

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2 BEFORE THE PATENT TRIAL AND APPEAL BOARD

3
4 INTUITIVE SURGICAL, INC.,)

5 Petitioner,)

6 vs.)

7 ETHICON, LLC.,)

8 Patent Owner.)

IPR No.

2018-00936

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14 DEPOSITION OF FRANK FRONCZAK, Ph.D.

15 Washington, D.C.

16 June 6, 2019

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22 REPORTED BY: Tina Alfaro, RPR, CRR, RMR

1 Deposition of FRANK FRONCZAK, Ph.D., held
2 at the offices of:

3
4 Weil Gotshal & Manges, LLP
5 2001 M Street, NW, Suite 600
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8 Taken pursuant to notice before Tina M.
9 Alfaro, a Notary Public within and for the District
10 of Columbia.

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1 APPEARANCES:

2 ON BEHALF OF THE PETITIONER:

3 FISH & RICHARDSON

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1 (Witness sworn.)

2 WHEREUPON:

3 FRANK FRONCZAK, Ph.D.,

4 called as a witness herein, having been first duly
5 sworn, was examined and testified as follows:

6 EXAMINATION

7 BY MR. KATZ:

8 Q. Welcome, Dr. Fronczak. Could you spell
9 your name for the record.

10 A. Sure. F-R-O-N-C-Z-A-K.

11 Q. And do you understand that you're here to
12 testify regarding IPR 2018-00936?

13 A. I -- the numbers don't ring a bell, but I
14 presume that you've got it correct.

15 Q. Okay. Well, do you understand that you're
16 here to testify about an IPR concerning the
17 '658 Patent?

18 A. Yes, I do.

19 Q. Okay. Great. And you believe you're an
20 expert in the relevant field of the '658 Patent?

21 A. I believe I am, yes.

22 Q. And what do you generally view that field

1 to be?

2 A. Surgical devices, in general surgical
3 devices. I think I have some of this in my report.
4 Would you mind giving me a copy of my report
5 because it will help refresh my memory as we go
6 along. I'm sorry, declaration, not a report.

7 Q. Yeah. I had that out here a moment ago.
8 I think it's 2005. So I'm going to hand you what
9 has been previously marked as Exhibit 2005 which
10 is, I believe, your declaration; is that correct?

11 A. Looks like it, yes.

12 Q. Okay. So feel free to reference that. So
13 my question is, again, what do you view the field
14 to be at issue in this proceeding?

15 MR. PEPE: Object to form.

16 BY THE WITNESS:

17 A. The broad field is surgical -- surgical
18 devices, and then in particular this particular
19 device -- let's just leave it as surgical devices
20 as the broad field.

21 Q. Can you just tell me what is the basis for
22 your expertise in surgical devices?

1 A. Well, a variety of things. I'm a retired
2 professor, title is emeritus professor. I was a
3 professor of mechanical and biomedical engineering
4 at the University of Wisconsin, Madison for about
5 30 years or so. During that time I taught courses
6 in mechanical design. I also instituted and taught
7 a sequence of courses in biomedical engineering
8 design of devices. Some of those devices that we
9 designed, the students with my supervision designed
10 was -- were surgical devices.

11 I also am -- have been and am currently
12 the principal mechanical design advisor for Marvel
13 Medtech, LLC, which is a small, relatively early
14 startup firm. In time we've been doing this for --
15 working on this for several years, but I still
16 consider us a startup firm working on a surgical
17 device, minimally invasive robotic surgical device.
18 So that work certainly is particularly relevant.

19 I've also worked on projects both in
20 conjunction with my teaching as well as my research
21 in advising grad students in the area of robotics,
22 some haptics surgical devices, for example. Marvel

1 Medtech is an outgrowth of a product that we
2 designed, a minimally invasive MRI image-guided
3 breast cancer biopsy needle-positioning device.
4 We've extended beyond that instead of just doing it
5 for taking biopsies, but also extending on into
6 doing treatment of the tumors.

7 We also -- I've also worked on a liver
8 biopsy tool, surgical device, an intracranial
9 router for infant surgery -- an intracranial -- I'm
10 sorry -- a router for intracranial surgery on
11 infants. I've also worked on a goniometer which
12 was used for control -- providing input for control
13 of a robotic hand. I've worked on meso scale,
14 that's M-E-S-O scale, hydraulic systems for robotic
15 applications, particularly a high torque, low speed
16 harmonic drive hydraulic motor. I've worked on a
17 continuum hydraulic pneumatic actuator.

18 I don't think I've captured everything,
19 but I think I've given you pretty much most of what
20 is relevant. Oh, there's another one comes to
21 mind. I worked on an intramedullar bone
22 lengthening device.

1 Q. All right. And so you mentioned a lot of
2 robotics in there. Do you view the '658 Patent as
3 being limited to robotics?

4 A. No. No. I didn't mean to -- there were a
5 lot of things in there that I talked about that
6 were not robotics as well.

7 Q. And so in the Marvel Medtech company, do
8 you view that as a company that is or is going to
9 be in competition with Intuitive Surgical?

10 MR. PEPE: I'm going to object and, Frank,
11 caution you this is a public record. So be careful
12 in terms of your response and any confidential
13 information of that company.

14 BY THE WITNESS:

15 A. I don't know what all Intuitive's plans
16 are. So I don't know if we would be in competition
17 with them.

18 Q. Okay. Setting aside Intuitive's plan,
19 based on what Intuitive Surgical does today, does
20 Marvel Medtech intend to develop robots that would
21 be sold in competition to what Intuitive Surgical
22 is offering today?

1 A. You know, I couldn't say, and I couldn't
2 say -- on the basis of two reasons I couldn't say.
3 Partly because our plans are continuously evolving
4 with Marvel Medtech, we're still in relatively
5 early stages, we're still deciding what we're going
6 to do and how we are going to proceed with our
7 device, and furthermore, I don't know the details
8 of all that Intuitive is doing in this particular
9 area.

10 Q. Are you familiar with the Intuitive
11 da Vinci robot?

12 A. Let me back up and add to that just a
13 little bit, elaborate on this. I don't see us in
14 direct competition, although that does not mean
15 that it couldn't happen or that there might be
16 something that Intuitive is doing that I'm not
17 aware of. But I'm not aware of any direct
18 competition that we have with our device with what
19 Intuitive is doing.

20 Q. Are you familiar with the Intuitive
21 robots?

22 A. I'm generally familiar with the Intuitive

1 da Vinci system robot.

2 Q. Which one are you referring to?

3 A. Well, which model number you're saying?

4 Q. What time period?

5 A. Oh, I'm generally aware of it from
6 probably over the last ten years or so, give or
7 take.

8 Q. Okay. Have you ever actually used one?

9 A. No, I have not.

10 Q. Have you ever physically seen one?

11 A. I may have. I don't recall specifically
12 if I have or not.

13 Q. All right. And so where -- where does the
14 general familiarity come from?

15 MR. PEPE: Object to form.

16 BY MR. KATZ:

17 Q. I'll ask it again. You say you're
18 generally familiar with the da Vinci robot. Where
19 does your information come from?

20 A. Published information, conversations with
21 surgeons. I guess that would be it.

22 Q. Okay. And is some of the published

1 information including the exhibits that you cite in
2 your declaration that refer to the da Vinci robot?

3 A. Well, that would be included, but I don't
4 know if there's anything particularly new that I've
5 seen. Perhaps there is, but, once again, you know,
6 I'm generally -- have been generally familiar with
7 it. I've been working in the area of medical
8 devices for several years, and so part of that is
9 to become familiar with what's going on. Not
10 necessarily intimately familiar, but at least
11 generally familiar.

12 Q. Do you consider yourself to be an expert
13 in robotics?

14 A. Well, I consider myself to be an expert in
15 the robotics sufficiently to be able to assess the
16 '658 Patent and the technology associated with the
17 '658 Patent.

18 Q. And the '658 Patent in addition to robotic
19 embodiments has kind of handheld surgical
20 instrument embodiments as well?

21 A. I would have phrased it differently. I
22 would say it has handheld surgical instruments and

1 in addition it has robotics, yes.

2 Q. Do you believe that your expertise extends
3 to handheld surgical instruments as well as robotic
4 surgical instruments?

5 A. Yes, I believe that would be correct. As
6 I said, Marvel Medtech is a robotic medically-
7 invasive surgical device, and so certainly
8 they're -- I'm intimately familiar with our system.

9 Q. Actually, I was referring to the handheld
10 piece. Do you consider yourself to be an expert in
11 just nonrobotic handheld surgical instruments?

12 A. I believe that my expertise includes
13 handheld surgical devices as well.

14 Q. Have you ever designed a handheld surgical
15 device?

16 A. Certainly the liver biopsy tool is a
17 handheld device. The intracranial router for
18 infant surgery is a handheld device as well.

19 Q. And what year was, if you know, the liver
20 biopsy tool developed or over what period of years?

21 A. I don't recall. It's been several years
22 ago.

1 Q. A lot -- in this deposition we're going to
2 be talking a lot about what people would have known
3 in 2006, which was before the earliest priority
4 date of the '658 Patent.

5 A. I thought it was 2007.

6 Q. I'm saying -- I'm picking the year before
7 that.

8 A. Oh, okay. Okay.

9 Q. So I'll be using 2006 because we know
10 that's before --

11 A. Okay.

12 Q. -- the 2007 date of the '658 Patent. Do
13 you know if the liver biopsy tool you designed was
14 before or after 2006?

15 A. I don't recall.

16 Q. What about the cranial router tool?

17 A. I don't recall.

18 Q. Can you tell me a little bit about what
19 the liver biopsy tool was physically?

20 A. Well, it's a tool for taking biopsies of
21 suspect tissue in livers, and in particular there's
22 an issue with cauterization and a large -- part of

1 the work that I was focusing on at that time was
2 including -- was looking at the cauterization
3 issues associated with that tool.

4 Q. Did the tool have like some kind of a
5 gripper at the end, like a handle on one side, a
6 long shaft, and a gripper on the other?

7 A. I don't recall. It's been a long time
8 since I've worked on that. I really don't recall
9 and I haven't reviewed it in several years. So I'm
10 really drawing a blank on that.

11 Q. Have you ever worked on like the
12 mechanical linkages of a surgical tool, you know,
13 going from a handle through gears to some end
14 effector?

15 A. Certainly without going into too much
16 detail in our work in our Marvel Medtech, yes.

17 Q. What year did that start?

18 A. I don't know. If you give me my CV -- I'm
19 sorry. My CV is here. I might be able to nail it
20 down, but I'm not sure that I can or not.

21 Q. Why don't you take a look and see if you
22 can at least give it a range.

1 (Witness reviewing document.)

2 BY THE WITNESS:

3 A. I don't have the specific dates down here
4 for when I was doing some of this work, but the
5 best I can -- hang on a second. Maybe I can find
6 one more thing here.

7 Looks like the work on the liver biopsy
8 tool was started somewhere around 2000 and extended
9 for several years after that because I see that we
10 have a paper in 2001. There was another paper in
11 2003 on that, and then the work continued on after
12 that.

13 So that's -- and the breast cancer biopsy
14 positioning device, that would have started about
15 the same time. So I'd say late 1900s through --
16 and then the work on the biopsy was extended from
17 the late 1900s until now, continuously. I've been
18 working on that somewhat in fits and spurts, but
19 pretty much continuously over that period of time.

20 Q. And your focus has been on the
21 cauterization aspect of the tool?

22 A. No, no, no. That was for the -- just for

1 the liver biopsy tool, the Marvel Medtech tool.

2 The MRI image-guided breast cancer positioning tool
3 focuses on everything, pretty much everything.

4 Q. And you're saying that the breast cancer
5 positioning tool work started prior to 2006?

6 A. Oh, yeah. Yes. I'm sorry. Oh, yes.

7 Q. Just as a reminder, the court reporter is
8 motioning it's important that we don't talk over
9 each other. That time I was talking over you. I'm
10 going to refrain from doing that. Again, I'll wait
11 until you finish, and if you wait until I finish,
12 the court reporter will be much happier.

13 A. I agree. I understand. I don't want to
14 make her job any more difficult than it is. We've
15 already thrown some words at her that I think
16 probably challenge even the best court reporter.

17 Q. Were there -- so in the tool you were just
18 referring to, the breast cancer positioning tool,
19 can you describe what is that tool? What does that
20 mean?

21 MR. PEPE: Object to form.

22 BY THE WITNESS:

1 A. Well, it's more than just the tool, it's a
2 system. So what we have without -- there are
3 certain things I can't tell you about it because
4 some of this material is being protected by trade
5 secret -- or the plan is to protect it by trade
6 secret, our intellectual property. So I can't tell
7 you everything about it, but I can tell you in
8 general terms.

9 Q. Let me just interrupt you there to make
10 sure we're talking about the same thing. I want to
11 talk about only work that was prior to 2006. So
12 that's over ten years ago now. Is there -- are
13 there still trade secrets tied to the work you did
14 before 2006?

15 A. Yes.

16 Q. Okay. So, again, talking about what this
17 tool you were working on did in 2006, if you could
18 tell me just generally without revealing
19 confidential information what the tool consisted
20 of.

21 A. Okay. So what it -- it is a system which
22 includes devices and control of those devices for

1 detecting and inserting a biopsy tool for -- which
2 is MRI-image guided while in the bore of an MRI
3 machine and actively guiding the positioning and
4 insertion of the tool -- actually guiding the
5 positioning of the tool while the tool is being
6 inserted by hand.

7 Q. To the extent you can tell me, how does a
8 machine guide a tool if it's being inserted by
9 hand?

10 A. The insertion of the tool -- I have to be
11 careful here on what's been revealed or not.

12 MR. PEPE: Frank, before you answer, I'll
13 just caution you to be conservative obviously --

14 THE WITNESS: That's what I'm thinking.

15 MR. KATZ: I'm going to actually withdraw
16 the question.

17 THE WITNESS: Okay.

18 BY MR. KATZ:

19 Q. Let's talk about the biopsy tool. A
20 biopsy tool is a tool that removes tissue?

21 A. We're getting into some of the technology
22 that -- let me ask -- I can only give you a partial

1 answer to that. It can be.

2 Q. Okay. And you're saying that's a partial
3 answer due to confidentiality, not due to lack of
4 knowledge?

5 A. Not due to lack --

6 Q. Are you telling me you can only give me a
7 partial answer because to go any further would be
8 confidential or that's the extent that you know?

9 A. Confidentiality issues.

10 Q. Okay. I'm just trying to figure out what
11 this tool is. So this is a tool that was never
12 released publicly you're talking about?

13 A. Was not what?

14 Q. Released publicly.

15 A. Not to the general public, no.

16 Q. Okay.

17 A. Not the version that we've been working
18 on. An earlier version was, but not the one that
19 we're working on and have been working on
20 continuously since around 2000.

21 Q. Okay. So earlier version, you mean
22 pre-2000?

1 A. I think it was pre-2000, yes.

2 Q. Okay. I just want to understand what a
3 biopsy tool is. I'm not a surgeon. So the one
4 that was publicly known around or before 2000, what
5 did that tool do?

6 A. Okay. I can talk about that.

7 I know we filed a patent application for
8 that and I thought we got a patent on that early
9 tool. We've gone well beyond that. Yeah. I think
10 the early one -- I don't remember the year, but in
11 my CV we have positional for medical devices such
12 as biopsy needles, U.S. Patent No. 6,558,337.

13 Q. Okay.

14 A. So that work has been published -- public
15 information. I don't remember the year of that
16 patent, though. So that I can talk freely about to
17 the best of my recollection. Our current work has
18 changed -- progressed from that initial patent
19 significantly.

20 So what you have -- I can talk in general
21 terms about this particular device and what is
22 particularly important for us. MRI is generally

1 considered by a large number of -- I shouldn't say
2 generally -- is considered by a large number of
3 surgeons, oncology surgeons and radiologists as the
4 premium way of detecting early cancer in breasts
5 particularly. So roughly -- a tumor roughly the
6 size of a BB can be identified pretty readily using
7 an MRI machine.

8 Now, currently when this is done or the
9 standard practice has been to then insert a biopsy
10 tool which is basically a cannula, a trocar, the
11 needle goes in, severs the tissue, and then the
12 cutting device is withdrawn. A biopsy tool is
13 inserted, a small tissue is taken and pulled out,
14 and then a biopsy is done on that.

15 Q. Let me interrupt you right there just to
16 make sure we're talking about the date. You used
17 the word currently in your answer. I'm referring
18 to technology around 2000.

19 A. Certainly 2000. I'm not aware of any
20 major changes since then.

21 Q. So, again, you used the word then a biopsy
22 tool is inserted. What I'm asking you is what is a

1 biopsy tool circa 2000?

2 A. Well, to do the biopsy you've got to get
3 access to the tumor. So the tool consists of the
4 cannula, the trocar, and then the tool that you
5 insert inside the cannula that then cuts a small
6 piece of tissue away.

7 So you can call the tool all of those
8 components or you could specifically if you want
9 to, if you're -- you could refer to it just as the
10 device that cuts and removes the tissue inside the
11 cannula, but you can't do it unless you've got the
12 cannula there. So you've got to have all these
13 things, you know.

14 In a way it would be like -- a comparable
15 thing would be, say, well, what's a socket? Well,
16 a socket by itself is only the socket, the thing
17 that goes on the nut, but that by itself doesn't do
18 anything. You need the wrench as well. So you
19 need to have these other things take place.

20 So when I'm talking about a biopsy tool,
21 I'm thinking about the tool that consists at least
22 of these three parts and within the one part you

1 may have multiple components within the one part.

2 Q. Well, the biopsy tool that cuts and
3 removes tissue, does it -- is it a fixed tool or
4 does it have movable parts in it?

5 A. There's different ways of doing it. I
6 can't recall specifically which one or ones we
7 looked at at this point in time.

8 Q. Well, do you know if biopsy tools in the
9 2000 area used either cables or gears or anything
10 like that?

11 A. Typically I would think no. I'm not
12 familiar with ones that used cables and gears and
13 such.

14 Q. Okay.

15 A. I never finished what the MRI -- what our
16 MRI tool did. I think the question was a broader
17 question and I was answering that, and then I think
18 you got away from that and started asking a
19 specific question.

20 Q. So you were working on an MRI tool that
21 was used in conjunction with other people's biopsy
22 tools?

1 A. We would be -- no. We would have to
2 have -- either modify existing biopsy tools or have
3 someone else manufacture them, or we would have
4 to -- it has to have certain characteristics.
5 Typical biopsy tools did not have -- exhibit those
6 characteristics because it was working inside the
7 bore of an MRI machine.

8 Q. So what are those characteristics you're
9 referring to?

10 A. Generally it has to be generally
11 nonconductive. It certainly has to be nonmagnetic
12 and it generally has to be a nonconductor of
13 electricity.

14 Q. So it didn't use metal?

15 A. We're getting into proprietary --

16 Q. Okay.

17 Well, have you ever designed a surgical
18 instrument prior to 2006 that used either gears or
19 cables to transmit forces?

20 A. The guide for the -- the guide for the
21 biopsy tool itself, yes, used gears, mechanical
22 components to transmit motion and to exert torques

1 and/or forces.

2 Q. Okay. And is that -- can you say any more
3 about that? You're saying anything further would
4 go into confidential information?

5 A. Certainly the details of much of the work
6 is very confidential.

7 Q. Okay. Let me try to get your expertise
8 another way. I did notice in your CV that you said
9 you designed -- or developed and taught various
10 courses. One of them seems to be the basic
11 mechanical engineering course that's called ME342,
12 Elements of Machine Design?

13 A. That is correct. I didn't develop that
14 course. I taught that course.

15 Q. You taught that course. Okay. I looked
16 at the description on-line and one thing that that
17 course involves is basic things like gears and
18 other mechanical components to transfer forces?

19 A. That's true. That's correct. That's one
20 of many things that the course covers.

21 Q. When you say that certainly prior -- what
22 year are we talking about? When did you teach that

1 course? Was it prior to 2006?

2 A. I'm pretty sure it was, yeah. I would say
3 with confidence that it was prior to 2006. Then
4 also I taught senior design 349 -- ME349. I also
5 taught 491, 492, 351, and 352, which are all
6 mechanical design courses, as well as ME549, which
7 is also pretty much a mechanical design course.

8 Q. And would you say that certainly prior to
9 2006 standard introductory mechanical design
10 courses would teach things like different types of
11 gears that are used to transmit forces in
12 mechanical devices?

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

14 Q. Yeah. I'm saying prior to 2006 would you
15 say that it was very typical that an introductory
16 mechanical engineering design course would cover
17 things like gears and different types of gears that
18 are used to transmit forces?

19 A. I would not characterize these as
20 introductory courses. I would consider these as
21 intermediate to senior-level courses. These are
22 junior- and senior-level courses.

1 Q. Are they? So introduction of mechanical
2 engineering wouldn't cover gears?

3 A. It might, it might not, but not in much
4 depth. An introduction to mechanical engineering
5 course would not cover gears in much depth. You
6 wouldn't have the background to be able to do much
7 to analyze gears in an introductory course because
8 you'd have to have a strength of materials or
9 mechanics of materials course, and that in turn is
10 usually taught sophomore year.

11 Q. Okay. Fair. So let me ask a different
12 question. By the time that a mechanical
13 engineering student graduates with a degree in
14 mechanical engineering they have taken a higher
15 level mechanical engineering design course that
16 certainly would have covered using various types of
17 gears to transmit forces?

18 A. You skipped over -- you jumped straight
19 from introductory to higher level.

20 Q. Yes.

21 A. The word I used was intermediate, and I
22 would call it intermediate. I would not consider

1 those higher level courses.

2 Q. I'm sorry.

3 A. That's fine. It's not a hard-and-fast
4 thing, but at the University of Wisconsin the
5 introductory courses are the 100 and maybe some 200
6 level courses. Generally speaking, the
7 intermediate courses are 3-, 4-, and 500 level
8 courses. Advanced courses are 4-, 5-, 6-, and 700
9 level courses with some exceptions.

10 Q. Okay. That's helpful. So let me just ask
11 it again. In your experience, certainly prior to
12 2006, a mechanical engineering student taking
13 intermediate level courses in mechanical design
14 would learn about different types of gears to
15 transmit forces?

16 A. Characteristically, certainly in our
17 curriculum and at the time, that would be
18 characteristic of curriculums in mechanical
19 engineering I think throughout the United States.
20 There could be some schools where they didn't, but
21 generally speaking, that would be part of the core
22 curriculum of a bachelor's degree in mechanical

1 engineering.

2 Q. And one function of gears is to increase
3 torque?

4 MR. PEPE: Object to form.

5 BY THE WITNESS:

6 A. Could you rephrase your question?

7 Q. Sure.

8 If I take a small diameter gear and I
9 drive a larger diameter gear, am I reducing speed
10 and increasing torque by using that gear
11 combination?

12 MR. PEPE: Object to form.

13 BY THE WITNESS:

14 A. I'll answer it a slightly different way,
15 but I think I will get at what you're asking
16 without trying to evade your question.

17 If you have two gears that mesh with each
18 other and you have a smaller gear as the input gear
19 or a shaft driving the smaller gear as an input
20 gear, you will have a certain torque and speed
21 associated with the drive, that is, a certain
22 amount of torque and a certain speed associated

1 with that input shaft.

2 If you then look at the torque which is
3 transmitted through the gear set and you look at
4 the output torque and the output speed of the
5 larger gear, in general you will have an increase
6 in torque and a reduction in speed. You will have
7 a reduction in speed and in general you will have
8 an increase in torque.

9 Q. And that would have been well known to a
10 mechanical engineering student who took an
11 intermediate mechanical design course?

12 A. They would have understood that and they
13 would have understood that before they took the
14 course on gears. They should have.

15 Q. Now, you said "in general." Why is it
16 qualified with "in general"?

17 A. Well, you start getting into situations
18 where you may have a very close gear ratio, one
19 gear the drive gear may be somewhat smaller but
20 only slightly smaller than the output gear, and you
21 can have the situation where while the speed ratio
22 will in general be given as the ratio of the radii

1 for the diameter of the two-gear teeth, the torque
2 transmitted is a little bit -- a little bit more
3 subtle because gear sets will have inefficiencies.
4 These inefficiencies are inherent in gears. Gears
5 can be made very efficient, on the order of
6 98 percent efficiency in transmission of the
7 torque, but they can also have lower efficiencies.

8 So what you can find is that if you have a
9 gear ratio -- have a gear set with a very close
10 gear ratio, meaning that the output gear is only
11 slightly larger, let's say the output gear is
12 1 percent larger than the input gear and we have a
13 98 percent gear efficiency, we're going to find
14 that the output torque is actually less than the
15 input torque even though it's operating at a lower
16 speed.

17 So that's why I said in general. There's
18 some specific cases that you have to -- you have to
19 look at some of the subtleties.

20 Q. And that would be a good question on a
21 final exam.

22 A. Probably.

1 Q. Is another common mechanical structure
2 that would be taught in these machine design
3 courses a lead screw?

4 MR. PEPE: Object to form.

5 BY THE WITNESS:

6 A. You said commonly? Did you have commonly?

7 Q. Yeah. Let me ask it even more precisely.
8 Would it be common for a mechanical engineering
9 student to learn about lead screws certainly prior
10 to 2006 when in a mechanical engineering program?

11 A. It wouldn't be uncommon, it wouldn't be
12 rare. Depending on the instructor in the course,
13 depending on the time, you know, how long the
14 course extended, depending upon what the
15 instructor's particular interest and points of
16 emphasis were it could be covered. It could be
17 covered in a cursory manner, it could be covered in
18 a somewhat in-depth manner, it could be glossed
19 over, it could be not taught.

20 Q. Isn't one of the aspects of a mechanical
21 engineering machine design course teaching students
22 how to convert rotary motion to linear motion?

1 MR. PEPE: Object to form.

2 BY THE WITNESS:

3 A. No. I wouldn't -- I would not consider
4 that one of the topics that's usually covered,
5 certainly not directly in an elements of machine
6 design course. That would be characteristically
7 covered in a kinematics course.

8 Q. Kinematics?

9 A. Right.

10 Q. And wouldn't a kinematics course teach a
11 mechanical engineering student that one very common
12 way to convert rotary motion to linear motion is
13 with the use of a lead screw?

14 MR. PEPE: Object to form.

15 BY THE WITNESS:

16 A. May or may not, but also kinematics is not
17 necessarily a part of many curriculum, nor was it
18 in 2006. I'm not sure of the time frame, but I
19 think at the University of Wisconsin the mechanical
20 engineering department dropped the kinematics
21 course requirement, moved it into the dynamics
22 course, but as part of the dynamics course only a

1 cursory review of kinematics was included.

2 So they may or may not have been exposed
3 to means of converting rotary into linear motion or
4 vice versa at any significant level. They may
5 have, they may not have. It depends, once again,
6 on the instructor, it depends on the particular
7 course structure, it depends on a lot of things,
8 but kinematics is one thing that is not -- in 2006,
9 at that time frame, yeah -- I'm trying to put the
10 right time frame. I think they dropped kinematics
11 before that.

12 Q. Okay. So it used to be required for
13 mechanical engineering students, and then your
14 university decided it was no longer going to be
15 required?

16 A. The kinematics -- some kinematics was
17 still required, but it was moved into the dynamics
18 course. So it was watered down considerably.

19 Q. Okay.

20 A. There was no longer a separate -- it used
21 to be an intermediate level course. It was moved
22 to an introductory level -- some of the topics that

1 had been covered in fairly -- with rigor and depth
2 in the intermediate course were moved into an
3 introductory course, and the introductory course
4 covered it with less material and with less rigor
5 and with less depth.

6 Q. Would you agree that at least by 2006 a
7 person certainly of ordinary skill in the art of
8 the '658 Patent would have known that one way to
9 convert rotary motion to linear motion is with a
10 rack and pinion gear set?

11 A. Yes. One of ordinary skill in the art as
12 Dr. Knodel and as I concurred or did not disagree
13 with his characterization of one of ordinary skill
14 in the art, they would have known that.

15 Q. Okay. And would one of ordinary skill in
16 the art certainly by 2006 also have known that a
17 lead screw is another way of converting rotary
18 motion to linear motion?

19 A. I'm sorry. I didn't catch the tail end of
20 your question.

21 Q. And also as of 2006 would a person of
22 ordinary skill in the art have known that another

1 way to convert rotary motion to linear motion is
2 through the use of a lead screw?

3 A. Yes.

4 Q. And just so our record's clear, when I say
5 "lead screw," what do you understand that to mean?

6 A. Without trying to lay out a precise
7 definition, a lead screw is a term that's used in
8 mechanical engineering generally as a -- once
9 again, without trying to lay out a precise
10 definition, a threaded rod generally with a
11 different thread form than a common SAE thread
12 form, for example, for transmitting power to a
13 mating nut. That's characteristically what I would
14 say. There could be some other subtleties involved
15 that I'm not getting into.

16 Q. My question was probably even at a higher
17 level. Am I correct that in general a lead screw
18 converts rotary to linear motion because as the
19 screw rotates the nut will move linearly being
20 driven by the rotating screw threads?

21 A. That's one aspect of a lead screw. It's
22 not limited to that. It's not limited to that.

1 Q. What other configurations of lead screws
2 are you thinking of?

3 A. Well, I'm not saying another
4 configuration. What I'm saying is you tied it into
5 a function, and there's also the function --
6 there's function associated with the kinematics,
7 the motion, which is what you addressed.

8 There's also the function associated with
9 power transmission and power is the product of
10 torque times rotation speed, force times linear
11 velocity. So we have not only motion that's being
12 transmitted, but we have power which is being
13 transmitted.

14 That's where I'm saying lead screws
15 generally are power-transmitting devices, although
16 not always. They generally are power-transmitting
17 devices. So we have to look not only at the motion
18 associated with the two mating components, but we
19 also have to look at the torque and forces
20 associated with them.

21 Q. So what you're saying --

22 A. Once again, there's some other

1 applications of lead screws where they are not
2 necessarily for power transmission, but we're
3 looking only at the force component -- the force
4 being transmitted rather than the motion.

5 Q. Can you explain what you mean by that last
6 sentence. How does a lead screw transmit force
7 without transmitting motion?

8 A. If, for example, your nut is deadheaded.

9 Q. What does that mean?

10 A. It reaches a hard stop.

11 Q. If it reaches a hard stop, can it transmit
12 force?

13 A. Sure. Absolutely.

14 Q. So you're saying if I've got a lead screw
15 and the nut's already traveled to the end and it
16 can't go any further, it can be applying a force
17 even though it can't go any further?

18 A. That's correct.

19 Q. Are you saying it's applying a force
20 against the thing that's causing it to have a hard
21 stop?

22 A. That would be one thing that it could be

1 applying the force through, sure, and these are all
2 relative terms.

3 Q. What do you mean by that?

4 MR. PEPE: Object to form.

5 BY THE WITNESS:

6 A. "Hard" is a relative term. For example,
7 if we were gauging the hardness of different
8 materials we'd have different scales. So, for
9 example, a hard rubber, what would be considered a
10 hard rubber, if we were to measure the hardness of
11 that rubber and then compare it to the hardness of
12 steel, we would say that's a soft steel but a hard
13 rubber.

14 Q. Okay.

15 A. So that's why I'm saying these are
16 relative terms. You have to look at the specific
17 situation, the specific application, and I'm trying
18 to be careful not to give an overly broad answer
19 that you say what does hard mean. You've got to
20 look at the specifics. Hard in one circumstance
21 could be considered soft in another circumstance.
22 Soft in one circumstance could be considered hard

1 in another circumstance.

2 Q. Oh, I forgot to ask this. Did you ever
3 work on the design of an Endocutter?

4 A. Not specifically an Endocutter, no.

5 Q. Did you ever work on the design of a
6 surgical instrument that has two jaws that can open
7 and close?

8 A. Yes, I believe so.

9 Q. What time frame was that?

10 A. Since I've been working with Marvel
11 Medtech.

12 Q. Again, can you tell me whether it was
13 before or after 2006?

14 A. I can't. I don't recall.

15 Q. Did you ever work on a surgical stapling
16 device?

17 A. Not that I recall.

18 Q. I'm going to give you a copy of what's
19 been previously marked as IS-1001, which is U.S.
20 Patent 9,585,658. I'd actually like you to turn to
21 paragraph 22 of your declaration first.

22 A. Okey-doke.

1 THE WITNESS: By the way, we've been going
2 about an hour here. I don't know when convenient
3 times for breaks are, but I would like to be able
4 to take a break about not much more than an hour
5 and a quarter because my legs will stiffen up and I
6 have a hard time getting out of the chair.

7 MR. KATZ: You know, that's fine. Given
8 we're at a transition point, let's just take a
9 break right now.

10 (A short break was had.)

11 BY MR. KATZ:

12 Q. Welcome back.

13 So on page 12 of your declaration you have
14 Figure 24 from the '658 Patent and you've labeled
15 some aspects of it.

16 A. I'm sorry?

17 Q. You've labeled some aspects of it.

18 A. Yes.

19 Q. Maybe it would be easier to actually go to
20 the patent, Figures 24 and 25. Am I correct that
21 figure --

22 A. 24, not 25.

1 Q. Right. Yes. You have Figure 24 in your
2 declaration?

3 A. Right.

4 Q. Am I correct that Figure 25 shows the
5 components that drive the components in
6 Figure 24?

7 A. Oh. Among other things, yes.

8 Q. Just so I understand how this is
9 working -- again, this isn't a memory test. To the
10 extent you don't feel comfortable responding
11 without reviewing the patent, just let me know.

12 A. Sure.

13 Q. Do you understand that there's a closure
14 to 207 that can be used to both close and open the
15 anvil?

16 A. To both partially close and open the
17 anvil, yes.

18 Q. And closure to 207 has I think what's
19 called an aperture 217, that little hole in the
20 closure tube?

21 A. That is correct. That's what I have
22 labeled there.

1 Q. Okay. And the tab 51 on the anvil would
2 be, at certain times anyway, inside the aperture
3 217?

4 A. I'm sorry. Could you repeat that?

5 Q. Tab 51 on the anvil would at certain times
6 be within the aperture 217?

7 MR. PEPE: Object to form.

8 BY THE WITNESS:

9 A. I think I understand, and the answer would
10 be yes.

11 Q. And I think, as you described, when the
12 closure tube is used to open the anvil the closure
13 tube pulls on tab 51 causing the anvil to open?

14 A. Are you referring to a particular
15 statement in my declaration? Okay.
16 Paragraph 22.

17 Q. Yes.

18 A. Yeah. In paragraph 22 I say "The Shelton
19 '658 Patent explains that during use the closure
20 tube is configured to move proximally, that is,
21 longitudinally, to apply a force to projection 51
22 on the anvil to move the anvil into an open

1 position." Proximal in this case is towards the
2 operator.

3 Q. Okay. So would it be fair to say that the
4 anvil is pulling against tab 51 to open the anvil
5 because tab 51 is sticking up inside aperture 217?

6 A. That's not the way I would say it.

7 Q. Okay. How would you say it?

8 A. I would say --

9 MR. PEPE: Object to form.

10 BY THE WITNESS:

11 A. I would say the closure tube is pulling on
12 the anvil. Now, we get into action/reaction, but I
13 wouldn't have said it the way you said it.

14 Q. Is it specifically pulling on tab 51 of
15 the anvil?

16 A. It's applying a force to tab 51 while it
17 is opening to pull the anvil to the -- which will
18 cause the anvil to move open.

19 Q. And what is causing the closure tube to
20 move back and forth or proximally and distally?

21 MR. PEPE: Object to form.

22 (Witness reviewing document.)

1 BY THE WITNESS:

2 A. Could you repeat the question? I want to
3 make sure I have the question correct.

4 Q. Sure.

5 My question is what is causing the closure
6 tube to move proximally and distally to open and
7 close the anvil?

8 MR. PEPE: Object to form.

9 (Witness reviewing document.)

10 BY MR. KATZ:

11 Q. If it would help, I think the proper place
12 for the description for that is column 20 --

13 A. Okay. Good.

14 Q. -- where they're talking about Figure 25,
15 and I would specifically direct your attention to
16 column 20, lines 37 to the end of that paragraph.

17 (Witness reviewing document.)

18 BY THE WITNESS:

19 A. So the specification says in column 20,
20 line 43 or thereabouts "Where closure tube can be
21 operatively connected to closure link 203 via
22 slider 205 and pin 211."

1 So based on that, as well as looking at
2 Figure 25 and Figure 24, we can see that -- from
3 the description as well as the figures, that it
4 looks to me as if 207 of Figure 24 goes into
5 Figure 25 -- I'm sorry -- 205 of Figure 25 and that
6 is the part that moves back and forth that in turn
7 moves the closure tube back and forth.

8 Q. Okay. And so --

9 A. Proximally and laterally -- proximally and
10 distally.

11 Q. So if I kind of step through from the
12 proximal to distal end of the instrument, am I
13 correct that trigger 201 is going to move link 203
14 which moves item 205?

15 A. Trigger 201 is connected to link 203 which
16 in turn is connected to 205, slider 205, yes.

17 Q. You're saying slider 205 is connected to
18 the closure tube 207?

19 A. That's what it says, yes.

20 Q. Slider 205 slides back and forth that
21 causes the closure tube to slide back and forth?

22 Excuse me. Let me ask it again.

1 BY THE WITNESS:

2 A. If you can help me out here. Are you
3 picking up No. 202 on Figure 24? I'm having a hard
4 time finding it there.

5 Q. Yes. Item 202?

6 A. Yeah, item 202.

7 Q. Is your question where is it on Figure 24?

8 A. Yeah. Are you seeing it on Figure 24
9 because I'm not seeing it?

10 Q. I don't believe there's a 202 on either
11 Figure 24 or 25.

12 A. Well, then you've got the same problem I
13 have because I can't find it either. I'm seeing
14 201, 203, 204, 205, 200, but I'm not picking up
15 202.

16 Q. I think part of the issue may be that 202
17 isn't a single structure, it's a combination of
18 multiple structures.

19 A. Right. Yeah. It's probably in a
20 different figure. That's one of the things,
21 sometimes you have to hunt from different figures,
22 but let me just proceed here.

1 Q. I stand corrected. I found 202.

2 A. There it is, yeah, in Figure 25.

3 Q. It's a general arrow pointing to multiple
4 structures, correct?

5 A. Got it. Thank you.

6 (Witness reviewing document.)

7 BY THE WITNESS:

8 A. Okay. I think I've reviewed it
9 sufficiently to be able to answer questions. I may
10 have to refer back to it again in more detail, but
11 we can proceed I think.

12 Q. Okay. I'm just trying to walk through and
13 make sure I understand the connections here.

14 A. Sure.

15 Q. So the firing trigger is 204; is that
16 correct?

17 A. Right.

18 Q. And that moves a ratchet gear structure?

19 A. I don't know if that's what they call it.
20 They call it a first ratchet assembly and second
21 ratchet assembly.

22 Q. Am I correct that a ratchet assembly

1 simply means I can pull the trigger, it moves a
2 gear, then the trigger can go back to its original
3 position but the gear remains fixed? So I can pull
4 the trigger a second time and move the gear some
5 more?

6 MR. PEPE: Object to form.

7 BY THE WITNESS:

8 A. In this particular --

9 Q. I'm taking the question back just to make
10 it easier. Let me ask a different question.

11 Can you tell me, what is your
12 understanding of the ratchet assembly being
13 described here?

14 A. The ratchet assembly -- which 210 and 212
15 are two separate ratchet assemblies. We can talk
16 about just one of them.

17 Q. Sure.

18 A. So as you pull the trigger -- let's just
19 talk about 210. The pawl 220 -- that's P-A-W-L --
20 drives the ratchet which looks like 224, yeah. It
21 engages the ratchet teeth, one of which is pointed
22 to 224 but there's a whole series of ratchet teeth,

1 and as it engages those ratchet teeth or one of the
2 ratchet's teeth it will drive the ratchet ring
3 which consists of all of the ratchet teeth in a
4 direction. In this case 210, looking at the
5 figure, this one will drive it looks like it's
6 counterclockwise.

7 Q. Let me -- go ahead.

8 A. Remember there's 210 and 212, one goes one
9 way, one goes the other way. So I'm talking just
10 about 210 now.

11 Q. Why are they going different directions?

12 MR. PEPE: Object to form.

13 BY THE WITNESS:

14 A. Why are 210 and 212 going in different
15 directions? For advancing and retracting.

16 Q. Am I correct --

17 A. Now, I didn't finish what I was talking
18 about. Did you want me to finish?

19 Q. Please do.

20 A. The ratchet ring is as shown here -- it
21 doesn't have to be, but as shown here looks like
22 one piece with the gear -- 222 I think is the gear.

1 They call it ratchet wheel 222. So that ratchet
2 wheel 222 is the gear which is driven by that
3 ratchet wheel.

4 Q. Am I correct that in general a ratchet is
5 a device that can change back-and-forth motion to
6 motion in a single direction?

7 MR. PEPE: Object to form.

8 BY THE WITNESS:

9 A. I'm sorry. Could you repeat that?

10 Q. Sure.

11 I'm just trying to understand what it
12 means to be a ratchet. Am I correct that a ratchet
13 is something where it converts back-and-forth
14 motion into motion in a single direction?

15 MR. PEPE: Same objection.

16 BY THE WITNESS:

17 A. It can. It doesn't have to.

18 Q. But this ratchet shown in the '658 Patent
19 converts back-and-forth trigger motion to
20 rotational motion in a single direction?

21 MR. PEPE: Object to form.

22 BY THE WITNESS:

1 A. I wouldn't say it that way, but I think
2 you're right. I don't see a problem with what
3 you've said, but that's not how I would have put
4 it.

5 Q. How would you put it?

6 A. So the ratchet and pawl mechanism is
7 something which when the pawl drives the ratchet,
8 it moves the mating ratchet to the pawl and then it
9 allows the pawl to retract and drive another tooth
10 of the ratchet, generally speaking.

11 Q. And is the reason for ratchet in Figure 25
12 for the purpose of increasing torque?

13 MR. PEPE: Object to form.

14 BY THE WITNESS:

15 A. I don't see that you could say that.

16 Q. Well, let me just ask you. What is your
17 understanding of the purpose of the ratchet in
18 Figure 25?

19 A. Similar to what you had said in this
20 particular case, it enables the trigger to -- well,
21 let me back up.

22 Let me ask a question. When you said "the

1 ratchet," are you referring to 210, are you
2 referring to 210 and 212, or just one or the other?

3 Q. I was thinking just -- wondering generally
4 if the ratchet mechanism is used to increase torque
5 in Figure 25?

6 MR. PEPE: Object to form.

7 BY THE WITNESS:

8 A. I would say no. In general, no.

9 Q. Okay. Let's continue on through the
10 mechanism until we get to the end effector. So the
11 firing trigger causes the ratchet to turn and that
12 in turn causes drive shaft 206 to turn?

13 A. Eventually. There's intermediate gears
14 between what they call the ratchet -- or what is
15 called the ratchet assembly 210 and the drive shaft
16 206.

17 Q. Are the gears part of the ratchet assembly
18 or are they after the ratchet assembly?

19 A. The way I read this and the way I'm
20 looking at the figure is that 210 refers to that
21 larger wheel which includes 222, 228, and 224.
22 Those are all part of 210.

1 So let me just be careful here. It says
2 "Engaged with ratchet assembly 210." Yeah. It
3 says ratchet wheel 222, which is part of 210, I
4 think, includes gear teeth 228.

5 Q. Okay. Actually, it may -- maybe this
6 solves the question. If you look at column 21,
7 line 38 -- or 37, it says "Drive shaft 206 can
8 include forward gear 226 connected thereto"; do you
9 see that?

10 A. Right.

11 Q. Okay. So does it matter whether you
12 consider 226 to be part of the ratchet or not, or
13 from a mechanical perspective is it not part of
14 it?

15 A. No, I didn't say 226 was part of that
16 ratchet assembly. I said gear teeth 228 --

17 Q. Okay.

18 A. -- were part of the ratchet assembly.
19 228 engage with the gear teeth on 226.

20 Q. Okay.

21 A. So those are two separate components,
22 those engage each other, but what I said -- I think

1 I said was that when we look at that arrow going to
2 that general area and it's referred to as a ratchet
3 assembly and then we look at Figures 25 and maybe
4 even more clearly 26, we look at -- it's showing
5 for 212 that the ratchet portion of 212 is one
6 piece, it looks to me, it certainly could be one
7 piece, it acts as one piece with 234, 238, and 240
8 and those are all driven around by the pawl 236,
9 and then there's a spring in there that's not
10 shown.

11 Q. Okay. Then from the drive shaft 206 that
12 then drives the screw 138?

13 A. Did you say 138?

14 Q. Yes.

15 A. Oh, yes.

16 Q. And 138 is a lead screw that causes nut
17 140 to move back and forth?

18 MR. PEPE: Object to form.

19 BY THE WITNESS:

20 A. That's part of what it does, yes.

21 Q. So 138 rotates and nut 140 moves back and
22 forth?

1 A. That's part of what it does, yes.

2 Q. What else does it do?

3 A. It transmits a force.

4 Q. Forces being transmitted from the rotating
5 screw 138 to nut 140?

6 A. Once again, I wouldn't say it that way.

7 Q. Okay. How would you say it? What did you
8 mean by that?

9 MR. PEPE: Object to form.

10 BY THE WITNESS:

11 A. A torque is applied to 138, that torque
12 generates a force -- can generate a force on nut
13 140 to react to a force which is being applied from
14 the other direction on 140.

15 Q. And what is applying the force from the
16 other direction on 140?

17 A. Do you recall where in the patent
18 specification it talks about 140 and the
19 connections?

20 Q. Let's see if I can find that. I don't
21 have it top of my fingers. I can look it up.

22 A. Yeah. It might help if you look it up

1 because...

2 Q. Is it your understanding that --

3 A. Wait. Here we go. It looks like it's the
4 next paragraph 21 -- I mean, column 21. Let me
5 just see. Yeah, there we go. I found it.

6 Q. And where are you reading?

7 A. Well, right now I'm looking at column 21
8 starting at about line 47.

9 Q. Am I correct that there's a -- the nut
10 that's moving back and forth is connected to drive
11 bar 146 that then moves back and forth because it's
12 connected to that? Am I correct that the nut is
13 connected to drive bar 146 so they move back and
14 forth together?

15 A. That's what it looks like, yes.

16 Q. And then drive bar 146 is connected to the
17 E-beam?

18 A. To what?

19 Q. The E-beam.

20 A. Oh, sure.

21 Q. Okay. So if we kind of put it all
22 together, if you remember early on we were looking

1 for that 202 number which was the firing drive?

2 A. Right. And we found it simultaneously,
3 right?

4 Q. Right. So what this is describing is that
5 you've got a firing drive that is driving lead
6 screw 138 which causes nut 140 to move back and
7 forth?

8 A. That's part of what it does.

9 Q. Oh, I'm sorry, because in addition to
10 causing a nut to move back and forth, it causes the
11 nut to apply force?

12 A. It can react to force applied to the nut
13 from the other direction.

14 Q. When you just said -- what was the "it" in
15 that sentence?

16 A. The nut reacts to a force -- the force
17 that the 138 applies to 140 is in reaction to the
18 force that is applied to the nut ultimately from
19 the -- what you referred to as the E-beam.

20 Q. Okay. I see. Say it one more time.

21 A. Amongst other forces that are generated in
22 that path between the nut and the E-beam.

1 Q. Okay. So the firing drive 202 drives the
2 drive screw 138 which causes 140 to move, and it
3 also imparts forces on 140 in reaction to forces
4 being put on 140 from the E-beam?

5 A. Amongst other forces.

6 Q. Amongst other forces, what I just said is
7 correct? What I said is correct, but you're
8 pointing out there are other forces as well?

9 A. That's correct.

10 Q. Okay.

11 And the firing drive here, if we look at
12 the top of column 21, includes the ratchet
13 assembly -- two ratchet assemblies?

14 A. Where are you looking at?

15 Q. Around lines 8 to 11.

16 A. Okay. So go ahead.

17 Q. So I'm talking about the firing drive
18 that's driving the lead screw. Okay?

19 A. Right.

20 Q. And that firing drive includes two ratchet
21 assemblies, correct?

22 A. That is correct, but keep in mind that one

1 firing drive ratchet drives it in one direction,
2 the other drives it in the opposite direction. So
3 they're not both driving it in the same direction.

4 Q. Okay.

5 A. One drives it in the proximal direction,
6 one drives it in the distal direction.

7 Q. If we're looking at the components that
8 comprise the firing drive, they do include one
9 ratchet assembly for forward motion and another
10 ratchet assembly for reverse motion?

11 A. That, plus a means to engage one ratchet
12 assembly or the other ratchet assembly.

13 Q. Okay. And the firing drive also includes
14 drive shaft 206?

15 A. Say that again, please.

16 Q. And the firing drive also includes drive
17 shaft 206?

18 A. Drive shaft 206, yes.

19 Q. Right. And the firing drive also includes
20 trigger 204?

21 A. That is correct.

22 Q. And if we look to the bottom of that big

1 paragraph on column 21 --

2 A. What line?

3 Q. Line 43.

4 A. Okay.

5 Q. I'll just read it into the record. It
6 says "In various embodiments forward gear 226 can
7 be press fit, for example, onto drive shaft 206, or
8 in other various embodiments forward gear 226 can
9 be integrally formed within drive shaft 206." Do
10 you see that text?

11 A. You made a small mistake. You said
12 "within drive shaft 206." It's just "with drive
13 shaft 206." I believe you misspoke.

14 Q. I believe I did. I have to read it one
15 more time. Okay. I'm going to read it one more
16 time. "In various embodiments forward gear 226 can
17 be press fit, for example, onto drive shaft 206, or
18 in other various embodiments forward gear 226 can
19 be integrally formed with drive shaft 206."

20 Did I read that correctly?

21 A. I believe so.

22 Q. Okay. And from a mechanical standpoint is

1 there a difference, a functional difference between
2 whether you have a gear that's separate from a
3 drive shaft or whether it's integrally formed with
4 a drive shaft?

5 MR. PEPE: Object to form.

6 BY THE WITNESS:

7 A. Could you repeat the question?

8 Q. I'll rephrase it.

9 They're giving two options here, right?

10 The gear could be -- they say press fit onto a
11 drive shaft, which I take it means there are two
12 separate components and one is through friction, I
13 guess, stuck on the other? Is that what it means
14 to press fit?

15 A. Pretty much in very coarse level. Yeah,
16 at a very coarse level that would be correct, I
17 think.

18 Q. And then the other example is that the
19 gear may be integrally formed with the drive shaft.
20 Does that mean that it's a single piece?

21 A. Is the question does "integrally formed"
22 mean that it's a single piece?

1 Q. Yes.

2 A. That would be what I would understand in
3 this instance "integrally formed" to be a single
4 piece, although it could be out of two pieces that
5 are, for example, bonded together.

6 Q. So two pieces are bonded together, you
7 think that could be characterized as "integrally
8 formed"?

9 A. Under some circumstances it could be.

10 Q. You say it's generally interchangeable
11 whether you bond two pieces together or integrally
12 form them, assuming that they move in unison?

13 MR. PEPE: Object to form.

14 BY THE WITNESS:

15 A. That's too broad to answer, way too broad.

16 Q. Let's go to column 35. I want to talk
17 about the robotic embodiments of the '658 Patent,
18 and I'm going to direct your attention to the
19 paragraph starting at line 3.

20 A. Column 35?

21 Q. Column 35, line 3, yes. Let me know when
22 you're there.

1 A. Okay.

2 Q. I'll read this into the record.

3 "The tool embodiment described above
4 employs an interface arrangement that is
5 particularly well suited for mounting the
6 robotically controllable medical tool onto at least
7 one form of robotic arm arrangement that generates
8 at least four different rotary control motions."

9 Did I read that correctly?

10 A. I think so.

11 Q. I thought I'd check before I get too far
12 into this.

13 Then it says "Those of ordinary skill in
14 the art will appreciate that such rotary output
15 motions may be selectively controlled through the
16 programmable control systems employed by the
17 robotic system/controller."

18 So far so good?

19 A. Yes.

20 Q. And then it says "For example, the tool
21 arrangement described above may be well suited for
22 use with those robotic systems manufactured by

1 Intuitive Surgical, Incorporated of Sunnyvale,
2 California, USA, many of which may be described in
3 detail in various patents incorporated herein by
4 reference."

5 Did I read that correctly?

6 A. Yes.

7 Q. So am I correct that what this paragraph
8 is saying is that the '658 Patent is describing a
9 particular tool that would be well suited to be
10 connected to existing Intuitive Surgical robots?

11 A. It appears that -- at the time that this
12 statement was written it appears that that is what
13 it says.

14 Q. And am I correct that the concept is that
15 the Intuitive Surgical robots can generate at least
16 four different rotary control motions and the '658
17 tool is designed to accept four different rotary
18 control motions?

19 A. I don't know that it says that. I see
20 where it says that "Robotically controlled medical
21 tool onto at least one form of robotic arm
22 arrangement that generates at least four different

1 rotary control motions," that is what it says. You
2 added another qualifier on there, if I remember
3 your question correctly, and you said that there
4 were -- that the Intuitive -- I'm sorry -- that the
5 patented device requires four different input
6 motions. I think you added that. I don't see that
7 written in the portion of the paragraph that we've
8 been focusing on.

9 Q. Okay. Am I correct that the patented
10 instrument has four rotary input mechanisms that
11 are designed to connect to the four rotary output
12 control motions generated by an Intuitive robot?

13 MR. PEPE: Objection, scope and misstates
14 the claims.

15 BY THE WITNESS:

16 A. I don't know the answer to that question.

17 Q. Okay. Let me see if I can find a figure
18 that might --

19 A. If you could refer me to something.

20 Q. Yeah. I'm looking. I've looked at so
21 many Ethicon patents, maybe this one doesn't have
22 the figure I'm thinking.

1 Let me ask a more general question. Are
2 you aware what the maximum number of control
3 motions, rotary control motions are necessary to
4 drive the instrument disclosed in the '658 Patent?

5 A. I don't recall that I addressed that issue
6 in my report -- or declaration. I don't recall
7 that Dr. Knodel addressed that in his report -- or
8 declaration. So off the top of my head, that's not
9 something that I did an analysis on that I can
10 recall, unless there's something in my report that
11 I don't recall. I don't recall it off the top of
12 my head.

13 Q. Okay. And if we go to column 28 which
14 further describes the robotic embodiment, and I'll
15 direct your attention to the passage starting at
16 line 25. I'll just read it into the record.

17 It says "One form of interface 1230 is
18 illustrated in Figs 39 to 43. In various" --

19 A. Did you say that right? Did you say 39 to
20 43?

21 Q. I think so, yeah.

22 A. I'm sorry.

1 Q. I'm going to continue reading. "In
2 various embodiments the tool-mounting portion 1300
3 includes a tool-mounting plate 1302 that operably
4 supports a plurality of (four are shown in Figure
5 43) rotatable body portions, driven discs or
6 elements 1304, that each include a pair of pins
7 1306 that extend from a surface of the driven
8 element 1304."

9 Did I read that correctly?

10 A. I believe so.

11 Q. Okay. And so is this passage saying that
12 at least the embodiment shown in Figure 43 accepts
13 four rotary control motions from the robot arm?

14 MR. PEPE: Object to scope.

15 BY THE WITNESS:

16 A. If we look at 43 --

17 Q. Did you get your patent out of order?

18 A. I'm trying to get them back in order
19 here.

20 Q. If you'd like, here's a second copy that's
21 still --

22 A. No. I think I'm good. With this

1 double-sided sometimes you get them turned upside
2 down. I don't want to have too many things here.
3 So that's that.

4 We're looking at 43, right?

5 Q. Yeah.

6 A. Which column were you just reading from?

7 Q. 28, line 25.

8 A. Okay. And then what was the question,
9 then?

10 Q. The question was am I correct that in at
11 least the embodiment of Figure 43 the tool accepts
12 four rotary input motions from four rotary control
13 discs on a robot arm?

14 MR. PEPE: Object to the scope.

15 BY THE WITNESS:

16 A. Once again, I will say I did not -- do not
17 recall Dr. Knodel addresses this particular issue,
18 and in my declaration, which is in response to his
19 declaration and his assertions, I didn't do a
20 thorough analysis of this. It appears that that's
21 what -- based on what you said, but I have not done
22 an analysis of this.

1 Q. I'm going to now hand you the Tierney
2 application which is Intuitive Surgical 1006.

3 A. Hang on one second.

4 Q. Take your time.

5 MR. PEPE: We're closing in on another
6 hour. I don't know if you want to plan a break
7 soon.

8 MR. KATZ: It's up to you. Would you like
9 to break now or go another ten minutes? It's up to
10 you.

11 THE WITNESS: We can go another ten
12 minutes, ten minutes is fine, but let's not make
13 ten minutes become 30.

14 MR. KATZ: Absolutely.

15 BY MR. KATZ:

16 Q. So I'm going to show you IS-1006, which
17 is the Tierney patent application publication, and
18 you may recall, and I think you commented on it,
19 Dr. Knodel showed some figures from Tierney prior
20 art as compared to figures in the '658 Patent. Do
21 you recall Dr. Knodel doing that?

22 A. In general terms I recall that there was

1 something about that topic.

2 Q. Okay. And so I'd like you to compare
3 Figure 42 of the '658 Patent -- let me take that
4 back. Let me take the word "compare" out of it.
5 I'd like you to look at Figure 42 of the
6 '658 Patent and also open up Figure 7C of the
7 Tierney patent.

8 A. 7 what?

9 Q. C.

10 A. C as in Charlie?

11 Q. Yes.

12 A. Okay.

13 Q. And would you agree that those two figures
14 appear to be showing substantially similar robotic
15 arm devices?

16 MR. PEPE: Object to form.

17 BY THE WITNESS:

18 A. I would have to look at the specification
19 to see what 7C shows. I'd have to go back again
20 and look at what 42 shows specifically in the
21 specification to answer your question with any
22 specificity.

1 Q. Well, Dr. Knodel made the statement in his
2 declaration that a number of figures including
3 these were substantially similar. Do you recall
4 forming any opinions identifying differences
5 between these figures?

6 A. I think I address that in my report. I
7 say report. Declaration. If I ever say report and
8 don't correct myself, it's declaration. For my
9 purposes here my declaration is what I sometimes
10 refer to as a report.

11 So let me just look. I recall addressing
12 that issue.

13 (Witness reviewing document.)

14 MR. PEPE: Steve, do you mind if I direct
15 Dr. Fronczak?

16 MR. KATZ: Go ahead. I'm not sure where
17 it is either.

18 MR. PEPE: In the interest of speeding
19 things up...

20 THE WITNESS: That's about generally where
21 I was looking. Thank you. Here we go.

22 BY MR. KATZ:

1 Q. Just let me know where you're referring.

2 A. Okay. Yeah. Let me look at it, but I'm
3 looking -- to help you out, I'm starting to look at
4 paragraph 48 of my declaration on page 32.

5 Q. Great. Thank you.

6 (Witness reviewing document.)

7 BY THE WITNESS:

8 A. Yeah. Just reading this out loud from my
9 declaration in paragraph 48, I say "In his
10 declaration, Dr. Knodel" -- that's K-N-O-D-E-L --
11 "asserts that the Shelton '658 Patent 'incorporates
12 a significant number of figures that are
13 substantially similar to those of the prior art
14 Tierney patent,' IS-1003 at Paragraph 48. The
15 Shelton '658 Patent includes over 150 figures, less
16 than ten of which are similar to those in Tierney.
17 See IS-1001 at Figures 32 -- 34 to 42. Indeed the
18 Shelton '658 Patent discloses over 100 figures
19 (see, for example, Figures 44 through 151) and
20 corresponding text that illustrate and describe
21 various drive systems for powering a robotic
22 Endocutter, none of which are disclosed in

1 Tierney."

2 So what my recollection is that Figure 42
3 in the '658 Patent was added at a later date, as
4 were a number of these figures, the ones that I
5 think -- my understanding is that Dr. Knodel is
6 referring to, and these are identified in the
7 '658 Patent in the action that was taken at
8 around -- somewhere in 2011, well after this 2007
9 priority date that we had been discussing earlier
10 and was referred to in the patent.

11 So the patent, the Shelton '658 Patent
12 refers to the Tierney patent which stemmed from
13 this Patent Application Publication U.S.
14 2003/0083673-A1 that we've been looking at for
15 those figures, with respect to those figures.

16 Q. Okay. And as you say in your declaration,
17 you're not disputing the figures are very similar
18 between Tierney and the '658 Patent, those figures
19 we're talking about?

20 MR. PEPE: Object to form.

21 BY MR. KATZ:

22 Q. That was a bad question. Let me ask it

1 again.

2 You're agreeing with Dr. Knodel that the
3 figures he identified, which include Figure 42 of
4 the '658 Patent, are, in fact, similar to the
5 figures from Tierney?

6 A. I agree that there are similarities
7 between 42 of the '658 Patent and Figure 7C of the
8 patent application publication that I just
9 referenced.

10 Q. And that's what you say in your
11 declaration?

12 A. I'm sorry?

13 Q. That's what you say in your declaration?
14 You say "Less than ten of which are similar to
15 those in Tierney"?

16 A. That's what I say in the declaration, yes.

17 Q. In fact, you don't identify any
18 differences between the figures in response to
19 Dr. Knodel's statement that they are substantially
20 similar, do you?

21 A. I don't --

22 MR. PEPE: Objection, form.

1 BY THE WITNESS:

2 A. -- recall in my declaration that I have
3 identified any substantial differences, and, as
4 I've said, my understanding is that when I read the
5 Shelton patent it says -- it refers to the Tierney
6 patent. So it says, hey, we're going to take
7 information from the Tierney patent and we're going
8 to bring that to your attention and we're going to
9 be having figures that are associated with the
10 Tierney patent.

11 So I don't see -- I can't see -- I can't
12 see anything -- you know, what I respond to? It is
13 what it is. Shelton says we're going to take
14 some -- take the Tierney patent and we're going to
15 refer to some figures from the Tierney patent.
16 That's what they do. Yeah, that's what they did.

17 Q. And when you say in your declaration on
18 the top of page 33 that "There are over a hundred
19 figures describing various drive systems for
20 powering robotic Endocutter"; do you see that text?

21 A. I'm sorry?

22 Q. Do you see the text I'm referring to?

1 A. Yes, I do.

2 Q. And you specifically mention Figures 44 to
3 151?

4 A. Yes.

5 Q. Am I correct that the drive system you're
6 talking about is on the instrument side, not the
7 robotic side of the robotic embodiments in the
8 '658 Patent?

9 A. Say that again.

10 Q. When you're referring to the over a
11 hundred figures describing various drive systems,
12 you're referring to the instrument that gets
13 connected to the robotic arm and not drive systems
14 in the robotic arm, correct?

15 MR. PEPE: Object to form.

16 Just FYI, we're at our ten minutes.

17 (Witness reviewing document.)

18 BY THE WITNESS:

19 A. I think there's a bit of both.

20 Q. We can take a break and then we'll come
21 back and figure out where the dividing line is.

22 A. I'm sorry?

1 Q. We can take a break now, and when we come
2 back we'll delve into that response.

3 MR. KATZ: Let's go off the record.

4 (A short break was had.)

5 BY MR. KATZ:

6 Q. Welcome back, Dr. Fronczak.

7 Let me kind of maybe help clarify things a
8 bit and, if it would help, you can reference like
9 columns.

10 A. Which column?

11 Q. Columns 5 to 9 which give brief
12 descriptions of all those figures, to the extent
13 that's helpful. You have the figures as well.

14 So let me just clarify. You identify a
15 range of figures of 44 to 151?

16 A. Correct.

17 Q. Some of those figures relate to some kind
18 of reloading apparatus, like, for example,
19 Figures 136 and 137?

20 A. I'm sorry. This --

21 Q. I can offer you another copy of your
22 patent.

1 A. I don't know what happened here. Yeah,
2 sure, I'll reorganize these later.

3 Q. Again, I'm just trying to make sure we're
4 all on the same page here.

5 A. Sure. You just said 136, I thought. I
6 was looking for that.

7 Q. I'm reading from column 9 and it just says
8 Figure 136 is a cross-sectional elevational view of
9 the automated reloading system embodiment depicted
10 in Figs 134 and 135.

11 A. That is correct.

12 Q. So there's a number of figures in here
13 that relate to an automated reloading system,
14 right?

15 A. That's what it looks like, yes.

16 Q. And that's not part of the robot arm,
17 right? That's a separate system to put more
18 staples in cartridges?

19 A. I think that's a fair assessment.

20 Q. Okay. And those weren't what you were
21 referring to when you were talking about drive
22 systems?

1 A. That is correct.

2 Q. So my question is when you were pointing
3 to Figures 44 to 151 as over a hundred figures
4 depicting various drive systems, am I correct that
5 the drive systems you were talking about all reside
6 in the instrument that gets connected to the robot
7 arm as opposed to drive systems in the robot arm
8 itself?

9 A. I would have to go through each of those
10 figures again one by one to make sure that that's,
11 in fact, the case. I think when I was -- when I
12 made this statement over here what I was really
13 trying to direct the contrast to Dr. Knodel's
14 statement that I think something to the effect that
15 these were copies or something like that, that
16 these drawings were copies. I was pointing out --
17 perhaps I was imprecise in my wording here, but I
18 was pointing out that there were drawings, over 100
19 figures that were not directly or similar to what
20 was in the Tierney patent application or patent.
21 So I may have been imprecise in what I said.

22 Q. And so because I do want to know I'm going

1 to have to ask you to actually go one by one. I'd
2 like you to start at the first figure you
3 mentioned, which is Figure 44, and walk through
4 those figures to 151 and let me know if you think
5 any of those figures depict part of the drive
6 system in a robot arm as opposed to in the
7 instrument that gets plugged onto the robot arm.

8 A. Starting at 44?

9 Q. Starting at 44, yeah.

10 A. Okay. Some will take more time than
11 others.

12 44 does not depict the robot.

13 Q. Right.

14 A. The term you used was what?

15 Q. Whether there was a drive system in the
16 robot arm.

17 A. The drive system in the robot arm. Okay.

18 Q. You know what? We don't need to kind of
19 go one by one and get your comment on the record.
20 You can silently just go through the figures, and
21 if you think you see a figure between 44 and 151
22 that depicts a drive system in a robot arm, then

1 just flag that figure number and we'll discuss it.

2 A. Okay.

3 (Witness reviewing document.)

4 BY THE WITNESS:

5 A. Figures 73 and 74, the captions for those
6 or the description for those are Figure 73 -- I'm
7 reading from column 6, line 53, it looks like. It
8 says "Figure 73 is a side view of a portion of
9 another surgical tool embodiment of the present
10 invention in relation to a tool holder portion of a
11 robotic system with some of the components thereof
12 shown in cross-section." Going on, "Figure 74 is a
13 side view of a portion of another surgical tool
14 embodiment of the present invention in relation to
15 a tool holder portion of a robotic system with some
16 of the components thereof shown in cross-section."

17 So this shows a bit of the robotic holder,
18 but it doesn't show any detail of any drive.
19 Without looking into detail, there may be a little
20 bit of the drive system associated with the robot
21 arm shown in these two figures.

22 Figure 100 has a very similar situation as

1 to what I had described for those two previous
2 figures.

3 Q. Meaning showing in very general block form
4 part of the robot arm?

5 A. That is correct.

6 Q. Do you know whether there's any
7 description of the drive system in that robot arm?

8 A. Not without going into that portion of the
9 patent. There's nothing in the Figure 100 which
10 shows any detail of any drive system, any drive
11 system in the robot arm.

12 Looking at Figure 144, there are certainly
13 no details of the drive system -- I'll wait until
14 you get to it.

15 Q. Go ahead.

16 A. There's certainly no details of any drive
17 train in the robot arm, that very bottom portion.
18 I'd have to go into a detailed description of that
19 drawing to see if that very bottom portion was part
20 of the robot arm or part of the tool. It's not
21 clear to me, but it certainly does not show any
22 part of the drive train associated with the robot

1 arm other than perhaps a connecting plate.

2 That's it from what I can see.

3 Q. Okay. So looking through Figures 44
4 through 151, there were some general references to
5 the robot arm, but there was no disclosure of the
6 specific drive systems in the robot arm?

7 A. I wouldn't say general reference. I would
8 say an illustration of a portion of a robot arm.

9 Q. So, again, in Figures 44 to 151, other
10 than illustrations of a portion of a robot arm,
11 there's no disclosure of the drive system actually
12 inside the robot arm?

13 A. I did not see any.

14 Q. So when you were referring to the drive
15 systems in your declaration, were you referring to
16 the drive systems in the instrument portion?

17 A. That's correct, yes, in this sentence.

18 Q. If we look in -- I want to read the
19 description of Figure 39 before we go there. So if
20 you turn to --

21 A. Say that again, please.

22 Q. I want to read the description of

1 Figure 39 before we go there. So if you look at
2 column 5 at about line 18.

3 A. Okay.

4 Q. It says "Figure 39 is an exploded assembly
5 view of an adapter in a tool holder arrangement for
6 attaching various surgical tool embodiments to a
7 robotic system"; do you see that?

8 A. Okay. I have that figure in front of me.

9 Q. Okay. And do you recognize that the
10 bottom is a tool holder and the top piece is the
11 tool adapter?

12 A. Where are you looking at in the patent
13 that describes that?

14 Q. Again, column 5 --

15 A. Oh, okay.

16 Q. -- line 18.

17 A. Yeah. It doesn't say which of these is
18 the adapter, which is the tool holder is what I was
19 getting at in my question. So I would need to go
20 to the description in the specification to see what
21 this arrangement -- it does identify that there are
22 those two portions, but whether 1270 is the adapter

1 or 1230 is the tool holder, it's not clear to me
2 what these different parts -- which of these
3 different parts are just looking at Figure 39.

4 Q. If you look at -- do you have a copy of
5 Dr. Knodel's declaration?

6 A. No. I don't think I've had that yet.

7 Q. I'm going to hand you what's been
8 previously marked as IS-1003, which is the
9 declaration of Dr. Knodel, and I'd like you to turn
10 to page 22 and let me know when you're there.

11 A. I am there.

12 Q. Okay. And do you notice that Dr. Knodel
13 was comparing something he described as the robotic
14 tool holder with driving elements from the Tierney
15 patent, Figure 7J -- excuse me -- from the Tierney
16 application, Figure 7J to the '658 Patent, Figure
17 39?

18 A. First of all, the Figure 39 that is in
19 Dr. -- on page 22 in Dr. Knodel's declaration is
20 not the complete picture.

21 Q. Right.

22 A. It's not the complete Figure 39.

1 Q. Right.

2 A. It's the lower portion of Figure 39.

3 Q. I guess, let me ask the specific question.

4 Dr. Knodel states that these two figures, Figure 39
5 from the '658 Patent -- the lower portion of
6 Figure 39 of the '658 Patent and Figure 7J, is the
7 robotic tool holder. Do you have any reason to
8 doubt that he accurately identified the tool holder
9 versus the tool adapter?

10 A. I don't have reason to doubt it, but I
11 would have to verify it. I'd have to delve into
12 that section of the '658 Patent as well as that
13 section of the patent application by Tierney to
14 verify that. If you want to represent that, I
15 don't have reason to doubt it, but I haven't
16 verified that.

17 Q. Well, I guess let's just find it. I'll
18 direct your attention to paragraph -- excuse me --
19 column 29.

20 A. In which --

21 Q. In the '658 Patent.

22 A. Okay.

1 Q. And do you see -- I'm going to direct your
2 attention to like line 5 where it's discussing the
3 "Tool holder portion 1270 of the robotic system
4 1000."

5 A. What line?

6 Q. Line 5 of column 29.

7 A. Oh, okay. "Tool holder portion 1270."
8 Okay.

9 Q. So the lower portion of Figure 39 is the
10 tool holder?

11 A. Tool holder portion, yes.

12 Q. As a kind of expert in mechanical
13 engineering, what is the maximum torque that that
14 tool holder can provide?

15 MR. PEPE: Objection, form.

16 BY THE WITNESS:

17 A. I can't answer that. That question's so
18 vague I can't answer that question. I can't begin
19 to answer that question.

20 Q. Let's make it more concrete. The actual
21 tool holder in Figure 39 in the '658 Patent, that
22 specific tool holder that's represented -- strike

1 that.

2 So the '658 Patent has robotic embodiments
3 that talk about a robot arm including tool holder
4 1270 shown in Figure 39, right?

5 A. I understand that to be the case, yes.

6 Q. And so in the embodiment shown here in
7 Figure 39 what is the maximum torque that each of
8 those rotary drive items 1272 -- well, 1272 I think
9 are the pins. Let me get this right. Let's get
10 the numbers right. Bear with me one second.

11 Okay. Yes. I'm referring to column 29
12 discusses it around line 12. It says that --

13 A. Where are you at?

14 Q. Column 29 mentions it at line 12 and it
15 refers to "Drive elements 1271 of the tool holder
16 1270"; do you see that?

17 A. Right.

18 Q. So if you look at Figure 39, there are
19 four drive elements -- strike that.

20 If we look at Figure 39, there are four
21 drive elements labeled 1271 on tool holder 1270? I
22 note you're looking at Dr. Knodel's declaration.

1 A. Yeah. Okay. Sure.

2 Q. You want to look at the bigger figure in
3 the patent.

4 A. Yeah, it helps looking at the original
5 figure because their leaders are clearer.

6 Q. Let me ask that again. Am I correct that
7 what this patent's depicting is four drive elements
8 each labeled 1271 on tool holder 1270?

9 A. That's consistent with what it says in
10 column 29 of the '658 Patent.

11 Q. And these drive elements spin and connect
12 with rotary discs on the instrument; is that
13 correct?

14 A. That's my understanding, yes.

15 Q. And so --

16 A. I'm sorry. Say that again.

17 Q. Let me reword it. Each drive element
18 spins and is coupled to spinning discs on the
19 surgical instrument?

20 A. Actually, we'd have to look at 1230
21 because I think those connect directly to the disc
22 in what I thought we said was the adapter plate.

1 Q. 1230 was the adapter. That's why I just
2 changed the word coupled I thought to address your
3 concern. So let me word it this way.

4 A. Okay.

5 Q. Drive elements 1271 spin and, thus, couple
6 rotary motion through the adapter to rotary discs
7 on the instrument?

8 MR. PEPE: Objection, form.

9 BY THE WITNESS:

10 A. That's more or less what I would
11 understand it to be. I wouldn't use necessarily
12 those words, but I'm not going to argue with it.

13 Q. Now, my question is for these drive
14 elements in the '658 Patent, you know, as shown
15 here in Figure 39 what is the maximum torque that
16 each drive element can generate?

17 MR. PEPE: Objection, form.

18 BY THE WITNESS:

19 A. There's a lot of reasons why I can't
20 answer that question. A lot of reasons I can't
21 answer -- at least a couple reasons I can't answer
22 that question.

1 Q. Why not?

2 A. Well, first of all, they don't generate
3 torque, they transmit torque, and you said generate
4 torque. So they're not a torque-generating device.

5 Q. That seems to be a good enough reason. So
6 let me reword and then we'll see if you can answer.

7 A. Okay.

8 Q. Within the system described in the
9 '658 Patent and specifically looking at Figure 39,
10 what is the maximum torque that that system can
11 transmit through drive elements 1271?

12 MR. PEPE: Objection, form.

13 BY THE WITNESS:

14 A. Once again, I can't answer that, I can't
15 assess that. There's a number of reasons why
16 that's indeterminable from Figure 39 or from what
17 I've seen that you referred to in column 29 or from
18 the title of the figure.

19 Q. What about just from the patent in its
20 entirety?

21 MR. PEPE: Objection, form.

22 BY THE WITNESS:

1 A. I still can't answer that.

2 Q. Why not?

3 A. Because there's too many factors that are
4 not included in enough sufficient detail to be able
5 to do an analysis or a calculation of that.

6 Q. What factors are coming to your mind right
7 now?

8 A. Material properties, the torque of the
9 motor, the size of the -- the specific size of the
10 components, the tolerances, the closeness of fit
11 between the different parts. Those are a couple of
12 the many things.

13 Q. Would you also include as a missing factor
14 the gear ratio between the motor and the drive
15 elements 1271?

16 MR. PEPE: Objection, form.

17 BY THE WITNESS:

18 A. I'm sorry. Say that again.

19 Q. Would you also include as one of the
20 factors that you would have to know is the gear
21 ratio in the gears between the motor and the drive
22 elements 1271?

1 MR. PEPE: Same objection.

2 BY THE WITNESS:

3 A. The torque capacity of the motors and any
4 torque multiplication in a drive train up to this
5 point would be one of the potential limiting
6 factors.

7 Q. Are you aware of any disclosure in the
8 '658 Patent that would allow a person of skill in
9 the art to determine the amount of torque that can
10 be delivered through each of the rotary drive
11 elements 1271 in the '658 Patent?

12 A. Could you ask the question again,
13 please.

14 Q. Are you aware of any disclosure in the
15 '658 Patent that would allow a person of skill in
16 the art to determine how much torque each of these
17 drive elements 1271 could deliver in the system
18 disclosed in the '658 Patent?

19 A. I'm sorry, but I don't understand your
20 question.

21 Q. Let me ask it another way. Either through
22 the figures or the text of the '658 Patent, could

1 someone reading this patent determine how much
2 torque -- how much -- what the maximum torque is
3 that could be delivered through the drive elements
4 1271?

5 MR. PEPE: Objection, form.

6 BY MR. KATZ:

7 Q. I'll ask it one more time to clear it up.
8 Would it be possible to calculate or otherwise
9 determine the maximum torque that each of the drive
10 elements 1271 could deliver in the robotic system
11 disclosed in the '658 Patent?

12 MR. PEPE: Objection, form.

13 BY THE WITNESS:

14 A. Could one? An engineer if they have
15 enough information about the geometry, the
16 materials, the tolerances, the loading, the drive
17 system that can provide torque -- I guess I'm
18 struggling with the answer here because I can't
19 wrap my head about what you're really asking. Are
20 you asking what an engineer knows how to do, or are
21 you asking -- or are you asking something
22 different? I don't understand your question.

1 Q. Okay. No. My question is based on the
2 disclosure in the '658 Patent, does it inform an
3 engineer what the maximum torque is that each of
4 drive elements 1271 could deliver in the disclosed
5 system, or could they not determine it based on
6 this patent disclosure?

7 A. I do not recall any quantification of the
8 torque capacity of these particular elements.
9 That's the best I can answer based on the question
10 that I think you're asking or that I understand you
11 to be asking.

12 Q. Okay.

13 A. I may not even have your answer. You
14 know, one of the things I have to do is make sure I
15 understand the question, and as I've said before,
16 I'm struggling with what you're really asking. And
17 I'm trying my best to respond to your questions,
18 but I'm having a hard time understanding
19 specifically what you're asking because you're
20 putting a lot of qualifiers in there.

21 Q. I'm trying to put very few qualifiers.
22 Let me try one more time.

1 A. Okay.

2 Q. Is there sufficient information in the
3 '658 Patent that you could give the '658 Patent to
4 an engineer and they could tell you the amount of
5 torque that would be transmitted through the drive
6 elements 1271, or is there just not enough
7 information to determine that?

8 MR. PEPE: Objection, form.

9 BY THE WITNESS:

10 A. In and of itself, limiting ourselves to
11 information that is explicitly in the '658 Patent
12 and subject to the possibility that some of the
13 patents that are incorporated by reference or
14 otherwise referred to in the '658 Patent, which is
15 just lots and lots and lots of information, but
16 just taking what is in black and white in the
17 specification and in the drawings of the
18 '658 Patent and only those, only that information,
19 I do not see that there's enough information there
20 for an engineer to ascertain what I believe you
21 asked was the torque transmitted by elements 1271.
22 I think that's what you asked.

1 Q. And I've got the same question for the
2 Tierney application, IS-1006, which I believe you
3 have a copy of.

4 A. Where did that go? This one.

5 Q. The question is based on the disclosure in
6 the Tierney application, which is IS-1006, is there
7 enough information to determine the maximum amount
8 of torque that could be delivered through the tool
9 drives which in Tierney are labeled 119?

10 (Witness reviewing document.)

11 BY THE WITNESS:

12 A. I do not recall specifically at this time
13 if there was quantification and that information
14 presented in the application. I don't recall that.
15 I've read the application, but it's been some time
16 ago since I first looked at it and reviewed it. I
17 don't recall that specific information being there.
18 So my answer subject to the fact that I may be
19 overlooking something, I don't think I am but I
20 could be overlooking something, my answer would be
21 the same.

22 Q. And what are the primary factors that

1 would limit the amount of torque that could be
2 delivered through drive elements 119 in a system
3 like Tierney's?

4 MR. PEPE: Objection, form.

5 BY THE WITNESS:

6 A. Geometry, material, motor properties,
7 motor driver characteristics, kinematics of the
8 drive train, details of manufacture would all
9 contribute, as well as other factors, to its
10 ability to transmit torque, the amount of torque
11 that it's able to transmit.

12 Q. Do you recall whether any of those details
13 were discussed in Tierney?

14 A. I don't recall if any of those were
15 addressed specifically in Tierney, but certainly
16 some of those would fall within the scope -- most,
17 if not all, of those would fall within the scope of
18 one of ordinary skill in the art if they had the
19 appropriate information at hand.

20 Once again, it's been some time since I
21 reviewed Tierney in detail and I can't answer that
22 question specifically. There may be some specific

1 things in there. You said are any of those factors
2 addressed. There may be some. For example, he
3 gets a little bit into the circuitry and that would
4 be one of the factors there.

5 Q. The only thing I'm familiar with is kind
6 of like a handheld power drill, you know, you can
7 buy at Sears or whatever. Does Sears still exist?

8 A. I'm sorry. Say that again.

9 Q. Does Sears still exist? I don't know.
10 When I referred to a handheld --

11 A. Let's say we buy it at Fronczak's
12 Hardware.

13 Q. Okay. In any case, a handheld power
14 motorized device is certainly able to generate
15 relatively high torques, higher torques than can be
16 generated by hand; is that correct?

17 MR. PEPE: Objection, form.

18 BY THE WITNESS:

19 A. I don't know that I would agree with that,
20 no.

21 Q. So you don't think it's possible to have
22 like a handheld screwdriver, motorized screwdriver

1 that generates higher torques than can be generated
2 by hand?

3 MR. PEPE: Objection, form.

4 BY THE WITNESS:

5 A. I wouldn't agree with that at all.

6 Q. I guess I'm not asking for agreement. I'm
7 asking a simple question. Are you saying that a
8 handheld motorized screwdriver is always going to
9 generate less torque than a nonmotorized handheld
10 screwdriver?

11 MR. PEPE: Objection, scope.

12 BY THE WITNESS:

13 A. It depends on a lot of things. I could
14 design a handheld tool that will generate more
15 torque than any drill driver that you're going to
16 be buying.

17 Q. Okay. You mean based on lever dynamics I
18 assume you're talking about?

19 MR. PEPE: Objection, form.

20 BY THE WITNESS:

21 A. That's one part of it. There's other ways
22 of generating torque other than high torque through

1 a lever.

2 Q. Okay. Is it possible to generate high
3 torques in a small package of the sort that can be
4 handheld, or does it require -- let me ask it this
5 way. If I want to generate high torque out of a
6 motorized device, is there some minimum size that
7 you can identify that device would have to be?

8 MR. PEPE: Objection, form.

9 BY THE WITNESS:

10 A. There will be a minimum size, but size
11 is -- when you're talking size are you talking
12 volume, are you talking diameter, are you talking
13 length, are you talking pancake configuration, are
14 you talking gear motor? There's an awful lot that
15 goes into it. So specifically the way you asked
16 the question it's a question I can't answer.

17 Q. Well, are you of the opinion that surgical
18 robot arms are too small to allow the generation of
19 high torque drive elements?

20 MR. PEPE: Objection, form.

21 BY THE WITNESS:

22 A. As I think I said earlier in this

1 deposition, these terms are all relative. So it's
2 all relative and it remains relative.

3 Q. In the course of your analysis for this
4 case did you attempt to calculate the amount -- the
5 maximum amount of torque that could be generated by
6 a drive element from a surgical robotic system as
7 they existed in 2006 or earlier?

8 A. I did not do that particular analysis.
9 What time do you think is a good time to
10 break?

11 Q. Let's break for lunch right now.

12 A. It seems like we got a pause here. Is
13 this a natural pause?

14 Q. Just because I paused asking a question
15 doesn't necessary mean it's lunchtime. I'm
16 kidding.

17 A. I'm saying if you feel you have two or
18 three --

19 Q. No. That's fine.

20 MR. KATZ: Let's go off the record.

21 (Whereupon, at 1:05 p.m., the
22 deposition was recessed, to

1 reconvene at 1:35 p.m., this
2 same day.)
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1 A. That's my understanding.

2 Q. And my question is would you agree that
3 certainly before 2006 it was well known that
4 surgical robots would give the ability to increase
5 surgical dexterity and allow surgeons to operate in
6 an intuitive manner?

7 A. I wouldn't disagree that there would be
8 some surgical robotic systems that would allow
9 that.

10 Q. Well, I guess my question's kind of
11 broader. Would you agree that -- in other words,
12 this wasn't Ethicon's concept in 2011. They were
13 reporting what was generally known about robotic
14 systems?

15 A. That's my understanding. They referred to
16 then several -- later on in that same paragraph
17 they refer to different patents and publications,
18 mostly patent publications.

19 Q. And then would you agree with the
20 statement that certainly prior to 2006 it was well
21 known that one of the potential benefits of
22 surgical robotic systems is that they give

1 increased surgical dexterity and they allow
2 surgeons to operate in an intuitive manner, at
3 least some robotic systems?

4 MR. PEPE: Objection, form.

5 BY THE WITNESS:

6 A. I would say my understanding is that some
7 robotic systems could and with some surgeries.
8 It's not a blanket statement that all surgeries
9 would be able to be performed advantageously with
10 robotic systems.

11 Q. As you mentioned, it lists a number of
12 patents, one of which is the Tierney patent,
13 correct? That would be the one that's 7,524,320 in
14 the middle of that paragraph.

15 A. Which one is it?

16 Q. It's on line 31, the one that's 7,524,320.

17 A. '320. Okay. That's the one with the
18 application we've been looking at. The Tierney
19 application is turned into this patent; is that
20 what you're saying?

21 Q. Yes.

22 A. Okay.

1 Q. Then there's a statement which you quote
2 in your declaration, and I'm looking at the
3 statement on line 40 of the patent. I'm reading
4 from the patent. I don't have your declaration in
5 front of me.

6 A. Okay.

7 Q. I shouldn't have confused you. I was
8 simply mentioning you did mention it in your
9 declaration, but I'm reading it from the patent.

10 A. Okay.

11 Q. I'm going to start over again.

12 A. So where did I -- where in my declaration
13 did you say?

14 Q. I have to look. I just know it's in there
15 somewhere.

16 A. Okay.

17 Q. I'll ask a new question. I won't make it
18 complicated.

19 A. Okay.

20 Q. So in column 26 it starts by pointing out
21 that over the years there have been these minimally
22 invasive robotic systems developed?

1 A. Yes.

2 Q. And then it mentions starting at line 40

3 "Many of such systems, however, have in the past
4 been unable to generate the magnitude of forces
5 required to effectively cut and fasten tissue"; do
6 you see that?

7 A. Yes, I do. Starting on 39, but yes.

8 Q. And do you happen to know the basis for
9 that statement in the '658 Patent, like where the
10 author got the information for that statement?

11 MR. PEPE: Objection, form.

12 BY THE WITNESS:

13 A. Not specifically where the author of the
14 patent -- or the drafter of the patent, where they
15 specifically got that information.

16 Q. And have you personally done a survey of
17 robotic systems that existed in 2006?

18 A. No, I did not.

19 Q. I take it that you don't know from your
20 own personal experience whether robotic surgical
21 systems prior to 2006 could generate the magnitude
22 of forces required to effectively cut and fasten

1 tissue?

2 A. Could you repeat the question?

3 Q. I take it that you personally don't know
4 from your own personal research whether robotic
5 systems in 2006 or earlier could generate the
6 forces necessary to cut and fasten tissue?

7 A. Well, I think I address that issue in my
8 declaration. Let me just look at that.

9 Q. My question is about whatever personal
10 research you may have put in your declaration if
11 that's what you're pointing to.

12 A. I'm sorry?

13 Q. My question's very narrow. It's about any
14 personal research you have done as an expert in the
15 robotic field to determine whether surgical robots
16 in 2006 could generate forces sufficient to cut and
17 fasten tissue.

18 MR. PEPE: Objection, form.

19 BY THE WITNESS:

20 A. There are documents that I cite -- in the
21 literature that I cite in my declaration, and those
22 address this issue. Other than that what is in my

1 declaration, I have not taken on any additional
2 undertaking to ascertain that.

3 Q. Okay. And those documents that you cite
4 in your declaration were provided by counsel from
5 the patent owner after your engagement in this
6 matter, correct?

7 A. They were provided to me -- at least some
8 of them, if not all of them, were provided to me by
9 counsel. Where he got them from I don't know.

10 Q. I mean prior to your engagement --

11 A. At least some. I don't recall if all of
12 them came from that source or if I had other
13 documents that I presented him. I don't recall the
14 source, whether they were all passed on to me or I
15 had knowledge that I passed on to him and then
16 would pass back on to me. I don't recall that
17 specific path for each and every one of the
18 documents.

19 Q. Okay. Prior to your engagement in this
20 matter had you done research into the forces
21 generated by surgical robots with respect to
22 cutting and fastening tissue?

1 A. Definitely into cutting tissue. Not that
2 I recall with respect to fastening as well, but
3 definitely we've done -- in my work at Marvel
4 Medtech we've done extensive -- what I consider
5 fairly extensive work in the forces involved in
6 cutting tissue and with a variety of tissue
7 characteristics and with a variety of knife or
8 blade configurations. So I've done, I would say, a
9 considerable or appreciable -- I don't want to make
10 it sound like that was exclusively what I've been
11 focusing on, but we did do what I would
12 characterize as a considerable amount of work in
13 that area.

14 Q. Is there a minimum amount of force
15 necessary to cut tissue?

16 MR. PEPE: Objection, form.

17 BY THE WITNESS:

18 A. I don't understand the question.

19 Q. Well, let's put it this way. Are you of
20 the opinion that there is a minimum amount of force
21 necessary to cut tissue such that the system
22 disclosed in the Tierney reference physically just

1 can't do it?

2 MR. PEPE: Objection, form.

3 BY THE WITNESS:

4 A. The best I can answer is that cutting
5 tissue involves a large number of considerations
6 and each specific situation has to be ascertained
7 independently -- has to be looked at independently
8 to a large degree to ascertain what the cutting
9 force would be required for each and every
10 individual situation.

11 Q. Have you formed an opinion one way or the
12 other whether the Tierney system is either capable
13 or incapable of cutting tissue -- excuse me --
14 generating forces sufficient to cut tissue?

15 MR. PEPE: Objection, form.

16 BY THE WITNESS:

17 A. My recollection -- let me look at
18 something first.

19 (Witness reviewing document.)

20 BY THE WITNESS:

21 A. In reference to Tierney, Tierney described
22 cutters being used, but only cutters for cutting

1 tissue, not Endocutters which require clamping,
2 cutting, and stapling.

3 Q. Okay. Right. Tierney you're saying does
4 not actually disclose an Endocutter instrument?

5 A. Tierney does not disclose using their
6 system with an Endocutter.

7 Q. Is there any disclosure in Tierney that
8 leads -- well, have you formed an opinion one way
9 or another whether the robot arm in Tierney could
10 generate the forces necessary to drive an
11 Endocutter?

12 A. My opinion is that -- as I point out in my
13 declaration, that in 2011 both Ethicon and
14 Intuitive acknowledged there was still need for
15 robotic instruments that could supply the forces
16 necessary to clamp, cut, and staple tissue. It is
17 my opinion that a person of ordinary skill in the
18 art in 2007 would have lacked a reasonable
19 expectation of success in adapting the instrument
20 disclosed in the Wales '628 Patent for use with the
21 robotic system disclosed in Tierney. That is what
22 my opinion is.

1 Q. Okay.

2 A. That's the opinion that I've formed.

3 Q. And if we look at column 26 of the
4 '658 Patent --

5 A. I'm sorry?

6 Q. Column 26 of the '658 Patent again,
7 line 40, and that sentence again says "Many of such
8 systems, however, have in the past been unable to
9 generate the magnitude of forces required to
10 effectively cut and fasten tissue"; do you see that
11 sentence?

12 A. Yes.

13 Q. And the word that the writers of the
14 '658 Patent use there is "many of such systems,"
15 correct?

16 A. Yes.

17 Q. They didn't say all such systems?

18 A. You read that correctly, yes.

19 Q. And so certainly looking at the
20 '658 Patent, nothing in that sentence says that the
21 Tierney '320 Patent specifically is incapable of
22 generating any specific force, correct?

1 A. In the material in column 26 that we've
2 been addressing, which, as I said, my understanding
3 was added in 2011, there is nothing specific in
4 that column that says that Tierney was incapable of
5 generating the torques and/or forces required to
6 drive an Endocutter. Nonetheless, my opinion is
7 based not just in what is in column 26, which, as
8 we said, we're looking at what -- my opinion is
9 based on what I understand was Dr. Knodel's
10 assertions and my response to Dr. Knodel's
11 assertion as to what a person of ordinary skill in
12 the art would have understood and appreciated in
13 the year 2007 leading up to the application of
14 the -- or the date.

15 Q. And that opinion was specifically about a
16 combination of Tierney and Wales that you read
17 earlier, right?

18 A. This section that I wrote it in was in
19 connection with my analysis of Tierney in
20 combination with Wales based on Dr. Knodel's
21 assertions. I'd have to look.

22 I think there's also -- Dr. Knodel also

1 asserted that Wales and Knodel or the combination
2 of Wales, Tierney, and Knodel too. So that would
3 apply to not just Wales and Tierney, but Wales,
4 Knodel, and Tierney.

5 Q. And certainly in the '658 Patent which
6 discloses an instrument with an Endocutter the
7 surgical robot 1000 -- excuse me -- the robotic
8 system -- strike that. I'll get a good question in
9 eventually today.

10 A. Okay.

11 Q. In the '658 Patent robotic system 1000 is
12 certainly able to drive the Endocutter disclosed in
13 the '658 Patent, correct?

14 A. Where are you reading, can I ask you that?

15 Q. I'm looking at the beginning of the
16 robotic embodiments in column 26.

17 A. What line?

18 Q. Roughly 43 where it says "Figure 34
19 depicts one version of a master controller 1001
20 that may be used in connection with a robotic arm
21 slave cart 1100 of the type depicted in Figure 35.
22 Master controller 1001 and robotic arm slave cart

1 1100 as well as their respective components and
2 control systems are collectively referred to herein
3 as a robotic system 1000"; do you see that?

4 A. Yes.

5 Q. And then it says "Examples of such systems
6 and devices are disclosed in U.S. Patent
7 No. 7,524,320 which has been herein incorporated by
8 reference"; do you see that?

9 A. Yes.

10 Q. And that's the Tierney patent?

11 A. That's what?

12 Q. That's the Tierney patent, correct?

13 A. You know, I don't remember the number of
14 the Tierney patent because I was always working --
15 Dr. Knodel in his declaration referred to the
16 application. So the number -- I'll take your word
17 for it. I'll take your word for it.

18 Q. We'll just call the '320 Patent the
19 Tierney patent.

20 A. Okay.

21 Q. We have a copy of it somewhere here.

22 A. As long as -- I'll accept that as long as

1 we agree that -- or you agree that the Tierney
2 application ending in 83673 led to the -- what
3 you're referring to as the '320 Tierney patent.

4 Q. I don't want you to have to take my
5 representation for anything in this deposition. So
6 let me show you Exhibit 2013. Can you confirm
7 that that is the patent number mentioned in
8 column 26, line 49 of the '658 Patent?

9 A. Yes, it is. Furthermore, on this patent
10 we can see that the prior publication data is the
11 U.S. 2003/0083673-A1 dated May 1st, 2003, which is
12 the application that Dr. Tierney -- Dr. Knodel
13 cited and which my report responds to.

14 Q. Okay. So now my question is am I correct
15 that certainly in the '658 Patent what it calls
16 robotic system 1000, that system is capable of
17 driving an Endocutter?

18 A. It says that the -- why don't we take a
19 look at Figure 34.

20 (Witness reviewing document.)

21 BY THE WITNESS:

22 A. I don't think that's what it says. I

1 think it shows -- refers to Figure 34, depicts one
2 version of a master control 1001 that may be used
3 in conduction with a robotic arm slave cart 1100,
4 which is shown in Figure 35. "Master controller
5 1001 and robotic arm slave cart 1100 as well as the
6 respective components and control systems are
7 collectively referred to herein as a robotic system
8 1000." That doesn't address -- I don't see where
9 that addresses the use of the Endocutter by this
10 device.

11 Q. Okay. So let's look somewhere else.

12 A. Okay.

13 Q. How about let's go to column 28, line 10.

14 Let me know when you're there.

15 A. Column --

16 Q. 28.

17 A. And what line?

18 Q. Line 10.

19 A. Pardon?

20 Q. Line 10.

21 A. Okay. Let me look at that.

22 (Witness reviewing document.)

1 BY THE WITNESS:

2 A. Okay.

3 Q. I'll try without reading it into the
4 record and see how that goes. Doesn't that section
5 say that the Endocutter instrument that's depicted
6 in Figure 38 is going to be plugged into the tool
7 drive of Figure 39 which is part of robotic system
8 1000?

9 A. Could you repeat that?

10 Q. Isn't that passage showing that the
11 Endocutter instrument shown in Figure 38 plugs into
12 the tool holder and adapter of Figure 39 which is
13 part of robotic system 1000?

14 A. I think that's correct what it says.

15 Q. And so robotic system 1000 is capable of
16 driving the Endocutter that's being depicted in
17 Figure 38?

18 A. Presumably.

19 Q. And that robotic system 1000, an example
20 of such a system -- going back to line 49 in
21 column 26, an example of such a system is disclosed
22 in the Tierney patent? Let me ask it again. Let

1 me clarify.

2 A. Okay.

3 Q. Not the Endocutter instrument piece, the
4 robotic system piece. Am I correct that they're
5 saying that the Endocutter that is disclosed in the
6 '658 Patent may be plugged onto robotic system 1000
7 and one example of robotic system 1000 is, in fact,
8 the Tierney patent?

9 MR. PEPE: Objection, form.

10 MR. KATZ: Should we take this step by
11 step?

12 BY THE WITNESS:

13 A. I'm trying to.

14 Q. I'm sorry. If you can answer the
15 question, great. Otherwise I'll break it down.

16 A. Let's break it down.

17 Q. Okay. So the '658 Patent discloses an
18 Endocutter such as that shown in Figure 38 that is
19 designed to be connected to robotic system 1000?

20 A. Correct.

21 Q. And according to column 26, lines 49 to
22 50, robotic system 1000 is actually an already

1 existing robot and specifically they say an example
2 of such a system is disclosed in the Tierney
3 patent?

4 A. That is -- that's correct as far as it
5 goes.

6 Q. What qualification do you want to put on
7 it?

8 A. Well that doesn't take into account
9 particular models or improvements or capabilities
10 that were introduced into the device over the
11 course of time.

12 Q. You're saying between --

13 A. What we're talking about is what is in the
14 Tierney patent and what is, in fact, the claims of
15 the Tierney patent, what is disclosed in the
16 Tierney patent, and just because a figure in the
17 '658 Patent refers to a device which had been
18 disclosed well after -- I'm sorry -- is referred to
19 well after the Tierney patent had originally been
20 filed doesn't mean that in 2006 -- or '7, I'm
21 sorry, 2007 that the device disclosed in the
22 Tierney patent was capable of providing the forces

1 required for use in an Endocutter.

2 Q. And you're saying because of advances
3 between 2007 and 2011 when the text was added; is
4 that what you're saying?

5 A. That could be part of it.

6 Q. Now, are you familiar with any advances to
7 the da Vinci robot between the Tierney patent and
8 2011?

9 A. Not specifically, other than as those may
10 have been addressed in my declaration --

11 Q. Okay.

12 A. -- because in my declaration there's a
13 discussion about applications that Ethicon made
14 subsequent to the 2007 patent as well as what
15 Intuitive had made. So other than what is in my
16 declaration, I'm not familiar -- I don't have any
17 specific recollection of any other particular
18 changes that may or may not have been made.

19 Let me get myself reorganized here just a
20 little bit so we don't fall completely out of --

21 Q. You're about to get another exhibit. So
22 we can go off the record.

1 (A short break was had.)

2 BY MR. KATZ:

3 Q. One of the documents I cite to is
4 Exhibit 2008. So I'll just give you copy of
5 that. Right now I'm just trying to discuss kind of
6 the benefits of robotic surgery. That's what I'm
7 focusing on. I'm focusing on the benefits of
8 robotic surgery.

9 A. Okay.

10 Q. Just so you know the context. Do you have
11 2008 in front of you?

12 A. Yes.

13 Q. And in that exhibit --

14 A. I think this is 2008.

15 Q. It should say right at the bottom.

16 A. Oh, Ethicon Exhibit 2008 (indecipherable).
17 Yeah. Thank you.

18 Q. This is an article entitled "Haptic
19 Feedback in a Telepresence System for Endoscopic
20 Heart Surgery."

21 A. Yes, it is.

22 Q. Is this an article that you were aware of

1 before this engagement, or was this brought to your
2 attention by Ethicon?

3 A. I may have seen it because I've reviewed
4 lots of different articles. I did not necessarily
5 have it in the forefront of my memory. So this one
6 at this point in time was brought to my attention
7 or re-attention by counsel, but that's not to say
8 that I have not seen this before because over the
9 course of my career I've read -- looked at
10 thousands of articles.

11 Q. The abstract says "The implementation of
12 telemanipulator systems for cardiac surgery enabled
13 heart surgeons to perform delicate minimally
14 invasive procedures with high precision under a
15 stereoscopic view"; do you see that?

16 A. Yes.

17 Q. And that's referring to a robotic surgical
18 system; is that correct?

19 A. What is considered a robotic surgical
20 system, yes.

21 Q. And one of the benefits of this system is
22 enables high precision under stereoscopic view?

1 A. I'm sorry?

2 Q. One of the benefits of the robotic
3 system -- excuse me. Let me start over again.

4 One of the benefits of the surgical
5 robotic system being discussed is that it provides
6 high precision under stereoscopic view; is that
7 correct?

8 A. It doesn't characterize that in the
9 sentence that you read as being a benefit, one of
10 the benefits attributed to telemanipulator systems
11 unique to -- let's put it this way, unique to
12 telemanipulator systems. It says that -- as it
13 says, "The implementation of telemanipulator
14 systems for cardiac surgery enabled heart surgeons
15 to perform delicate minimally invasive procedures
16 with high precision under stereoscopic view."

17 Q. Let me ask this question. In the 2006
18 time frame, so a year before this article was
19 published, was it known that some of the benefits
20 of surgical robotic systems are that they can
21 provide very high precision?

22 MR. PEPE: Objection, form.

1 BY THE WITNESS:

2 A. Once again, these terms are relative -- I
3 think you used the term "high precision." These
4 are relative terms. I don't know that they're
5 necessarily quantified. I don't recall
6 specifically seeing the quantification, although in
7 one of these articles there may have been some
8 tests done to actually try to quantify the
9 characteristics of the tasks.

10 Q. And I'm not asking about a quantification.
11 So let me just ask it this way.

12 A. Okay.

13 Q. You started working in the surgical
14 robotic field roughly what year? Was it prior to
15 2006 at least?

16 A. Yes, but let me look real quick.

17 (Witness reviewing document.)

18 BY THE WITNESS:

19 A. I don't remember the year, but --

20 Q. Prior to 2006?

21 A. -- it's fair to say it was prior to 2006,
22 yes.

1 Q. I assume given that you entered -- when
2 you entered the field of robotic surgery you did so
3 because there were some well-known benefits of
4 robotic surgery that people were after?

5 MR. PEPE: Objection, form.

6 BY THE WITNESS:

7 A. There were anticipated benefits that could
8 be achieved -- could potentially be achieved by
9 robotic surgical systems in some circumstances for
10 some surgeries.

11 Q. And what were the more well-known expected
12 benefits of surgical robotic systems for at least
13 some procedures?

14 A. Well, the one that really comes to mind
15 first and foremost was the ability to do this
16 remotely because my recollection -- and it could be
17 faulty over the course of 20-some years -- was that
18 Darpa was very interested in this -- that's
19 D-A-R-P-A -- was very interested in this for remote
20 surgeries so that when there would be a --
21 particularly a battlefield injury that the surgeons
22 would not have to be so close to the battlefield,

1 that soldiers that were injured -- of course,
2 civilians and soldiers that were injured in battle
3 could be operated on.

4 My recollection is that was the main
5 driving force for at least Darpa's interest in it,
6 and I thought Darpa at the time was the one that
7 was really amongst the leaders of the charge,
8 leading the charge. A lot of the -- let's leave it
9 at that.

10 Q. One thing that this article mentions is
11 something called tremor filtering. Are you
12 familiar with that?

13 A. Talks about --

14 Q. One of this thing this article mentions is
15 tremor filtering. Are you familiar with that term?

16 A. Yes, I am.

17 Q. What is tremor filtering?

18 A. Unfortunately I'm intimately familiar with
19 tremor because with my right hand it comes and
20 goes, but I have a -- what do they call it? Some
21 kind of tremor. It affects people when you get
22 old.

1 Tremor filtering is a generic term. In
2 generic term it's used to take the effect of the
3 tremor and subtract it -- take the gross motion of
4 your hand, subtract the motion of the tremor to get
5 the supposed intended motion.

6 Q. To put it in more --

7 A. The bottom line, it's a vibration-
8 reduction technique.

9 Q. To put it in lay terms, a surgeon's hand
10 is going to have a natural tremor, while a surgical
11 instrument through a robot can remove it so there's
12 virtually no tremor?

13 A. You once again used a relative term
14 "virtually no tremor." Depending on the control
15 system, depending on the technology, depending upon
16 an awful lot of details of the mechanical system,
17 as well as the control system that is implemented,
18 there are techniques that can, in fact, reduce the
19 tremor as well as purely mechanical means of
20 reducing tremor.

21 Q. I wasn't trying to create, again, any kind
22 of a quantification. So let me ask it another way.

1 The idea of tremor filtering is ideally to remove
2 or substantially reduce the tremor of a surgeon's
3 hand so that the instrument is not vibrating back
4 and forth?

5 MR. PEPE: Objection, form.

6 BY THE WITNESS:

7 A. In most -- in a very large number of
8 situations I would agree that it is undesirable to
9 have a surgeon's hands exhibit a tremor. There can
10 be some circumstances where a slight vibration is
11 desirable. That's very unusual and all things
12 considered you would prefer not to have a surgeon's
13 hand tremor or you would like to not have the
14 device exhibit a vibration other than one which is
15 intentionally introduced.

16 Q. And in the 2006 time frame was it well
17 known that one of the expected benefits of robotic
18 surgical systems would be tremor vibration
19 reduction?

20 MR. PEPE: Objection, form.

21 BY MR. KATZ:

22 Q. Let me use the term they use in the

1 article. I'm going to ask it again. I'm going to
2 ask it slightly differently.

3 Am I correct that in 2006 it was well
4 known that one of the perceived benefits of robotic
5 surgical systems is that they could have tremor
6 filtering?

7 MR. PEPE: Same objection.

8 BY THE WITNESS:

9 A. I don't recall where in the article that
10 is referred to. Do you have a place in this
11 article -- you're referring to this article. So do
12 you have a spot in the article that you want to
13 refer me to?

14 Q. Yes. Bottom of the first column on
15 page 2.

16 A. Which page?

17 Q. 2.

18 A. That's page 460 of the -- in the upper
19 left?

20 Q. Yes, page 460 of the article.

21 A. Okay. And where in that page?

22 Q. So if we start kind of towards the lower

1 two-thirds of the first column, do you see where it
2 says "An important step"?

3 A. Yes. Okay.

4 Q. And it says "An important step in
5 developing this technology was the introduction of
6 telemanipulation which was specially designed to
7 enable delicate interventions with high surgical
8 precision"; do you see that?

9 A. Yes.

10 Q. And it says "That's because the surgeon no
11 longer controls the instruments directly but they
12 are controlled by a special device. With a
13 Cartesian user interface the surgeons can handle as
14 usual, that is, like instruments for open surgery";
15 do you see that?

16 A. Yes.

17 Q. And they're referring to a surgical robot;
18 is that correct?

19 A. Yeah. Then it goes on to say "They assist
20 the surgeon with motion scaling, tremor filtering,
21 and a stereovision interface at the input counsel."

22 Q. Right.

1 A. Yes.

2 Q. So my question is, in fact, even by 2006
3 it was well known that one of the expected benefits
4 of robotic surgery was tremor filtering?

5 A. I don't know how well known it was, but it
6 was certainly one of the benefits that would be
7 perceived as -- one of the benefits that would be
8 perceived by using robotic applications.

9 Q. And if you go to the top of the next page,
10 it mentions "Surgeons can now operate using a
11 surgical mechatronic assistant with a comfortable,
12 dexterous, and intuitive" -- excuse me. I'm going
13 to read it again.

14 "Surgeons can now operate using a surgical
15 mechatronic assistant in a comfortable, dexterous,
16 and intuitive manner"; do you see that text?

17 A. That's what it says, yes.

18 Q. And do you see that they're citing
19 articles from 2001 and 2003?

20 A. Yes, I see that.

21 Q. And then it mentions "Despite the obvious
22 potential advantages of robot assisted endoscopic

1 surgery, most researchers and surgeons in this area
2 agree that the lack of haptic feedback is the most
3 important drawback of currently available systems"?

4 A. I see that.

5 Q. So according to this article, the most
6 important drawback of the available systems was
7 something called haptic feedback?

8 A. Right.

9 Q. But in addition to that drawback this
10 article's saying that there were obvious potential
11 advantages?

12 A. There are advantages and there's an
13 obvious potential drawback, which is what I address
14 directly in my report and is one of the things
15 that -- without going into detail, is one of the
16 things that we talked about with my work at Marvel
17 Medtech, the importance of haptic feedback in
18 certain parts of the process even now.

19 Q. We'll get to that in a second.

20 A. Okay.

21 Q. My first question is when it mentions the
22 "obvious potential advantages," am I correct that

1 that's referring to well-known potential
2 advantages, that that's what they mean by "obvious"
3 in that sentence?

4 MR. PEPE: Objection, form.

5 BY THE WITNESS:

6 A. Could you repeat the question?

7 Q. The phrase "the obvious potential
8 advantages of robot assisted endoscopic surgery,"
9 is it in reference to the very well-known potential
10 advantages of such robot-assisted surgery?

11 MR. PEPE: Same objection.

12 BY THE WITNESS:

13 A. I think it refers to what was pretty much
14 immediately preceding -- the way I read it is the
15 pretty much immediately preceding cited potential
16 advantages of robotic-assisted surgery. You may be
17 throwing some additional ones, but those are the
18 ones that -- I think those -- the way I'm reading
19 the article, the way I'm reading this portion of
20 the article, they are referring to the -- in this
21 sentence they are referring to the immediately
22 preceding cited potential benefits.

1 Q. And do you understand that the phrase
2 "obvious potential" -- let me start again.

3 In the phrase "obvious potential
4 advantages" it's referring to the fact that these
5 researchers think those advantages are well known
6 at the time?

7 MR. PEPE: Objection, form, misstates the
8 document.

9 BY THE WITNESS:

10 A. I don't know. What it says is that these
11 authors are stating that their research in this
12 area indicates that the system that they are
13 investigating offers advantages in motion scaling,
14 tremor filtering, and stereovision. Those are the
15 ones that they are saying that for their particular
16 operation they -- operation, wrong word, bad choice
17 of words here -- for their particular investigation
18 or study using the particular equipment that they
19 were working with that these particular
20 characteristics or traits were dealt with and they
21 identify the assistance of those characteristics by
22 the machine as obvious potential advantages.

1 That's what it says. That's what I think they
2 said.

3 Q. What do you think they mean by "obvious
4 potential advantages" as opposed to just "potential
5 advantages"?

6 MR. PEPE: Objection, form.

7 BY THE WITNESS:

8 A. It's funny because the word "obvious" is
9 one of those words that lawyers use in patent cases
10 that is very, very different than what people use
11 in their ordinary meaning. "Obvious" in this case
12 I think it could mean -- I shouldn't speculate what
13 it means specifically because I don't know what
14 these -- this was done at a German university and I
15 think they're all German authors, what their
16 understanding of the English language was and their
17 understanding of the nuances of the English
18 language and in particular with a word as fraught
19 with potential conflict as the word "obvious."

20 Q. Right. That's why my question is do you
21 interpret this phrase "obvious" in this context to
22 mean that these were well-known potential

1 advantages?

2 MR. PEPE: Objection, form, asked and
3 answered.

4 BY THE WITNESS:

5 A. I don't recall how well known these
6 advantages were at this particular time. So I
7 can't answer that.

8 Q. You mentioned that haptic feedback was
9 viewed as a drawback in the systems?

10 A. The lack of haptic feedback was a
11 drawback, yes.

12 Q. But even though that was a drawback, it
13 didn't prevent people from building, selling, and
14 using those surgical systems; isn't that true?

15 A. Building and selling what?

16 Q. Those surgical systems.

17 A. That is correct, but it also has -- there
18 were limits to what can and are best accomplished,
19 what procedures, what actions that are taken that
20 are best done and are greatly informed by the
21 presence of haptic feedback. It's not just a
22 throw-away little disadvantage that you say, oh,

1 we're giving up the haptic feedback because we can
2 do some of these other things.

3 There are some things that haptic feedback
4 is very, very important and critical on and, once
5 again, I refer to some of the aspects of the work
6 that I've been doing for the last dozen or more
7 years with Marvel Medtech.

8 Q. And, in fact, this article, Exhibit 2008,
9 states that although haptic feedback is a drawback
10 and it's something they're investigating -- I'm
11 sorry. I said that again, didn't I? Let me start
12 over.

13 This article itself states explicitly that
14 even though the lack of haptic feedback is a
15 drawback, there are still existing surgical systems
16 that are being used even as of that time?

17 MR. PEPE: Objection, form.

18 BY THE WITNESS:

19 A. I believe that's what it says, yes.

20 Q. So the lack of haptic feedback wasn't a
21 show stopper?

22 MR. PEPE: Objection, form.

1 BY THE WITNESS:

2 A. A show stopper for what?

3 Q. It didn't prevent people from wanting to
4 build and use surgical robots.

5 A. For some applications in some surgeries in
6 some circumstances by some surgeons.

7 Q. In fact, if we look at the "Related Work"
8 section of this article, you can read to yourself
9 that first paragraph on the second page.

10 (Witness reviewing document.)

11 BY THE WITNESS:

12 A. Uh-huh.

13 Q. Doesn't it say that "The da Vinci surgical
14 robots at that time were being used in the daily
15 practice to perform even delicate operations"?

16 A. That's what it says to the period. The
17 next sentence says "However, they offer no force
18 feedback and their control loop is closed visually
19 by the surgeon." The very next line says they
20 offer no force feedback, which is part of haptics
21 just for clarification.

22 Q. Can you explain that? Is haptic feedback

1 a type of force feedback? Is force feedback a type
2 of haptic feedback? Are they the same thing? How
3 are these terms related?

4 A. Haptic feedback without getting too
5 specific has at least two aspects to it. One is
6 the amount of force that a person is encountering
7 in the application, how much force a person is
8 applying, the resistance to their motion. That's
9 part of haptic. Let me back up.

10 Haptic feedback refers to the sense of
11 touch in general. The sense of touch has different
12 aspects to it. One of them is the amount -- the
13 sense of how much force, the magnitude of the force
14 that you are exerting.

15 Another one is also the amount of or
16 presence of or absence of slip or incipient slip
17 between the fingers and the tool. So haptic in
18 general relates to the sense of touch, but it can
19 be broken down finer than that.

20 MR. PEPE: We've been going about an hour
21 if you want to find a good breaking point in the
22 next few minutes.

1 MR. KATZ: If you want to take a break,
2 we'll just take a break.

3 THE WITNESS: If we're coming to a logical
4 break point in the next five to ten minutes, we can
5 proceed. If not, then I prefer to take a break.

6 BY MR. KATZ:

7 Q. When the term "force feedback" is used in
8 this article, is that the same as haptic feedback?
9 Let me direct you to something specific. So if you
10 look on page 3 or page 461 of the article, they're
11 discussing robotic systems that do offer what they
12 call force feedback?

13 A. I'm sorry. I didn't hear your question.

14 Q. Look at the -- maybe a third of the way
15 down the first column on page 461 of Exhibit 2008
16 where it says "The Korean Advanced Institute of
17 Science."

18 A. Yes.

19 Q. It says "The Korean Advanced Institute of
20 Science and Technology developed a micro-telerobot
21 system that provides force feedback"; do you see
22 that?

1 A. Right.

2 Q. Is that referring to haptic feedback or is
3 that something else?

4 A. I don't know without looking at that
5 particular article. Haptic feedback refers to a
6 sense of touch. Force feedback can be a more
7 general term because you can have force feedback in
8 an instrument.

9 Based on what I'm looking at in this
10 document, it looks to me that when they are
11 referring to -- when they say "However, they
12 provide no force feedback and a control loop is
13 closed visually by the surgeon," it looks to me
14 like they in looking to their previous -- the
15 fairly immediately preceding paragraphs they are
16 referring to tactile force feedback, which would be
17 tactile which would be considered haptic.

18 Q. Okay.

19 A. But there's force feedback which is not
20 necessarily haptic feedback.

21 Q. Let me see if I can rephrase what you said
22 concisely. You're saying that in this article

1 force feedback appears to be referring to tactile
2 feedback, but that in other contexts it might not?

3 A. No, I wouldn't even say that. I'm saying
4 based on what I'm reading here, based on their use
5 of "force feedback" in the bottom line on page 460,
6 I think it's reasonable that they are referring to
7 tactile feedback.

8 Q. And what about --

9 A. Haptic, haptic feedback which, once again,
10 is tactile. When it's referring to a micro-
11 telerobot system that provides force feedback, I'm
12 not sure that they are referring to the same
13 tactile haptic sense in that particular application
14 and I did not review that paper.

15 Q. Okay. And then it says "In Germany two
16 systems for robotic surgery were built at the
17 research facility of" -- I'm just going to spell it
18 Karlsruhe, K-A-R-L-S-R-U-H-E. I'm skipping the
19 citation. Actually I'll just jump on to the next
20 sentence. It says "While the first system provides
21 no force feedback, the latter is equipped with
22 PHANTOM devices for haptic display."

1 Are you familiar with the PHANTOM devices?

2 A. No, I'm not.

3 Q. Because they reference haptic display, do
4 you think in this context they're referring to one
5 system provides haptic feedback and the other does
6 not?

7 A. No. It's not clear. When they tie it
8 into haptic display -- and, once again, I'm not
9 familiar with this particular device -- there are
10 different ways of presenting the information that
11 you can get from the sense of touch. And if you
12 display that information on, for example, a
13 computer screen you could be saying that you are
14 providing haptic display, but not necessarily the
15 same thing that we're talking about -- that I've
16 been talking about as haptic where you're actually
17 touching and feeling forces.

18 Once again, when reading these articles --
19 and I've read lots of technical articles over my
20 career -- you have to sometimes fill in the blanks
21 and recognize that -- once again, for many of these
22 articles, especially if they're written by a

1 non-native English speaker, which these people may
2 or may not be, but based upon the fact that they
3 are from a non-American institution, they're from a
4 German institution -- or from German institutions,
5 you have to be a little bit cautious about taking
6 every word and understanding it precisely. You
7 have to read it and try to put it into context and
8 understand it that way.

9 Q. On the next page they're talking about the
10 system they built under section 3.1, "Robotic
11 telemanipulator"; do you see that?

12 (Witness reviewing document.)

13 BY THE WITNESS:

14 A. Yes, I see that.

15 Q. It's referring to an Aramis system,
16 A-R-A-M-I-S. Are you familiar with that system?

17 A. Not particularly, no.

18 Q. And it mentions "The crucial part of the
19 master console is two PHANToM haptic interfaces.
20 They are used to control the instruments and to
21 feed back forces"; do you see that?

22 A. Yes, I see that.

1 Q. And do you understand in the context of
2 this article they're talking about a haptic
3 feedback system?

4 A. And once again, this is referring to the
5 PHANTOM, their particular device, haptic interfaces
6 and, as we saw earlier, it said that -- on page 461
7 in the left-hand column about halfway down it says
8 "Equipped with PHANTOM devices," the same device
9 for haptic display. So it's not clear that the
10 sense of touch is being transmitted back to the
11 surgeon directly as a sense of touch.

12 Q. Let me just ask you. This is kind of a
13 big article. You read this article, correct?

14 A. Yes, I did.

15 Q. Does this article entitled "Haptic
16 Feedback in a Telepresence System for Endoscopic
17 Heart Surgery" discuss an experimental system that
18 provided haptic feedback, or are you saying it only
19 provided haptic display? Actually, I'm going to
20 ask it a different way.

21 A. I'm sorry?

22 Q. I'm going to ask it a different way.

1 A. Okay.

2 Q. Is the haptic feedback referenced in this
3 article broad enough of a concept to cover haptic
4 display, or are they referring to haptic touch?

5 MR. PEPE: Objection, form.

6 BY MR. KATZ:

7 Q. That was a bad question. I'm withdrawing
8 that question and I'm asking a different one.

9 I understand your testimony to be that the
10 crucial drawback in certain robotic systems was the
11 lack of haptic feedback that would provide the
12 feedback in the form of touch to the physician's
13 hands; is that correct?

14 A. I think you overstated what I've stated.
15 It is -- you said the crucial something or other.
16 I wouldn't have characterized what my opinion is as
17 the crucial limitation. I'm saying that one
18 deficiency that has existed, had existed at the
19 time of the patent application is the lack of this
20 haptic feedback to the operator, particularly the
21 surgeons, as reported by the surgeons basically.

22 Q. Okay. And the drawback you're referring

1 to that you call haptic feedback excludes haptic
2 display, you're saying it has to be more than
3 display?

4 A. There's a continuum and from my
5 experience -- direct experience as well as my
6 experience in working with surgeons as well as
7 other tool operators is that a sense of touch
8 feedback that is transmitted as a touch through
9 your tactile senses is the preferred way of
10 acquiring what would be generally called haptic
11 feedback.

12 Q. Okay.

13 Now, my question is does this article,
14 which is Exhibit 2008, does it disclose a system
15 that provides haptic feedback through a sense of
16 touch, or is it a system that provides haptic
17 feedback in the form of just a visual haptic
18 indication?

19 (Witness reviewing document.)

20 BY THE WITNESS:

21 A. It's not clear that I can see from the
22 article whether they are providing the users of the

1 system with feedback, haptic feedback via the
2 tactile sense of their hands, fingers, or providing
3 it via a display.

4 Q. And likewise, I guess is it not clear that
5 when they use -- strike that.

6 In this article when they are referring to
7 the term "haptic feedback," does it include haptic
8 visual display?

9 MR. PEPE: Objection, form.

10 BY THE WITNESS:

11 A. I'm sorry?

12 Q. As you understand the article in
13 Exhibit 2008, when they use the term "haptic
14 feedback," do you understand them to be including
15 haptic display as well as potential touch feedback?

16 A. It appears to me they could be. It's not
17 clear -- completely clear from the article.

18 MR. KATZ: Let's take a break.

19 (A short break was had.)

20 BY MR. KATZ:

21 Q. What I'd like to do now is go through
22 number portions of the Knodel declaration, areas

1 that I believe you're in agreement, and we'll just
2 see if, in fact, you're in agreement on the
3 portions that we're going to cover. I'm not
4 suggesting that you're in agreement with everything
5 he says.

6 A. I'm sorry?

7 Q. I'm not suggesting you're in agreement
8 with everything he says.

9 A. That is correct.

10 Q. But let's talk about what you are in
11 agreement with.

12 A. Okay.

13 Q. Let's start on paragraph 27 --

14 A. 27 of Dr. Knodel's.

15 Q. -- of Dr. Knodel's declaration, which for
16 the record is IS-1003. So paragraph 27 just refers
17 to the level of ordinary skill in the art. Do you
18 agree with Dr. Knodel's assessment in paragraph 27?

19 A. I do not disagree with Dr. Knodel.

20 Q. Does "do not disagree" mean something
21 different than agree?

22 A. Subtly.

1 Q. What's the difference just so I
2 understand?

3 A. I would perhaps say it a little bit
4 differently, but I don't disagree with it. I think
5 in my declaration -- I can't find it. I think I
6 said I do not disagree, where for purposes of this
7 report I've adopted his -- yeah.

8 In my declaration I say "I have adopted
9 this level of ordinary skill in the art for
10 purposes of my analysis set forth in this
11 declaration." I don't disagree with it.

12 Q. So we turn to paragraph 31, and I know you
13 don't agree with all of it. So I'm going to direct
14 you to where I think there might be some agreement.
15 You know, so for the term "rotary drive member,"
16 "rotary member" and "rotatable drive member,"
17 Dr. Knodel states a few lines down "The plain
18 meaning of these terms is clear." Are you with me?
19 Are you there?

20 A. Paragraph 31 in his --

21 Q. Paragraph 31, six lines down.

22 A. Oh, okay.

1 Q. I'll start over again.

2 So referring to the terms "rotary drive
3 member," "rotary member," and "rotatable drive
4 member," Dr. Knodel has a statement "The plain
5 meaning of these terms is clear, a component that
6 drives another component causes the latter
7 component to move. A rotary drive, as the name
8 suggests, rotates to provide the driving force."

9 Just that much that I read, do you agree
10 with that statement as far as it goes?

11 MR. PEPE: Objection, form.

12 BY THE WITNESS:

13 A. As I state in my declaration "When we talk
14 about rotary drive member, rotary member, rotatable
15 drive member in the context of the Shelton
16 '658 Patent, a person of ordinary skill would
17 understand the broadest reasonable interpretation
18 of these terms to be a component that rotates to
19 drive another component in response to actuation of
20 the stapling system." That's my opinion.

21 Q. So regarding just the statement that I
22 read -- let's put it this way. "A rotary drive,"

1 Dr. Knodel says, "as the name suggests, rotates to
2 provide a driving force." Would you agree with
3 that statement?

4 MR. PEPE: Object to form.

5 BY THE WITNESS:

6 A. I would not say it that way. I wouldn't
7 say it that way.

8 Q. Do you think it's technically wrong?

9 A. I don't think it's technically precise.

10 Q. So what meaning -- why is that not
11 precise? How would you fix his statement, then,
12 regarding just a rotary drive? I'm not referring
13 to the terms in the claim, by the way. I'm not
14 including the word "member." I'm saying a rotary
15 drive in and of itself.

16 MR. PEPE: Object to form.

17 BY THE WITNESS:

18 A. I think the way I would correct it is the
19 way -- the way I said it is that it's "a component
20 that rotates to drive another component in response
21 to actuation of the stapling system" --

22 THE REPORTER: I'm sorry.

1 BY THE WITNESS:

2 A. I'm sorry. "A component that rotates to
3 drive another component in response to actuation of
4 the stapling system." That's the way I would
5 correct it because I think that is correct,
6 complete, and concise and not imprecise.

7 Q. Okay. Let's look at paragraph 33. In
8 paragraph 33 Dr. Knodel quotes from the
9 '658 Patent. I take it you've got no objection to
10 his quote?

11 A. I'd have to verify that it's accurately
12 quoted. If you want me to do that, I'll do that.

13 Q. In your declaration did you assert that he
14 misquoted?

15 A. No, I didn't.

16 Q. Then Dr. Knodel states "Figure 8 discloses
17 a trigger that rotates toward the handle." Do you
18 agree with that statement? Does Figure 8 disclose
19 a trigger that rotates toward the handle?

20 A. I would, once again, say that the first
21 handle pivots towards -- I'm sorry -- the trigger
22 pivots towards the handle.

1 Q. Do you believe that Dr. Knodel's statement
2 that it rotates towards the handle is incorrect?

3 A. Once again, I think it's imprecise.

4 Q. And why is it imprecise? Okay. So it's
5 imprecise, but not incorrect?

6 MR. PEPE: Object to form.

7 BY MR. KATZ:

8 Q. Let me ask again. I guess what I need is
9 a yes or no answer. I need to understand your
10 position. Do you believe Dr. Knodel's statement
11 that the trigger rotates toward the handle is
12 incorrect?

13 MR. PEPE: Object to form.

14 BY THE WITNESS:

15 A. If he is considering that -- he's equating
16 "rotates" to "pivoting," then I would say it is
17 correct. As I said before, pivoting -- using the
18 word "pivots" rather than "rotates" would be a more
19 precise -- a more correct way to state it.

20 Q. In your view, does "rotate" not encompass
21 "pivot"?

22 A. It can under some circumstances, but once

1 again, it's imprecise because the handle does not
2 complete 360 degrees of rotation and then some. It
3 pivots, which means that it moves through a much
4 smaller angle than 360 degrees, less than 180
5 degrees, less than 90 degrees.

6 Q. Do you think that something has to be able
7 to rotate 180 degrees to be considered an object
8 that rotates?

9 A. No, I didn't say that. I'm saying that a
10 more precise term is pivots in this situation.

11 Q. And what -- so if it's not the number of
12 degrees that something rotates, what determines
13 whether it is --

14 A. I'm sorry. What?

15 Q. If it's not the number of degrees that
16 something rotates, then what is the criteria? Why
17 is it imprecise to say a trigger rotates? If it's
18 not that -- if something can rotate less than 360
19 degrees and still rotate, I'm trying to understand
20 why you think what Dr. Knodel is saying is
21 imprecise.

22 MR. PEPE: Object to form.

1 BY THE WITNESS:

2 A. I think you misunderstood or I misspoke,
3 one or the other, because what I'm saying is
4 rotation is understood generally to be -- without
5 qualification is understood to be a full rotation
6 and less than that and certainly significantly less
7 than that is considered pivoting.

8 Q. Okay. Got it. Okay. So you are saying
9 that in your view the term "rotate" implies the
10 ability to rotate a complete 360 degrees or more?

11 A. It's not in my world view. What I'm
12 saying is that a person of ordinary skill in the
13 art if they are being careful and precise would
14 understand that rotation refers to movement around
15 a full circle and perhaps then some. Pivoting,
16 especially with small -- if something moves back
17 and forth or moves in one direction about a pivot
18 point and only a relatively small angle, they would
19 consider that pivoting --

20 Q. Okay.

21 A. -- if they are going to be more precise.

22 Q. The next sentence in paragraph 33 of

1 Dr. Knodel's declaration says "The patent confirms
2 that the trigger and its associated gear portion
3 rotate about pin 70." I'll stop there. Do you
4 believe that statement is incorrect?

5 A. If we look at the next sentence, it says
6 "Referring primarily to Figures 3 and 4, an
7 actuation of Figure 54 can rotate trigger gear
8 portion 100 about an axis defined by pin 7 [sic]."
9 That is his statement that the patent confirms that
10 the trigger and its associated gear portion rotate
11 about pin 7. In a sense that the patent refers to
12 a pivoting motion as a rotate -- pivot and rotate,
13 uses those terms perhaps interchangeably, what he
14 says here is correct. What I'm saying is that a
15 person of ordinary skill in the art would generally
16 understand pivoting to be a motion less than 360
17 degrees.

18 Q. But do you agree that in the patent, the
19 patent uses the term "rotate" to include pivoting
20 motions?

21 A. I agree that that is correct, what you
22 just said is correct. I'm not saying that

1 that's -- that the use of "rotate" is precisely
2 correct, but the way the patent uses it is what you
3 said.

4 Q. Okay.

5 Now let's go to paragraph 34. Paragraph
6 34 states "The 'rotary drive member,' 'rotary
7 member,' and 'rotatable drive member' in the claims
8 each are operatively coupled to a cam that
9 interacts with a cam surface of the anvil." Then
10 it says "The specification discloses a preclamping
11 collar that acts as a cam and interact with a cam
12 surface of the anvil." Maybe that should have been
13 "interacts," plural.

14 Those two sentences, do you agree with
15 those two sentences?

16 MR. PEPE: Object to form.

17 BY THE WITNESS:

18 A. I don't recall specifically in the patent
19 where it says -- where it uses the term
20 "preclamping." I'd have to look at that.

21 Q. One place at least is paragraph 62,
22 line 31, which is actually the first citation in

1 Knodel's declaration.

2 A. Beginning at line 31?

3 Q. That's right.

4 (Witness reviewing document.)

5 BY THE WITNESS:

6 A. Okay. "Preclamping collar," now I see
7 that term. That number and name did not resonate
8 with me, but I see that it's there.

9 Q. So do you agree with the first two
10 sentences of paragraph 34 of Knodel's declaration?

11 A. Let me go back to that section again.

12 (Witness reviewing document.)

13 BY THE WITNESS:

14 A. That looks correct.

15 Q. And then the next sentence -- oh, it
16 refers to a "cam surface 3825," and if you see in
17 the text in the patent that you just looked at if
18 you also turn to Figure 100 of the patent, do you
19 see numeral 3825?

20 A. Yes, I see that.

21 Q. And in the passage being discussed in
22 column 62, lines 31 to 34 it's referring to

1 what's -- the cam surface as item 3825 in
2 Figure 100; is that correct?

3 A. It says -- in the patent at that location
4 it says "The anvil 3824 has a cam surface 3825 that
5 is configured for interaction with a preclamping
6 collar 3840."

7 Q. Looking at Figure 100, 3825 looks properly
8 identified?

9 A. Looks properly what?

10 Q. Identified, that that is the surface that
11 the preclamping collar will come into contact with.

12 A. I would understand that to be correct,
13 yes.

14 Q. Then the next sentence says in Knodel's
15 declaration in paragraph 34 "The cam surface is a
16 top surface of the anvil that is pressed down by
17 the collar." Do you agree with that statement?

18 A. He says "The cam surface is a top surface
19 of the anvil." That is one cam surface. It is not
20 the only cam surface in this device. So if he's
21 using "the" then "cam surface" referring to the
22 most recently mentioned cam surface, then I agree,

1 but make it clear that is not the only cam surface
2 in this device.

3 Q. And then he states "I did not see any
4 other reference to a 'cam surface' on the anvil,"
5 and my question to you is did you find any
6 reference to a cam surface on the anvil other than
7 cam surface 3825?

8 (Witness reviewing document.)

9 BY THE WITNESS:

10 A. If you'll look at my report, paragraph 27
11 of my report and the figure associated with --
12 Figure 72 associated with paragraph 27 of my
13 report, we see a slot and a cam surface which is
14 part of -- let me think here.

15 We see that as stated in paragraph 27
16 which says "As shown below in Figure 72 of the
17 Shelton '658 Patent, the fins of the sled assembly
18 apply a closing force at a different location of
19 the anvil, i.e. within the anvil slot, than the
20 location at which closure tube 2750, that is, the
21 opening member, applies an opening force to the
22 anvil that is at tab 2727." So there is a second

1 cam surface in the slot of the anvil.

2 Q. Is there any reference to that slot or any
3 portion of that slot as being a "cam surface"?

4 A. From Figure 72, which is part of the
5 patent, it's clear that's what it is, as well as
6 from understanding the reading of the patent and
7 the way that the device works.

8 Q. So Figure 72 does not identify any surface
9 in that figure as a cam surface, correct?

10 MR. PEPE: Object to form.

11 BY THE WITNESS:

12 A. You look at it and you can see what's the
13 cam surface.

14 Q. Well, I guess you're offering your opinion
15 on what constitutes cam surfaces in Figure 72,
16 correct?

17 A. I'm applying the definition that
18 Dr. Knodel used for what is a cam surface and I'm
19 applying it to Figure 72, and it's very clear that
20 the surface of the slots serves as a cam surface of
21 the anvil.

22 Q. So, again, is there any mention of a

1 surface of that slot being a "cam surface" in
2 Figure 72?

3 MR. PEPE: Object to form.

4 BY THE WITNESS:

5 A. It may not specifically refer to that
6 surface as being a cam surface, but it is clear
7 from Figure 72 as well as the other figures as well
8 as the operation of the machine -- or the device, I
9 shouldn't call it a machine, the operation of the
10 device that that is a cam surface consistent with
11 Dr. Knodel's definition or understanding of what a
12 cam surface is.

13 Q. Well, what we're focusing on now is --

14 A. I'm sorry. What?

15 Q. What we're focusing on now is what the
16 patent identifies as cam surfaces. So Dr. Knodel
17 says he found a reference to cam surface 3825 in
18 the patent, and then he's saying he didn't find any
19 other reference to any other cam surface. So my
20 question to you is did you find any other component
21 in the '658 Patent identified by the patent
22 inventors as being a cam surface?

1 MR. PEPE: Object to form.

2 BY THE WITNESS:

3 A. My understanding is that the drawings are
4 part of the specification of the patent of the
5 invention, and this is clear in the drawings that
6 this is a cam surface. Whether it is referred to
7 specifically by number or name in the text of the
8 written portion of the specification I don't
9 recall. That's immaterial.

10 Q. Well, it's material to my question because
11 my question was did you find anything identified by
12 the patent inventors as being "a cam surface"?

13 MR. PEPE: I'm going to object to form and
14 please allow the witness to finish his answers
15 instead of cutting him off.

16 MR. KATZ: My question has been repeatedly
17 the same question. Is Knodel --

18 MR. PEPE: You need to allow the witness
19 to finish answering before you ask another
20 question.

21 MR. KATZ: You clearly misunderstood my
22 question. So I'm withdrawing it. If you want to

1 follow up in your redirect time and open up more
2 deposition, that's fine too, but I don't need to
3 have the witness finish answering a different
4 question than I asked. So if he didn't understand
5 the question, I'm withdrawing and rephrasing.

6 BY MR. KATZ:

7 Q. Dr. Knodel says there's no other component
8 identified as a "cam surface" except for item 3825.
9 Did you find -- is he wrong about that, or do you
10 agree that there's no other surface that has been
11 identified as a cam surface in the text of the
12 patent?

13 MR. PEPE: Object to form.

14 BY THE WITNESS:

15 A. Well, first of all, Dr. Knodel said, and I
16 quote, "I did not see any other reference to a cam
17 surface on the anvil." He didn't say I did not
18 identify any other surface --

19 Q. I don't want to kind of -- we don't need
20 to overly parse that because what it actually says
21 is a reference to "cam surface." So now I'm giving
22 you an interpretation of that. If what Dr. Knodel

1 meant was I did not find the words "cam surface"
2 used to associate any other component in the
3 '658 Patent, would you agree with that statement?

4 MR. PEPE: Object to form.

5 BY THE WITNESS:

6 A. With the limitation that you just put on
7 that you are looking only at the words "cam
8 surface" associated with the anvil and you're
9 eliminating the evidence that is in figure --
10 particularly Figure 72 that I discussed that
11 clearly shows a cam surface on the anvil that is
12 part of the slot, then I don't recall that there's
13 any other specific words that are used in the
14 written portion of the specification to identify
15 that as what it clearly is, which is a cam surface.

16 Q. Okay. So, again, if we interpret
17 Dr. Knodel's sentence as saying the words "cam
18 surface" are not associated with any other
19 component on the anvil, you would agree with that
20 statement?

21 MR. PEPE: Object to form.

22 BY THE WITNESS:

1 A. If his sentence as you are presenting it
2 here means that the words "cam surface" do not
3 refer to any other surface on the anvil, I'm just
4 using those words as spelled out as words, not as
5 what a cam surface is, and we're interpreting
6 reference being limited to the text associated with
7 those words spelled out, C-A-M, S-U-R-F-A-C-E, then
8 I don't -- I don't have a reason to disagree with
9 that statement by Dr. Knodel.

10 That being said, it is very clear that
11 there is a cam surface in the anvil as illustrated,
12 as we can see in Figure 72 that guides the fins in
13 the slot of the anvil.

14 Q. But those words aren't in Figure 72,
15 correct?

16 A. Those words are not there, but an
17 engineer, one of ordinary skill in the art would
18 understand that just because the words aren't there
19 doesn't mean the object isn't there.

20 Q. Right. I'm just asking about the words
21 now, sir.

22 A. And I answered your question.

1 Q. So now if we go to the next sentence, "The
2 '658 Patent further describes a 'distal closure
3 tube' that when 'driven distally' the end of the
4 closure tube segment 2042 will engage a portion of
5 the anvil 2024 and cause the anvil 2024 to pivot to
6 a closed position"; do you see that text?

7 A. I see that.

8 Q. Do you agree with that statement?

9 (Witness reviewing document.)

10 BY THE WITNESS:

11 A. Well, I'm looking at the patent,
12 column 32, lines 34 to 39 and that does not seem to
13 track. If I looked at the patent line 32 -- column
14 32, line 34 says "1000 the closure sled 2100 will
15 be driven in the distal direction, DD, and
16 ultimately drive the closure tube assembly 1009 in
17 the distal direction." That doesn't track with
18 what I see in paragraph 34.

19 Q. Yeah. I think that the text is actually
20 mis- -- I think if you look at 37, start at 37,
21 "driven distally," instead of starting on 34.

22 (Witness reviewing document.)

1 BY THE WITNESS:

2 A. Yeah. I think -- so it looks like the
3 lines in Dr. Knodel's report are -- direct us to
4 the wrong spot. Close, but not quite.

5 Q. They're overinclusive?

6 A. They're overinclusive. There you go.
7 There you go.

8 Q. And do you agree with him that when
9 referring to a portion of the anvil that is being
10 contacted it is referring to that same portion that
11 is referred to as a cam segment -- strike that.

12 Do you agree with him -- I'll just read
13 it -- that the portion of the anvil being
14 referenced, that is, the portion that's being
15 connected by the closure tube segment, is the cam
16 surface, although that term is not used?

17 (Witness reviewing document.)

18 BY THE WITNESS:

19 A. Yeah. I think that even though the
20 term -- in this case the words "cam surface" are
21 not used, a person of ordinary skill in the art
22 would look at this and understand that -- what a

1 cam surface is and understand that the word
2 "portion" here refers to cam surface, because a
3 person of ordinary skill in the art as we discussed
4 at some length just a bit ago understands what a
5 cam surface is.

6 Q. Okay. And it says -- then he writes
7 "Figures 44 through 48 depict the closure tube and
8 anvil, and it is clear that the closure tube will
9 contact the top surface of anvil 2024 which is
10 similar to the top surface 3825 of anvil 3824 and
11 it is thus also a cam surface."

12 A. I've got to look at this.

13 Q. Dr. Knodel does provide figures side by
14 side if that helps.

15 A. I'm sorry?

16 Q. Dr. Knodel provides figures side by side,
17 but you can also look in the patent.

18 A. Oh, okay. I looked for that and I missed
19 it. Okay.

20 (Witness reviewing document.)

21 BY THE WITNESS:

22 A. So we're looking at -- where do you want

1 me to start looking?

2 Q. My question is whether you agree with his
3 statement in the last sentence of paragraph 34.

4 A. "The portion of the anvil being referenced
5 is the cam surface, although that term is not
6 used"; is that the sentence?

7 Q. No. What I'm asking you to do is confirm
8 whether you agree with the last sentence of
9 paragraph 34 which starts "Figures 44 through 48. "

10 A. Oh, that's a new sentence. Okay.

11 MR. PEPE: Object to form.

12 (Witness reviewing document.)

13 BY THE WITNESS:

14 A. Well, that's what I'm confused about. You
15 say that 44 and 100 are there, but he's talking
16 about Figures 44 through 48. So I need to look at
17 44 through 48, right?

18 Q. Right.

19 A. The questions are not 44 and 100?

20 Q. No. He's comparing what's shown in
21 Figures 44 through 48 to the top surface of the
22 anvil shown in Figure 100, but by all means, you

1 can look at the patent if you like.

2 A. I guess I'm confused by Figure 100 being
3 here when it's not referred to.

4 Q. It shows the surface 3825 referred to in
5 this sentence.

6 A. Okay.

7 (Witness reviewing document.)

8 BY THE WITNESS:

9 A. So looking at the sentence again,
10 "Figures 44 through 48 depict the closure tube and
11 anvil," they depict the closure tube and anvil and
12 much more.

13 And then the next part it says "And it is
14 clear that the closure tube will contact the top
15 surface of anvil 2024," and I think that's clear in
16 46, Figure 46. I don't know that it is
17 particularly clear in Figures 44, which is an
18 exploded view, so it doesn't show the anvil in its
19 assembled position so it's a little bit -- I don't
20 know that that statement is -- I wouldn't make that
21 statement that it's clear from Figure 44, nor from
22 45, nor from 47, nor from 48.

1 Q. Because of the perspectives they're drawn
2 in?

3 A. Because of the position of the end -- the
4 anvil with respect to the closure tube. So I would
5 not agree that it's -- I agree that it depicts the
6 closure tube and anvil, and it's not clear from all
7 of those drawings that that surface is what comes
8 in contact from all of those drawings.

9 Q. You would agree that Figure 46 at least
10 shows that?

11 A. It looks to be Figure 46 does show that.

12 Q. Do you have any reason to doubt that
13 Figures 44 through 48 are showing the same closure
14 tube structure?

15 A. I don't have any reason to, no.

16 Q. If you could go to paragraph 37 and just
17 read that to yourself. My question is whether you
18 agree or disagree with paragraph 37.

19 MR. PEPE: Object to form.

20 (Witness reviewing document.)

21 BY THE WITNESS:

22 A. Given that I'm looking at two different

1 figures and two different locations on the patent
2 and trying to keep track of this, I don't see any
3 problem on this with this statement, but keep in
4 mind that the task is not a trivial task and I'm
5 doing my best. I don't see any problem with it and
6 I've taken reasonable care to do so, but I can't
7 absolutely say with certainty.

8 Let me get these back in order if I'm done
9 with these sheets. Is that all right?

10 Q. Yeah. Sure.

11 I'm going to move on to something else in
12 Knodel's declaration. So we're going to look at
13 the Wales reference, which is IS-1004. I'm only
14 going to ask you about paragraph 43 of Knodel,
15 which is a nice short paragraph. So if you look at
16 paragraph 43 of Knodel, do you agree with paragraph
17 43? Do you have that in front of you?

18 A. Knodel where it starts off "In addition
19 Wales discloses."

20 Q. Let's set the "in addition" aside because
21 I only want to address paragraph 43, the substance.

22 A. I'm sorry?

1 Q. Set the "in addition" aside because I only
2 want to address the substance of paragraph 43.

3 A. I got ya.

4 Q. So if you just read paragraph 43 after the
5 words "in addition" and let me know if you agree
6 with Dr. Knodel's statement there?

7 MR. PEPE: Object to scope.

8 (Witness reviewing document.)

9 BY THE WITNESS:

10 A. I didn't do an analysis of this, but based
11 on the limited text of paragraph 43 of Dr. Knodel
12 and that section appearing in column 5 of the
13 Whales '628 Patent, I don't see any argument --
14 anything that I disagree with with what Dr. Knodel
15 said at this -- in this statement.

16 Q. Paragraph 43?

17 A. Paragraph 43 after the words "in addition"
18 as you instructed earlier.

19 Q. Let's look at paragraph 28 of your
20 declaration.

21 A. Okay.

22 MR. PEPE: We're getting close to an hour.

1 MR. KATZ: You know what? Maybe we should
2 just take a break and then we'll come back.

3 (A short break was had.)

4 BY MR. KATZ:

5 Q. If you go to page 62 of your report.

6 A. 62?

7 Q. Yeah. You have a figure of Wales in
8 there.

9 A. Okay.

10 Q. In the middle of that figure is what Wales
11 refers to as "Multiplier 136."

12 A. I'm sorry. Say that again.

13 Q. In the middle of that figure is what Wales
14 refers to as "Multiplier 136."

15 A. Okay.

16 Q. Do you know what that multiplier does?

17 A. It's a compound gear that engages at least
18 with rack 138, and I'm not sure where the other
19 side engages, what the other gear teeth engage.
20 I'd have to look at the specification. I remember
21 looking at it, but I don't remember off the top of
22 my head.

1 Q. In any case, am I correct that these
2 functions -- at least one of these functions will
3 reduce the torque from the trigger to the end
4 effector?

5 MR. PEPE: Object to form.

6 BY THE WITNESS:

7 A. Let me look at the patent here. I want
8 to --

9 Q. It's at column 8 they discuss the
10 multiplier, but at that portion you're not going to
11 see a discussion of what it accomplishes. It's
12 just a discussion of the structure.

13 A. So that's what I thought. Ask your
14 question again.

15 Q. So what is the purpose -- let me just make
16 it an open-ended question. What is the purpose of
17 that compound gear which is called a multiplier in
18 Wales?

19 A. It kinematically connects the motion of
20 rack 138 -- I'm sorry -- the gear rack 141 on
21 member 138 to gear rack 154 on drive rod 140.

22 Q. And the input gear rack is connected to a

1 trigger and the output gear rack is connected to
2 the end effector; is that correct?

3 MR. PEPE: Object to form and scope.

4 BY THE WITNESS:

5 A. Which trigger are you referring to?

6 Q. So just one of the triggers. In fact,
7 your answer stopped at the racks?

8 A. I'm sorry?

9 Q. Isn't it correct that in Wales the
10 multiplier kinematically connects one of the
11 triggers to a component on the end effector?

12 A. That gear, as I said, connects to two
13 racks. That's what it connects.

14 Q. Okay. Maybe I'll use the word "couples"
15 instead of "connects."

16 A. Couples or connects those two racks.

17 Q. And one rack is connected to an A trigger
18 and the other rack is connected to a component in
19 the end effector, right?

20 A. Let me see here.

21 MR. PEPE: Object to scope.

22 (Witness reviewing document.)

1 BY MR. KATZ:

2 Q. Let me just ask this. Maybe we'll come
3 back to this if we have time. I take it that at
4 this time without studying the patent you're not
5 exactly sure what components those two racks
6 connect to?

7 A. The problem I have -- I remember looking
8 at this very carefully and this particular view is
9 real hard to read with the Figure 6, what 28 or 26,
10 how they engage and what they engage, and it
11 looks -- I remember going through this very
12 carefully. Dr. Knodel, as I recall, didn't address
13 this. So I didn't respond to this, if my memory is
14 correct. So I haven't looked at it in as specific
15 detail very recently, meaning in the last day or
16 two.

17 Q. My question is -- let's just limit it to
18 the multiplier itself. The multiplier has an input
19 gear rack that is connected to the smaller diameter
20 gear and the output gear rack is connected to the
21 larger diameter gear, right?

22 A. That is what it looks like. That's what I

1 recall, yes.

2 Q. And isn't the result of that to multiply
3 the torque downward?

4 A. Do what? Multiply the torque what?

5 Q. Downward. It reduces the torque by a
6 multiplication factor.

7 MR. PEPE: Object to form.

8 BY THE WITNESS:

9 A. Which torque are you talking about or
10 which torques are you talking about?

11 Q. Maybe I should use a more general term for
12 us. Can you confirm that what this multiplier does
13 is take an input force from the input rack and
14 reduce it by a multiplication factor when
15 converting it to an output force on the output
16 rack?

17 A. There's a ratio between the force that the
18 output rack 148 and the -- there's a ratio between
19 the force that the gear 136, the larger portion of
20 gear 136 at teeth 150 exerts on rack teeth 148 and
21 the force that 138 acting on 152, and that ratio is
22 given by the radii, the ratio of the diameter of

1 the gears, and that the ratio of that force results
2 in a lower force acting on 148 than that being
3 applied to 140.

4 Q. All right. So the structure of the
5 multiplier --

6 A. Let me back up.

7 Q. I'm sorry.

8 A. Than the force that 140 exerts on 152.

9 Q. So the structure of the multiplier in
10 Wales is to reduce the force from the input to the
11 output?

12 A. There's a ratio of forces, as I said
13 before, where the force that the gear exerts on --
14 the larger diameter portion of the gear exerts on
15 the output rack is lower than the force that the
16 rack exerts on the smaller gear.

17 Q. The input rack?

18 A. The input rack which acts on the smaller
19 gear.

20 Q. And I take it that if the gears were
21 reversed and the input drove the larger diameter
22 gear of the multiplier, then it would act as a way

1 to increase the force from input to output?

2 A. As we discussed before, depending upon the
3 gear ratios and the other forces and torques
4 involved in the gear set and its supporting members
5 and bearings of its supporting members, that is
6 correct.

7 Q. Is it a linear ratio? If the diameter is
8 double, is the force -- if the diameter of the
9 input gear is double the diameter of the output
10 gear, is the force doubled?

11 A. As a first approximation, yes.

12 Q. If you could turn to paragraph 28 of your
13 report, and there's a lot of text in your
14 paragraph 28.

15 A. Hang on a second. This is mine.

16 Q. Unless you want to just adopt Dr. Knodel's
17 report.

18 A. No.

19 Q. Okay. Let me know when you're at
20 paragraph 28 of your report.

21 A. I'm at paragraph 28 now.

22 Q. Okay. Looking at the sentence -- the

1 first sentence after the block quote.

2 A. Okay.

3 Q. Where you say "The asserted claims of the
4 Shelton '658 Patent are directed to a rotary drive
5 system and thus require a closure cam that is
6 operably coupled to a rotary drive member"; do you
7 see that?

8 A. Yes, I do.

9 Q. And so in the nonrobotic embodiment shown
10 at the beginning of the '658 Patent, in the first
11 40-or-so figures can you identify an exemplary what
12 you view as the closure cam? Again, not
13 necessarily the only one, but an exemplary one, one
14 you're thinking of that meets the claim language.

15 (Witness reviewing document.)

16 BY THE WITNESS:

17 A. I think you probably can see it in
18 Figure 18 and 19, and if you look at the structure
19 carefully -- let me take a look at one more figure.

20 Q. I'll direct your attention maybe 24 might
21 be easier, but it's up to you, the one we discussed
22 earlier.

1 A. No, I don't think so.

2 Q. Okay.

3 A. No.

4 Q. Okay. So where on 18 should I focus?

5 A. I don't think so, not in 24, but let me
6 look at something else. Hang on a second.

7 (Witness reviewing document.)

8 BY THE WITNESS:

9 A. You know, I just saw a mistake on
10 page 17 -- oh, no, it's right. I'm sorry. It's
11 right. Forget that. I have to look at one more
12 thing.

13 I think if you look at Figure 18 -- let's
14 just settle on one. I think it shows up I'll say
15 on 16 -- at least on 16, 17, and 18.

16 Q. Let's focus on 18 in the interest of time.

17 A. Sure.

18 Q. What is the closure cam in 18?

19 A. We're looking at it. It's the -- if you
20 see No. 59 -- do you see No. 59 and the leader
21 going to 59?

22 Q. I do. Do you know what 59 is pointing at?

1 A. I don't know what 59 is pointing at, but
2 I'm pointing at 59 here. Do you see where I'm
3 pointing?

4 Q. I see 59, yes.

5 A. So just to orient us so we're in the same
6 quadrant at least of the drawing so you know where
7 I'm looking, if we look where that leader goes and
8 we see 96, 97 just above where that leader goes, if
9 we look to the right of that split, which is the
10 97, 96 part, and we look at the anvil and we see
11 that's where the ramp and slot is and while you
12 asked me to look at the handheld version, this is
13 the same structure basically that we had in my
14 report in paragraph 27, it shows the same structure
15 but in more detail.

16 Q. And what about --

17 A. That's the location of the other cam
18 slot -- or cam surface.

19 Q. And you say it's "operably coupled to a
20 rotary drive member." What would be the rotary
21 drive member if there is one disclosed in this
22 embodiment?

1 A. Let me back up. Where are we at on my
2 report?

3 Q. The first sentence after the block quote
4 on paragraph 27 -- 28. Excuse me. You identified
5 the closure cam in your last few answers, and now
6 I'm asking you to identify an exemplary rotary
7 drive member that the cam is operably coupled to,
8 if one exists in the figure.

9 A. If we go to Figure 16 and there we see the
10 rotary -- one of the rotary drive members that I've
11 identified as a rotary drive member, that 138.

12 Q. And how is 138 operably coupled to the
13 closure cam?

14 A. Via the fins on the sled.

15 Q. What is -- is component 138 connected --
16 or what do you mean by the fins to the sled? How
17 is 138 related to the fins?

18 A. Well, once again, if we look, it's more
19 clearly shown in Figure 72, which is the same
20 structure, and we see in Figure 72, which is
21 IS-1001 at Figure 72 excerpt, that's in
22 paragraph 27, we see the sled which has what's

1 indicated as a fin with the red leader going to
2 it.

3 Q. What is that word you keep saying?

4 A. Fin.

5 Q. Fin with a what going to it?

6 A. Leader.

7 Q. Leader?

8 A. Leader.

9 Q. What's a leader?

10 A. L-E-A-D-E-R, the line that's goes from --

11 Q. That's the leader. Got it.

12 A. That's the leader. I'm sorry. I thought
13 that would be universally known.

14 Q. We call them lines.

15 A. Okay.

16 Q. Okay.

17 A. So that fin engages with what you can see
18 as the ramp which is the beginning of the cam
19 surface, but the cam surface -- two of the cam
20 surfaces here of slot are the lower surface of that
21 slot -- well, the upper surface of the bottom of
22 the slot and the bottom surface of the upper part

1 of the slot, and that fin engages with that so it's
2 operably coupled.

3 Q. My question wasn't how is the fin coupled
4 to a surface. It was how is the -- what you
5 identified as the drive screw, how is that coupled
6 to the closure cam?

7 A. That's what I'm showing. That's what I'm
8 showing.

9 Q. I guess let me back up. Does Figure 72
10 show the drive screw?

11 A. Say what?

12 Q. Does Figure 72 show the drive screw or
13 not?

14 A. The what?

15 Q. Okay. I'm sorry. I thought you just said
16 the drive screw 38 from Figure 18 was one exemplary
17 rotary drive member?

18 A. That is correct.

19 Q. Figure 17. Excuse me. Let's be very
20 clear. In Figure 17 there's a drive screw 138,
21 right, and you're saying that is a rotary drive
22 member. Okay. Are you on Figure 17?

1 A. I'm on Figure 17.

2 Q. I believe earlier you said -- when I said
3 identify a rotary drive member you identified screw
4 138?

5 A. As one rotary drive member, yes.

6 Q. Is the equivalent screw to screw 138 shown
7 in Figure 72, or no?

8 A. No. It terminates before that point.

9 Q. Okay. So how does that screw, which is
10 not in Figure 72, get operably coupled to the
11 closure cam?

12 A. Via the nut, which I think is 140 which we
13 see in Figure 17, which then is connected to 146
14 which is the drive rod, which in turn is connected
15 to the sled. So the screw turns, the nut advances
16 or retracts, firing rod -- I think they call it
17 firing rod -- 146 is connected to the nut, so it
18 moves with the nut, it then is connected to the
19 sled and it drives the sled, and the fins on the
20 sled are -- I think we used the word -- you asked
21 the question operably coupled -- operably coupled
22 to the anvil because the slot that we see in

1 Figure 72 clearly -- or we see also in Figure 17
2 drives -- is driven -- the cam surface is driven up
3 or down by the fins in the sled -- of the sled.

4 Q. I was actually asking about the coupling
5 of the screw to -- I guess I'm a little confused.
6 The closure cam acts on a cam surface, right?

7 A. Right.

8 Q. What is the closure cam in Figure 72?

9 A. The closure cam is the slot surfaces.

10 Q. Remember, the closure cam is interacting
11 with a cam surface, right? It's late. So let me
12 take a step back.

13 What Dr. Knodel was pointing to, which is
14 a different structure than you're pointing to, the
15 closure cam was the closure tube that interacts
16 with the cam surface on the anvil, right? Do you
17 remember that?

18 A. Right.

19 Q. And you agree that's one example of a
20 closure cam?

21 A. That's one example.

22 Q. I'm saying in your example you're, I

1 assume, identifying a closure cam that is
2 interacting with a cam surface?

3 A. Right.

4 Q. What is the -- I believe you told me what
5 the cam surface is. What do you consider to be the
6 closure cam?

7 A. These would then be the fins acting on
8 that surface, but the closure cam is really the
9 entire structure. It's a cam with the follower,
10 the thing that drives it, the thing that is driven,
11 that whole thing is the cam.

12 So we have a cam surface which is this
13 slope -- the slot, the surfaces of the slot, and
14 then we have the driver which in this case is the
15 fins that drives that down.

16 Q. So the surface is in the slot -- this is
17 your testimony, I'm not agreeing with you. As I
18 understand what you're saying, the surface is in
19 the slot and you're saying the closure cam is the
20 fin?

21 A. Let me just look at my report to make
22 sure.

1 (Witness reviewing document.)

2 BY THE WITNESS:

3 A. In my report or declaration, paragraph 26,
4 I think it's clear, "The firing member (that is,
5 sled assembly) is a cam because it moves
6 longitudinally to engage the slots in the anvil,
7 which translates the longitudinal motion of the
8 firing member into downward motion (that is,
9 rotational or pivoting motion) of the anvil to move
10 it closer to the lower jaw of the end effector.
11 (Cam, a rotating or sliding piece in a mechanical
12 linkage used especially in transforming rotary
13 motion into linear motion or vice versa.)"

14 Q. Do you believe that the closure cam must
15 be a separate part from other structures? Does it
16 have to be a stand-alone part?

17 MR. PEPE: Object to form.

18 BY THE WITNESS:

19 A. I don't understand your question.

20 Q. If we look at Figure 72, am I correct that
21 Figure 72 —

22 A. Where are we at on Figure 72?

1 Q. Figure 72 of the patent.

2 A. Okay, which I reproduce in my --

3 Q. You do. You produce it on page 17 of your
4 report if you'd like to look there.

5 A. Okay.

6 Q. Figure 72 shows the position of the anvil
7 after the closure tube has closed the anvil but
8 before the instrument has been fired; is that
9 correct?

10 A. It's an idealized representation of the
11 closing of the anvil.

12 Q. But as far as timing, am I correct in my
13 understanding what this figure is representing? It
14 is after the closure tube has been used to close
15 the anvil and is before the -- that firing member
16 with its fin has moved?

17 A. It could be at that time.

18 Q. What other times might it be?

19 A. Well, I think it could also be -- I'd have
20 to be careful on this, but it shows it in that
21 position and that position could be when that -- if
22 and when the sled were retracted and before the

1 anvil were pulled fully open. So it's a state, but
2 we don't know from the figure what -- how it got to
3 that state. Did it get there coming or going.

4 Q. Okay. But at the very least we know this
5 is the anvil in the closed position?

6 A. In a somewhat closed position.

7 Q. In fact, the patent says it's the closed
8 position, doesn't it?

9 A. The patent points out -- I'm not sure
10 exactly where right now, but the patent also talks
11 about the fin on the sled driving it to a fully
12 closed position, and one would understand that
13 closed can be closed but not fully closed.

14 Q. So what you're saying is that you think
15 Figure 72 is showing a position that is not fully
16 closed?

17 A. I didn't say that. It could be that a
18 portion of the anvil is fully closed and a portion
19 of the anvil is not fully closed.

20 MR. KATZ: I have no further questions.

21 MR. PEPE: I'm not going to ask any
22 questions.

1 (Whereupon, at 4:42 p.m. the
2 taking of the instant
3 deposition ceased.)
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CERTIFICATE OF DEPONENT

I hereby certify that I have read the foregoing pages of my deposition testimony in this proceeding, and with the exception of changes and/or corrections, if any, find them to be a true and correct transcription thereof.

Deponent

Date

NOTARY PUBLIC

Subscribed and sworn to before me this

_____ day of _____, 20__.

Notary Republic

My Commission Expires:_____

1 INSTRUCTIONS TO WITNESS

2

3 Please read your deposition over carefully
4 and make any necessary corrections. You
5 should state the reason in the appropriate
6 space on the errata sheet for any corrections
7 that are made.

8

9 After doing so, please sign the errata
10 sheet and date it.

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12 You are signing same subject to the changes
13 you have noted on the errata sheet, which
14 will be attached to your deposition.

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16 It is imperative that you return the
17 original errata sheet to the deposing
18 attorney within thirty (30) days of
19 receipt of the deposition transcript by
20 you. If you fail to do so, the deposition
21 transcript may be deemed to be accurate
22 and may be used in court.

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1 CERTIFICATE OF SHORTHAND REPORTER–NOTARY PUBLIC

2
3 I, TINA M. ALFARO, Registered Professional
4 Reporter, Certified Realtime Reporter, and Notary
5 Public, the officer before whom the foregoing
6 deposition was taken, do hereby certify that the
7 foregoing transcript is a true and correct record
8 of the testimony given; that said testimony was
9 taken by me stenographically and thereafter reduced
10 to typewriting under my direction; that reading and
11 signing was requested; and that I am neither
12 counsel for, related to, nor employed by any of the
13 parties to this case and have no interest,
14 financial or otherwise, in its outcome.

15 IN WITNESS WHEREOF, I have hereunto set my
16 hand and affixed my notarial seal this 13th day of
17 June, 2019.

18
19 

20 NOTARY PUBLIC IN AND FOR THE
21 DISTRICT OF COLUMBIA

22 My Commission expires October 31, 2020.