocopy. It's not the
6 original.

7 Q Understood.

8 A Go ahead.

9 Q You wrote this Declaration in the
10 same way you wrote the '023?

11 A That's a fair statement, yeah.

12 Q Was there any differences in how you
13 prepared this one than the '023 patent?

14 A Not really. In fact, you'll find a
15 great deal of overlap between them because the
16 patents are very similar.

17 Q But as far as the procedure.

18 A No. This is formulaic. There is --
19 I have some experience with Declarations and
20 there's usually sort of a sequential pattern you
21 can follow, and I follow that.

22 Q And how much time did you spend
23 preparing this Declaration?

24 A Probably about the same time.

25 Q Any changes you want to make in this

1 one?

2 A Same response as before.

3 Q Which is none that you're aware of?

4 A None that I'm aware of, but if in the
5 course of going through it I find something that I
6 would like to amend in some way, I will certainly
7 let you know.

8 Q Understood. Okay. If you can pull
9 out your CV, please? And this is Exhibit Number
10 1004 in both IPRs. Do you recognize this as a copy
11 of your CV, sir?

12 A I do.

13 Q And at the bottom of page 1 here it
14 says "Curriculum Vitae, C. A. MacCarley (Updated
15 June 2023)."

16 A That's correct.

17 Q Does this mean that the CV is up to
18 date as of June of 2023?

19 A Yes.

20 Q Is there anything since June 2023
21 that you'd want to add?

22 A Yes, I've been engaged on at least
23 two cases since then. Would you like to know more
24 about them?

25 Q Are you able to?

1 A I think it's a matter of public
2 record. One was for Tesla, Tesla IPR against
3 Graphite Charging, which is actually an NPE.
4 Non-participating entity. And another IPR
5 involving NOCO, this time they had asserted against
6 Deltran, or Deltronics, and I am serving as their
7 expert also.

8 Q In the Tesla IPR, did you submit a
9 Declaration?

10 A I have, yes.

11 Q At the top of page 1 of your CV you
12 list your specializations as "Automotive
13 electronics and control systems, electric and
14 alternative fuel vehicles." Correct?

15 A That's correct.

16 Q Would you consider yourself to be an
17 expert in these areas, sir?

18 A I think most people would consider me
19 to be an expert.

20 Q And then starting on page 5 of your
21 CV, going through for the next several pages, you
22 list multiple publications that relate generally to
23 automotive technology. Is that correct? Starts at
24 the bottom of page 5.

25 A Page 5 of 12 of the exhibit is what

1 I'm on.

2 Q I take that back. I think your
3 publications start at the top of page 5; correct?

4 A Yes. These are publications over the
5 course of my academic and research career.

6 Q And mostly relating to automotive
7 technology?

8 A Mostly.

9 Q Is there anything in here that
10 specifically relates to jump starter technology?

11 A Jump starter. Nothing directly, but
12 indirectly quite a few of them because --

13 Q How so?

14 A Power control technology, say, on
15 electronic vehicles and automobiles in general, has
16 a lot of -- a lot of the same electronics involved,
17 power conversion, power transfer. As I'm sure
18 you're aware, electric cars and even combustion
19 engine vehicles now carry enough electronics to
20 probably cover all electronics that were available
21 30 years ago.

22 Q Sure. Well, is there anything in
23 here, in these publications, that relates to
24 vehicle emission systems?

25 A Yes.

1 Q Could you -- could you point them
2 out? I'm trying to reduce what I have to read.

3 A Sure. If you could give me a moment.
4 Well, starting with the first one, which was my
5 first professional publication in 1976, "Sodium
6 Borohydride Hydrogen Fuel Storage," the whole
7 objective of that is to produce vehicles that have
8 no regulated emissions.

9 Hydrogen can do that. The problem
10 with hydrogen is it's difficult to store on board
11 and this was -- I would -- I would say most people
12 consider it now a significant milestone publication
13 in that area.

14 Q Let me make my question more
15 specific. Anything in here that you would find
16 relevant to vehicle emission systems for combustion
17 engine vehicles?

18 A Sure. Well, that is for combustion
19 engine vehicles.

20 Q Oh, sorry.

21 A Yeah. You're probably thinking of
22 fuel cell hydrogen vehicles now, and you can use
23 hydrogen for that, but in this time frame, although
24 hydrogen fuel cells were available, and actually
25 part of this paper does talk about I developed a

1 hydrogen from sodium borohydride base fuel cell at
2 the time.

3 But moving forward to most directly
4 answer your question, electronic fuel injection
5 techniques for hydrogen powered internal combustion
6 engines, IC engines, that was on point.

7 I'll -- Alternative Automotive Fuels
8 Handbook, I was not the sole author on this, I was
9 contributor to it, by the National Science
10 Foundation, had to do with the use of alternative
11 fuels as a way of reducing emissions and improving
12 efficiency.

13 Moving down to "An Indirect Sensing
14 Technique for Closed-Loop Diesel Fuel Quantity
15 Control," this was -- it dealt with reducing the
16 emissions of diesel engines. I should point out,
17 although the titles for maybe the next five or six
18 or seven don't speak directly to automotive,
19 they're all funded by the California Department of
20 Transportation, which part of their mandate has to
21 do with reducing emissions as well as maintaining
22 flow of traffic.

23 That is, in the chronology for this
24 CV, that's the end of the journal papers. Now I go
25 into the conference papers for which there are

1 quite a few more. I should add to this list,
2 though, I have just published a book which covers
3 many of these same topics.

4 Q What's the name of it?

5 A It's called The New Age of
6 Non-petroleum Transportation. It's very heavily
7 involved in the control systems of vehicles that
8 run on something other than gasoline or diesel
9 fuel, as well as the whole field of electric
10 vehicles.

11 Q There's a lot of papers here, so
12 maybe let me ask a more specific question. Are
13 there any of your conference papers or other
14 publications, journal publications, books, that
15 relate to jump starter technology?

16 A No. Not specifically, no.

17 Q What about USB technology?

18 A No.

19 Q Consumer electronics in any way?

20 A Yes, you'll find a number of these
21 that involve video assessment sensing technologies,
22 all in the automotive space. You probably have
23 noticed from my case list later, beyond the
24 publications, that I've done a number of expert
25 witness cases related to -- in a similar area that

1 are all automotive.

2 I guess the closest I can claim to it
3 is in the vicinity of 2,000, I've published a few
4 papers related to alternatives to vehicle battery
5 charging, but this was devoted to electric
6 vehicles, not jump starting internal combustion
7 engine vehicles.

8 One of my prior expert witness cases,
9 since I guess you can say that Declarations that I
10 have written do -- they're actually published. I
11 don't list them and stuff, but they are public
12 record.

13 One is for AM General and it dealt
14 with charging dead batteries basically in military
15 vehicles usually. They were the primary contractor
16 for the Humvee. The standard vehicle used in the
17 Gulf wars.

18 Q AM General, is that listed on here,
19 that case?

20 A I'll have to jump forward to --

21 Q I'll look for it at the same time.

22 A If you do a search for. It's the
23 third from the bottom on page 10 of the CV, UUSI
24 LLC versus AM General LLC.

25 Q And you say you submitted a

1 Declaration in this case?

2 A Yes. And we prevailed.

3 Q Any others?

4 A Oh, gosh. You'll find that, you
5 know, I've -- I just jump to my legal experience.
6 I didn't complete answering your question for the
7 publications. Do you want me to go back?

8 Q Sure. Either legal experience or
9 publications, let's make it a broader question,
10 related to jump starter technology.

11 A Well, again, I have no publications
12 directly related to jump start technology. As I
13 mentioned before, I am doing an almost identical
14 current case in support of Deltran against your
15 client.

16 Well, going to the end of the
17 conference publication list and reports, I've done
18 a fair amount of research and have developed
19 expertise in the electric vehicle area. One paper
20 I list called "Electric Vehicle Safety," which is
21 actually online tutorial.

22 Q Okay.

23 A This is November of 2011, dealt with
24 charging batteries. Maybe almost half the
25 publication is related to that because they're

1 enormous hazards when you're dealing with extremely
2 high powered batteries found in electric vehicles.
3 And this is for the benefit of, first of all, all
4 my students.

5 I was the founder of the Electric
6 Vehicle Engineering Club at Cal Poly. We built
7 several vehicles, competed in some, and I was very
8 concerned about students so I produced this
9 publication, put it out there for general use, and
10 over the years, even though it's out of date now
11 because this was mainly talking about lead acid
12 battery technology, which is the same thing for
13 current IC engine vehicles for their SLI batteries,
14 starting, lighting, and ignition, it does not
15 discuss lithium batteries but it was very much
16 centered around handling batteries, charging them,
17 appropriate safe wiring procedures when building
18 prototype electric vehicles, of which we and the
19 students and projects and classes or in the context
20 of the club that I founded did do. With some -- a
21 fairly high level of success also I should say.

22 Q Is that it?

23 A Now we'll jump to the legal cases.
24 There's quite a few cases here that dealt with
25 almost identical technology in the power

1 electronics. In fact, the core issues that I'm
2 sure you will be addressing later, for instance,
3 Continental Automotive GmbH versus Atmel, I was
4 representing Atmel. Had to do with an airbag
5 control module and the electronics at issue was a
6 bidirectional buck-boost converter. Buck, as in
7 buck-boost, and then converter. Sorry. So there
8 was a lot of commonality in that technology.

9 Also a class action suit in which I
10 represented the class against Toyota later. Okay.
11 It's, at about the 60 percent point down on page
12 11, it's Remy McCarthy, et al., which was a class,
13 versus Toyota, and it had to do with, it says, a
14 "Product defect, hybrid drive power electronics."
15 Which is exactly the same voltage increase or
16 decrease technology that is one of -- one of the
17 points I'm sure you'll be discussing later.

18 Q Okay. I asked this for your
19 publications. I don't think I did for your
20 experience. Any of your expert witness experience
21 relate to USB technology?

22 A Some in -- I would say quite a few
23 involved at some point equipment that had USB
24 connections, but none was specifically related to
25 intellectual property of USB or USB applications.

1 Q As an expert in the field of
2 automotive electronics, are you familiar with the
3 operation of an automobile ignition system?

4 A Yes.

5 Q And are you familiar with the
6 operation of portable jump starters?

7 A Yes.

8 Q So for a typical midsize automobile
9 in average weather conditions, do you know, what's
10 the typical peak current that a jump starter would
11 need in order to start the engine?

12 A Well, it is -- it is strongly
13 dependent upon the displacement of the engine, as
14 it's almost linear proportional because that's the
15 opposing torque from the engine. I'll say about
16 500 amps. A typical starting, lighting, and
17 ignition battery that you would use to start a car
18 is in the range of capability between 450 and 1,000
19 peak amps.

20 You'll see a rating on the side of a
21 battery. Usually they will say CCA, cold cranking
22 amps, which under cold weather conditions, I think
23 that's zero Centigrade; although, I'm not sure on
24 that point, that's how much current it can provide.

25 And under hot normal room temperature

1 cranking conditions, 1,000 amps is within the realm
2 of, say, a group 27 automotive battery, which you
3 would find in maybe the most common type of
4 vehicles now which are SUVs.

5 Q So a common automotive battery can
6 provide a peak amp rating of 1,000 amps?

7 A Yes. And I speak from my own actual
8 personal experience on that.

9 Q Yeah.

10 A The actually rating, the name plate
11 rating, again, would say, typically, we'll say
12 between 650 and 850 CCA, cold cranking amps. You
13 can find that on the name plate of the battery.
14 And that would be more than adequate to start a car
15 for which you would actually require at least 500
16 amps to rotate the starter under those same
17 conditions.

18 Q Is the peak current that's required
19 to start a battery higher than the cold cranking
20 amps?

21 A Yes. Batteries perform -- at least
22 lead acid batteries perform better when they are at
23 room temperature. All batteries tend to degrade
24 their potential power output as they get cold.

25 Q The average peak current for a

1 standard automobile that's required to start the
2 battery would be you said 500 amps?

3 A Yes.

4 Q What about the cold cranking amps?

5 A Well, this is why they list CCA on
6 batteries because what matters to the owner is I
7 want to be able to start my car in the morning and
8 it's cold in the morning, so the ability of the
9 battery to provide a certain current flow under
10 those conditions sets the minimum required for that
11 battery. This is why you'll find different size
12 batteries in different cars.

13 Q Let me ask it this way. Does the
14 temperature affect the peak current that's required
15 to start a car?

16 A Oh, absolutely, yes.

17 Q How so?

18 A Well, when it is cold, with the
19 exception of a few exotic battery chemistries, all
20 batteries are limited to lower current outputs when
21 it is cold. I'm sure you've observed that if you
22 come from a cold climate and you find your car
23 doesn't crank over very well when it's 20 below
24 zero.

25 Q Is that why a typical battery would

1 have a peak current rating of 1,000 amps so it can
2 start in unfavorable conditions?

3 A Well, the thousand amps was at normal
4 temperature or maybe about 20 C, 20 degrees
5 Centigrade. Under cold conditions, I don't believe
6 that same battery that I'm thinking of could
7 provide that much current.

8 Q Under winter conditions, do you know
9 what the typical peak amperage would be that's
10 required to start a midsize automobile?

11 A Well, the actual requirement from the
12 engine, which is the way you asked the question, is
13 actually -- is higher while concurrently the
14 battery amp capability is lower.

15 So I mean, this is the problem with
16 starting cars under cold conditions. It's why -- I
17 used to live in Minnesota for a while and a lot of
18 people have battery heaters if their car is in an
19 unheated garage or outdoors.

20 Q You said the peak amp requirement's
21 higher. Do you know average, what amount?

22 A If it required 500 under normal
23 conditions, it might require 600 or so. Maybe
24 slightly more. Concurrently, the battery's
25 capability to provide that current is also reduced.

1 Cold weather is hard on starting cars.

2 Q And if you're using a jump starter
3 instead of the vehicle battery to jump start the
4 car, that jump starter would be required to provide
5 that peak amp current; right?

6 A Yes. Although one of the advantages
7 of using a portable jump starter is that it is
8 usually warm. It has been in the interior of the
9 car or you keep it in your house or in the garage,
10 so it is not as cold as the battery that is sitting
11 in the car.

12 Q You mean the device is warm.

13 A Yes. The batteries in the jump
14 starter are warmer.

15 Q But if a jump starter were being used
16 to start a car that's in cold conditions, it would
17 need to provide a higher peak current than in the
18 car were in --

19 A Yes.

20 Q -- warm conditions?

21 A Further to your question, if you left
22 your jump starter outdoors, left it on the roof of
23 your car when it hit 20 below, it would be subject
24 to the same limitations as any other batteries.

25 In fact, lithium batteries may even

1 be a bit worse. This is one of the big issues in
2 the design of lithium batteries for electric
3 vehicles.

4 Q Are you aware that many commercially
5 available jump starters have peak current rating of
6 over 1,000 amps?

7 A I don't believe that's a number I've
8 seen published for them.

9 Q What number have you seen published?

10 A I have not seen published numbers for
11 them. I can infer that from the size and the
12 number of batteries on the side. And for brief
13 periods, compact jump starters of the type that are
14 produced by your client, I suppose. They certainly
15 can provide more than 500 amps.

16 Q And is that so that they can -- would
17 you infer that that's so that they can start cars
18 in favorable conditions as well?

19 A I would assume so. At some point it
20 could be too cold for even them to work, but I
21 believe one of the times that you would probably
22 end up using a jump starter is if you have a weak
23 battery in the car and it's really cold and it
24 doesn't quite have enough juice to crank the
25 engine. Juice being energy storage capacity.

1 Q What about vehicles with larger
2 engines, would they require a higher peak current
3 to start?

4 A Yes.

5 Q Pickup trucks?

6 A I wouldn't say -- pickup trucks are
7 in the class of light trucks. They generally have
8 the same types of engines as the SUVs that
9 completely dominate the US market right now. But
10 generally the larger the engine, the more power is
11 necessary to crank it. Under any conditions.

12 Q What about a tractor-trailer?

13 A That would be a fairly large diesel
14 engine and most definitely it would require more
15 power.

16 Q Do you know roundabout the peak
17 current that would be required to start a
18 tractor-trailer in average weather conditions?

19 A I -- I don't -- I don't -- I don't
20 know exactly. I was speaking from personal
21 experience before. I'm sure this is something I
22 could look up for you if you needed or if I ever
23 needed it, I would, but I have never had the need
24 to have that number.

25 Q Certainly higher than the 500 amps

1 that you say for a typical automobile?

2 A Yes.

3 Q Would you think it would be twice as
4 much? In the neighborhood of twice as much?

5 A Well, general diesel engines require
6 more power to start.

7 Q Sure.

8 A It is because they are higher
9 compression ratio engines. So it's a -- call it a
10 higher pressure compressor and it requires more
11 power to drive that compressor. That's probably
12 the biggest factor even more so than the increase
13 in the displacement.

14 Truck engines are -- a ten liter
15 tractor-trailer engine might be typical; whereas, a
16 typical for car might be a five liter engine.

17 Q So you really couldn't put a number
18 on peak current off the top of your head?

19 A No. I would look it up.

20 Q And you said that largely because
21 it's a diesel engine. Is the same true for diesel
22 automobiles? Do they require a higher current to
23 start?

24 A Yes. I own a diesel light pickup
25 truck and I'm not sure -- in fact, I'm sure that

1 all of them don't, but mine has dual batteries
2 specifically for that purpose and they are kept in
3 parallel.

4 Q Parallel?

5 A Yes. Simply to provide higher power.
6 Higher current. Two batteries in parallel can
7 provide twice the current of one battery.

8 Q Do you know what size batteries?

9 A I think they're group 24s.

10 Q Does the peak current rating factor
11 into the battery capacity that's needed to -- in a
12 jump starter?

13 A I'm just a bit confused by your
14 question because -- could you separate that into
15 what is the requirement of the jump starter versus
16 the --

17 Q In order -- let me ask it this way.
18 In order to provide a higher peak current to start
19 a vehicle, does that also mean you need to have a
20 higher capacity battery? Are the two related?

21 A Higher capacity jump starter?

22 Q Jump starter or battery.

23 A Or another vehicle to connect jumper
24 cables to, jump start, yes, that's true.

25 Q There's a relationship between the

1 amount of current that a battery can provide and
2 its capacity?

3 A Yes. Now, I should, as a subtlety
4 here, in lead acid batteries alone there are
5 considered three main classes. In vehicles they're
6 called SLI, starting, lighting, and ignition
7 batteries, and they are designed specifically to
8 provide high current at the expense of not very
9 much energy storage capacity. They can provide
10 that, you know, that thousand amps, if necessary,
11 for a brief period of time, but you can't go
12 cranking for a long, long time.

13 The other extreme are batteries
14 called deep cycle batteries which are the type you
15 would use in a lead acid power battery for an
16 electric vehicle like a golf cart. Those are all
17 deep cycle batteries. Or for lead acid battery
18 equipped solar, home solar systems, the standard
19 used to be large banks of deep cycle batteries.

20 Then there is an intermediate class
21 called marine deep cycle batteries, which are kind
22 of halfway between, because in a marine application
23 you need a decent amount of energy but you also
24 need to be able to start the engine, which is
25 usually a diesel engine, in a boat.

1 Q We're going to move on to another
2 topic. Whenever you want to take a break, just let
3 me know. Otherwise, I lose track of time.

4 A We can go at least an hour.

5 Q As long as I'm not in the middle of a
6 question.

7 A Okay. I appreciate the offer.

8 Q Okay. If you can pull out the
9 Richardson reference. And this is Exhibit 1005 and
10 that's the same exhibit number for both IPRs.
11 Turning first to your '023 Declaration for
12 Richardson, if you can flip to page 28, please?

13 A I am there.

14 Q Starting on page 28 of your '023
15 Declaration and continuing through page 71, you
16 address Ground 1, which alleges that (quote as
17 read):

18 Claims 1, 32, 38, 39, 47, 52, and
19 54 are unpatentable over
20 Richardson in view of Zhao,
21 Z-h-a-o.

22 Is that correct?

23 A That's correct.

24 Q And if you can pull out your '243
25 Declaration? On page 28?

1 A I'm there.

2 Q Similarly, starting on page 28 of
3 your '243 Declaration, you address Ground 1 that
4 alleges that (quote as read):

5 Claims 1 and 2 are unpatentable
6 over Richardson in view of Zhao.

7 Correct?

8 A Correct.

9 Q Now if you can turn to Richardson,
10 please, Exhibit 1005?

11 A In '023 or --

12 Q No, the reference exhibit. Exhibit
13 1005 is a copy of US Patent Application Number
14 2013/0154543 to Richardson. Correct?

15 A That's correct.

16 Q Do you recognize this as the same
17 Richardson reference that you've addressed in your
18 Declarations?

19 A Yes.

20 Q Did you review Richardson during the
21 preparation of your Declarations?

22 A Yes.

23 Q How much time did you spend reviewing
24 this reference?

25 A I used it as needed rather than do a

1 block read through. So certain parts were
2 applicable to certain things. I can say I feel
3 more than adequately familiar with the Richardson
4 patent.

5 Q Okay. Then if you could turn to
6 Page 5 of Richardson?

7 A I'm there.

8 Q I'm sorry, page 18. It says 5 at the
9 top, but page 18 of 20 at the bottom. That's the
10 problem with renumbering things that already have
11 numbers.

12 A I'm there.

13 Q Refer to paragraph 55, 0055?

14 A Okay.

15 Q Can you read this paragraph to
16 yourself, let me know when you're done?

17 A It references Figure 2, but there is
18 actually a Figure 2A, 2B, and 2C, and it appears to
19 be referring to Figure 2C, just for your...

20 I've read it.

21 Q What's Richardson describing in
22 paragraph 55?

23 A He's pointing out an advantage OF
24 their approach whereby if the jump starter, as he
25 envisioned it, is left connected after the vehicle

1 does start, then the charging system of the
2 vehicle, which generally produces 60 to 80 amps,
3 always sets the rating of the alternator, will
4 actually back charge the batteries in the jump
5 starter.

6 Because you're talking about very
7 high current available, either directly from the
8 now charged battery or from the charging system,
9 the alternator, generator of the vehicle. It can,
10 therefore, charge the jump starter batteries quite
11 quickly.

12 They cite one to five minutes as
13 opposed to a longer period of time if it was slow
14 charged from a lower current source. And they
15 point out that (quote as read):

16 This is very useful -- I'm
17 quoting -- This is very useful
18 when starting fleets of vehicles
19 with dead batteries.

20 This would be where you would use
21 your jump starter to start one vehicle and then
22 immediately use it or within one to five minutes
23 use it to start another vehicle.

24 Q You said one to five minutes because
25 Richardson states that the goal was to be able to

1 do this in about one to five minutes; right?

2 A He cites it as, as he says, (quote as
3 read):

4 This is very useful when starting
5 fleets of vehicles.

6 This is a rare situation, I should
7 point out, but most compact jump starters are
8 designed with the consumer in mind who is not going
9 to be starting one vehicle after another vehicle.
10 They're going to start their vehicle with the dead
11 battery and then go to work or leave for the
12 grocery store.

13 Q But Richardson's device is designed
14 with that in mind you're saying?

15 A It has that additional capability
16 beyond capabilities of any other way in which the
17 jump starter batteries can be charged.

18 Q And at the beginning of this
19 paragraph Richardson refers to Figures 1 and 2?

20 A Correct.

21 Q And you were saying that's 2C;
22 correct?

23 A Yes. This really refers to Figures
24 2C.

25 Q And says specifically, (quote as

1 read):

2 Referring to Figures 1 and 2, a
3 diode 35 may be connected across
4 the contact 34 to charge the
5 capacitors 21 and jump starter
6 batteries 22 from the vehicle
7 charging system 28.

8 Right?

9 A I didn't read along with you but that
10 sounds correct.

11 Q Let's look at Figure 1 then on
12 page --

13 A Did you mean Figure 2C?

14 Q Let's start with Figure 1.

15 A Okay. Figure 1 is a higher level
16 diagram. So you can see towards the bottom of
17 Figure 1, jump starter batteries 22. You see that?
18 Bottom left.

19 A Yes.

20 Q And these are the same jump starter
21 batteries 22 that Richardson is referring to in
22 paragraph 55. Right?

23 A Yes. And as you can see from the
24 schematic, they are in parallel with the optional
25 capacitors.

1 Q Capacitors 21, they are also shown on
2 Figure 1. Right?

3 A Correct.

4 Q And diode 35 that's refers to in
5 paragraph 55, is also shown here in Figure 1.
6 Right? On the right.

7 A Sorry, I -- what I heard was 55.
8 This is 35.

9 Q I'm sorry, I have 35. I may have
10 misspoke.

11 A I see it, yes. I see diode 35.

12 Q That's the diode that's referred to
13 in paragraph 55?

14 A Yes.

15 Q And it's connected across the contact
16 relay 34. Right?

17 A Yes. The power contacts of the
18 relay, yes.

19 Q And then there's box 41 that's also
20 connected to the contact relay. Do you see that?

21 A Yes.

22 Q And that's a thermal switch.
23 Correct? It's referred to in paragraph 18, if
24 you'd like to go there.

25 A It does not appear in Figures --

1 Q Thermal switch is box 41?

2 A Yes. I see that. I'm trying to
3 match it to the diagram as we did previously, and
4 I'm not finding it on the diagram. I'm referring
5 to the schematic diagram.

6 Q Let's look at Figure 1 for now.
7 We'll get to Figure 2.

8 A Yes, I definitely see it in Figure 1.

9 Q It's connected to the contact relay
10 34.

11 A Yes.

12 Q And do you recognize that as a
13 thermal switch? Let me help you. Look at
14 paragraph 18 on page 15. See the first sentence of
15 paragraph 18 says (quote as read):

16 The temperature of a 00 AWG shunt
17 cable 37 may also be monitored by
18 a temperature sensor or thermal
19 switch 41.

20 You see that?

21 A Yes.

22 Q Then referring back to Figure 1?

23 A Yes.

24 Q 41 is a thermal switch. Correct?

25 A Correct. Which I would -- there's

1 multiple embodiments of thermal switches, but yes,
2 I see it there.

3 Q Sure. And then that's connected, the
4 thermal switch directly to the vehicle charging
5 system 28 through jumper cables which are labeled
6 60 in Figure 1. Correct?

7 A Yes. It is in series with those.

8 Q So looking at this circuit in
9 Figure 1, so long as this thermal switch 41 is
10 closed, the vehicle charging system 28 is connected
11 directly to the jump starter batteries 22 through
12 the diode 35. Right?

13 A Correct. I'm sure you included the
14 caveat that the diode flows current only in the
15 charge direction, that is, the external battery of
16 the vehicle or its charge system is now pushing
17 current in the reverse direction of charging it to
18 recharge the battery in the jump starter.

19 Q And that direct connection through
20 that diode allows the charging system 28 inside the
21 vehicle to directly charge the jump starter
22 batteries 22 after the vehicle's been started.
23 Right?

24 A I'm not sure about the first thing
25 you said. The diode bypasses the contact relays.

1 So even when the contacts of the -- it's labeled
2 contact relay, element 34, even when they are open,
3 it still allows current to flow in the reverse
4 direction in which it would be used as a jump
5 starter.

6 Q Yes. So I guess let me rephrase the
7 question. The connection from the vehicle 28 --

8 A Yes.

9 Q -- to the jump starter batteries
10 22 --

11 A Yes.

12 Q -- through that diode 35 --

13 A Yes.

14 Q -- is what enables the vehicle
15 charging system to recharge the --

16 A Or the battery on board the vehicle,
17 if it is adequately charged to be able to provide
18 current back to the jump starter, yes.

19 Q To directly charge the jump starter
20 batteries?

21 A Yes, that is the obvious purpose of
22 that diode 35.

23 Q Then this same circuit is shown in
24 Figures 2A and 2C of Richardson; correct?

25 A The diode is not shown in 2A. It is

1 shown in 2C.

2 Q Let's look at 2A first, they connect.
3 So Figure 2A on page 3, you can see here are the
4 batteries and they are inside that dark box labeled
5 22; right?

6 A That's correct.

7 Q And they go out to nodes C and D;
8 correct?

9 A Yes.

10 Q And then now if you flip to Figure 2C
11 on page 5, here again you have those nodes C and D;
12 right?

13 A Yes.

14 Q And here you have the diode 35
15 connected to the vehicle 28?

16 A Yes.

17 Q So it's the same circuit?

18 MR. SMELCER: Objection, form.

19 A Please give me a moment, I've just
20 noticed something in the diagram. Okay. I think
21 the answer to your question is yes, but maybe you
22 should repeat the question.

23 Q (BY MR. SAUER) I just wanted to
24 confirm that the circuit showing a diode directly
25 connecting the vehicle charging system 28 to the

1 batteries 22 is shown in both Figures 1 and is
2 shown in the same way in Figures 2A and 2C. Is
3 that correct? The same circuit is shown in both?

4 A The circuit, but 2A does not show the
5 diode.

6 Q 2C shows the diode?

7 A That's correct.

8 Q But the circuit is shown in both.
9 Correct? Same circuit? Is there a difference --

10 A Well, as you noticed in my
11 Declaration, I just connected all these parts
12 together. When they say A, B, C, D, these are page
13 connectors. They're not specifically terminals
14 they identify in the circuit. It's standard
15 practice when you're writing out schematics that
16 cover more than one page.

17 So, but the point being, the
18 schematic of 2C would normally be placed to the
19 right of the schematic in Figure 2A.

20 Q Let's just follow it through to make
21 sure we're all on the same page. If you look at
22 Figure 2C, you have a box labeled "Vehicle" that's
23 reference 28?

24 A Yes.

25 Q And that's the same as the box in

1 Figure 1 that's labeled "Vehicle to Be Started" 28.
2 Right?

3 A If I might just be more specific in
4 answering, the connection shown as 28 going to
5 "Vehicle to Be Started" is the red and the black
6 thick jumper cables we'll call them, large clamps
7 that normally you hook onto the terminals of the
8 battery in the vehicle that you wish to jump start.

9 So it provides, as -- as you --

10 Q So if you can turn to page 15,
11 please? Let me know when you're there.

12 A I'm there.

13 Q And let's say paragraph 16.

14 A Okay.

15 Q In the second sentence in paragraph
16 16 refers to 28 and it refers to it as (quote as
17 read):

18 ...the vehicle's electrical
19 system 28.

20 Do you see that?

21 A Yes, are connected to the vehicle's
22 electrical system in 28, yes.

23 Q And then on Figure 1, you can see
24 there's reference 60. You see that?

25 A Yes. That's -- you've identified

1 that connection to -- when they say vehicle
2 electrical system, in practice, the large jumper
3 clamps are always connected to the terminals,
4 usually the top and the side terminals of the
5 battery in the vehicle. And then it does become
6 part of the vehicle's electrical system.

7 So we can refer to it as the
8 vehicle's electrical system or the terminals of the
9 battery in the vehicle. They are the same.

10 Q Okay. And 60 on Figure 11 is
11 referring to the jumper cables that are used to
12 connect to that system; correct?

13 A Yes.

14 Q So back on page 5, Figure 2C, you can
15 see there's the vehicle's electrical system 28 that
16 we were just referring to?

17 A Yes.

18 Q And there are the clamps 60 that we
19 were just referring to; correct?

20 A Yes.

21 Q And then from the red clamp, you can
22 see there's a connection to box 41.

23 Do you see that? Do you see box 41?

24 A I'm searching for it. It's the
25 positive terminal of the battery is connected to --

1 yes. It goes into something identified as box 41.

2 Q We identified -- we've already
3 established that box 41 is the thermal switch;
4 correct? Which is also shown --

5 A Yes.

6 Q -- also shown in Figure 1?

7 A Yes.

8 Q And then from that thermal switch 41,
9 there's a connection to diode 35. Correct?

10 A It connects to one of the power
11 contacts, the relay and the anode of diode 35.

12 Q And is that the same connection
13 that's shown in Figure 1 between the thermal switch
14 41 and diode 35?

15 A Yes.

16 Q And then back to Figure 2C from the
17 other terminal of diode 35, there's a connection to
18 36. Which is shown as a resistive device?

19 A Correct.

20 Q And if you look on Figure 1, you can
21 see 36 is the 00 AWG cable; correct?

22 A Yes. American wire gauge.

23 Q So those are the same connections in
24 Figure 1 and Figure 2. Correct?

25 A Yes.

1 Q And then back on Figure 2C, it goes
2 from 36 to node C. Correct?

3 A Yes.

4 Q So if we can turn to Figure 2A on
5 page 3, do you see node C?

6 A Yes, I do.

7 Q Node C is directly connected to
8 battery 22, which is inside the dotted box on this
9 page. Correct?

10 A Yes.

11 Q And referring to Figure 1 again,
12 that's the same connection shown here between cable
13 36 and jump starter batteries 22. Correct?

14 A Yes.

15 Q So the circuit between the vehicle to
16 be started 28 and the jump starter batteries 22
17 through diode 35 is the same circuit in Figure 1
18 and Figures 2A and 2C. Correct?

19 A It appears to be.

20 Q And in the circuits shown in Figure 1
21 and Figures 2 of Richardson, the connection between
22 diode 35 from the vehicle charging system 28 to the
23 jump starter batteries 22 is the only circuit
24 that's shown for recharging jump starter batteries
25 22. Is that correct?

1 A It does identify a sensor connection
2 labeled 26 intended to -- let me back up a minute.
3 This is the problem with a block diagram. You're
4 talking about circuits, you always have two
5 conductors to pass power. It shows one as a signal
6 path or a power flow path.

7 So 26 says sensor wiring harness and
8 then it bifurcates into one leg going up to join
9 what is identified as cable 36, which is the left
10 side contactor of the relay. It also goes over to
11 60, which is the vehicle to be started battery.

12 I don't believe this is discussed in
13 the text, but I can verify if you'd like me to be
14 sure, but I believe that's simply an embodiment of
15 saying it is a wiring harness and not a single
16 conductor; therefore, there's actually two signals
17 coming in on it for different purposes.

18 Q What different purposes?

19 A Well, one would be a fair measure of
20 the voltage across the jump start batteries and the
21 capacitors that are in parallel, and the other
22 would be the voltage measured at the vehicle to be
23 started.

24 The latter being critical for doing
25 preliminary voltage measurements to assure that

1 you'd want to close the relay to charge that
2 battery in the first place, Since the patent does
3 identify the ability to detect a reverse connection
4 or a -- not a -- a failure of the connection to the
5 battery itself.

6 Q But as far as recharging the jump
7 starter batteries 22, the only circuit that's shown
8 is the connection through diode 35 from the vehicle
9 battery. Correct?

10 A You're referring to Figure 1?

11 Q Yes, referring to Figure 1.

12 A That's correct. It only shows cable
13 36 going into it that carries power into the
14 batteries and capacitors.

15 Q And the same is true for Figure 2;
16 correct? 2A through 2C?

17 A Um, 80 percent, yes.

18 Q Let me help you.

19 A Let me qualify my answer.

20 Q Okay.

21 A Save you the trouble. There is
22 nothing in Figures 2A or 2C you're referring to,
23 these are the actual schematic diagrams, that
24 preclude another contact being made to either draw
25 power from the jump starter batteries or inject

1 power into it, current flowing into it.

2 But the primary path identified in
3 both Figure 1 and Figure 2C where it shows the
4 vehicle battery is indeed through the red and the
5 black clamps.

6 Q You're saying there's nothing shown
7 in these figures to preclude another contact to
8 recharge the batteries, but there's no other
9 contact shown to recharge the batteries other than
10 from the vehicle battery system; correct?

11 A Well, it's possible that the reason
12 that they broke out in the patent Figure 2C
13 separately with connections C and D identified on
14 them is, well, you may want to connect something
15 else there.

16 But as shown here, Richardson is
17 assuming in this embodiment that the power would be
18 used to charge the jump start batteries would come
19 in via cables labeled the red clamp and the black
20 clamp connected to the vehicle battery.

21 Q And just to make it even more clear,
22 let's look at page 16 of Richardson in paragraph
23 28. Why don't you go ahead and read paragraph 28
24 to yourself and let me know when you're done.

25 A Page 16, paragraph 28.

1 Q You see it?

2 A Yes. I'm reading.

3 Yes. And the final sentence of that
4 does point out that you need not connect this to a
5 vehicle battery or a vehicle charging system. You
6 could connect it to any external source of power
7 that could be used to recharge the jump start
8 batteries, and they specifically mention a battery
9 charger not shown has been connected to the
10 batteries 22.

11 What they don't show, as you pointed
12 out, is, well, where exactly would you connect
13 that? And my statement before was allowing the
14 fact there is actually several places shown in the
15 schematic. They just haven't been identified by
16 the words "connect battery charger here."

17 Q So you understand the words "not
18 shown" in the last sentence of paragraph 28 --

19 A I do.

20 Q -- to mean that it's "not shown" in
21 the drawings. Correct?

22 A The battery charger is not shown in
23 the drawing. In fact, the battery charger and the
24 connections are not shown in the drawing. But I'm
25 sure that Richardson pointed it out because it's

1 just an obvious thing you could do and you may want
2 to -- in fact, it's very likely you may want to
3 recharge the batteries in the jump starter from an
4 external battery charger, not shown, as opposed to
5 hooking it up to a vehicle 12 volt battery.

6 Q But you can confirm that how you
7 would connect that external battery charger is not
8 shown in any of the figures for Richardson?

9 A It's not identified, but as far as
10 shown, because there are conductors there that you
11 could connect it to, I -- there are multiple
12 possibilities shown. They are just not labeled as
13 such in the diagram.

14 Q There's no charging circuitry shown
15 to connect when an external battery is there?

16 A That's a much broader issue.

17 Q To connect to an external battery
18 charger?

19 A I would prefer to leave the word
20 "charging circuitry" to a follow-on question and
21 discussion, but there is no specific point in that
22 schematic diagram or in the block diagram,
23 conceptual block diagram of Figure 1 in which they
24 say "connect external battery charger here."

25 Q There's no circuitry shown to connect

1 to an external battery charger?

2 A No circuitry is necessary. All you
3 need to do is connect the power source to the jump
4 start batteries, and there's multiple places shown
5 in the schematic where that's possible.

6 Q You want to take a break?

7 A Sure.

8 (Off the record.)

9 Q (BY MR. SAUER) Welcome back. Over
10 the break did you and counsel talk about your
11 testimony?

12 A No. Not at all.

13 Q Let's go now still with Richardson to
14 paragraph 34, which is on page 16 of 20.

15 A I see it.

16 Q Can you read that paragraph to
17 yourself, let me know when you're done?

18 A Okay.

19 Q So here, second sentence Richardson
20 tells us that their jump starter can (quote as
21 read):

22 ...be configured for 12, 18, 24,

23 30, 36, 42, or 48 volts.

24 Correct?

25 A Yes.

1 MR. SMELCER: Objection, form.

2 Q (BY MR. SAUER) And this is done
3 using jump selector 55 it tells us. Correct? Same
4 sentence.

5 A Yeah. Got it. Referencing Figure
6 2A.

7 Q Yes. Let's look at Figure 2A since
8 you're there, page 3. Figure 2A, the jump starter
9 batteries are shown inside the dotted box labeled
10 22. Correct?

11 A That's correct.

12 Q And this includes two batteries
13 labeled 23 and one battery labeled 25. Correct?

14 A Correct.

15 Q And the jump selector 55 here is
16 shown with jumpers 27 and another one labeled 29.
17 Correct?

18 A Correct.

19 Q And the jumpers are used to connect
20 the batteries 23 or 25 in different configurations.
21 Correct?

22 A Either in series or in parallel.

23 Q In series or in parallel?

24 A Series or in parallel. It's a
25 classic series parallel switch.

1 Q How could you use these in connective
2 parallel?

3 A Well, if you put the -- if 29 is --
4 well, let's start with the top. Normal operation
5 -- if 27, if the jumper 27 is connected to the
6 arrows to the left, the two arrows to the left,
7 then you've placed these two batteries in series.
8 If they are both 12 volt batteries, it would
9 provide a 24 volt output, which would be maybe
10 appropriate for a marine application or sometimes
11 heavier duty engines.

12 Whereas, if the lower, 29, was
13 connected to those, these two batteries would then
14 be placed in parallel where you would be able to
15 get double the current but at the 12 volt voltage.

16 Q Is it common to connect jump starter
17 batteries in series?

18 A You could configure the battery pack
19 and the jump starter to be probably whatever is the
20 cheapest to the manufacturer battery, the best deal
21 that they could come up with. You might want to --
22 electric vehicles batteries, for instance, are
23 comprised of many cells. Series strings and then
24 series strings are connected in parallel.

25 So both -- you see the same thing

1 going on here. And they're allowing the
2 possibility that with just using jumper 27 or 29,
3 that you could produce either 24 volts or 12 volts,
4 assuming that each of the batteries labeled 23 are
5 12 volt nominal batteries.

6 Q To produce more current, you might
7 put them in parallel?

8 A That's correct.

9 Q But to increase the voltage, you
10 would want to put them in series?

11 A That's correct.

12 Q So, for example, if I wanted to --
13 let's say the batteries labeled 23 were both 12
14 volt batteries and I wanted to have a 24 volt
15 output, I would then use the jumper cable to put
16 them in series; correct?

17 A Yes.

18 Q And similarly, if I wanted to create
19 a 48 volt battery, I would put some -- I would put
20 batteries in series to do that?

21 A You said 12 volt?

22 Q Well, Richardson refers to --

23 A I think you meant -- the first
24 question you asked placed them in series to create
25 28 volts.

1 Q 24, right.

2 A The second would create 12 volts by
3 placing them in parallel.

4 Q Right. But to increase the voltage
5 output of the batteries, you would place batteries
6 in series?

7 A In series in general, yes. That's
8 correct.

9 Q Most automobiles use 12 volts?

10 A Yes.

11 Q What kind of vehicles might need a
12 battery larger than 12 volts?

13 A Some heavy duty engines that, say,
14 might be found in a Class 6, 7, or 8 truck. There
15 is, and has been for some years, a movement by auto
16 manufacturers worldwide to transition to a 44 volt
17 standard for automotive batteries so that they
18 could use smaller conductors to carry the same
19 power, and that hasn't gained much traction but I
20 am aware that the high end of BMW and Mercedes
21 product offerings, they do use 44 volt systems.

22 Q Is that why you want to configure
23 potentially Richardson to output 48 volts?

24 A I'm not sure that the 40 volt
25 standard was -- it was probably discussed in 2014

1 but I can't place the chronology. It's been
2 kicking around a long time. But there's a lot of
3 inertia in the automotive industry to change not
4 just the batteries, but every electrical accessory,
5 every -- the lights, the starting voltage.

6 So there's -- it's been a slow
7 transition and some wonder whether it will ever
8 occur.

9 Q Do you know of any vehicles that use
10 a 48 volt battery?

11 A I can't say with certainty. I
12 believe that some of the military vehicles use 48
13 volt systems. And 48 volts is actually the
14 standard for small electric vehicles like golf
15 carts. So if you were planning on quickly
16 recharging the batteries in your golf cart, that
17 would be a 48 volt connection.

18 Q Does the voltage of the vehicle
19 battery have any relationship to the peak current
20 that's necessary to start an engine?

21 A Yes, they are inversely related.

22 Q How so?

23 A Power is the product of the voltage
24 times the current. So if you increase the voltage,
25 say, going 12 to 48 by a factor of 4, you could

1 reduce the current by that same inverse factor.

2 Q But would a vehicle that -- maybe I
3 have this backwards, but would a vehicle that
4 operates with a higher voltage battery typically
5 need a higher peak current?

6 A No, it would need a lower peak
7 current because, as I was attempting to explain
8 before, power is the product of the voltage times
9 the current.

10 Q So you're not necessarily -- you're
11 saying you're not necessarily using a larger, for
12 example, 48 volt battery because it's a larger
13 engine?

14 A That actually could be a motivation
15 because the -- if you stuck with 12 volts and you
16 have a cranking requirement, starting the motor
17 requirement that, for 12 volts would be very, very
18 large. High current. And a way of -- which would
19 require very, very thick cables.

20 This is why, if you look at the cable
21 that goes down to the starter in any car, it'll be
22 pretty fat.

23 The way you can get away with reduced
24 size of that cable, by reducing the current you
25 have to push to the starter, you could increase the

1 starter's operating voltage. And it's an inverse
2 relationship. The higher the voltage, the lower
3 the current. To deliver the same power.

4 Q Now, if I'm putting batteries --
5 start over.

6 If I'm connecting batteries in series
7 to achieve the output voltage that I want --

8 A The higher output voltage.

9 Q Yes, each one of those series
10 connected batteries, since they're connected
11 series, has to be capable of generating on its own
12 the peak current. Correct?

13 A Yes, because they are in series and
14 the current that is provided by each one of those
15 batteries is the output current of the series
16 connection.

17 Q So if Richardson is connecting -- has
18 the capability of generating a 12 volt output and
19 -- or connecting multiple of these 12 volt
20 batteries in series to generate a higher output
21 voltage, by connecting them in series, I would be
22 necessarily increasing the capacity of the battery.
23 Correct?

24 A Oh, no. No. Well, I'll allow that
25 there may be multiple definitions of capacity of

1 the battery. You would be increasing the voltage
2 capacity of the battery. But capacity usually
3 refers to the energy that is stored in the
4 combination of the batteries and that does not
5 change whether it is connected in series or in
6 parallel.

7 Q What I mean is since each battery has
8 to be capable of generating the peak current
9 because they're connected in series. Correct?

10 A Yes.

11 Q So let's say I have two batteries
12 that each both -- each can generate a peak current
13 of 500 amps. I connect those in series, since each
14 individual battery still has to be able to generate
15 500 amp peak current, the voltage of them is the
16 same, I'm doubling the battery capacity by
17 connecting them in series; isn't that right?

18 A No. You're doubling the battery
19 voltage.

20 Q But the current of each stays the
21 same, so just times current is power, I'm doubling
22 capacity. Right?

23 A Well, no, again, capacity, I will
24 allow that by some other definition, maybe more of
25 a layman's definition, capacity could mean a number

1 of things including the voltage capacity, the
2 current capacity. But in automotive and electrical
3 engineering, it's just assume, when you say the
4 capacity of a battery, you are referring to its
5 energy storage capacity usually measured in
6 kilowatt hours.

7 And that does not change whether you
8 hook the batteries up in series or parallel. You
9 still have the same energy stored in each battery.
10 It's just being delivered at a different current or
11 voltage depending upon the series or parallel
12 connection.

13 Q But I have one battery and now I have
14 two connecting the series.

15 A Correct.

16 Q Each with the same capacity.

17 A Yes. So you have double the
18 capacity.

19 Q So I've doubled the capacity. That's
20 all I'm saying.

21 A Perhaps I misunderstood your
22 question. You're really just asking, has nothing
23 to do with series or parallel, has to do if I have
24 two batteries, I have double the capacity of one,
25 and that's correct.

1 Q But by connecting the series, I would
2 have to have double the capacity. If I connected
3 them in parallel, I could use smaller batteries
4 because I don't need to generate the same peak
5 current with each; right? You could cut that in
6 half.

7 A No. I -- forgive me if I
8 misinterpret. You're not getting any more power
9 delivered to the starter regardless of whether they
10 are hooked up in parallel or series. I'm
11 emphasizing the word "power."

12 Q Mm-hmm.

13 A By hooking them in series, you're
14 increasing the voltage but reducing -- retaining
15 the current to the limits of each battery
16 individually. So you said 500 amps. That 500 amps
17 times now twice the voltage of one battery would
18 give you a certain power measured in watts or
19 kilowatts.

20 If you hook them in parallel, you
21 still have the same energy storage capacity in the
22 two batteries, but it's being delivered as twice
23 the current but at the voltage of any -- of each of
24 the individual batteries.

25 Q Okay. And in Richardson, if I were

1 trying to generate a 48 volt output, I would
2 connect four 12 volt batteries in series. Correct?

3 A Yes. You could do it that way.

4 Q How else could you do it in
5 Richardson?

6 A Well, "battery," by definition, means
7 a connection of multiple cells, and by default it
8 means an internal series connection of multiple
9 cells. In a 12 volt battery there are six
10 individual lead acid cells that are internally
11 connected in series, and that's why it provides a
12 12 volt output. Did that answer your question?

13 Q That's why -- so you have a number of
14 cells usually for inside the 12 volt battery, I
15 understand that. But you want to create a 48 volt
16 battery using Richardson's system now we can
17 connect --

18 A You would take 12 volt batteries and
19 took four of them in series.

20 Q Compared to a single 12 volt battery,
21 it would be four times the battery capacity?

22 A Not capacity. You're not changing
23 the capacity. Same amount of power can be
24 delivered regardless of how you hook those up
25 because it's based upon the energy storage capacity

1 of all of the batteries and all four, no matter how
2 you hook them up, they will be -- they will be
3 delivering that power in a different current or
4 voltage, but it will be same power.

5 Q So you're saying if you were using a
6 12 volt output, you would still have the same four
7 batteries, just connected differently?

8 A If you hook them in parallel to
9 produce a 12 volt output, it would be at four times
10 the current of any individual battery, and either
11 way, 12 times 4 times the current is going to be
12 the same power as 48 volt times 1 times the
13 current.

14 Q I understand. So in that scenario
15 the capacity would be the same four connected in
16 parallel or four connected in series. But if
17 instead the difference were one singular battery
18 not connected to anything as an output, compared
19 to four of the identical batteries connected to
20 series --

21 A Series or parallel.

22 Q -- or parallel, you would --

23 A Doesn't matter.

24 Q -- you would have four times the
25 capacity because you have four of the same

1 batteries?

2 A But at four times both the energy
3 storage capacity and four times the power delivery
4 capability, agnostic as to how they are connected.

5 Q Okay. Let's move on then to Yu.
6 This is Exhibit 1008 in both IPRs. Exhibit 1008 is
7 a copy of the translation of Chinese Utility Model
8 Patent Number 203211234U, to inventor Yu Chunlan.
9 Correct?

10 A Correct.

11 Q Do you recognize this as the same Yu
12 reference you address in your Declarations?

13 A Yes.

14 Q Did you review Yu during the
15 preparation of your Declarations?

16 A Yes.

17 Q About how much time?

18 A Gosh. I have to apologize, I don't
19 do a very good accounting of my time. An adequate
20 amount of time in order to understand it.

21 Q Would you consider yourself familiar
22 with the technologies described in Yu?

23 A Yes.

24 Q Let's turn to page 5, please. Page
25 5, they're the same here. 5 of 5 and 5, so less

1 confusing.

2 A All right. You're talking about this
3 page?

4 Q Page 5 of 12 at the bottom?

5 A It says yeah, 5, 5 of 12. Got it.

6 Q Here there's a paragraph 28. You see
7 that?

8 A Got it.

9 Q Paragraph 28, it says, (quote as
10 read):

11 To allow the internal battery 1
12 to be charged, a charging input
13 10 interface is provided on the
14 device.

15 Correct?

16 A That's what it says.

17 Q And then if you look on page 11,
18 please?

19 A Mm-hmm.

20 Q That charging input 10 that you had
21 described in paragraph 28 is shown in Figure 9.
22 Correct?

23 A Charging input 10. The --

24 Q 10.

25 A Marked as 10 in Figure 9, it's a

1 female barrel connector.

2 Q That's what I was going to ask. It
3 appears to be a barrel connector, a BC --

4 A It's kinda hard to tell. That
5 actually could be a din connector or even a mini
6 jack. What used to be called RCA jacks.

7 Q Okay.

8 A It's simply a way of connecting --
9 it's co-axial, to conductors, provides power.

10 Q Okay. Then on the same page you see
11 Figure 7?

12 A I do.

13 Q And Figure 7 has two additional
14 ports, one labeled 8 and one labeled 9?

15 A Correct.

16 Q Would you agree that port that's
17 labeled 8 is a USB port?

18 A Yes, that's a USB-A port.

19 Q In paragraph 25, which is on page 4,
20 turn to page 4?

21 A Okay.

22 Q 25 is at the bottom of page 4.
23 Starting there and then it continues on the next
24 page. And here it says, (quote as read):

25 For convenience of use, the

1 emergency automotive starting
2 device in the present invention
3 also includes a 5 volt output
4 circuit and a 19 volt output
5 circuit; the 5 volt output
6 circuit is connected to the 5
7 volt output terminal 8.

8 Correct?

9 A Correct.

10 Q And it goes on. Correct?

11 A Correct.

12 Q So this is telling us that that USB
13 port labeled 8 in Figure 7 is a 5 volt output
14 terminal; right?

15 A According to this sentence, yes.

16 Q That's enough of Yu. If you could
17 pull out your '023 Declaration again, please?

18 A Got it.

19 Q Turn to page 39.

20 A Okay. I'm on page 39.

21 Q Starting at the bottom of page 39,
22 you're addressing what you call Limitation 1(f) of
23 the '023 patent. Right?

24 A Yes.

25 Q And Limitation 1(f) requires (quote

1 as read):

2 A USB input circuit connected to
3 the power supply, the USB input
4 circuit configured for converting
5 power from a USB power source to
6 increase power voltage to the
7 power supply.

8 Correct?

9 A Correct.

10 Q And here you're relying on the
11 combination of Richardson and Zhao for this claim
12 element. Correct?

13 A Yes.

14 Q Flip then to page 43.

15 A Go ahead.

16 Q Page 43 in paragraph 89, you're still
17 referring to claim element 1(f). Correct?

18 A Let me double check that. Yes.

19 Q And in paragraph 89 you say, you
20 support your proposed combination of Richardson and
21 Zhao, you cite to USB-IF Battery Charging
22 Specification, Revision 1, which is Exhibit 1025.
23 Correct?

24 A Correct.

25 Q And quoting from the first sentence

1 in paragraph 89, you cite to this USB charging
2 specification as showing (quote as read):

3 ..the known benefits of utilizing
4 USB technology to charge battery
5 powered devices.

6 Correct?

7 A Yes.

8 Q As a person of skill in the art, if
9 you were adding a USB input port to charge battery
10 powered device in 2014, was this the USB
11 specification that you would have relied on?

12 MR. SMELCER: Object to form.

13 A There were revisions to the revision.
14 There was a 1.1, 1.2, I think there are -- they are
15 mentioned in exhibit -- on the face of it, it says
16 Exhibit D, so you would, at the very least, conform
17 to a specification from 2007, seven years later,
18 2014. But there may be -- but the variations,
19 improvements in the specification between then and
20 2014, would also be apropos.

21 Q (BY MR. SAUER) You didn't refer to
22 any other USB specification in your Declaration,
23 did you?

24 A No. Well, gosh. To save the time of
25 me verifying by an extensive read, if you're aware

1 of a reference to it, let me know. Otherwise, I
2 have no recollection of referring to a sub
3 specification.

4 Q I'm not. And if you look on
5 page 5 --

6 A Of my Declaration?

7 Q -- 5 through 7 of your Declaration,
8 there is an exhibit list so you can refresh your
9 recollection.

10 A You're referring me to the exhibit
11 list.

12 Q Yes.

13 A And this is the exhibit referred to.

14 Q Right. And that's the only USB
15 specification that's an exhibit.

16 A Right, but if you note inside this,
17 there is mention of sub specifications.

18 Q The witness is looking at Exhibit --

19 A Exhibit 1025.

20 Q Okay.

21 A Um, I'm not seeing it in the Table of
22 Contents for the exhibit, which is quite lengthy.
23 But I can tell you with certainty that USB Battery
24 Charging Specification 2 came out in 2012. So in
25 2014 it would definitely be appropriate.

1 Q That's not cited your Declaration, is
2 it?

3 A Honestly, to save the time of
4 exhaustively checking everything in a 100-page
5 document I wrote eight months ago, I can tell you
6 with certainty that charging standard one oh from
7 2007 would be applicable. There were revisions to
8 the revision. I know specifically one came out in
9 2010, but the most relevant change, a very radical
10 change, occurred in 2012 with revision 2.0 that
11 then subsequently had its own sub revisions.

12 Q If they were applicable, is there a
13 reason they're not in your Declaration?

14 A Well, that's assuming that I didn't.
15 It's probably true that I didn't. I just didn't
16 want to do an exhaustive check.

17 Q I'll proffer to you that you didn't
18 cite any other USB specifications.

19 A I'll believe you and your question
20 was is that the reason I didn't cite?

21 Q No. Is there a reason you didn't
22 cite them?

23 A Is there a reason? No. Well, let me
24 change that. It wasn't required that the
25 capabilities, the power transfer standards that

1 were established in the rev 1 charging spec were
2 adequate for -- for all of the discussions, and
3 Nook doesn't cite them either.

4 Q That circles back to my first
5 question then. Is this the USB standard that you
6 would have relied on as showing the power
7 requirements that were necessary to install a USB
8 port into a jump starter in 2014?

9 A It would have been adequate because
10 spec 1, I had actually allowed a change from the 5
11 volt input to as high as 20 volts, and that was
12 greatly expanded when it came -- when two oh came
13 around in 2012, that that was more than adequate,
14 and although Nook -- neither of the patents talks
15 about the capacity of the USB, it's -- I believe
16 this was retained in 2007, it was certainly part of
17 the original USB spec, that the maximum current
18 expected was 100 milliamps. Which wasn't much when
19 you consider it's either 5 or under the new power
20 spec which allowed higher voltages, you could run
21 it up as high as 20.

22 In fact, I think they even mentioned
23 in spec 1 -- actually, I'm sure they did, that's
24 from memory, that under that 2007 USB power spec 1,
25 you could push it up to 500 milliamps if -- it says

1 if bus is not suspended and configured for 500
2 milliamps. So there has to be some special
3 provision in the hardware for that.

4 Either way the output is fairly
5 small. They allowed for the absolute maximum power
6 transfer in the original spec, again from memory of
7 I believe 100 watts.

8 Q Let's take a look at that. Let's
9 start on page 6, and you are familiar with this
10 document?

11 A Which document?

12 Q Exhibit 1025? The USB specification
13 we've just been talking about?

14 A Yes.

15 Q So let's look at page 6. And on page
16 6, are you there?

17 A Not yet.

18 Q Take your time. At the bottom where
19 it says page 6 of 30, this is another one that has
20 multiple numbers.

21 A Okay.

22 Q And there should be section 1.2 on
23 page 6. Do you see that?

24 A Yes. Background.

25 Q Yes. And it continues for a few

1 short paragraphs. Can you read -- go ahead and
2 read section 1.2 to yourself. Just let me know
3 when you're done.

4 A I've read it.

5 Q Okay. So second paragraph, section
6 1.2 starts with, (quote as read):

7 If a portable device is attached
8 to a USB host or hub, then the
9 USB 2.0 spec requires that:
10 After connecting, a portable
11 device must draw less than.

12 And then it lists some current
13 requirements; right?

14 A Yes.

15 Q So am I correct that what this means
16 is that if you were drawing power from a standard
17 USB host or hub, you had to meet the listed current
18 requirements from the USB 2.0 spec. Right?

19 A Yes.

20 Q And then the next paragraph starts --
21 it refers to different current requirements if
22 attached to authenticated charger or a host or hub
23 charger; right?

24 A Yes.

25 Q And specifically for a dedicated

1 charger, it says you're allowed to draw a current
2 of, and it gives a defined term of IDEV_DCHGR;
3 right?

4 A Yes.

5 Q And then for a host or hub charger,
6 it says you're allowed to draw a current of either
7 two more defined terms, first being IDEV_HCHGR_LFS,
8 or IDEV_HCHGR_HS. Right?

9 A Yes.

10 Q So let's talk first about the
11 standard USB host or hub. The second paragraph of
12 section 1.2 tells us that after connecting a
13 portable device to a USB host or hub, USB 2.0
14 requires that the maximum current that the portable
15 device can draw from the USB connection is 500
16 milliamps; right?

17 A Yes. Subject to the requirement if a
18 bus is not suspended and it is configured for 500
19 milliamps.

20 Q Right. So there were some situations
21 where it can draw less than that, but the maximum
22 it can draw --

23 A Normally it's 100 milliamps because
24 -- except in specific cases of -- they refer to
25 them as -- well. I'll simply refer to it as USB

1 connection specifically for charging that have
2 slightly larger conductors and contacts. They
3 would be -- that would constitute configuring them
4 for 500 milliamps.

5 Q So normally it's 100 milliamps, but
6 there's some situations where it could be up to 500
7 milliamps?

8 A Yes.

9 Q And if you add 500 milliamps, that's
10 provided at 5 volts, right, USB?

11 A Well, under 2007 spec, the nominal
12 voltage, the initial connect voltage is always 5
13 volts. But following the negotiation that occurs
14 over the data lines, a different voltage could be
15 called for, a different current limit could be
16 called for. That's one of the advantages of USB
17 for power transfer.

18 Q At 5 volts, the power would be, what,
19 five times 500 milliamps, so 2.5 watts; right?

20 A I was referring to 100 milliamps. So
21 at 500 milliamps, yes, it would be 2.5 watts,
22 that's correct. At 5 volts.

23 Q If it was at -- then if you took and
24 boosted that 5 volts to a higher voltage, you'd
25 still have a maximum of 2.5 watts; correct?

1 A Yes.

2 Q 2.5 watts is the most I can pull?

3 A Second part of your statement, yes.

4 First part, no. They -- I would like to review --
5 refresh my memory on how it handles power limits
6 under the maximum condition. I believe under the
7 -- I will say this from memory and then confirm in
8 a moment.

9 I believe the current spec is
10 independent of the voltage spec because under --
11 it's unlike the situation we were talking about
12 before, you're not constrained to a specific power
13 transfer rate. It is defined in this spec in terms
14 of current and voltage.

15 Q I understand what you're saying. I'm
16 not talking about using USB to configure a higher
17 voltage. I understand that's allowed for in this,
18 but set that aside. It's you're using USB to
19 output 5 volts, in the maximum --

20 A Correct.

21 Q -- 500 milliamps.

22 A Unless negotiated otherwise.

23 Q Unless negotiated otherwise. But
24 we've negotiated 5 volt output, 500 milliamps, so
25 the maximum power is 2.5 watts.

1 A Okay. In that -- with configured for
2 500 milliamps, yes.

3 Q If I took that 5 volt output with
4 external circuitry and I boosted it to a higher
5 voltage, I couldn't pull -- I couldn't pull more
6 than 2.5 watts from that USB, could I?

7 A That's what I was saying I'd like to
8 verify, because I don't believe they, unlike the
9 situation we were talking about before, my
10 recollection is that you could still provide 500 --
11 500 milliamps at -- under the spec, I'm not talking
12 about how you would do it, but at that higher
13 voltage, whatever it was supplied as.

14 Now, I'm going to -- what I think
15 you're talking about is what you could do with that
16 power after it is received by the device. Is that
17 it?

18 Q Right. I'm trying to get my head
19 around is it power limited, that USB port? I can
20 only draw 2.5 watts from that?

21 A I don't believe that that is, you
22 know, I'd like to review that, but from memory, no,
23 I don't believe that it says that it is limited to
24 2.5 watts.

25 That's why you see it written out as

1 2.5 milliamps, 100 milliamps, or 500 milliamps,
2 under various conditions, and then elsewhere it
3 allows for the possibility that the voltage
4 delivered could be something other than 5 volts, if
5 negotiated.

6 I don't believe -- I don't recall it
7 being limited at a higher voltage to the same power
8 transfer. I believe the power transfer -- I think
9 the power transfer would actually be higher. But
10 this sounds like it's important to your argument,
11 so may I take a look at -- read the document and
12 verify this?

13 Q Let's make sure we have the same
14 hypothetical in mind. You have a USB port that's
15 outputting 5 volts.

16 A Okay.

17 Q And it's current limited under the
18 USB specifications to --

19 A 500 milliamps at the extreme, which
20 is delivering 2.5 watts.

21 Q And then external circuitry that
22 receives that 5 volts and 500 milliamps, you have a
23 boost converter that changes the voltage.

24 A Yes.

25 Q So the question is, does that

1 necessarily lower than the current since you're
2 limited to 2.5 watts, or can you deliver more than
3 2.5 watts?

4 MR. SMELCER: Object to form.

5 Q (BY MR. SAUER) Does that make sense
6 to you?

7 A Yes. That was what I was saying. I
8 think you're talking about what happens after it
9 gets into the device where it hits a DC to DC
10 converter and it up converts the voltage. But this
11 is something that happens inside your device as
12 opposed to negotiated by the voltage supplied by
13 the source.

14 Q Exactly.

15 A And the answer to that question is I
16 don't think there could be a difference. 2.5 watts
17 delivered to your device, if you up convert it to a
18 higher voltage, you will compromise the current
19 such that, at best, you could still provide 2.5
20 watts after the DC to DC converter. In fact,
21 slightly less because of the second law of
22 thermodynamics. Which means you always lose.

23 Q In fact, DC to DC converters are
24 lossy devices; right?

25 A A high quality device is probably

1 about 80 percent efficient. It depends on the
2 configuration of the DC to DC converter, also.

3 Q Let's say you boosted all the way to
4 48 volts. You'd still have to --

5 A If 2.5 watts was all that's coming
6 into the device, you can't get energy out of
7 nothing. You're still going to be limited to that
8 2.5 watts, which means at 48 volts, you're going to
9 be proportionally decreasing the current.

10 Q 2.5 divided by 48, which is about 52
11 milliamps?

12 A Yes. Yeah, you have that
13 configuration.

14 Q Let's look at the higher currents
15 under this USB spec. Look at page 29. 29 of 30.
16 Table 5 point -- 5-2?

17 A Mm-hmm.

18 Q Table 5-2, the specification lists
19 the currents for power received from different
20 types of chargers.

21 Do you see that?

22 A Yes.

23 Q And the highest current listed here
24 is from the dedicated charger IDEV_DCHGR. Right?

25 A Yes. First line.

1 Q And that's at 1.8 amps. Right?

2 A I see 1.5. Oh, 1.8, third line down.

3 Q Yeah.

4 A "Device Current from Dedicated
5 Charger." Yes. That's a maximum rating.

6 Q Maximum rating of 1.8 amps, but you
7 make a good point. The dedicated charger output
8 current is 1.5 max amps; right?

9 A Yes.

10 Q So why then is the device current
11 from the dedicated charger, line 3, higher than the
12 1.5 max that the dedicated charger is able to put
13 out, if you know?

14 A I could tell you if I had a little
15 bit of time to go through this and -- more than a
16 little bit of time. I cannot answer off the top of
17 my head.

18 Q That's fair. Let's just assume 1.8
19 is the max then, if you're using a dedicated
20 charger, but you'd still -- it's the same holds
21 true; right? If your 5 volt output, then the
22 maximum power that you could deliver would then be
23 1.8 times 5, 9 watts?

24 A My assumption, consistent with the
25 data sheets, is when they list a max value, that

1 means do not ever exceed this or something's going
2 to burn up.

3 Devices are never operated at the
4 max. It just wouldn't be -- it would compromise
5 your reliability a bit depending on who's designing
6 the device, whatever their internal design margins
7 were, it could be more or less hazardous.

8 And the criteria they use for
9 determining the max, like, do I see smoke yet, or
10 is it just above 100 Centigrade or something. So
11 it can mean a lot of different things, but please
12 don't assume that 1.8 amps is a normal way you
13 would transfer power under this USB specification.

14 Q Same holds true as under the lower
15 current for USB 2.0 if we boosted that voltage
16 externally above 5 volts, we would lower the
17 current that we could deliver because the wattage
18 stays the same; correct?

19 A Yes, the power flow rate would be the
20 same or even slightly less.

21 MR. SAUER: All right. Why don't we
22 take a break. I might be done here.

23 (Off the record.)

24 MR. SAUER: Welcome back. I have no
25 further questions.

1 MR. SMELCER: I have no questions at
2 this time.

3 THE REPORTER: Signature?

4 MR. SMELCER: I will reserve the
5 right to read and sign. Thank you.

6 (Wherein, the taking of the instant
7 deposition ceased at 11:26 AM.)

8 (Deposition to be read and signed by
9 the witness.)

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CERTIFICATE OF REPORTER

I, TARA SCHWAKE, a Registered Professional Reporter and Notary Public within and for the State of Missouri, do hereby certify that the witness whose testimony appears in the foregoing deposition was duly sworn by me; that the testimony of said witness was taken by me to the best of my ability and thereafter reduced to typewriting under my direction; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this deposition was taken, and further that I am not a relative or employee of any attorney or counsel employed by the parties thereto, nor financially or otherwise interested in the outcome of the action.



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November 5, 2024

To: Paul Smelcer, Esq.

Case Name: ADC Solutions Auto LLC v. The NOCO Company

Veritext Reference Number: 6947786

Witness: Dr. C. Arthur MacCarley Deposition Date: 10/29/2024

Dear Sir/Madam:

Enclosed please find a deposition transcript. Please have the witness review the transcript and note any changes or corrections on the included errata sheet, indicating the page, line number, change, and the reason for the change. Have the witness' signature notarized and forward the completed page(s) back to us at the Production address shown above, or email to production-midwest@veritext.com.

If the errata is not returned within thirty days of your receipt of this letter, the reading and signing will be deemed waived.

Sincerely,
Production Department

NO NOTARY REQUIRED IN CA

DEPOSITION REVIEW
CERTIFICATION OF WITNESS

ASSIGNMENT REFERENCE NO: 6947786

CASE NAME: ADC Solutions Auto LLC v. The NOCO Company

DATE OF DEPOSITION: 10/29/2024

WITNESS' NAME: Dr. C. Arthur MacCarley

In accordance with the Rules of Civil Procedure, I have read the entire transcript of my testimony or it has been read to me.

I have made no changes to the testimony as transcribed by the court reporter.

Date Dr. C. Arthur MacCarley

Sworn to and subscribed before me, a Notary Public in and for the State and County, the referenced witness did personally appear and acknowledge that:

They have read the transcript;

They signed the foregoing Sworn Statement; and

Their execution of this Statement is of their free act and deed.

I have affixed my name and official seal

this _____ day of _____, 20____.

Notary Public

Commission Expiration Date

DEPOSITION REVIEW
CERTIFICATION OF WITNESS

ASSIGNMENT REFERENCE NO: 6947786

CASE NAME: ADC Solutions Auto LLC v. The NOCO Company

DATE OF DEPOSITION: 10/29/2024

WITNESS' NAME: Dr. C. Arthur MacCarley

In accordance with the Rules of Civil Procedure, I have read the entire transcript of my testimony or it has been read to me.

I have listed my changes on the attached Errata Sheet, listing page and line numbers as well as the reason(s) for the change(s).

I request that these changes be entered as part of the record of my testimony.

I have executed the Errata Sheet, as well as this Certificate, and request and authorize that both be appended to the transcript of my testimony and be incorporated therein.
11/15/2024

Signed by:

Art MacCarley

212681A561344F7...

Date

Dr. C. Arthur MacCarley

Sworn to and subscribed before me, a Notary Public in and for the State and County, the referenced witness did personally appear and acknowledge that:

They have read the transcript;

They have listed all of their corrections in the appended Errata Sheet;

They signed the foregoing Sworn Statement; and

Their execution of this Statement is of their free act and deed.

I have affixed my name and official seal this _____ day of _____, 20____.

Notary Public

Commission Expiration Date

ERRATA SHEET 1 of 2

VERITEXT LEGAL SOLUTIONS MIDWEST

ASSIGNMENT NO: 6947786

PAGE/LINE(S) / CHANGE / REASON

7:19 "I'll speak louder" was my response to a request by the court reporter.

16:25 Replace "talk about I developed" with "talk about, I developed" / grammar

27:17-18 Replace "than in the car were in" with "than if the car were in" / transcription error

28:12 Replace "side" with "site" / transcription error

31:2 Replace "kept" with "connected" / transcription error

36:3 Replace "always sets" with "according to" / transcription error

36:9 Replace "alternator, generator" with "alternator or generator" / transcription error

37:7 Replace "but" with "that" / transcription error

41:25 Replace "contact relays" with "relay contacts" / transcription error

46:4 Replace "top and the side terminals" with "top or side terminals" / transcription error

47:11 Replace "contacts, the relay" with "contacts of the relay" / transcription error

51:17 Replace "power would" with "power that would" / transcription error

52:14 Replace "is" with "are" / transcription error

53:10 Remove "because" / transcription error

57:25 Replace "28" with "24" / transcription error

15 November 2024

Art MacCarley

Date

Dr. C. Arthur MacCarley

SUBSCRIBED AND SWORN TO BEFORE ME THIS _____

DAY OF _____, 20____.

Notary Public

Commission Expiration Date

ERRATA SHEET 2 of 2

VERITEXT LEGAL SOLUTIONS MIDWEST

ASSIGNMENT NO: 6947786

PAGE/LINE(S) / CHANGE /REASON

58:20 Replace "that the" with "that in the" transcription error

58:24 Replace "40" with "44" transcription error

59:3 Replace "change" with "changing" transcription error

63:3 Replace "assume" with "assumed" transcription error

65:19 Replace "took" with "put" transcription error

69:9 Replace "to" with "two" transcription error

72:18 Replace "variations" with "various" transcription error

74:6 Remove "oh" transcription error

75:12 Replace "two oh" with "two point zero" transcription error

75:19 Replace "either 5 or" with "either 5 volts, or" transcription error

76:6 Replace "memory of" with "memory, of" grammar

81:21 Replace "that that" with "that it" transcription error

15 November 2024

Art MacCarley

Date

Dr. C. Arthur MacCarley

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Notary Public

Commission Expiration Date

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

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VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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