

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,

Petitioner,

Case IPR2024-00983

v.

RESONANT SYSTEMS, INC.,

US Patent 11,152,882

Patent Owner.

VIDEOTAPED DEPOSITION OF KEITH W. GOOSSEN, PH.D.

May 9, 2025

10:16 a.m. Eastern Time

Reported by: Lori J. Goodin, RPR, CRR, RSA,
California CSR #13959

DIGITAL EVIDENCE GROUP

1730 M Street, NW, Suite 812

Washington, D.C. 20036

(202) 232-0646

1 REMOTE VIDEOTAPED DEPOSITION of
2 KEITH W. GOOSSEN, PH.D.,
3 in the above-titled action, held on Wednesday,
4 May 9, 2025, commencing at approximately 10:19
5 a.m. before Lori J. Goodin, RPR, CRR, RSA,
6 California CSR #13959, Registered Professional
7 Reporter, Certified Realtime Reporter, Realtime
8 Systems Administrator, and Certified Shorthand
9 Reporter, and Notary Public of the State of
10 Florida, State of California, State of Maryland,
11 District of Columbia, and State of Delaware.

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1 REMOTE APPEARANCES:

2

3

4 ON BEHALF OF PETITIONER:

5 FISH & RICHARDSON P.C.

6 BY: CRAIG DEUTSCH, ESQUIRE

7 60 South Sixth Street

8 Minneapolis, Minnesota 55402

9 612-335-5070

10 deutsch@fr.com

11

12 AND

13

FISH & RICHARDSON P.C.

14 BY: THOMAS ROZYLOWICZ, ESQUIRE

1000 Maine Avenue, SW

15 Washington, D.C. 20024

202-626-6395

16 rozylowicz@fr.com

17

18 ON BEHALF OF PATENT OWNER:

19 RUSS AUGUST & KABAT

BY: KRISTOPHER R. DAVIS, ESQUIRE

20 12424 Wilshire Boulevard, 12th Floor

Los Angeles, California 90025

21 310-826-6991

kdavis@raklaw.com

22

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Lori J. Goodin, RPR, CRR, RSA,

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California CSR #13959

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PREVIOUSLY MARKED EXHIBITS

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3 PROCEEDINGS

4

5 * * *

6 Whereupon,

7 KEITH W. GOOSSEN, PH.D.,

8 a witness called for examination, having been

9 first duly sworn, was examined and testified as

10 follows:

11 * * *

12

13 EXAMINATION

14

15 BY MR. DEUTSCH:

16 Q. Good morning, Dr. Goossen.

17 A. Good morning.

18 Q. Thank you for being here again

19 today. We've had a series of depositions now in

20 this case.

21 Today we are talking about

22 IPR2024-00983 and this relates to the '882 patent

1 which is U.S. Patent Number 11,152,882.

2 A. Yes.

3 Q. And I think when we spoke earlier
4 this week, you had said you had been in about 20
5 depositions. So, I think as of today it is about
6 20 plus a few more, perhaps.

7 Does that sound right?

8 A. Yeah, I don't know the exact number.
9 It is right around 20.

10 Q. Good. Well, and so I won't step
11 through all of the ground rules but I will just
12 ask, you know, as before, if any question is
13 unclear, if you could let me know if it is
14 unclear and I will try to clarify or restate the
15 question.

16 Does that sound fair?

17 A. Yes.

18 Q. And of course, we will take regular
19 breaks.

20 But, if you need a break at any
21 time, please just let me know and we can, we can
22 take a break.

1 A. Okay.

2 Q. Where are you located today,

3 Dr. Goossen?

4 A. At my home in New Jersey.

5 Q. And is anyone with you today?

6 A. No. My wife and son are downstairs.

7 Q. Understood. And do you have any
8 materials with you?

9 A. Yes. I have a paper copies of the
10 report in question here and the '882 patent.

11 Q. Okay. And are there any notes or
12 markings on those?

13 A. No, they are clean.

14 Q. In preparing for your testimony
15 today, did you communicate with anyone about the
16 declaration you submitted in the 983 proceeding?

17 A. Well, I met earlier in the week with
18 counsel.

19 Q. Did you conduct any independent
20 searches outside of the materials in the record?

21 A. No.

22 Q. All right. Let's turn to the '882

1 patent.

2 And so, on Column 1, the Background
3 section at -- excuse me, Column 1, Line 23 of
4 the '882 patent recites, "Vibration inducing
5 motors and mechanisms have been used for many
6 years in a wide variety of different consumer
7 appliances.

8 Toys and other device systems
9 examples include vibration signals generated by
10 pagers, smartphones, vibration driven appliances,
11 such as hair trimming appliances, electric
12 toothbrushes, electric toy football games and
13 many other appliances, devices and systems."

14 Did I read that correctly?

15 A. Yes.

16 Q. And then it continues, "The most
17 common electro mechanical system used for
18 generating vibrations is an intentionally
19 unbalanced electric motor."

20 A. Yes.

21 Q. Are you familiar with what the '882
22 patent refers to when it talks about an

1 intentionally unbalanced electric motor?

2 A. Yes.

3 Q. What is it, generally?

4 A. Well, it just what it sounds like.

5 It is a rotary motor that

6 intentionally has some sort of imbalance

7 introduced to it so as it rotates it produces a

8 vibration.

9 Q. Okay. And then continuing in the
10 Background section the '882 patent discusses
11 problems with prior intentionally unbalanced
12 electric motors, do you agree?

13 A. Yes.

14 Q. And, for example, if we continue
15 down to the end of that paragraph on the top of
16 Column 2, it continues that "The frequency of
17 vibration of the unbalanced electric motor is
18 equal to the rotational frequency of the electric
19 motor shaft and is therefore constrained by the
20 rate at which the motor can rotate the shaft. At
21 low rotational speeds, little vibration is
22 produced."

1 Did I read that correctly?

2 A. Yes.

3 Q. And the '882 patent in the
4 background here is describing that as a problem
5 of prior unbalanced electric motors, correct?

6 A. I mean, I suppose it is stating that
7 as a problem, yes.

8 Q. Okay. And then it continues with
9 some additional specific problems. "While
10 effective in producing vibrations there are many
11 problems associated with the unbalanced electric
12 motor vibration generating units," and then it
13 discusses a few of those problems in that
14 paragraph.

15 And so I wanted to step through
16 that.

17 "For example, enormous care and
18 effort is undertaken to precisely balance
19 rotating parts in motors, vehicles and other
20 types of machinery and the consequences of
21 unbalanced rotating parts are well known to
22 anyone familiar with automobiles."

1 What are some of those consequences
2 that are being referred to?

3 A. Well, he doesn't state explicitly
4 but, you know, if you, if you use like
5 automobiles as an example, an unbalanced motor
6 will introduce undesired vibrations which can
7 cause failures to occur.

8 Q. Okay. And then if we continued to
9 Line 37 of Column 2, can you read the sentence
10 that begins unbalanced electric motors?

11 A. Yes. "Unbalanced electric motors as
12 discussed above" -- well, the grammar appears
13 wrong. I mean, I will read it as it directly
14 what it says.

15 "Unbalanced electric motors as
16 discussed above, oscillating motion back and
17 forth along a predefined path or space curve
18 cannot generally be produced by unbalanced
19 electric motors."

20 So, it is somewhat odd grammar.

21 Q. Yeah, right. I guess grammar aside,
22 is it correct that the '882 patent in that

1 sentence is describing a limitation of these
2 prior unbalanced electric motors?

3 A. Well, actually I'm not quite clear
4 what he is getting at here.

5 An unbalanced electric motor we
6 discussed as rotary, which means that the sort of
7 vibrating mass moves in a circle.

8 And so, I guess he is saying that it
9 is constrained to that circular motion.

10 Q. And then continuing onto the next
11 sentence, the '882 patent says, "Unbalanced
12 electric motors generate vibrations in only a
13 very limited portion of the total vibrational
14 force/frequency space."

15 Is that right?

16 A. That is what it reads, yes.

17 Q. And so the '882 patent is pointing
18 out a limitation of those types of devices in
19 terms of the type of vibrational output that they
20 can produce.

21 Is that right?

22 A. Well, I suppose it, that sentence is

1 reading back to the latter sentences of the
2 previous paragraph where he states that an
3 unbalanced electric motor, the frequency is the
4 rotational frequency and so you have only sort of
5 one knob which is the rotational frequency.

6 And so you don't have independent
7 control of frequency and vibration based upon
8 those latter sentences in the previous paragraph.

9 Because he is saying that the
10 frequency is the rotational frequency and at low
11 rotational speeds, little vibration is produced.

12 So, he is indicating in those two
13 sentences that if you wanted a low frequency but
14 large vibration, you couldn't do that with a
15 unbalanced electric motor, rotating motor.

16 Q. Okay.

17 A. Just using his language.

18 Q. Understood. And I think sticking
19 with the language of the '882 patent, I think
20 that might be described in more detail or related
21 concept is described in more detail later with
22 reference to Figure 10?

1 A. Do you want me to go to Figure 10?

2 Q. Yes. Let's go to Figure 10.

3 "Figure 10 shows a plot to the
4 amplitude/frequency space and regions in that
5 space that can be operationally achieved by
6 unbalanced electric motors and by ORMs."

7 Do you agree with that?

8 A. Well, I will refer to the text.

9 So, it appears that Figure 10 is
10 described in Column 10 of the patent about
11 two-thirds or so down.

12 "Figure 10 shows a plot of the
13 amplitude/frequency space and regions in that
14 space that can be operationally achieved by
15 unbalanced electric motors and by linear ORMs.

16 "Unbalanced electric motors can be
17 implemented to produce amplitude/frequency
18 combinations roughly within the cross-hatched
19 square region 1,002."

20 "By contrast linear ORMs can be
21 designed and implemented to produce
22 amplitude/frequency combinations underlying curve

1 1,004."

2 So, that is what he is reporting in
3 that figure, yes.

4 Q. Okay. Thank you. You answered my
5 next question which was what is the 1,002
6 referring to.

7 Could you tell me what the labels
8 are on the horizontal and vertical axis? It is
9 on the horizontal axis I see an arrow with V,
10 what is V?

11 A. Well, it is labeled "frequency" and
12 also labeled V.

13 So, I mean it, sometimes Nu, I mean
14 I'm not sure if the Greek letter Nu is meant to
15 be -- sometimes that is used for frequency.

16 Or, he could be somehow conflating
17 frequency and velocity there.

18 Q. Okay. Yes.

19 A. But, at the action -- I'm sorry --

20 Q. Go ahead.

21 A. The axes are labeled in Hertz. So,
22 I would treat it as frequency.

1 Q. Understood. And so on the frequency
2 axis it is labeled 0, 80 Hertz, 250 Hertz,
3 350 Hertz.

4 A. Yes.

5 Q. And then there is a Line 1,004, or a
6 curve, I should say 1,004, that extends from the
7 Y-axis on the left to the right of the graph.

8 And what is that curve showing?

9 A. Well, the Y-axis is labeled
10 amplitude.

11 Q. And so the curve 104 is showing the
12 amplitude at the various frequencies of the
13 X-axis for the linear ORM of this example?

14 A. That is how I would interpret that,
15 yes.

16 Q. Okay. And so it looks like in this
17 example, the amplitude peaks somewhere in between
18 zero and the left edge of the hatched Box 1002?

19 A. That is what is drawn. I'm not sure
20 if that is just a, you know, sort of a roughly
21 drawn curve or whether its reflects actual data,
22 I don't know.

1 Q. Do you have any reason to believe it
2 is not accurately depicting the amplitude of the
3 ORM that the '882 patent is describing with
4 respect to this example?

5 A. Well, I don't know if it is
6 referring to a specific design or not. I don't
7 know, I don't remember whether the text says it
8 is a particular design.

9 Q. The, so, I think in the text you
10 read it says "Figure 10 shows a plot of the
11 amplitude/frequency space and the regions in that
12 space that can be operationally achieved by
13 unbalanced electric motors and by linear ORMs."

14 A. Yes.

15 Q. Does that help?

16 A. Well, what I am saying is that it
17 could be a generic curve, there is no indication
18 that it is for a specific design of a linear ORM.

19 Q. But it is showing the amplitude
20 frequency space that can be operationally
21 achieved by a linear ORM, right?

22 A. Well, it is, it is indicating a

1 general property of linear ORMs, which is the
2 term "resonant" which it is indicating that it is
3 a maximum amplitude occurring at a particular
4 frequency.

5 So, the general shape of the curve
6 appears accurate. I'm just saying the, you know,
7 particular positions for, you talked about the
8 maximum being in a particular position, you know,
9 I don't know if he used a particular design in
10 order to obtain this curve or whether he sort of
11 hand drew it with the salient features for the
12 peak somewhere.

13 Q. Sure. And so for this particular
14 curve the, at say 20 Hertz, there is a particular
15 amplitude output that is relatively high if we
16 are looking at the curve 1,004?

17 A. Yes.

18 Q. Okay. And then in this particular
19 example, the amplitude goes down following the
20 curve as the frequency increases to the right
21 along the X-axis.

22 A. Yes.

1 Q. All right. Let's talk about another
2 waveform that the '882 patent describes with
3 respect to Figure 37A.

4 A. Which is the previous waveform we
5 have discussed?

6 Q. I am sorry. The, yes, strike that.
7 Let's talk about the waveform that is shown in
8 Figure 37A.

9 A. Okay.

10 Q. What is Figure 37A showing?

11 A. Well, just looking at the figure, it
12 appears to be depicting a sine wave.

13 Q. And that would be the wave labeled
14 with numeral 2702?

15 A. Well, I mean, do you want me to go
16 to the text to make sure? I'm just saying that
17 from memory the --

18 Q. Yeah --

19 A. -- the curve shown looks like a sine
20 wave.

21 Q. Got it. And yeah, I can help with
22 the cite here.

1 In Column 24, Line 47 the '882
2 patent states, "The desired vibration response of
3 the ORM is a sine-wave-like 3702 oscillation that
4 is plotted in Figure 37A on an amplitude versus
5 time coordinate system 3704."

6 A. Yes.

7 Q. And so I think when the text refers
8 to 3702 in that sentence, it is referring to the
9 sine wave that is mislabeled as 2702 in
10 Figure 37A.

11 Do you agree?

12 A. Yeah. That appears to be a typo.

13 Q. Okay. And then just for the sake of
14 completeness, what is T of an X-axis?

15 A. I believe "time."

16 Q. And what is A on the Y-axis?

17 A. Well, A could be referring to
18 amplitude.

19 Q. Okay. All right. Let's turn ahead
20 to Column 31 where discussion of Figure 45
21 begins.

22 A. Yes.

1 Q. And so I'm at Column 31, Line 19
2 which begins, "Figure 45 illustrates an
3 alternative approach to sensing the driving
4 oscillations produced by an ORM," and then it
5 continues, "In this approach, rather than
6 inferential sensing as described above with
7 reference to Figure 44, the ORM4502 includes a
8 direct sensor 4504 that directly determines the
9 position and velocity of the moving weight or
10 mass 4506."

11 A. I'm sorry, was there a question?

12 Q. The -- so, I would like to talk
13 through the control approach that is being
14 discussed with respect to Figure 45.

15 And I'm looking at Figure 45, and it
16 looks like in Figure 45 the first box in the
17 sequence is labeled with numeral 4512 and
18 indicates Received Target Frequency.

19 Is that correct?

20 A. Yes.

21 Q. And so what happens at 4512?

22 A. Well, a target frequency is received

1 which the control then seeks to produce.

2 Q. When you say "seeks to produce,"
3 seeks to oscillate at that target frequency?

4 A. Well, seeks to match the position of
5 that target waveform.

6 Q. And then what happens in the
7 approach after, or what happens next after 4512?

8 A. Well, it initiates oscillation. It
9 initiates the sensor. And then it goes into the
10 loop.

11 Q. And what is the loop?

12 A. Well, in the loop, position and
13 velocity are read via the sensor.

14 And then a control is computed based
15 upon that determined position and velocity and
16 the target waveform, Omega T, and it executes a
17 control for the drive voltage so as to achieve
18 that target position and velocity based on the
19 waveform Omega T.

20 And then it reads it and sees
21 whether it got it right and keeps looping to try
22 and match the, the input desired waveform.

1 Q. What do you mean when you say a
2 determined position and velocity?

3 A. Well, it uses the sensor to
4 determine the position and the velocity of the
5 mass.

6 I mean he says in there, that may
7 require computation.

8 Q. The determination from the sensor
9 signal of what the position and velocity is, is
10 that what you mean?

11 A. Yeah. I mean, if we go to
12 Figure 45's descriptio,n we are talking about
13 Step 4519.

14 In Step 4519, the control logic
15 reads the position and velocity data from the
16 sensor. This may involve a certain amount of
17 computation.

18 So, you know, that is why I used the
19 word determine. Because it uses the sensor data
20 and computation to determine P and V.

21 Q. Okay. And then once P and V are
22 determined, how are those values used?

1 A. Well, the input waveform, Omega T,
2 is the target.

3 And so based upon the actual P and V
4 and based upon the target waveform, Omega T, it
5 then develops a control output for the drive so
6 as to try and drive the mass to the desired
7 target P and V of the input waveform.

8 Q. And when you said develops a control
9 output for the drive, is that something that the
10 '882 patent describes how to implement here?

11 A. Well, I can go back to the text.
12 So, that is 4520.

13 "Then in Step 4520 the appropriate
14 control is computed based upon the target
15 frequency Omega T and the current position and
16 velocity of the moving mass P and V."

17 So, it is developing a control in
18 that step so that it may apply a drive signal so
19 as to try and achieve the target.

20 Q. And so how is P used in developing
21 that control signal?

22 A. How is P used? I mean, the, the

1 determined P is the actual position of the mass.

2 And so, you know, based upon the
3 target, it tries to drive the mass to, from its
4 existing P to whatever the target P is, which is
5 determined by the waveform.

6 Q. And is that something that is
7 described in this paragraph or is that something
8 a person of skill in the art would just know how
9 to implement?

10 A. Well, I mean, it is a feedback loop.

11 And so, you know, computing the
12 drive signal required to get your target is, you
13 know, could be learned from textbooks and the
14 time on control theory.

15 Q. How about for velocity, how is the
16 velocity value used?

17 A. Well, I mean, to a certain extent, I
18 mean the way, you know, I think of it is that,
19 you know, the inventor has basically stated he
20 needs both P and V in order to apply the
21 appropriate control.

22 And the way I think of that is that

1 V is the slope of the waveform.

2 And so, you know, if you, if you
3 just did P, it sort of, it might, you know, I
4 imagine you are following some waveform, right,
5 and so you measure here and you've got to go
6 there.

7 But the thing is that, I mean just
8 updating your position correctly isn't enough.
9 You need to update both the position and the
10 slope at that point which is V, the XDT.

11 Q. And that is a relationship that
12 would have been well known to a POSITA reading
13 the '882 patent?

14 A. Well, I mean a POSITA reading the
15 patent would have understood that the inventor
16 believed that both P and V were required to make
17 the algorithm work.

18 And you know, after thinking about
19 it for a little bit, that makes sense.

20 Q. And that is because --

21 Just to make sure I'm understanding
22 correctly, that is because if you only had P, you

1 wouldn't have as complete a picture of the
2 waveform because you would be lacking the, kind
3 of the slope aspect of the waveform?

4 Is that --

5 A. Yeah, I mean --

6 Q. -- correct?

7 A. Yes, I mean the inventor says both P
8 and V are required. As a POSITA I would accept
9 that in order to perform proper control that that
10 is true.

11 I mean, in order to track the
12 waveform.

13 Q. And so said another way, it is your
14 opinion that it couldn't be done with position
15 alone?

16 A. Well, I'm, I mean, that is what he
17 is saying in the figure. He needs both.

18 Q. Is there a text that you are
19 referring to when you say the inventor requires
20 both P and V?

21 A. Well I, I mean you can just look at
22 Step 4520.

1 I mean the control is a function of
2 P and V and the target. So, he states it
3 directly there.

4 Q. So, what would be a disadvantage of
5 not using V and only using P?

6 A. Well, I mean in, in, I mean in my
7 envisioning of the system, I mean like I say if
8 you only had P and you updated it according to
9 the target but you didn't update V the slope,
10 right, then, I mean, the thing would be going off
11 in the wrong direction, so to speak, kind of,
12 right, in the next step.

13 So, it definitely tracks better if
14 you do both. Because V is the slope of the
15 waveform.

16 Q. Uh-huh. Are there any other values
17 that you would consider to add even more
18 information to the calculation beyond P and V?

19 A. Well, I mean I am, I am just reading
20 from the patent. That is what the patent
21 requires.

22 Performing further invention is not

1 part of my analysis here.

2 Q. I wanted to ask you about the
3 discussion in the middle of this paragraph where
4 it talks about how the computation is performed
5 either based on the predetermined function or
6 based on tables with values or computed as
7 another of the initiation steps.

8 If using -- when -- let me rephrase
9 that.

10 What are the values in the tables
11 that are being referred to?

12 A. Well, I mean the values may refer
13 to, you know, however, whatever the transfer
14 function is between the device in question and
15 updating P and V according to current P and V and
16 the target waveform.

17 And so, you know, there is a lot of
18 computation involved there. There is a transfer
19 function based upon, you know, how the drive
20 voltage affects P and V, all of that would have
21 to be evaluated.

22 Q. And when you say all of that would

1 have to be evaluated, what do you mean by that?

2 A. Well, you would have to develop the
3 control function, the transfer function of the
4 control loop.

5 Q. Based on the physical system?

6 A. Yes.

7 Q. How is the target frequency used in
8 the function, or in the table?

9 A. Well, that is your target P and V
10 based upon that sine wave.

11 Q. So, do you have -- let me ask a
12 different question.

13 What would the function be that you
14 are inputting the P and V values into?

15 A. Well, I mean when you talk about a
16 function, the function that I believe he is
17 referring to in the text is the transfer function
18 of the device under question so you know what the
19 voltage output needs to be, based upon the
20 current P and V and the target P and V.

21 The target P and V is supplied by
22 Omega T, based on the sine wave.

1 Q. Going back to velocity again you had
2 mentioned one reason why velocity is useful in
3 this determination.

4 Are there additional reasons that a
5 person of skill in the art at the time would have
6 found it beneficial to calculate velocity?

7 A. Well, I mean what I stated is just
8 sort of common sense that if you are tracking a
9 position waveform and you are at a certain point
10 on that waveform where you measure a P and a V, V
11 being the slope.

12 And you understand from the target
13 waveform that you want to, in the next cycle,
14 update P and V to that target, I mean, if you
15 just updated P you would get the slope wrong and
16 so then you would be moving.

17 You know, I mean I, I just think
18 about it as tracking this curve. And so if I am
19 at this point in this curve and I want to go to
20 this point in the curve, well I don't just want
21 to update position, I want to update my slope,
22 too, in order to maintain position on that curve.

1 So, I mean that is, that is why, you
2 know, I believe he is using both P and V.

3 Q. And so in that example if you were
4 just looking at position at different points in
5 time --

6 A. If you got the slope wrong then, you
7 know, further updating would be complicated
8 because the thing would be, you know, moving in
9 sort of, at the wrong speed.

10 And so tracking a waveform would be
11 much simpler if you had both P, if you were doing
12 both P and V.

13 Q. But is it -- but it could be done
14 with just position, it would just be --

15 A. Well, I'm not sure. I mean, it may
16 lead to instabilities in the control because, you
17 know, it just couldn't track because, you know,
18 if you weren't updating the velocity as well, at
19 some point it might be impossible to perform
20 update and so the system would go off kilter and
21 become unstable.

22 Q. Got it. Are there reasons a POSITA

1 would have considered further enhancing the
2 control function by looking at the derivative of
3 velocity in addition to --

4 A. I haven't performed any analysis
5 like that, no.

6 Q. Okay. Let's take a quick break if
7 it is okay with you.

8 A. Sure.

9 (Recess taken -- 11:04 a.m.)

10 (After recess -- 11:10 a.m.)

11 MR. DEUTSCH: All right,
12 Dr. Goossen. I would like to talk about the
13 Alexander reference.

14 (Whereupon, previously marked.

15 Exhibit 1005,
16 first referral.)

17 THE WITNESS: Okay.

18 BY MR. DEUTSCH:

19 Q. This is Exhibit 1005.

20 A. So, I will need a copy of that.

21 Q. Okay. I have dropped Exhibit 1005
22 the Alexander reference into the Chat. And this

1 is U.S. 2013-0237751.

2 A. Okay. I have it up.

3 Q. And do you see in the cover page the
4 title of the Alexander publication?

5 A. Yes.

6 Q. What is the title?

7 A. Linear Motor and Handheld Unit.

8 Q. I had a question about the
9 construction of one of Alexander's examples and I
10 would like to turn to Paragraph 40.

11 A. Yes.

12 Q. And so Paragraph 40 says, "Having
13 determined the desired trajectory the software
14 determines the actual position, speed, and
15 acceleration (or trajectory).

16 "Position is directly measured using
17 possibly two magnetic field sensors. Speed and
18 acceleration (and possibly jerk and snap) are
19 calculated from position over time."

20 Did I read that right?

21 A. Yes.

22 Q. And then it continues discussing the

1 magnetic field sensors and the magnets that are
2 included as part of that structure indicating
3 that "The magnetic field sensors return a
4 repeating wave pattern that can be used to
5 calculate the rod's position within one phase of
6 the magnets (a magnet-spacer-magnet-spacer set)."

7 A. Yes.

8 Q. And then it continues that "Value
9 will repeat when moving to a new phase so the
10 processor can keep track of which phase it is
11 in."

12 Can you explain the operation with
13 respect to the phases that are being discussed
14 here?

15 A. Well, it is basically a positioner
16 and it is, according to some, you know, desired
17 movement, adjusting the position of the rod.

18 Q. Okay. So, I guess my question, it
19 says, "If one phase is two inches long, the
20 position calculation will only ever return to the
21 position from 0 to 2 inches."

22 And so if one phase is three inches

1 long, then the position calculation would only
2 ever return a position from 0 to 3 inches; is
3 that right?

4 A. I mean, I am reading the same thing
5 and I am assuming that in one phase it is going
6 to move the rod to the two-inch position and then
7 on another phase it is going to move it to the
8 six-inch position.

9 Q. So, in the next sentence it says,
10 "If the rod stroke is six inches, there are three
11 different phases the rods could be in."

12 And I guess I'm just making sure I
13 have an understanding of the phases within the
14 stroke length.

15 And so, if the, or let me rephrase
16 that.

17 If one phase is three inches long
18 and the rod stroke is six inches, then there are
19 two different phases the rod could be in, right?

20 A. That is what I am reading. It is
21 positioning the rod into different positions.

22 Q. Right. And just so just to, I guess

1 play out that example or another example.

2 If one phase is one inch long and
3 the stroke is four inches long, then there would
4 be four different phases the rod could be in.

5 A. My analysis of this art was specific
6 to whether it is a resonant system, and my
7 opinion is that it is not a resonant system. And
8 any other analysis is outside this scope of my
9 report.

10 Q. Well so I'm just trying to
11 understand the construction that Alexander is
12 describing in Paragraph 40.

13 And so, my question is, if one phase
14 is two inches long and the rod stroke is four
15 inches, there would just be two different phases
16 the rod could be in. Correct?

17 A. I mean again, my report contains
18 analysis that it is my opinion that this is not
19 showing a resonant system, and any other analysis
20 like the phases of the stroke are not part of my
21 analysis.

22 Q. Did you analyze the construction of

1 a phase of the magnets?

2 A. The phase of the magnets? I, I
3 am -- I think the phase refers to, the phase
4 refers to a particular stroking operation.

5 Q. Just to clarify, I'm talking about
6 the, at partway through Paragraph 40 where it
7 says, "The magnetic field sensors return a
8 repeating wave pattern that can be used to
9 calculate the rod's position within one phase of
10 the magnets (a magnet-spacer-magnet-spacer set)."

11 A. That was not part of my analysis.

12 Q. Did you consider how many magnets
13 could be in each respective phase?

14 A. I did not need that for my analysis.

15 Q. Okay. How about, how many phases of
16 magnets would be present in the device?

17 A. Again, that was not necessary for,
18 to perform an analysis to support my opinion that
19 this is not a resonant system.

20 Q. And so, for example, you didn't
21 consider a configuration of Alexander that used a
22 single magnet, for example?

1 A. It was not necessary for my
2 analysis.

3 Q. How about the, I guess we can turn
4 to a different topic. It might be the same
5 answer.

6 In Paragraph 55, Alexander is
7 talking about use of its device and explains,
8 "The user input that can be used to switch
9 between different "profiles" which each have
10 different parameter settings."

11 A. Yes.

12 Q. And then it goes on to some examples
13 of what those profiles entail.

14 Do you have an opinion how a user
15 would select those different profiles during use
16 of the device?

17 A. How a user would select the stroke
18 length?

19 Q. No. I'm sorry. I guess maybe my
20 question is even more simple than that.

21 The, I think what Alexander -- let
22 me rephrase that.

1 The selection of a particular
2 profile would be up to the user; is that correct?

3 A. For example, it is saying here
4 stroke length can be a user input.

5 Q. And so in that example a user could
6 select between some range of stroke lengths? It
7 is not based on --

8 A. It says stroke length can be a user
9 input.

10 Q. And continuing on in that paragraph
11 where it says, "A user may simply switch between
12 different profiles which each have different
13 parameter settings."

14 Why would a user switch between
15 profiles?

16 A. This is a, I mean, this is a sex
17 toy. It is, you know, something used for
18 penetration.

19 And, in terms of how a user selects
20 the stroke length, that is not something that is
21 part of my expert profile.

22 Q. Fair enough. And, I guess just

1 sticking with the text of Paragraph 55, the, it
2 gives examples of Profile 1 and Profile 2,
3 particularly noting difference in speed where it
4 indicates Profile 1 may be a slow stroke while
5 Profile 2 may be a fast sinusoidal stroke; is
6 that correct?

7 A. Yes, and then it says another
8 profile may have a fast extension of the mover
9 with a slow retraction of the mover.

10 Q. Okay. And so those are all things a
11 user could select, using the user input that is
12 mentioned in Paragraph 55 and operated according
13 to those profiles for whatever duration the user
14 desired; is that correct?

15 A. Presumably, someone with an
16 expertise in penetrating sex toys could determine
17 what a user might want.

18 Q. Understood, yes. I mean, my
19 question is more to the electronic device and the
20 user input switching between profiles.

21 A. I mean, again, none of this is
22 necessary for my analysis in my report that this

1 is not showing a resonant device.

2 Although, I mean, that it stated
3 that a profile may have a fast extension and a
4 slow retraction to a certain extent proves it is
5 not resonant.

6 Q. Let's turn to Paragraph 21. "While
7 the exemplary embodiments illustrated herein may
8 show various features, it will be understood that
9 the different features disclosed herein could be
10 combined variously to achieve the objective of
11 the present invention."

12 And then it continues in Paragraph
13 22 to describe one objective which it states, "is
14 to provide a linear motor with attributes that
15 may include precise motion control and/or
16 relatively low cost among other possible
17 attributes."

18 Did I read that correctly?

19 A. Yes. And I mean, I guess, I would
20 add that in Paragraph two it states that these
21 objections, or these objectives are for sex toys.

22 Q. And so for that reason it is your

1 opinion that it is just, it is not --

2 A. Well, my opinion in my report is --

3 Q. You are referring, so, I was asking,
4 I think you are referring to Paragraph 2; is that
5 correct?

6 A. 2 and 3.

7 Q. 2 and 3. And so I am referring to
8 Paragraph 22 when it is talking about one of its
9 objectives, and then it continues there to talk
10 about what linear, how it is using the term
11 linear, "In addition the term 'linear' may mean
12 at least some extent of linear motion and may
13 optionally include rotary motion in addition to
14 linear motion. Or alternatively, it may be
15 curvilinear motion."

16 Did I read that correctly?

17 A. Yes.

18 Q. And then just above that again in
19 Paragraph 21 it refers to the exemplary
20 embodiments illustrated herein.

21 Is it your opinion that Alexander is
22 only describing one embodiment even though it is

1 using the term plural embodiments?

2 A. No. My opinion is that Alexander
3 only shows nonresonant systems.

4 Q. Okay. I wanted to shift gears here
5 and talk a little bit about your background, and
6 in particular, I understand a lot of your
7 research and professional experience says focused
8 on kind of MEMS type devices?

9 A. Yes.

10 Q. Have you ever been involved in the
11 development of a haptic device?

12 A. If by haptic you mean restricted to
13 producing a tactile response on a human being,
14 no, I have not.

15 Q. Yeah, that is exactly what I meant.
16 And so, I guess, suffice it to say, then, that
17 you haven't worked on a haptic system with closed
18 loop control?

19 A. Not haptic, no. But linear resonant
20 actuators, yes.

21 Q. And what was the, let me rephrase
22 that.

1 Have you ever worked as an expert
2 witness on a case that involved haptic devices?

3 A. Before this case, no.

4 Q. Before this case. How about the, I
5 think the '882 patent mentions a number of, kind
6 of, use cases in the Background. And this is
7 beginning at Line 24 examples include vibration
8 signals generated by, and then it lists a number
9 of things including pagers, smartphones.

10 And so I take it, for the same
11 reasons, you haven't worked on generation of
12 vibration signals for a pager or smartphone
13 application; is that correct?

14 A. In the sense that to produce
15 vibrations, I mean, that is a, sort of a --
16 vibrations in any of the work I have done would
17 always have been an undesired response of the
18 devices.

19 Q. Sure. Continuing through his list,
20 I suppose the same is true for hair trimming
21 appliances, electric toothbrushes, electric toy
22 football games?

1 A. I have never worked on toothbrushes
2 or hair trimming devices in terms of design
3 research, no.

4 Q. How about the background type
5 devices he talks about such as intentionally
6 unbalanced electric motors.

7 Is that something that was ever a
8 focus of your research or professional work?

9 A. Well, I mean, I deal with motorized
10 systems in some of my work, and vibrations are a
11 measure of, how to put it, possible failure
12 occurring.

13 And so I use vibration of electric
14 motors as a diagnosis in my work.

15 Q. And so, there you are not -- you are
16 detecting vibration having certain
17 characteristics that you want to avoid as opposed
18 to techniques for generating a particular
19 vibration response?

20 A. Well, it is a, it is a diagnostic.
21 Sometimes it is not to be avoided. Sometimes it
22 is to provide information about the systems that

1 the motor is connected to.

2 So, you know, it is used for
3 analysis sometimes in the systems I evaluate.

4 MR. DEUTSCH: All right,
5 Dr. Goossen. No further questions.

6 THE WITNESS: Okay, thank you.

7 MR. DAVIS: And happy to report, no
8 redirect.

9 (Whereupon, signature not having been waived,
10 the deposition suspended at 12:38 p.m.)

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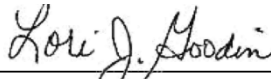
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1 Keith W. Goossen, Ph.D., c/o

2 RUSS AUGUST & KABAT

3 12424 Wilshire Boulevard, 12th Floor

4 Los Angeles, California 90025

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6 Case: Apple Inc. v. Resonant Systems, Inc.

7 Date of deposition: May 9, 2025

8 Deponent: Keith W. Goossen, Ph.D.

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