

UNITED STATES INTERNATIONAL TRADE COMMISSION

In the Matter of:	)	Investigation No.
CERTAIN OUTDOOR AND SEMI-OUTDOOR	)	337-TA-1331
ELECTRONIC DISPLAYS, PRODUCTS	)	
CONTAINING SAME, AND COMPONENTS	)	
THEREOF	)	

OPEN SESSIONS

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1 UNITED STATES INTERNATIONAL TRADE COMMISSION
2 Washington, D.C.
3 BEFORE THE HONORABLE MONICA BHATTACHARYYA
4 Administrative Law Judge

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7 CERTAIN OUTDOOR AND SEMI-OUTDOOR) 337-TA-1331
8 ELECTRONIC DISPLAYS, PRODUCTS)
9 CONTAINING SAME, AND COMPONENTS)
10 THEREOF)

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13 International Trade Commission
14 500 E Street, S.W.
15 Washington, D.C.

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17 Friday, June 30, 2023

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19 EVIDENTIARY HEARING, VOLUME V

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21 The Hearing commenced in Courtroom A, pursuant to the
22 notice of the Judge, at 9:30 a.m. Eastern.

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1 still under oath?

2 THE WITNESS: Yes, I understand.

3 DIRECT EXAMINATION

4 BY MR. REED:

5 Q. Good afternoon or morning, I guess, still,
6 Dr. Pokharna. Please introduce yourself again.

7 A. Good morning, Your Honor. Good morning,
8 everybody. My name is Himanshu Pokharna.

9 Q. Did you prepare demonstratives for your rebuttal
10 presentation today?

11 A. Yes, I did.

12 Q. Can we bring up CDX-12, please.

13 And, Dr. Pokharna, are these the rebuttal slides
14 that you prepared?

15 A. Yes.

16 Q. And if we could go to slide 2, please.

17 What were you asked to do regarding Respondents'
18 allegations that MRI's patents are invalid?

19 A. I was asked to evaluate if the Respondents'
20 allegation of invalidity of the asserted claims of MRI
21 '287, '740, and '142 patents is valid.

22 Q. And what did you review in order to conduct your
23 analysis?

24 A. I reviewed the asserted patents and their file
25 histories. I also reviewed the prior art that was asserted

1 against all three of those patents. I reviewed the claim
2 construction order from Your Honor. I also reviewed expert
3 report and deposition from Mr. Smith-Gillespie.

4 I was -- I reviewed testimony here at the trial,
5 and I also reviewed MRI's evidence of secondary
6 considerations.

7 Q. Can you provide us with an overview of
8 Respondent's invalidity grounds that remain at issue in
9 this case?

10 A. Yes. So Respondents are claiming against the
11 '287 patent, claim 12, Karppanen; against the '740 patent,
12 claims 1 and 5, they assert Karppanen and Yare; and for
13 '142 patent, claim 6 and 10, they are asserting Karppanen
14 in combination with Larson, and Yare in combination with
15 Larson.

16 Q. What were your conclusions from your evaluation
17 of these invalidity grounds?

18 A. My conclusion was all the asserted claims of the
19 patents that I just mentioned are valid.

20 Q. Dr. Pokharna, are you aware of difficulties back
21 in the 2007 and '8 time frame that were presented when
22 attempting to design electronic displays for outdoor use in
23 full sun?

24 A. Yes, I'm familiar with that.

25 Q. Summarize that for us, please.

1 A. At that time, like I mentioned in my
2 introduction, I was working mostly on cooling of CPUs in
3 computers, also cooling at the system level for things like
4 laptop all-in-one displays, and the display cooling
5 challenge in the systems that I was working on was not as
6 significant as the display cooling challenge here.

7 I was particularly intrigued by the testimony of
8 Mr. Bill Dunn when he mentioned on that cold, frigid day in
9 Canada in the morning he saw at zero degrees Celsius
10 temperature outside his displays heating up within a couple
11 of hours to 90 degrees Celsius.

12 And I think this is the kind of unique insight
13 into a problem that leads to an interesting solution. That
14 certainly meets with my experience as an inventor in terms
15 of developing technologies.

16 Q. Let's discuss MRI's solutions to that problem,
17 the ones that are claimed in the claims that you reviewed.

18 What are the features of the claimed inventions
19 that enable outdoor use of electronic displays? And start
20 with claim 12 of the '287 patent.

21 A. So claim 12 of '287 patent describes a
22 combination of open and closed loop of airflows to improve
23 the cooling of the displays.

24 Q. Now, does claim 12 claim an open and closed loop
25 generally or is it more specific?

1 A. No, it's quite specific, specific to a closed
2 loop of isolated gas that circulates within the housing and
3 an open loop of ambient air that passes through the housing
4 and along the backlight.

5 Q. Did you hear any testimony about this this week?

6 A. Yes. We heard testimony from Mr. Mike Brown who
7 described how bringing the cold ambient air directly in
8 contact with the backlight, which is the hottest point,
9 improves in focusing the cooling to where the problem is.

10 Q. Turning to the '740 patent, do you have an
11 understanding of the novel features that enable electronic
12 displays to be used outdoors recited in that patent?

13 A. Yeah. The '740 patent adds an additional
14 thermal management element called heat exchanger to further
15 assist in cooling of these outdoor displays.

16 Q. Have you heard any testimony about that feature
17 this week?

18 A. Yes. Again, we heard from Mr. Dunn that as they
19 were increasing the size of the displays to 75- and
20 86-inch, the solar loading was simply too much to cool
21 using the existing methods.

22 And there, I believe, the co-inventor, Mr. Tim
23 Hubbard, came up with a scheme to use heat exchangers. I
24 recall them saying that they initially used just some
25 plastic coatings for the corrugated channels to -- and

1 reconfigured them, and made a heat exchanger.

2 And they were very surprised about the efficacy
3 of that heat exchanger in cooling the hot air and using the
4 ambient air to remove that heat from within the display.

5 Q. So turning to the '142 patent, the claims are
6 long, they are not on the board here, but if you need to,
7 you can refer to JX-5 in your binder.

8 But what additional features does the '142
9 patent recite that enable electronic displays to operate in
10 full sun?

11 A. The '142 patent added the element of solar
12 energy reduction layer. So this is a film that can reduce
13 the sunlight from entering the display and thereby
14 improving the cooling of the display.

15 MR. REED: Your Honor, at this time, we would
16 like to go on the Samsung confidential record.

17 JUDGE BHATTACHARYYA: We're moving on to the
18 Samsung confidential record.

19 (Whereupon, the hearing proceeded in
20 confidential session.)

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1 O P E N S E S S I O N

2 BY MR. REED:

3 Q. Okay. Let's turn to claim 12 of the '287
4 patent. And, first, I have lost the display. Here we go.
5 Here we have the language of claim 12. Can you
6 remind us about the recited open and closed loops briefly?

7 A. Yeah. Again, it is the open loop is ambient air
8 passing through the display along the backlight. And the
9 closed loop is isolated gas.

10 Q. Do you understand that Respondents assert that
11 claim 12 is invalid as obvious based on the Karppanen
12 patent?

13 A. Yes, I'm aware of that.

14 Q. What was your conclusion from your evaluation of
15 Karppanen?

16 A. My conclusion was that the Karppanen does not
17 render claim 12 as invalid.

18 Q. And what was the basis for your conclusion?

19 A. Because Karppanen does not disclose closed loop
20 of isolated gas or an open loop of ambient air that -- that
21 passes along the backlight.

22 Q. Please give us a brief overview of the Karppanen
23 patent.

24 A. So Karppanen patent generally describes three
25 different casings. There is the display casing where the

1 displays; there is the device casing. What he has done is
2 moved all the electronics from the display and has put it
3 in another casing that he calls as device casing.

4 And those two casings are tethered against each
5 other with a central channel that is formed between those
6 two casings, which he calls as the cooling channel. So he
7 has the ambient air coming through the cooling channels to
8 remove the heat from display casing and device casing.

9 Q. At a high level, can you tell us the reasons why
10 you believe that claim 12 is valid over Karppanen?

11 A. Like I'm showing on this page, it does not meet
12 the closed loop of isolated gas claim element, as well as
13 open loop that passes along the backlight, and
14 Mr. Smith-Gillespie does not offer any modifications of
15 combinations to Karppanen.

16 Q. On slide 15 is an excerpt or is a reproduction
17 of Figure 1 of Karppanen. Please point out those features
18 you just described using Figure 1.

19 You can use your laser pointer, perhaps.

20 A. Right. So here what we see is that that whole
21 casing being open on the -- what you are looking into right
22 now is that cooling channel that is configured in between
23 the display casing on this side and the device casing on
24 that side (indicating). So you have these fans that are
25 taking in ambient air through an inlet there. They have it

1 flow along the heat sink here (indicating) and then go to
2 the exit.

3 And that's broadly what Karppanen is describing.

4 Q. Turning to slide 16, you have excerpts of
5 Smith-Gillespie annotations to Figure 2 of Karppanen.
6 First, what claim construction have you applied in your
7 analysis of this term?

8 A. Well, along the backlight was a disputed claim
9 term. And Your Honor had defined it to have its plain and
10 ordinary meaning. Respondents had contended it should mean
11 something that is in thermal communication with the
12 backlight and that was denied. And I have applied that
13 construction given by this Court in my analysis.

14 Q. Using Mr. Smith-Gillespie's annotations, could
15 you explain whether, in your view, Karppanen teaches an
16 open loop of ambient air which passes through the housing
17 and along the backlight?

18 A. Okay. So, first, let's analyze this figure a
19 little bit. What you see here marked is the display
20 element, Number 26. Now, this display element is a
21 complete display element that is configured to have --
22 likely to have in the rear portion of this display element
23 a backlight.

24 What you have in Karppanen is a green colored
25 loop going all around the display. That's the closed loop.

1 And what Mr. Gillespie has also identified is this pink
2 colored loop. That's the open loop. So what you have is,
3 again, a closed loop and an open loop.

4 Q. And what is between the backlight and the open
5 loop in Karppanen?

6 A. So if you see the backlight, which ends there,
7 there is the closed loop present between the backlight and
8 the open loop. The open loop is essentially going around
9 here (indicating). So there is -- there is the closed
10 loop, as well as the presence of the wall of the display
11 casing marked as, I believe, Number 22 here.

12 So those are two additional elements that are
13 intervening between the open loop and the backlight.

14 Q. Do you believe that those two fin structures
15 that stick out into the flow path that is colored pink are
16 part of the backlight?

17 A. No.

18 Q. Why not?

19 A. So those -- I believe that to show that the open
20 loop is falling along the backlight, Mr. Smith-Gillespie
21 uses this embodiment at the bottom. At the bottom, you
22 have, again, the backlight. You have this portion
23 (indicating), which is called the first heat transfer part,
24 presumably it is solid in this implementation. And then
25 you have a heat sink here.

1 So also described in the patent, though it is
2 not marked here, it says that this conduction element or
3 the first heat transfer part is glued to the back of the
4 surface. So you have a backlight ending here (indicating).
5 You have a glue that is sticking this first heat transfer
6 part.

7 After that you have sort of a break here. There
8 is a dry contact between that element, the first heat
9 transfer part, and the second heat transfer part, 62 here,
10 which is essentially a heat sink.

11 So let's count, right, after the backlight, you
12 have a blue, you have a conduction element, you have a dry
13 contact here and then you have a heat sink. And after
14 that, you have the open loop. So there are several
15 intervening structures now in between the open loop and the
16 backlight.

17 Q. Let's turn and look at the closed loop of
18 isolated gas term. Remind us what the closed loop element
19 requires?

20 A. So closed loop element in '287, claim 12, has a
21 very specific language. It is not any closed loop. It's
22 closed loop of isolated gas, which in the context of this
23 patent, means essentially isolated, essentially isolated
24 from dust and water from going in and harming the
25 electronics.

1 Q. You have excerpts from Karppanen here that state
2 that, and I quote, "The display casing and the device
3 casing have been made weatherproof."

4 Do you believe that teaches an isolated gas
5 within the meaning of the patent?

6 A. No, it does not.

7 Q. Why not?

8 A. So weatherproof is a common term. Weatherproof
9 is used just like the word says, weatherproof, to prevent
10 against things like rain, storm, like that affect all of us
11 in our patios have these electric receptacles. Those
12 electrical receptacles are called waterproof because they
13 have a cover on top, which prevents almost vertically
14 falling rain from going inside and debris, which may be
15 flying around, from going inside and plugging that plug.

16 Also sometimes some electrical boxes that may
17 have a little cover on them and many like a switch box,
18 that's also called weatherproof, but weatherproof does not
19 mean that it prevents any air from going in and out of the
20 product.

21 In fact, even in the patent, the weatherproof
22 appears in claims and in specifications and everywhere it
23 appears, it doesn't say anything about isolation. It just
24 talks about weatherproof in the context of enabling the
25 performance of updating and maintenance measurement

1 outside. Every time they use weatherproof, they use that
2 phrase.

3 The other things that Mr. Smith-Gillespie had
4 relied upon to claim that it is isolated is because the
5 specification said it can be closed, it can be in a closed
6 position, and the closed position doesn't say anything
7 about isolation.

8 A door could be closed. You still can have
9 draft of air coming through it, just one very simple
10 example.

11 Q. Let's skip forward to slide 19.

12 Dr. Pokharna, did you hear Mr. Smith-Gillespie
13 opine on any modifications or combinations of Karppanen to
14 make claim 12 obvious?

15 A. No, he did not.

16 Q. Why would a person of ordinary skill in the art
17 not be motivated to modify Karppanen?

18 A. Karppanen already claims to solve the problem of
19 cooling of these displays.

20 Q. Let's switch gears and look at the '740 and '142
21 patents. Did you evaluate Samsung's contentions that these
22 two patents are obvious?

23 A. Yes, I did.

24 Q. What was your conclusion?

25 A. My conclusion was that Samsung asserted patents

1 failed to disclose claim element 1c, 1d, 1e, 1f, as well as
2 claim 5.

3 Q. Slide 23 has Figures 3 and 4 of the '740 patent
4 and the '142 patent as well, of course. What are we
5 looking at in these figures?

6 A. So these figures show these new elements, which
7 I had described as heat exchanger, so they are describing
8 alternating channels of fluid flow that can help in keeping
9 those two fluid flows separate, but still have high heat
10 transfer rate between those two fluid channels.

11 Q. On the next slide is an excerpt from column 4.
12 What are the patents describing here?

13 A. So in the specifications of the patent, they
14 describe various kind of heat exchangers. You can have
15 heat exchangers where the fluids would be going parallel to
16 each other. Of course one of the main things is the fluids
17 have to be separated so they could be going parallel, they
18 could be going like opposite to each other, or they could
19 be going like cross flow in 90 degrees to each other.

20 But in each of these embodiments, the key
21 feature is that the flow is through the channels and it is
22 interspaced, between the stacked layer of interleaving
23 these flow channels.

24 Q. What does the background of these two patents
25 say about systems of the past?

1 A. So background of the patent, of course,
2 describes the prior art. And it refers to the prior art as
3 people were trying to cool these displays by convective
4 heat transfer system inside, like you have a fan blowing
5 air inside a cabinet, and then you place some fin
6 structures in thermal communication with the hot air, so
7 that you can reject the heat so that's really what was
8 described in the prior art, in the background of these
9 patents.

10 Q. Do you see Figure 7 of the '064 application
11 filed March 3rd, 2008 on the left on slide 26?

12 A. I do.

13 Q. And what does Figure 7 show?

14 A. So Figure 7 is describing a method to transfer
15 heat from this closed loop to the open loop by using these
16 fin structures, these element 150 are described as fin
17 structure. So essentially what this '064 patent is
18 describing is a heat sink that is on the outside.

19 Q. And does the '064 application describe these
20 features as a heat exchanger?

21 A. No. '064 patent does not describe these
22 features as heat exchangers.

23 Q. On the right you see the -- sorry, the '736
24 provisional application that was filed December 18th, 2008?

25 A. Yes, I see that.

1 Q. And what was the title of that patent
2 application?

3 A. Heat Exchanger for an Electronic Display.

4 Q. What does Figure 2B of that application show?

5 A. This is the application that discloses the
6 claimed heat exchangers. Again, you can see them. They
7 are essentially stacked, so there is one fluid going
8 through the page here (indicating), the other fluid is
9 going in the perpendicular direction. This is the
10 cross-flow heat exchanger that they are describing.

11 And you can see these corrugated plates, which I
12 believe are some election boards from some backyards, which
13 were configured, as I have described earlier. These are
14 the pictures from that actual product. But what they are
15 really describing are these alternating channels of fluid
16 flow.

17 Q. And what do these two applications that you're
18 comparing tell you about what a heat exchanger is within
19 the '740 and '142 patents?

20 A. So when I look at both of these, it tells me
21 that heat exchangers are clearly being defined here as what
22 I would call as a classical heat exchanger that is referred
23 to in the literature, and in addition, it is drawing
24 contrast with what are called typically the fin structures
25 like heat sinks.

1 Q. What are you showing here on slide 27?

2 A. So I want to spend a little bit of time, you
3 know, talking about how the heat exchangers are known in
4 the thermal management academic literature. So this here
5 is the most popular textbook of heat transfer that is used
6 around the world for the first class in heat transfer in
7 undergraduate level, as well as graduate level. And let's
8 see what this book says what a heat exchanger is.

9 So the heat exchanger it describes first as
10 exchanging heat between two fluid streams that are not
11 mixed together. And it goes on to explain various kinds of
12 heat exchangers in the introduction itself. That is what
13 is called a shell-and-tube heat exchanger.

14 You have a bank of tubes that have one fluid
15 going through it, something, let's say, that you need to
16 cool. And around there is the other fluid that is going
17 around it to enhance the heat transfer without mixing these
18 two fluids.

19 But of particular interest here I want to
20 mention are these two kinds of configurations that are
21 shown here at the bottom, which are curiously similar to
22 the structures that we saw in the '740 and '142
23 application.

24 Q. And what do all of these heat exchangers have in
25 common?

1 A. All of these heat exchangers have flow channels
2 through which you have the two fluids, the heating or the
3 cooling fluid going through it.

4 Q. Turning to slide 29, do you agree with
5 Mr. Smith-Gillespie that in the context of these patents,
6 any device that transfers heat from one fluid stream to
7 another fluid stream is a heat exchanger?

8 A. No, absolutely not.

9 Q. Why not?

10 A. Well, if that was the case, I mean, I will look
11 at the window behind us. Inside it is cooler. Outside it
12 is warmer. So that window is transferring heat outside.
13 That's not a heat transfer. Nobody would call it as a heat
14 transfer. So nobody would call it as a heat exchanger, I'm
15 sorry.

16 Heat exchanger is a specific device, a classic
17 thermal management device that I just described on previous
18 slide.

19 Q. Turning to slide 30, what is your opinion
20 regarding whether Karppanen renders claims 1 and 5 of the
21 '740 patent obvious?

22 A. I don't believe Karppanen renders any of these
23 elements of claim 1 obvious.

24 Q. Why not?

25 A. So Karppanen fails to disclose a closed loop, at

1 least under the Respondents' construction, which requires
2 an essentially sealed element for the closed loop. It does
3 not describe a heat exchanger, and since it does not
4 describe a heat exchanger, there is no gas circulation
5 device that can force the cooling air out of the other air
6 stream through the heat chamber. And then claim 5 depends
7 on claim 1, so that is also not satisfied.

8 Q. Turning here to slide 31, there's an image from
9 CX-2485 at the top. What are you describing here in terms
10 of your view of whether Karppanen teaches a closed loop for
11 the '740 and '142 patents under Respondent's construction?

12 A. So I spoke about it in the context of '287. I
13 am not going to describe all of that again. But
14 weatherproof as I mentioned earlier does not mean that it
15 is essentially sealed under the Respondents' claim
16 construction.

17 Q. Do you agree with Mr. Smith-Gillespie that
18 Karppanen discloses a common heat exchanger?

19 A. No. As I just explained, Karppanen does not
20 have a common heat exchanger.

21 Q. What does Karppanen describe?

22 A. So let's look at Karppanen's figure, which
23 Mr. Smith-Gillespie concludes is a heat exchanger. First
24 of all, this heat exchanger or this -- sorry, this
25 element -- cooling element 32 is described in three

1 different ways in the Karppanen prior art.

2 The first way he describes it as it has number
3 of plate-like cooling fins placed side-by-side. He is
4 talking about, these are the number of cooling fins placed
5 side-by-side. So that's the structure that Smith-Gillespie
6 is -- that's the structure that Karppanen is describing.

7 Q. Is this similar to the fin structure described
8 in the background section of the patent?

9 A. Yes, absolutely.

10 Q. Is Karppanen describing a heat exchanger in this
11 first location that you mentioned?

12 A. No, he is not.

13 Q. What is the second way that Karppanen describes
14 its heat transfer elements?

15 A. Second way is this embodiment that I talked
16 about, this conduction element being glued to the back of
17 the backlight and then this sort of analysis structure
18 here.

19 So if you look at this entire structure, this is
20 a classical heat sink. This is what is being used in your
21 computer to remove the heat from the CPUs and some other
22 hot chips.

23 Q. Is Karppanen describing a heat exchanger here?

24 A. No.

25 Q. What is the third way that Karppanen describes

1 the heat transfer elements in that reference?

2 A. So the third way is this preferred embodiment.

3 And he calls these cooling elements to be Peltier elements.

4 Q. What is a Peltier element?

5 A. A Peltier element is a very different thermal
6 management device. It's actually a solid-state compressor,
7 meaning you put DC power in it and it pumps heat from
8 colder temperature to hotter temperature.

9 Essentially what a compressor in your
10 refrigerator or air-conditioner is doing, so you can use a
11 Peltier device to cool -- to set the temperature, meaning
12 below the ambient temperature. That is what a Peltier
13 element is.

14 Q. Let's look now at the elements of the '740
15 patent that recite a gas circulation device and an air
16 circulation device, each positioned to force ambient air
17 through a common heat exchanger.

18 Does Karppanen teach these elements?

19 A. No, Karppanen does not teach -- First of all,
20 Karppanen does not teach a heat exchanger. As you can see
21 in all of these heat exchangers, the fluid streams have to
22 flow through the heat exchanger, right, like through these
23 channels, through these channels; whereas Karppanen's heat
24 sink of the cooling elements do not have any feature that
25 allows the flow to go through it. It is going along it.

1 Q. Why would a person of ordinary skill in the art
2 not be modified to modify Karppanen?

3 A. First and foremost, let's look at what people
4 were thinking in that time frame for the cooling of these
5 displays. One of the prior art, Wellhofer, specifically
6 talks about that heat exchangers that work on the
7 air-to-air principle have proven to be unsuitable due to
8 their inflexible design. So there is prior art that
9 actually is teaching away from using those heat exchangers.
10 Secondly, if you see the Williams reference here
11 and that Mr. Smith-Gillespie had described yesterday, it
12 uses a heat exchanger, but that heat exchanger was fairly
13 chunky in volumeness. It requires some specific ways to
14 bring air into the inlet and out of the outlet because you
15 can't mix these air streams.

16 So it requires some specific configurations,
17 whereas what Karppanen is describing is a modular, thin
18 electronic information board that has to be sitting outside
19 and it needs to be serviceable and it needs to be modular.

20 And none of those basic features that Karppanen
21 is trying to achieve will be broken if we try to integrate
22 something that is going in like on the back of this thick
23 gaming machine on to the back of this thin display.

24 Q. Did Karppanen identify any problem that would
25 have motivated someone to modify the reference?

1 A. No. Karppanen claims to have already solved the
2 problem of thermal management of electronic display.

3 Q. Okay. Turning to the Yare reference, does Yare
4 render claims 1 and 5 of the '740 patent obvious in your
5 view?

6 A. No. Yare does not render these claim elements
7 obvious.

8 Q. And why not?

9 A. So I'm giving my listing here. So Yare does not
10 have a closed loop that is going around the display. Yare
11 does not have a common heat exchanger that the two paths
12 are flowing through, and I believe there are a couple of
13 others on this slide, counselor. This is one of the older
14 versions of my slides, but that's fine.

15 Also there is no gas circulation device that is
16 having the circulating gas go through the heat exchanger
17 and there is no air circulation device that is having the
18 air go through the common heat exchanger, and claim 5 is
19 dependent on claim 1. That's why that is also not met.

20 Q. All right. Let's look at Yare and its
21 disclosure. Does Yare disclose a closed loop gas
22 circulation path about the electronic image assembly?

23 A. No. Yare does not describe any closed loop
24 about the electronic image assembly.

25 Q. Can you tell us why you don't believe it does,

1 in your view?

2 A. Yeah. So Yare describes this -- what actually
3 Yare is talking about is getting -- trying a display that
4 is really not configured for outdoor use and then put it in
5 a cabinet, seal the cabinet, and use the cooling scheme of
6 the actual display system.

7 And within the cabinet, his main invention is
8 around the cabinet and some heat exchange elements in the
9 -- in the cabinet itself to remove heat from inside of that
10 sealed zone to outside.

11 So what Yare is talking about, what he describes
12 is display system. This is, again, fully configured
13 product. It's a display that has its own cooling scheme
14 right here (indicating) through the fan and presumably
15 there are some other internal schemes that are linking all
16 the thermal elements together to cool this display.

17 So Yare's display is described in front of the
18 cabinet right here (indicating). And it does not form any
19 flow channel in front of the display for the closed loop
20 gas to go in front of it.

21 Q. Where is the display in Yare relative to the
22 front glass of the cabinet?

23 A. It's abutting the front glass of the cabinet as
24 shown in this.

25 Q. And just remind us one more time. What is the

1 feature that you have highlighted here in yellow?

2 A. That's the full display system.

3 Q. Have you reviewed Mr. Smith-Gillespie's expert
4 report at paragraph 1243?

5 A. 12 -- yeah -- yes, I have reviewed
6 Mr. Smith-Gillespie's report.

7 Q. Here on the slide is an annotation from
8 Smith-Gillespie's report. Do you agree or disagree with
9 how he identifies the display here?

10 A. I disagree.

11 Q. Why?

12 A. So Mr. Smith-Gillespie has drawn this
13 hypothetical location for the display whereas the display
14 is called out to be that entire element. I think it is
15 self-serving because then you can show that there is flow
16 around the display. I think that's probably the reason
17 that he drew it there.

18 Q. Is there a box that appears in Yare where this
19 blue box appears on the annotation?

20 A. No, absolutely not.

21 Q. Let's zoom in on the image from the last slide
22 on the right. What is your green arrow pointing at?

23 A. So the green arrow is pointing at the fact that
24 the 20, that was the display element, right, that was just
25 merely pointing to this location for the entire

1 yellow-colored highlight that I had a couple slides
2 earlier. What Mr. Smith-Gillespie has done is annotated
3 that by extending it to what he marked as his imaginary
4 display location.

5 Q. Were you here for Mr. Smith-Gillespie's
6 testimony yesterday?

7 A. Yes, I was.

8 Q. Does he annotate the front portion of the
9 display in the same way that he did before?

10 A. No. I was surprised to see he has agreed with
11 me about the location of the -- where the display is in his
12 new annotation.

13 Q. Now that you appear to agree, what do the
14 L-shaped arrows show?

15 A. So, as it is very clear from this figure, the
16 L-shaped arrows are showing the flow of air through the
17 display, not around the display.

18 Q. Okay. Let's turn to slide 46 and look at
19 another set of Smith-Gillespie's annotations. On the left
20 are his annotations to Yare in paragraph 1253 of his
21 report.

22 Do you see that?

23 A. Yes, I do.

24 Q. And on the right are the new annotations that we
25 saw yesterday. Do you see that?

1 A. Yes.

2 Q. Does it appear that he changed his annotations
3 again?

4 A. It appears to me that he has changed his
5 annotations again.

6 Q. On the right-hand image, if there is air flowing
7 internal to the display system, is there enough information
8 to conclude that air is flowing between the display system
9 panel and the display system front glass?

10 A. No.

11 Q. Okay. On either image here, is there enough
12 information to conclude that any air is flowing between a
13 fully formed display system and the front glass of the
14 cabinet?

15 A. No, there is not.

16 Q. On slide 47, here is another set of annotations.
17 Do you agree with Mr. Smith-Gillespie that Yare teaches an
18 air circulation device or a gas circulation device
19 positioned to force circulating gas through a common heat
20 exchanger?

21 A. No. I do not believe that the air that is
22 going, for example, in this atmospheric zone 40 as here, is
23 going through the heat exchanger. It's -- in fact, Yare
24 talks about it as flowing along the heat exchanger.

25 Q. Okay. Let's look at the Larson reference. Does

1 Larson teach a person of ordinary skill in the art that
2 there's a gap between a front display surface and a cover
3 glass that would allow gas circulation about the front of
4 the electronic image assembly?

5 A. So Larson talks about two different
6 implementations to reduce what he called unwanted
7 reflections and ghosting. And one of them had a gap, air
8 gap between the front cover and the display. But then he
9 also describes another method here, which involves using
10 adhesive between the cover layer and the polarizer 8.
11 Polarizer 8 was a part of his LCD. So they are adhered
12 together, essentially.

13 So he describes, again, two implementations, one
14 with and one without any air gap.

15 Q. Did you hear Smith-Gillespie provide any
16 analysis about Pandolfi yesterday?

17 A. No, I did not hear him provide any analysis.

18 Q. Do you agree that Pandolfi shows displays spaced
19 apart from the front surface of their cabinets?

20 A. No.

21 Q. What does Yare teach about the effectiveness of
22 the display's cooling system?

23 A. Yeah, so Yare teaches that he has improved the
24 effectiveness of display cooling system so that they can
25 work in that sealed compartment.

1 Q. Would Yare provide any motivation to a person
2 skilled in the art to make any modifications to its design?

3 A. No, he claims to have already solved the
4 problem.

5 Q. All right. Claims 6 and 10 of the '142 patent,
6 you understand that Smith-Gillespie contends that these two
7 claims are obvious in view of the combination of Karppanen
8 and Larson?

9 A. I understand that.

10 Q. Do you agree with his opinion?

11 A. No, I do not agree with his opinion.

12 Q. And why don't you agree with his opinion?

13 A. Yeah. So, first of all, Karppanen does not
14 disclose a heat exchanger. And also there are no solar
15 energy reduction layers or anti-reflection layers that are
16 present in Karppanen.

17 Q. Let's look at the heat exchanger element first.
18 Can you remind us why in your view Karppanen does not
19 disclose a heat exchanger?

20 A. I go into all of this in some detail. I am not
21 going to repeat all of my testimony, especially before
22 lunch right now. So this has -- essentially I describe
23 three different elements. There is a cooling element 32.
24 None of these describe a heat exchanger. Actually, that
25 second arrow should be pointing down, I'm sorry.

1 That's the heat sink that is described here
2 (indicating). None of them disclose a heat exchanger.

3 Q. Do you recall the solar energy reduction layer
4 limitation in claims 6 and 10?

5 A. Yes, I recall that.

6 Q. Now, is there a dispute whether Karppanen
7 teaches a solar energy reduction layer between the parties?

8 A. No, there wasn't any dispute. Karppanen does
9 not disclose presence of any solar energy reduction layers.

10 Q. Can you remind us the purpose of the solar
11 energy reduction layers in the '142 patent?

12 A. Solar energy reduction layer is to reduce the
13 amount of solar energy that passes through the display's
14 housing. So by reducing the solar thermal load, it
15 improves the cooling of those displays.

16 Q. Is there any reason that a person skilled in the
17 art in your field would have modified Karppanen to include
18 solar energy reduction layers?

19 A. No.

20 Q. Why not?

21 A. Because, again, Karppanen claims to have already
22 solved that problem.

23 Q. Do you agree with Smith-Gillespie's assertion
24 that a person of skill in the art would have combined
25 Karppanen and Larson?

1 A. No. Larson is in the field of optics.
2 Karppanen is in the field of thermal management. It is
3 unlikely that somebody -- that a POSITA would be looking at
4 the optics field to solve a thermal challenge.

5 Q. Do you also understand that Smith-Gillespie has
6 asserted the combination of Yare and Larson against claims
7 6 and 10?

8 A. I'm aware of that.

9 Q. And do you agree with his opinion based on the
10 Yare and Larson combination?

11 A. Sorry, could you repeat the question?

12 Q. Do you agree with his opinions that claims 6 and
13 10 are obvious or would have been obvious in view of the
14 combination of Yare and Larson?

15 A. Yes, I have reviewed his opinion. I do not
16 agree with that.

17 Q. And why not?

18 A. Because Yare does not disclose that within the
19 heat exchanger, you have the open loop airflow pathway as
20 described in claim 6 of the '142 patent. Also, there is no
21 motivation to combine, so, therefore, the claim element 6
22 and claim 10 which are describing the solar energy
23 reduction layers are not present.

24 Q. Can you remind me your first basis -- I may have
25 misheard -- regarding Yare and the reason in your view that

1 it doesn't render claim 6 and 10 obvious?

2 A. Yeah. So Yare does not -- does not disclose the
3 open loop airflow pathway where in the second portion of
4 the set heat exchanger forms part of said -- sorry --
5 closed loop gas circulation pathway, I'm sorry. The Yare
6 does not disclose the closed loop gas circulation pathway.

7 Q. And using this slide, can you remind us your
8 basis for that opinion?

9 A. Again, as I described earlier, Yare's display
10 system is formed all the way to the front of this cabinet.
11 There is no space remaining in between for it to form a
12 closed loop of gas circulation pathway.

13 Q. All right. And, finally, is there a dispute
14 whether Yare teaches solar energy reduction layer?

15 A. No, there is no dispute about that. Yare does
16 not talk about solar energy reduction layers.

17 Q. And in your view, is there any reason that a
18 person skilled in the art would have been motivated or had
19 reason to modify Yare to include a solar energy reduction
20 layer?

21 A. No, there is no motivation because Yare claims
22 to have already solved the problem of thermal management of
23 electronic displays.

24 Q. And do you agree with Smith-Gillespie's
25 assertion that a person skilled in the art would have

1 combined Yare and Larson?

2 A. It's my opinion that a person of ordinary skill
3 would not combine Larson with Yare because they are in two
4 separate fields. Yare is talking about thermal management;
5 whereas Larson is about optics.

6 MR. REED: Your Honor, we have no further
7 questions. We pass the witness.

8 JUDGE BHATTACHARYYA: All right. Why don't we
9 take lunch now. We're going to have a slightly longer
10 lunch today, an hour and 15 minutes. If necessary, I will
11 add 15 minutes at the end of the day to make up the time.

12 (Whereupon, at 12:51 p.m., a lunch recess was
13 taken.)

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1 A F T E R N O O N S E S S I O N

2 (2:08 p.m.)

3 JUDGE BHATTACHARYYA: Good afternoon. Please be
4 seated.

5 I have a few housekeeping matters that I want to
6 address, but in order to avoid interrupting Dr. Pokharna's
7 examination, I will do that after we're finished with the
8 witness.

9 MR. REDDY: All right, we have a few binders to
10 hand out, Dr. Pokharna. Just like last time, one binder
11 will have now your four reports in this case, as well as
12 your three transcripts. The other will have several
13 documents that I may be speaking with you about.

14 CROSS-EXAMINATION

15 BY MR. REDDY:

16 Q. So you and me, sir, one last time. Good
17 afternoon.

18 A. Good afternoon.

19 Q. Let's start with Karppanen, which is RX-1351.
20 If I could have the lower half portion of this document on
21 the screen, please, including the abstract, please.

22 Now, Dr. Pokharna, you're familiar with
23 Karppanen, obviously, right?

24 A. Yes, I am.

25 Q. And Karppanen discloses an electronic

1 information board, correct?

2 A. That's right.

3 Q. And the electronic information board is designed
4 to be suitable for installation outdoors, correct?

5 A. That's right.

6 Q. And as I think you mentioned on your direct
7 examination, the electronic information board in Karppanen
8 has three compartments, right?

9 A. That's right.

10 Q. A first is a display casing, correct?

11 A. That's right.

12 Q. And we see it depicted as element Number 10 in
13 the figure on the first page, correct?

14 A. Yes.

15 Q. Now, in the opposite end of the electronic
16 information board is a device casing, correct?

17 A. That's right.

18 Q. And then in between the display casing and the
19 device casing is a common cooling space, correct?

20 A. That's correct.

21 Q. And that's labeled element 20 in this figure,
22 correct?

23 A. That's right.

24 Q. All right. Let's talk a little bit more about
25 the display casing. So the display casing includes a

1 display element, which is Number 26, correct?

2 A. That's right.

3 Q. And the electronic information board may include
4 an LCD display, correct?

5 A. That's right.

6 Q. Now, let's start at the top on the left of the
7 figure. You see element Number 50 there, sir?

8 A. That's right.

9 Q. Element Number 50 is called a sealing element,
10 correct?

11 A. To attenuate vibration. Sealing element to
12 attenuate vibrations, yes.

13 Q. Let's take a look at column 7, line 35 in
14 RX-1351.

15 Do you see starting at line 35 it says, "The
16 transparent front plate has been fastened to the fastening
17 collar of the edge parts by means of a flexible, vibration
18 attenuating sealing elements 50, so that the edge parts of
19 the front plate and the back wall form a closed display
20 casing."

21 Do you see that?

22 A. Yes, I do.

23 Q. So you would agree that Karppanen discloses that
24 the display casing is sealed, correct?

25 A. No, I would not agree to that.

1 Q. Well, you would at least agree that Karppanen
2 discloses the use of sealing elements to create a closed
3 display casing, correct?

4 A. Yes, vibration attenuating sealing element.

5 Q. Right. And those sealing elements are used to
6 create a closed display casing, correct?

7 A. That's what the patent states.

8 Q. Right. And that's your understanding of what
9 the patent says too, right, sir?

10 A. Yes.

11 Q. Okay. Now, let's go back to the first page and
12 take another look at that figure with the abstract next to
13 it.

14 Now, element 64 is a fan, correct?

15 A. Element 64, yes, it's a fan.

16 Q. Right. And we see fans at the top and the
17 bottom of the display element, correct?

18 A. Yes.

19 Q. And you would agree that Karppanen discloses the
20 concept that fans are placed inside the display casing for
21 circulating the air in the space between the walls of the
22 display element and the display casing, correct?

23 A. That's right.

24 Q. And you would also agree that ducting has been
25 arranged between the walls of the casing and the display

1 element for directing the circulation of air around the
2 display element.

3 Is that right?

4 A. That's right.

5 Q. Now, element 56 is called a support element,
6 correct?

7 A. Yes, that's right.

8 Q. And the support elements in Karppanen's display
9 are designed in such a way that there's a gap to enable
10 circulation of air between the walls of the display casing
11 and the outer-most surface of the display element, correct?

12 A. Yes.

13 Q. Now, according to Karppanen, the display case is
14 weatherproof, correct?

15 A. That's what he describes it as.

16 Q. Right. And I think you testified to that on
17 your direct as well; isn't that true, sir?

18 A. Yes, it's weatherproof for performing
19 maintenance and service of the equipment, something along
20 those lines. Everywhere other than the abstract talks
21 that.

22 Q. What does that mean? Does that mean, sir, that
23 in your view, the electronic information board is only
24 weatherproof when it's being serviced?

25 A. No. That's not what that means.

1 Q. Okay. But the patent says that the display
2 casing is weatherproof, right, sir?

3 A. Yes, with some modifiers to weatherproof.

4 Q. Let's take a look at the abstract. Do you see
5 the second full sentence, it says, "The information board
6 has a weatherproof display casing 10 for the display
7 element and a weatherproof device casing 12 for the
8 electronic equipment needed for controlling the display
9 element."

10 Do you see that, sir?

11 A. Yes, I do.

12 Q. There's no modification in that language
13 limiting the times when it is weatherproof to when it is
14 being serviced or maintained, right, sir?

15 A. Yes, not in the abstract.

16 Q. Okay. Now, in the middle of the abstract
17 starting with the words "the display casing," it says, "The
18 display casing has a back wall 22, bordered by the cooling
19 space, having cooling elements for transferring heat from
20 the display casing to the cooling space."

21 Do you see that, sir?

22 A. Yes, I do.

23 Q. And the cooling element is labeled Number 32 in
24 this figure, right?

25 A. Yeah.

1 Q. And there's a first heat transfer part, which is
2 labeled Number 60, correct?

3 A. That's right.

4 Q. And the air that is circulating in the display
5 casing transfers heat to the first heat transfer part,
6 right, sir?

7 A. Yes, that's right.

8 Q. And then there is also the second heat transfer
9 part, which is Number 62, correct?

10 A. Yes, that's correct.

11 Q. And let's take a look at page or column 4, line
12 10, in Karppanen, please.

13 Now, in this particular embodiment, starting in
14 the middle of the first sentence, Karppanen is disclosing
15 "The display casing has a back wall bordered to the cooling
16 space, and the cooling elements have been arranged in the
17 back wall for transferring heat from the display casing to
18 the cooling space."

19 Do you see that?

20 A. Yes, I do.

21 Q. And that's consistent with what Karppanen
22 discloses in your view, right, sir?

23 A. That's right.

24 Q. Now, if we can go to Figure 3, please.

25 Now, on Figure 3, once again, if we can now zoom

1 in to the top, please.

2 In Figure 3, once again, we see that second
3 cooling element -- I'm sorry -- we see the second heat
4 transfer part, which is labeled Number 62, right, sir?

5 A. That's right.

6 Q. And in this instance, if we can zoom in on those
7 particular bodies there that are labeled 62.

8 Now, here they are shown as a series of plates,
9 correct, sir?

10 A. That's correct.

11 Q. And Karppanen discloses that, in this figure,
12 Figure 3, that ambient air enters through those vents
13 located on the side of the unit, and passes through that
14 second heat transfer part and then exits, correct?

15 A. That's right.

16 Q. If we can go to your slide 17, please.

17 Now, in slide 17 you offer the opinion that the
18 display and the device casings are only closed when they
19 are turned against each other and locked.

20 Is that right?

21 A. That's right.

22 Q. Okay. So your opinion is that the display
23 casing is not independently closed unless the device casing
24 is attached to it.

25 Is that right, sir?

1 A. Yes, I believe so.

2 Q. Okay. And, likewise, your opinion is that the
3 device casing is only closed when it is connected to the
4 display casing.

5 Is that right, sir?

6 A. Yes, I believe this product is meant to work in
7 a close position.

8 Q. All right. Well, let's take a look at column 6,
9 line 17 in Karppanen.

10 Beginning at line 17, you see that Karppanen
11 discloses "The information board has a closed display
12 casing 10, to the back wall 22 of which a cover 24 opening
13 on hinges 14 have been connected."

14 Do you see that, sir?

15 A. Yes, I do.

16 Q. And so Karppanen is disclosing, again here, that
17 the display casing itself is closed, correct?

18 A. That's correct.

19 Q. If we can go back to the abstract, please.

20 As we discussed, the abstract likewise discloses
21 that both the display casing and the device casing are
22 independently closed. Correct?

23 A. I don't know, if you point me to the word
24 "independently".

25 Q. Well, sorry, let me rephrase. So the abstract

1 states that the display casing is weatherproof
2 independently, correct?

3 A. It should be.

4 Q. And, likewise, that the device casing is
5 independently weatherproof, correct, sir?

6 A. Should be.

7 Q. All right. Now, let's go to slide 31 in your
8 presentation, please.

9 Now, in slide 31 you have opined that one reason
10 that you cannot tell whether there is a closed loop of
11 isolated gas in Karppanen is because you don't know whether
12 the enclosure has an IP5 rating or not; is that right, sir?

13 A. That's not the only reason for saying this, but
14 that is one of the reasons for saying this.

15 Q. Sorry, sir?

16 A. That's not the only reason, but that's one of
17 the reasons. I'm looking at the phrase "weatherproof for
18 enabling the performance and updating maintenance measures
19 outdoors."

20 Q. That's because in your view if an enclosure has
21 an IP5 rating, then it must have a closed loop in it,
22 right, sir?

23 A. Isolated gas is the phrase I would use for that,
24 not closed loop.

25 Q. All right. So let's start again.

1 So, in your opinion, an enclosure containing a
2 fan that has an IP5 rating, has a closed loop of isolated
3 gas in it; is that -- that's your opinion?

4 A. Given the fan is on, yes.

5 Q. Okay. Now, Dr. Pokharna, were you here when Mr.
6 Bolton testified that Vertigo always sold open loop
7 filtered systems that had an IP56 rating?

8 A. I was not here during his testimony, but I'm
9 familiar with what you are saying.

10 Q. Right. And so companies like Vertigo were
11 selling exclusively open loop products that had IP56
12 ratings, right, sir?

13 MR. REED: Your Honor?

14 JUDGE BHATTACHARYYA: I believe there is an
15 objection. Mr. Reed, what is the objection?

16 MR. REED: It is outside the scope of the
17 direct. There wasn't any testimony about this subject
18 matter.

19 MR. REDDY: Your Honor, I think -- we're basing
20 it on the slide, Your Honor. He is opined that one reason
21 that Karppanen does not have a closed loop is that there is
22 no indication that there is an IP5 rating in the document
23 itself.

24 The cross-examination is directed to whether
25 that's a sufficient -- whether that requirement that he has

1 indicated is sufficient to show that it's a closed loop or
2 not.

3 MR. REED: He hasn't opined on any Vertigo
4 products. It is outside the scope of his direct. And he
5 also testified he wasn't here for Mr. Bolton's testimony.

6 MR. REDDY: Right. And that he just testified
7 after that he was familiar with it.

8 JUDGE BHATTACHARYYA: The objection is
9 overruled. If he is not familiar, he can say so.

10 BY MR. REDDY:

11 Q. So, thank you, Dr. Pokharna.

12 So you would agree, companies like Vertigo were
13 selling displays that leveraged exclusively open loop
14 technology that did not have an IP56 rating; is that right?

15 A. I have heard that, but it required frequent
16 filter changes.

17 Q. Okay. And -- all right.

18 Since you weren't here the day Mr. Bolton
19 testified, sir, I won't ask you any further questions on
20 that. But now I would like to talk about your opinion with
21 respect to the "along the backlight limitation" in claim
22 12.

23 Now, your opinion is that Karppanen does not
24 disclose an open loop of ambient air that travels along the
25 backlight, correct?

1 A. That's correct.

2 Q. Now, if I can have slide 16, please, from
3 Dr. Pokharna's deck, please.

4 Now, as I believe you testified, you would agree
5 that there's a closed loop of air shown in green that is
6 flowing along the backlight in Karppanen, correct?

7 A. That's correct.

8 Q. But you would -- as we have discussed, you also
9 agree that an objective in Karppanen is to transfer heat
10 from the backlight to the cooling space, right, sir?

11 A. That's right.

12 Q. And that heat transfer is facilitated by what we
13 have been referring to as the cooling elements, right?

14 A. That's right.

15 Q. All right. I would like to talk a little bit
16 about heat exchangers, sir. Now, you would agree that
17 there are many, many different kinds of heat exchangers,
18 right?

19 A. Agree. Yes.

20 Q. Now, let's take a look at CX-2092, which is the
21 Incropera reference that you discussed. You call this the
22 most popular textbook on heat and mass transfer; is that
23 right, sir?

24 A. That's right.

25 Q. Let's take a look at the first page in the

1 paragraph which was CX-2092.676.

2 If I can zoom in on the first paragraph, please.

3 A. Do I have any CX --

4 Q. I'm sorry. This would be in your direct
5 examination binder that Mr. Reed gave you.

6 A. Got it.

7 Q. Incropera states, "The process of heat exchange
8 between two fluids that are at different temperatures and
9 separated by a solid wall occurs in many engineering
10 applications. The device used to implement this exchange
11 is termed a heat exchanger, and specific applications may
12 be found in space heating and air-conditioning, power
13 production, waste heat recovery and chemical processing."

14 Did I read that right?

15 A. Yes, sir.

16 Q. And that's how Incropera discusses what a heat
17 exchanger is, right?

18 A. This is the opening paragraph of his chapter
19 that lasts for --

20 Q. Right. In this opening chapter, the author is
21 conveying just generally conceptually what a heat exchanger
22 is, right, sir; would you agree with that?

23 A. Yes.

24 Q. Now, your opinion is that the heat exchanger
25 term in the '740 and '142 patents is limited to a

1 fluid-to-fluid heat transfer device that allows two fluid
2 streams to directly exchange heat by the fluid passing
3 through channels of the same structure, correct?

4 A. That's correct.

5 Q. And in your view, that's the only type of heat
6 exchanger that falls within the scope of the claims of the
7 '740 and '142 patent; is that right?

8 A. I believe the specifications also talk about
9 some other kind of heat exchanger, like you have one of the
10 fluids might be flowing through tubes. I believe I could
11 look at '740 and find that location where it talks about
12 other kind of heat exchangers, but they focus on the heat
13 exchanger that you just read from my testimony.

14 Q. Well, let's see what you said in your report,
15 Dr. Pokharna, because as we have learned, right, we don't
16 want to stray far from the opinions in the report.

17 Let's take a look at paragraph 259 in the
18 supplemental opening report, which in your binder should be
19 RX-221C.

20 A. Okay.

21 Q. Now, in your report in the second full sentence
22 you said "The '740 patent describes a heat exchanger as a
23 fluid-to-fluid heat transfer device that allows two fluid
24 streams to directly exchange heat by the fluid passing
25 through channels of the same structure."

1 Did I read that right?

2 A. Yes, you did.

3 Q. And that was the opinion that you disclosed in
4 your report, right, sir?

5 A. That's right.

6 Q. And that continues to be your opinion today,
7 right, sir?

8 A. That's right.

9 Q. Now, as I believe you also have opined, "A heat
10 exchanger has to have a plurality of channels, pathways or
11 tubes for the ambient air and the closed loop air."

12 Is that right, sir?

13 A. That's correct.

14 Q. And I should -- and that's the type of heat
15 exchanger that's in your view required under the claims of
16 the '740 and '142 patents. Is that right?

17 A. That's right.

18 Q. Now, let's take a look at the '740 patent, which
19 should be JX-4 in your binder.

20 In particular, let's go to column 4, lines 18 to
21 22:

22 Now, the '740 patent specification says "In a
23 preferred embodiment, the heat exchanger 101 would be a
24 cross-flow heat exchanger. However, many types of heat
25 exchangers are known and can be used with any of the

1 embodiments herein."

2 Do you see that?

3 A. I do.

4 Q. Now, in your opinion, the language that I just
5 read from the specification is only referring to heat
6 exchangers that have -- that are fluid-to-fluid heat
7 transfer devices that allow two streams of fluid to
8 directly exchange heat by the fluid passing through
9 channels of the same structure; that's your opinion?

10 A. That's right.

11 Q. Okay. Now, if we start with line 22 in this
12 same column, Mr. Smith, if we can increase the size of the
13 text box slightly.

14 It states, "In an exemplary embodiment, the heat
15 exchanger 101 may be a cross flow, parallel flow, or
16 counter-flow" -- I'm sorry.

17 Sorry, let me start again.

18 Starting at line 23, it says, "In an exemplary
19 embodiment, the heat exchanger 101 would be comprised of a
20 plurality of stacked layers of thin plates."

21 Do you see that?

22 A. Yes, I do.

23 Q. And we saw those -- an example of those stacked
24 layers of thin plates when we looked at Figure 3 in
25 Karppanen, right, sir?

1 A. No.

2 Q. We didn't see layers of stacked plates when we
3 looked at Figure 3?

4 A. No.

5 Q. All right. Could I have this -- can we keep
6 this text and then go side-by-side with Figure 3 from
7 Karppanen, please?

8 Just so the record is clear, we have RX-1351,
9 page 19. And, again, if we can zoom in on the top
10 structure.

11 And so those aren't stacked layers of thin
12 plates, sir?

13 A. Those are cooling fins. If you would read that
14 sentence completely of that paragraph completely, go down
15 to line 27, 28, I think it describes the stacked layers are
16 for what.

17 And I think you are leaving that, just reading,
18 just like you did the textbook, you are reading the first
19 paragraph to mean the entirety of a field of study. If you
20 go down to line 28 on the same column, I think you could
21 read it for yourself, what stacked layers of thin plates
22 are meant to do.

23 Q. Dr. Pokharna, if there is something in there
24 that explicitly supports your position, I'm sure Dr. Reed
25 will raise that with you.

1 Let's take a look at the file history now from
2 the '740 patent. And you should have JX-9 in front of you,
3 which will just be excerpts, rather, from the file history
4 of the '740 patent because it is many thousands of pages.

5 But you have reviewed this file history before,
6 right, sir?

7 A. Yes, I have.

8 Q. And on the first page it indicates that the
9 application was filed on October 20th, 2017, correct?

10 A. That's right.

11 Q. And you considered what happened during
12 prosecution of the application which led to the '740 patent
13 to form your opinions in this case, right, sir?

14 A. That's correct.

15 Q. All right. Let's take a look at JX-9.35.

16 Do you see this page begins, "The claims that
17 Mr. Dunn and Mr. Hubbard applied for when they filed their
18 application," right, sir?

19 A. Yes, I see this.

20 Q. And on claim 1, we have -- sorry, claim 1 is
21 shown on the screen and is on this page, JX-9.35, right,
22 sir?

23 A. That's correct.

24 Q. All right. And then on the -- the fourth
25 limitation requires a common heat exchanger located in the

1 pathway of both the closed loop gas circulation path and
2 the open loop ambient air flow path, correct?

3 Do you see that?

4 A. I see that.

5 Q. And we have it right there. That's the same
6 language that appears in element 1d as ultimately issued in
7 the '740 patent, right, sir?

8 A. That's right.

9 Q. Let's go to JX-9.3515.

10 Do you see on page 9.3515, this is the start of
11 an office action that appears to be dated October 5th,
12 2018. Do you see that?

13 A. Yes, I see that. Thank you.

14 Q. And you would have reviewed this office action
15 in preparing to render your opinions in this case, right,
16 sir?

17 A. That's correct.

18 Q. Now, let's turn to the next page. I'm sorry,
19 let's turn to page 9.3517. And if I may have the bottom
20 starting where claims 1 through 20 is/are rejected, and
21 then continue to the end of this paragraph and the rest of
22 the paragraph on the next page.

23 A. I see that.

24 Q. All right. Do you see that the examiner has
25 rejected the pending claims based on a reference called

1 Thielemans, right?

2 A. I see that.

3 Q. And you're familiar with the Thielemans
4 reference, right, sir?

5 A. You may have to show it to me to remind myself.
6 I've looked at it but, sitting here right now, I don't
7 exactly remember. You will have to show it to me.

8 Q. All right. Do you see that in the examiner's
9 rejection they state "Thielemans, et al. teaches an
10 electronic display" -- sorry, Mr. Smith, could we go back?

11 Do you see the examiner has stated "Thielemans
12 teaches an electronic display 10, see Figures 1a to 1b,
13 comprising an electronic image assembly, and continuing to
14 this, on the first page, a closed loop gas circulation
15 path, and then onto the next page, it states that
16 Thielemans discloses a common heat exchanger located in the
17 pathway of both the closed loop gas circulation path and
18 the open loop ambient air path."

19 Do you see that?

20 A. I see that.

21 Q. All right. Let's go to tab RX-1368, please.

22 Exhibit 1368, sir, is the Thielemans reference,
23 which I believe you testified you believe you're familiar
24 with, right, sir?

25 A. It was 13 -- yeah, okay. I recall reviewing it.

1 Q. And if we can go to the figure at the bottom of
2 this, please.

3 Now, in the prosecution history, the examiner
4 identified element 22 as the common heat exchanger,
5 correct?

6 A. Yes.

7 Q. And now if I can have this figure side-by-side
8 with the abstract from Thielemans, please.

9 Now, according to Thielemans, element 22 is a
10 heat sink, right, sir?

11 A. Right.

12 Q. And if we go to paragraph 49, which is on page
13 RX-1368.15. In paragraph 49 of Thielemans, it is
14 disclosed, "Preferably, a heat sink 22 is provided in the
15 form of a heat transporting plate disposed in the region of
16 a rear side of the array 14 of light emitting devices."

17 Do you see that?

18 A. I do.

19 Q. And so that's disclosing that the heat sink is
20 essentially right up against the lighting elements in the
21 display in Thielemans, right, sir?

22 A. That's what it describes, yes.

23 Q. And if we continue, it says, "The heat sink 22
24 is preferably in thermal communication with the light
25 emitting devices and is arranged in use to absorb heat

1 generated thereby."

2 Do you see that?

3 A. I do.

4 Q. And, again, "The heat sink 22 comprise a metal
5 having a high thermal conductivity, for example, aluminum
6 or an alloy thereof."

7 Did I read that correctly?

8 A. Yes.

9 Q. And, again, it is -- continuing, it says,
10 "Thermal communication may be optimized by connecting the
11 heat sink 22 to the rear face of the light-emitting display
12 through an optional thermal path. In addition, the heat
13 sink 22 may be colorably suitable to absorb heat energy,
14 e.g., mat black to absorb radiant energy."

15 Do you see that?

16 A. I do.

17 Q. So Thielemans is describing element 22 as
18 essentially a common heat sink, would you agree?

19 A. Yes.

20 Q. All right. Let's go back to the abstract in
21 Thielemans, please, which is on page 1.

22 If we start with the last full sentence starting
23 with the word "drive circuitry," Thielemans discloses,
24 "Drive circuitry 30 for the light emitting element 12 is
25 connected thereto by the electrical connections and spaced

1 apart from the heat sink 22 in such a manner that at least
2 one cooling channel 34 is defined between the heat sink 22
3 and the drive circuitry 30 for the passage in use of a
4 cooling fluid."

5 Did I read that correctly?

6 A. Yes.

7 Q. And so what Thielemans is describing is that on
8 one side, there is a heat sink, which is absorbing heat
9 from the lighting elements. And on the other side, there's
10 some form of cooling fluid or cooling path to cool the heat
11 sink, right, sir?

12 A. I believe so, yeah.

13 Q. Now, do you agree with the examiner that
14 Thielemans discloses that a heat exchanger as set forth in
15 claim 1 of the '740 patent?

16 A. No, I do not.

17 Q. Okay. Now, let's take a look at demonstrative
18 RDX-7-103 from Mr. Gillespie's presentation. You were here
19 for Mr. Gillespie's testimony, right, sir?

20 A. Yes, I was present.

21 Q. And do you recall he offered testimony about the
22 Williams reference?

23 A. I do.

24 Q. And you're familiar with this reference too,
25 right, sir?

1 A. I have reviewed it.

2 Q. All right. And if you need to review it, it's
3 at RX-1397 in your binder.

4 Now, you would agree Williams discloses a heat
5 exchanger as you have defined it for purposes of the '740
6 and '142 patents, right, sir?

7 A. Yes. Williams discloses a heat exchanger.

8 Q. Right. And, in particular, the type of heat
9 exchanger that you contend is the type that's covered by
10 the '740 and '142 patents, right?

11 A. Yes.

12 Q. And, in particular, Williams discloses an
13 air-to-air heat exchanger, right?

14 A. That's correct.

15 Q. Now, were you aware that at one point in this
16 investigation, your counsel had proposed that the phrase
17 "heat exchanger" means a device for transferring heat from
18 one fluid to another without allowing them to mix during
19 the claim construction process?

20 A. I have no recollection of that.

21 Q. Okay. But do you disagree that the definition
22 that I just provided you is the definition of the heat
23 exchanger that's covered by the '740 and '142 patents?

24 A. I have offered my opinion about what the
25 definition of heat exchanger is.

1 Q. Okay. Let's talk a little bit about the Yare
2 reference, which is RX-1398 in your binder.

3 Again, if I can have the abstract from the
4 figure at the bottom of the page, please.

5 Now, Yare discloses a cabinet for an electronic
6 display, correct?

7 A. That's right.

8 Q. And it discloses that this cabinet is designed
9 to be adaptable to mounting many different kinds of
10 displays within it, correct?

11 A. Could you point me to the adaptable phrase?

12 Q. Well, why don't we look at what you said in your
13 report, because I was actually quoting from that, sir.

14 So if we can go to page 106 in your report,
15 please.

16 A. Sorry, counsel, what's the tab number?

17 Q. It would be RX-221C.

18 A. RX-221C. Thank you.

19 Q. Actually, if I can go to -- actually, Mr. Smith,
20 why don't we take that down for a second and I will see if
21 I can move us forward a little bit.

22 You would agree Yare's display could include an
23 LCD display; is that right?

24 A. Yes.

25 Q. And, Mr. Smith, if we can go back to RX-1398,

1 please, and show the bottom half of it.

2 The cabinet in Yare is labeled Number 10. Is
3 that right?

4 A. Yes.

5 Q. And Yare's cabinet for its electronic display
6 contains two compartments, correct?

7 A. That's right.

8 Q. And the compartments of cabinet 10 include an
9 atmospheric zone and a sealed zone, correct?

10 A. That's right.

11 Q. And the atmospheric zone is labeled 40?

12 A. Yeah.

13 Q. And the sealed zone is labeled 30, correct?

14 A. That's correct.

15 Q. Now, the sealed zone 30 is a sealed air-tight
16 compartment, correct?

17 A. That's right.

18 Q. And you agree that the sealed zone 30 as
19 described in Yare is substantially atmospherically sealed,
20 correct?

21 A. Yes.

22 Q. And Yare describes that a preferred -- in a
23 preferred embodiment, the zone of the cabinet creating the
24 display system is sealed to the external environment,
25 correct?

1 A. That's right.

2 Q. And you would also agree that sealed zone 30 as
3 described by Yare, includes an internal cooling system that
4 is not open to atmospheric air, correct?

5 A. Could you repeat the question again? I'm sorry.

6 Q. Sure. Sealed zone 30 as described by Yare
7 includes an internal cooling system that is not open to
8 atmospheric air, correct?

9 A. That's right.

10 Q. And Yare also discloses that air is sealed
11 within the sealed zone 30, correct?

12 A. That's right.

13 Q. Okay. Could I have Figure 4 in Yare, please.
14 Figure 4 is shown on RX-1398.4.

15 Now, in Yare's Figure 4, the solid arrows show
16 movement of air in the sealed zone 30, correct?

17 A. That's right.

18 Q. Now, in your view, does this airflow create a
19 closed loop of isolated gas?

20 A. It is closed loop of isolated gas.

21 Q. Okay. And Yare discloses a heat exchanger,
22 Number 70, correct?

23 A. He calls it heat exchanger 70, yes.

24 Q. And one of the disclosures of the material used
25 to make that heat exchanger is corrugated metal, correct?

1 A. That's right.

2 Q. And the heat exchanger 70 communicates heat
3 between the atmospheric air zone and the sealed zone,
4 correct?

5 A. That's right.

6 Q. And as air passes through each zone, it passes
7 along the channels of the corrugated heat exchanger,
8 correct?

9 A. That's right.

10 Q. And it also discloses that other heat exchanger
11 arrangements or mechanisms could be used in its
12 configurations, agreed?

13 A. I suppose it says that.

14 Q. Let's take a look at page 6, lines 13 to 14.

15 A. Yes. I see that.

16 Q. You would agree, starting at line 13, Yare is
17 disclosing that other heat exchanger arrangements and
18 mechanisms could be used in its configuration, correct?

19 A. I see that.

20 Q. And Yare recognizes that there are many
21 different types of heat exchangers that are known, correct?

22 A. Yes.

23 Q. Now, would you also agree that Yare discloses
24 that heat is transferred by the heat exchanger from the hot
25 zone to the sealed zone to the cooler atmospheric air of

1 the atmospheric air zone?

2 A. Yes.

3 Q. All right. Now, can we have slide 41 from your
4 presentation, which is CDX-12.

5 Now, on slide 41, sir, you have indicated the
6 limitations of claims 1 and 5 of the '740 patent that, in
7 your opinion, Yare does not disclose, correct?

8 A. That's right.

9 Q. You would agree Yare at least discloses an
10 electronic display, correct?

11 A. Yes, Yare discloses that.

12 Q. And it also discloses an electronic image
13 assembly having a front portion and a rear portion?

14 A. Yes.

15 Q. And it also discloses an ambient air flow path
16 behind the rear portion of the display, correct?

17 A. Yes.

18 Q. All right, Dr. Pokharna -- we can take away that
19 slide, please.

20 Dr. Pokharna, you were here yesterday during the
21 deposition of Mr. Smith-Gillespie, correct?

22 A. I was.

23 Q. And you remember -- sorry, the testimony of
24 Mr. Smith-Gillespie. You were here, right, sir?

25 A. Yes.

1 Q. And you remember he was asked some questions
2 about whether Yare, Karppanen, or Larson was considered
3 during prosecution of the application that led to the '142
4 patent?

5 A. I recall that.

6 Q. Are you offering any opinion that Yare was
7 considered during prosecution of the application that led
8 to the '142 patent?

9 A. No, I'm not offering any other independent.

10 Q. And likewise, you're not offering any opinion
11 that either Karppanen or Larson were considered by the
12 examiner during the prosecutions that led to the '142 or
13 '740 patents, right, sir?

14 A. Yes, I have not offered any opinion about that.

15 MR. REDDY: I will pass the witness then, sir.

16 REDIRECT EXAMINATION

17 BY MR. REED:

18 Q. I just have a few questions for you,
19 Dr. Pokharna.

20 At the outset of Mr. Reddy's questions to you,
21 he asked you about the Karppanen reference. Do you
22 remember that?

23 A. Yes, I do.

24 Q. And he asked you specifically about the
25 vibration attenuating sealing elements?

1 A. Yes, I recall that.

2 Q. Counsel asked you if this forms a seal. Do you
3 recall that?

4 A. Yes.

5 Q. Can you explain what a vibration attenuating
6 sealing is in Karppanen?

7 A. I had understood that to mean a feature that
8 will absorb vibrations because that's how he describes it
9 as a vibration attenuating sealing mechanism.

10 Q. Now, the term that we're discussing in claim 12
11 is the -- I can see it now, a closed loop of isolated gas
12 which circulates within the housing. Correct?

13 A. That's right.

14 Q. Does the vibration attenuating sealing create an
15 area of isolated gas as recited in claim 12?

16 A. No, it does not.

17 Q. Why not?

18 A. Again, as I had described in my direct
19 testimony, weatherproof means it's only protected against
20 vertically falling rain or flying debris. And that's
21 reasonably well-known term of art.

22 You could walk in a Home Depot and ask for a
23 weatherproof socket and you will get the sockets that I was
24 describing which are used outside in your patio, which
25 doesn't allow the rain to fall inside and that's the

1 definition that I was applying in my analysis of Karppanen.

2 Q. You were asked many questions about whether the
3 casings were closed in Karppanen. Do you recall?

4 A. Yes.

5 Q. Just so the record is clear, is the statement
6 that a casing is closed sufficient to conclude what level
7 of sealing is used?

8 A. In my opinion, being in closed position does not
9 make it sealed.

10 Q. Can we pull up JX-4, please, page 12.

11 Mr. Reddy asked you some questions. Do you
12 recall looking at this page during your examination?

13 A. Would you blow it up, please?

14 Q. Yeah. Could we enlarge column 4, lines 18 to
15 38.

16 A. Thank you.

17 Q. You understand JX-4 is a copy of the '740
18 patent?

19 A. Yes.

20 Q. Okay. You were reading part of this column, and
21 I believe you wanted to read down further. Do you recall
22 saying that?

23 A. Yes, I do.

24 Q. And can you please read what you were wanting to
25 read?

1 A. I believe Mr. Reddy had me read from line 23.
2 "In an exemplary embodiment, the heat exchanger 101 would
3 be comprised of plurality of stacked layers of thin
4 plates."

5 However, what I wanted to read through was "The
6 plates may have a corrugated, honeycomb or tubular design,
7 where a plurality of channels/pathways, tubes travel down
8 the plate wise-length."

9 Furthermore it states, "The plates may be
10 stacked such that the direction of the pathways are
11 alternated with each adjacent plate, so each plate's
12 pathways are substantially perpendicular to the pathway of
13 the adjacent plates."

14 He is describing the cross-flow heat exchanger
15 and this is very different than the Karppanen stacked
16 plates that was insinuated in my cross-examination.

17 Q. Do you recall also being asked some questions
18 about the Yare reference? We can take that down.

19 A. I do.

20 Q. And you were asked to opine on page 106 of your
21 report. Do you recall?

22 If we could pull up Dr. Pokharna's report on
23 page 106, the supplemental rebuttal report.

24 If we can go to page 106 and blow up paragraph
25 281.

1 So I believe you were asked briefly about this
2 paragraph. Can you explain for us what you were explaining
3 in that paragraph?

4 A. Yeah. What the paragraph states that in the
5 Yare reference, the display 20 is already drawn and there
6 is no further need to define where that is.

7 Q. Thank you.

8 MR. REED: I have no further questions, Your
9 Honor.

10 JUDGE BHATTACHARYYA: Thank you.

11 MR. REDDY: Nothing further, Your Honor.

12 JUDGE BHATTACHARYYA: Very well. Thank you,
13 Dr. Pokharna.

14 THE WITNESS: Thank you, Your Honor.

15 (The witness stood down.)

16 JUDGE BHATTACHARYYA: Before our next witness, I
17 have a couple things I wanted to address.

18 MR. ABSHER: Very good, Your Honor.

19 JUDGE BHATTACHARYYA: So, first of all, I wanted
20 to provide some rulings on outstanding issues regarding
21 Mr. Smith-Gillespie. There was an objection raised to his
22 qualifications as an expert.

23 In consideration of the evidence regarding
24 Mr. Smith-Gillespie's education, experience, level of skill
25 in the art as has been defined in this investigation,