

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD
3 GODBERSEN-SMITH)
4 CONSTRUCTION COMPANY) CASE IPR2021-00136
5 d/b/a GOMACO) U.S. Patent No. 9,908,571
6 CORPORATION,)
7) CASE IPR2020-01698
8) U.S. Patent No. 10,029,749
9) PETITIONER,
10)
11) VS.
12) MOBILE VIDEOCONFERENCE
13) DEPOSITION OF
14) WILLIAM SINGHOSE, Ph.D.
15 GUNTERT & ZIMMERMAN)
16 CONST. DIV., INC.,)
17)
18) PATENT OWNER.
19)
20)
21)
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23)
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11 MOBILE VIDEOCONFERENCE DEPOSITION OF
12 WILLIAM SINGHOSE, Ph.D., taken before Brianne L.
13 Starkey, RPR, CRR, Online Notary Public within and
14 for the State of Nebraska, beginning at
15 9:59 a.m. EST, on July 23, 2021.

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1	I N D E X		
2	CASE CAPTION	Page	1
	APPEARANCES	Page	2
3	INDEX	Page	3
	EXHIBITS	Page	3
4	TESTIMONY	Page	4
	REPORTER CERTIFICATE	Page	
5			
6	DIRECT EXAMINATION:		
	By Ms. Fuller	Page	4
7			
	CROSS-EXAMINATION:		
8	By Mr. Mroz	Page	56
9			
10	E X H I B I T S		
11	EXHIBIT PREVIOUSLY MARKED	IDENTIFIED	
12	Exhibit 1001. '749 Patent		20
13	Exhibit 1006. '995 Patent		34
14			
15			
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1 (Whereupon, the following proceedings were
2 had, to-wit:)

3 COURT REPORTER: (For the record, the
4 court reporter requests that all parties present
5 state their name, location, and representation.)

6 MS. FULLER: Jenna Fuller
7 representing G&Z. I'm in California.

8 Then with me is my colleague, Jeff Price,
9 representing G&Z, and he is in New York.

10 MR. MROZ: And this is David Mroz on
11 behalf of Gomaco. I'm with Finnegan. I'm in the
12 Reston office in Virginia.

13 And Bill Singhose is with me, the witness.
14 He is in Finnegan's Atlanta office.

15 WILLIAM SINGHOSE, Ph.D.
16 having been first duly sworn,
17 was examined and testified as follows:

18 DIRECT EXAMINATION

19 BY MS. FULLER:

20 Q. Good morning, Dr. Singhose. How are you
21 today?

22 A. Good morning, Ms. Fuller. How are you?
23 Your name is really tiny on the screen.

24 Q. Oh, no worries. You can call me Jenna
25 too.

1 A. Okay.

2 Q. So do you understand today that your
3 deposition covers two different IPR proceedings in
4 which you submitted declarations in each proceeding?

5 A. Yes.

6 Q. And then just to be clear, you provided a
7 declaration in IPR2020-01698 pertaining to U.S.
8 Patent No. 10,029,749; is that correct?

9 A. Yes.

10 Q. Is that okay if we refer to that patent as
11 the '749 patent today?

12 A. Yes, that will be fine.

13 Q. Then next we have your declaration in
14 IPR2021-00136 pertaining to U.S. Patent
15 No. 9,908,571, right?

16 A. Yes.

17 Q. And is that okay if we refer to that
18 patent as the '571 patent today?

19 A. Yes.

20 Q. Just before we continue, is there any
21 reason why you can't put forth your truthful
22 testimony today?

23 A. No.

24 Q. And you probably know, but I just want to
25 go over just the ground rules again, that you can

1 ask for a break at any time. I just ask that we
2 finish the line of questioning before you ask for a
3 break.

4 And then I also ask that for your answers,
5 you provide verbal answers to my questions.

6 A. Okay.

7 Q. Is that okay? Perfect.

8 So looking at your CV, you have a list --
9 a laundry list of accomplishments and accolades, so
10 pretty impressive. One that I want to focus on is
11 your work at Bill's Asphalt Repair.

12 A. Okay.

13 Q. Can you tell me a little bit about that?

14 A. Sure. Bill's Asphalt Repair is a company
15 that was owned by my family named after my
16 stepfather, Bill Barton, not named after me.

17 And he was an operator of heavy machinery
18 and my mother was a truck driver and they worked
19 together on many construction projects.

20 And after a while, they decided to start
21 their own company, so they bought a dump truck and a
22 spreader and a tamper and a steamroller and all the
23 stuff that you would need to make asphalt roads and
24 asphalt driveways and also equipment to make cement,
25 mainly sidewalks.

1 And they just went into business, and I
2 generally worked at that company for over a couple
3 years operating everything. Mainly I was the truck
4 driver a lot of the time; but in a small company
5 like that, you just get off the truck and do
6 everything that has to be done to get the job done.

7 Q. A little bit of everything.

8 So then -- with a little bit of
9 everything, did you guys work on constructing road
10 projects?

11 A. Yes.

12 Q. So did you operate -- in these projects,
13 did you operate slipform pavers?

14 A. No, I never operated a slipform paver.
15 What you do with asphalt is you use what's called a
16 spreader or spreader box, but it operates kind of
17 the same way. You drop material in front of it, you
18 drive over it, and you spread it over and level it.

19 But the cement work or the concrete work
20 that we did was basically by hand where you dig it
21 out and you put wood around -- you have wood frames
22 and you pour it in there and then you work it by
23 hand.

24 The slipform pavers would be used for much
25 bigger projects than my family ever bid on or got.

1 Q. So when you say, like, a bigger project,
2 is that, like, bigger road construction projects,
3 like paving highways?

4 A. Yeah. I mean, the slipform pavers, they
5 would normally be used for freeways or highways
6 or -- some of the ones we're talking about here are
7 for gutters and curbs that would go in, like, when
8 you're doing a new housing development with a bunch
9 of houses and you've got a lot to do.

10 That's when it would justify the cost of
11 this kind of machine.

12 Q. Are these machines pretty expensive?

13 A. We didn't have one, but yeah, they're
14 hundreds of thousands of dollars, so I don't know
15 the exact price.

16 Q. So it kind of precludes people in small
17 businesses to buy hundreds of thousands of dollars
18 worth of a machine if they...

19 MR. MROZ: Objection: Form.

20 THE WITNESS: Well, it precluded our
21 family. In fact, you know, we specialized in
22 asphalt. And although we did concrete work, all of
23 our machinery was set up for asphalt, so we would do
24 concrete that was related to our projects.

25 So if we put in a parking lot, they would

1 often want a sidewalk and gutters and so we'd put
2 that in. But our main focus was asphalt.

3 BY MS. FULLER:

4 Q. Do you have a general understanding on how
5 these slipform pavers work?

6 A. Yes.

7 Q. Can you please provide that understanding?

8 A. Without going into too much detail -- I'll
9 provide more detail if you ask for it.

10 But basically you set up this machine and
11 it is, in fact, a form and you dump cement in front
12 of it and you drive forward.

13 You have to move the cement -- or the
14 concrete around and you have to vibrate the concrete
15 to get the air bubbles out, and you basically drive
16 forward and push it out in front of you and fill up
17 the form. And then out the back of the machine
18 comes the finished product, the concrete in the
19 shape that you want.

20 Q. Do you understand the process of
21 transforming a slipform paver from a paving mode to
22 a transport mode?

23 A. Yeah. I mean, you have to -- you have to
24 pack these things up. They're basically bigger than
25 a road, but you have -- at some point, you have to

1 drive them down the road to get them to the job site
2 or back from the job site.

3 So a lot of construction machinery is like
4 that. You have to fold it up or pack it up and put
5 it on a truck that can drive down the road.

6 Q. So when you were in the construction
7 business at Bill's Asphalt Repair, did you see this
8 process happen firsthand?

9 A. Yeah. Our spreader box, we had to do
10 that. Our spreader box is, like I said, sort of the
11 equivalent to the slipform paver they use for
12 asphalt. And it's basically got things that stick
13 out the side that's bigger than the road, and so you
14 have to pack that in so it can go down the road.

15 Then when you get to the new job site, you
16 basically deploy the extra parts and you drive
17 forward and make the road.

18 Q. When you say "deploy the extra parts,"
19 what do you mean by "deploy the extra parts"?

20 A. Well, this particular spreader box had
21 essentially wings out the side that you could stand
22 on while you're operating it or you could put
23 equipment on and stuff like that.

24 Basically the main box is as big as the
25 road, and so if that's all you had, you -- it would

1 be tough for you to ride on and operate. You
2 basically have to ride on these things and operate
3 them.

4 So those operator standing platforms would
5 deploy, and then one side had another deployment
6 sort of carrier device for things like tar and
7 shovels and that kind of stuff that you would want
8 to go along with the machine as you're laying out
9 these roads.

10 Q. So getting back into a slipform paver,
11 could you explain, to the extent that you have
12 knowledge, a paving mode of a slipform paver?

13 A. I didn't hear what you said. Which mode?

14 Q. I'll restate my question.

15 So getting back into a slipform paver,
16 could you explain, to the extent that you have
17 knowledge, the paving mode of a slipform paver?

18 A. Oh, okay. The paving mode, that's
19 essentially the working mode. So all the -- all the
20 parts of the machine are attached and deployed, and
21 you normally have something like a conveyor belt
22 that allows you to load in the concrete that you're
23 going to spread.

24 So basically it's the full machine ready
25 to go, that if you load it with concrete and you

1 start driving it forward, it'll start making a road
2 or a curb for you.

3 Q. So then you transition from a paving mode
4 to a transport mode, correct? You can't take the
5 paving mode into a trans- -- strike that.

6 The paving mode and transport mode are
7 different, correct?

8 A. Yeah, generally. I think most machines,
9 it would be very difficult to transport them from
10 one job site to another in the same configuration
11 that you were paving with. Generally, stuff needs
12 to be taken off or folded up and made more compact.

13 So it doesn't make a road while it's in
14 transport mode. It's nonfunctioning in that extent.

15 Q. Do you have any understanding prior to the
16 claimed inventions of the '749 and '571 patent the
17 length of time it would take to change a slipform
18 paver from a paving mode to a transport mode?

19 A. I mean, I never did that personally; but I
20 watched a lot of construction sites throughout my
21 life, and I can see what's going on there and what
22 would have to be done.

23 The answer to that question is highly
24 dependent on the size of the slipform pavers. Some
25 of these slipform pavers, if they're just making a

1 curb, you could set them up pretty quickly, probably
2 in a couple of hours, because they're much smaller
3 and there's not that much stuff to add to them.

4 A big -- you know, one that you see making
5 a freeway, my guess is that's a day to set that up,
6 depending on the model. It's not a short amount of
7 time.

8 Q. So a pretty time consuming process,
9 correct?

10 A. Yeah. Again, I never went through it
11 personally, but looking at when they first dropped
12 the machine off and all the stuff they're adding on
13 and getting it aligned and --

14 There's some over stuff I'm not sure that
15 is exactly part of setting up the machine, whether
16 you consider that, but you have to set up guidelines
17 along the edge of the road that you want it to
18 follow.

19 So setting this -- this whole process of
20 setting up and getting ready to go is quite
21 extensive.

22 Q. When you say "guidelines," are those like
23 stringlines for steering a paver in paving mode?

24 A. Yes. You would -- I mean, these machines
25 are big and they're going a long way, and most of

1 them were developed before, you know, accurate
2 positioning with GPS and all that kind of stuff.

3 So you would basically go to these
4 construction sites and you would put posts along the
5 edge of the road and you'd put a string or a wire
6 along there.

7 And the machine basically has a little arm
8 that sticks out and touches that wire and tries to
9 drive along it. And if it starts to deviate, it
10 uses that touching to say I've got to go a little
11 bit right or a little bit left.

12 So that's the guideline or guidewire that
13 keeps these machines relatively straight.

14 Q. If it starts to deviate, what component
15 puts it back into alignment with the guideline?

16 A. I think that would depend on the model of
17 the machine. Really, you've got some options there.

18 Probably most of the time they'll steer
19 the crawler track, you know, and -- one or more
20 crawler tracks, as you know, some of these have
21 three or four crawler tracks, so you could steer
22 them just by turning the first -- the front two like
23 a car.

24 You could also choose to steer the rear
25 one or the rear ones if you wanted to; but

1 basically, for the most part, the crawler tracks are
2 going to be angled a little bit to get it back on
3 track.

4 Q. And the crawler tracks use a hydraulic
5 steering cylinder; is that correct?

6 MR. MROZ: Objection: Form.

7 THE WITNESS: They wouldn't -- I
8 mean, that's one option. They probably use a
9 hydraulic actuator of some kind because these are
10 pretty big machines, and hydraulics would normally
11 be used to move big machines.

12 But you could have a hydraulic linear
13 actuator with a linkage that creates a steering
14 effect on the crawler track, or you could have a
15 rotary actuator that just spins around like a slew
16 drive.

17 So there's a few options there on how you
18 would do it, but basically you need to turn the
19 crawler track in some way.

20 BY MS. FULLER:

21 Q. But it's a fair assessment to say that
22 steering is pretty important for these large
23 slipform pavers; is that correct?

24 A. Yeah, I think it's pretty important. I
25 mean, they move really slow, so it's not like you

1 have to, you know, steer them wildly back and forth.

2 But, yeah, you have to make continual
3 adjustments to make sure you're going the way you
4 want to go, so it's an essential part of the
5 operation to steer them.

6 Q. In terms of steering a slipform paver, is
7 maneuverability also pretty important for
8 maneuvering around obstacles that may come up in a
9 paving path?

10 A. Yes, certainly.

11 Q. Do you have an understanding prior to the
12 claimed invention how operators would maneuver a
13 slipform paver?

14 A. Sure. Yes.

15 Q. Can you briefly explain that
16 understanding?

17 A. Well, I mean it's basically what we were
18 just talking about. They would turn the crawler
19 track so they would go around an obstacle.

20 Now, if you wanted it to go very close to
21 an obstacle and make a right-hand turn, you know,
22 that can't be done. So there's some limitations on
23 how you can steer these things.

24 But, generally, they would -- you know,
25 you're not going to be surprised by an obstacle.

1 These things are crawling around really slowly and
2 you've plotted out your course.

3 So you could put a guideline that just
4 slowly curved out and around an obstacle, or you
5 might just have to stop the machine, you know, and
6 move it sideways and start on the other side and
7 then hand work the cement that's around an obstacle.

8 Q. When you say "move it sideways," would
9 workers, then, have to manually move the swing legs,
10 reposition the swing legs sideways, or how would
11 that work?

12 MR. MROZ: Objection: Form.

13 THE WITNESS: Again, it's really
14 dependent on the model.

15 But, for example, one way is you would --
16 you know, you stop laying the cement because you're
17 coming up on this obstacle, and essentially you
18 drive the machine a little bit forward and then you
19 turn the crawler tracks -- turn all the crawler
20 tracks 90 degrees and then you can just drive
21 sideways.

22 BY MS. FULLER:

23 Q. When you say "turn all the crawler tracks
24 90 degrees," would a worker have to manually
25 reposition that steering cylinder to get into a

1 90-degree turn?

2 MR. MROZ: Objection: Form.

3 THE WITNESS: No. Again, it depends
4 on the model that you're using.

5 But if you had a rotary slew drive, those
6 generally could turn 360 degrees, so turning
7 90 degrees would not be a problem.

8 There were also probably models that could
9 turn 90 degrees with the linear actuator and a
10 linkage. That would be possible. I don't -- I
11 don't know any of those off the top of my head.

12 But certainly that 90-degree turn could be
13 done in essentially kind of an automated mode or a
14 jog mode where an operator is just pushing a button
15 or a lever and directly telling it to keep turning,
16 keep turning, keep turning. It could be done in one
17 of those two ways.

18 Q. When you're using the steering cylinder,
19 how would it be done with the steering cylinder?

20 A. I thought I answered that question.

21 Yeah, steering cylinder, it's the same
22 thing. You would extend or retract the steering
23 cylinder, and that steering cylinder would generally
24 be attached to a linkage that causes the crawler
25 track to rotate.

1 There's just some physical limits with
2 those, and you would have to have the proper design
3 to be able to go 90 degrees plus or minus with
4 those, but it could be done.

5 But if you really wanted to do that
6 90-degree turn, a rotary actuator would be a good
7 choice for your machine.

8 Q. What were the physical limits with the
9 steering cylinder?

10 A. Well, the steering cylinder, because --
11 it's converting linear motion, an in-and-out motion
12 of a cylinder, coupled to a linkage that converts
13 that to rotation.

14 If you want to get a bigger rotation
15 angle, you essentially have to have a longer piston
16 or a longer linear cylinder or a bigger lever arm,
17 which means that you start sticking out the side
18 further and further.

19 So, at some point, it -- you just end up
20 with this huge linear actuator and this huge linkage
21 if you're trying to rotate too much with that idea.

22 But I think a lot of these machines are --
23 you can move them and drive them around without --
24 without the need to go exactly 90 degrees. You
25 could also turn 60 degrees and start heading over

1 sort of at a diagonal to go around an obstacle as
2 well.

3 (Exhibit 1001 previously marked
4 in a prior deposition.)

5 BY MS. FULLER:

6 Q. So, Dr. Singhose, can I ask you to take
7 out Exhibit 1001, which is the patent '749?

8 A. Okay. I have the '749 patent in front of
9 me.

10 Q. So, Dr. Singhose, we were touching a
11 little bit on the physical limitations of a steering
12 cylinder and that being a drawback.

13 Can I direct you to Column 4 starting at
14 Line 27 through 31?

15 MR. MROZ: Objection:
16 Mischaracterizes testimony.

17 BY MS. FULLER:

18 Q. Can you read that, Dr. Singhose?

19 A. Just so I'm clear, I'm in the '749 patent,
20 Column 4. And if I go down to Line 27 and halfway
21 over, there's a sentence that starts, "Amongst
22 others." Is that what --

23 Q. Correct.

24 A. Okay.

25 Okay. I've reviewed that.

1 Q. This passage, is this the physical
2 limitation that you were referring to?

3 A. Yes. They're touching on the same
4 physical limitation that I'm touching about.
5 They're actually putting in sort of an exact limit
6 of, like, 90 degrees. That's not exactly true.

7 You could do -- depending on the size of
8 your linear actuator and your linkage, you could do
9 more than 90, but I think the sentiment is correct
10 is that that structure does have a limited ability
11 to steer. It's not 90 degrees. It's a bit more.

12 But they are identifying, like, a problem.
13 It's difficult to just spin continuously and turn to
14 any angle with this kind of a structure.

15 Q. And with that problem, is it a fair
16 assessment to say that an operator would have to
17 manually repin the steering cylinder to attempt to
18 achieve that 90-degree steering?

19 A. Yes. If you had a machine whose cylinder
20 and linkage did not allow 90 degrees, then one way
21 to achieve 90 degrees would be to detach either side
22 of that linkage and reattach it to a different
23 location that essentially gets you a different lever
24 arm at a different direction.

25 So you could rotate it, say, 60 degrees,

1 and that might be the limit of your particular
2 linkage. You could disconnect, move over one side
3 and basically come at it from a different angle and
4 then do another 30 degrees to add up to a complete
5 90 degrees. That's definitely how some of these
6 machines were designed.

7 Q. So, Dr. Singhose, do you have an
8 understanding of the novelty of the '749 patent?

9 A. I mean --

10 MR. MROZ: Objection: Form.

11 THE WITNESS: I have an understanding
12 of the alleged novelty.

13 BY MS. FULLER:

14 Q. And what is that understanding?

15 A. Of the '749? I'll need to review the
16 patent claims real quick.

17 So for the '749, looking at Claim 1, I
18 think that this argument back and forth between the
19 parties has settled on the alleged novelty being the
20 power drive located between the jacking column and
21 the crawler track.

22 Q. Can I refer you to Column 6 starting at
23 Line 60 and going through Column 7, Line 5? If you
24 could read that and just let me know when you've
25 read that.

1 A. Okay. You said start at Column 6,
2 Line 61?

3 Q. Correct.

4 A. Okay.

5 Q. Going through Column 7, Line 4.

6 A. Okay. I've reviewed that.

7 Q. So the '749 patent eliminates the need to
8 reposition the steering cylinder on the jacking
9 column by physically placing a power drive between
10 the jacking column and the crawler track; is that
11 correct?

12 A. Well, I mean, the passage that you just
13 wrote me seems to be a little bit different than
14 that. It seems to be suggesting that you don't use
15 a steering cylinder.

16 So you get rid of the steering cylinder
17 and you use a rotary actuator there, and so you get
18 rid of that need we were talking about of
19 repositioning the steering cylinder if you can't
20 steer to the sharpest angle as you want.

21 Q. So getting rid of the steering cylinder by
22 placing a power drive between the jacking column and
23 the crawler track, correct?

24 A. Yeah. That seems to be the suggestion
25 that they're making in that paragraph.

1 Q. Dr. Singhose, do all mechanical component
2 combinations achieve predictable results in your
3 line of work?

4 A. I didn't hear the last part of your
5 question. Did you say in my line of work or in this
6 line of work?

7 Q. In your line of work.

8 A. Oh. Well, my line of work includes things
9 like satellites, you know, and I think things get
10 less predictable when you get really complicated and
11 you go into a space environment where the
12 temperature is near zero.

13 I also do work in underwater robotics, and
14 there's all kinds of weird currents down there and
15 forces, hydrostatic -- hydro forces.

16 Some of the areas I work in, it's hard to
17 predict what mechanical components will be; but
18 other parts of my work, like in cranes, for example,
19 they've been around so long that we really know
20 what's going to happen when we put a certain kind of
21 mechanism on there.

22 So I think it depends on the area that I'm
23 working in whether or not these mechanical
24 structures I'm working with are highly predictable,
25 somewhat predictable, or a bit hard to predict.

1 Q. Satellites would be pretty interesting
2 that you're working with. That -- that seems pretty
3 cool.

4 A. You would -- you would think so, but it
5 gets less interesting when you work on something for
6 eight years. That's about the time length it takes
7 to get anything up into space.

8 So once it happens, it's very satisfying,
9 but a lot of times it's not interesting because
10 you're waiting years and years.

11 Q. That's the definition of insanity right
12 there, working on the same thing over and over again
13 for eight years and expecting different results.

14 A. That's right. Hopefully we were making
15 progress along the way.

16 But I've had a few things go to space; and
17 it's very satisfying, but it takes a long time.

18 Q. That's really cool. Congrats on that.

19 So is it a fair assumption, though, that
20 when you consider -- you have to consider the
21 interactions between components when you're doing
22 this design process?

23 A. Yes. That's the fundamental nature of
24 mechanical design is considering to use a new
25 component and thinking about how that affects the

1 operation of other components and the interaction of
2 those components. That's kind of the basic idea of
3 mechanical design.

4 Q. So, Dr. Singhose, Commander III, which is
5 the base reference in these -- in your declaration
6 that you provide, can you explain Commander III's
7 features?

8 A. I'm not sure I can explain them all.
9 There's a, what, 440-page manual that comes with it.

10 But, generally speaking, it's a slipform
11 paver that we've been talking about, and they
12 designed it to be very versatile. In fact, when I
13 view the machine, I view it as a machine that could
14 be sold to actually smaller companies, perhaps like
15 my family's company, because you could, you know,
16 spend money on just that one kind of machine and you
17 could do a variety of jobs with it.

18 It's not highly specialized in only one
19 thing. So one configuration, let's say the
20 three-legged configuration, it's set up and works
21 quite well doing slipform paving for smaller things
22 like a curb or a sidewalk.

23 And then they've designed this so it can
24 be modified to a four-legged version and you attach
25 a different kind of slipform on it and then you can

1 start making roads with it as well.

2 So you can make something, you know, 8 or
3 10 feet wide as opposed to just a sidewalk or a curb
4 that's a couple feet wide.

5 Q. And specifically, can you describe the
6 features of the swing leg assembly?

7 A. Okay. Well, yeah. So it has a swing leg
8 on the upper left side that allows that track to be
9 moved horizontally back and forth.

10 And you did that for a couple of reasons.
11 One is to -- as you mentioned before, go around an
12 obstacle. So the obstacle may not be in the direct
13 path of the concrete that -- the cement that you're
14 laying or the concrete that you're laying, but you
15 might be coming up against a manhole cover or some
16 obstacle. You could move the swing leg out or in to
17 go around that.

18 You also would generally want to keep the
19 swing leg farthest to the outside for more
20 stability. So if you were hanging a very heavy
21 slipform off of the other side, you'd want to move
22 that leg further and further to the left to gain you
23 more tip-over stability and more tipping stability.

24 Q. And how would you move the leg? Could you
25 explain that?

1 A. Sure. On the Commander III, it's sort of
2 manually pinned in place, and it's got two pins.
3 One is back near the front bolster, the front part
4 of the machine. So you manually pull this locking
5 pin out, and then the swing leg is free to move to
6 rotate left or right or move horizontally.

7 And you would drive that with a -- by
8 basically pushing a button and jogging that swing
9 leg sideways. And then when it got to the position
10 that you want, you put that locking pin back in.

11 But while you -- while you did that, you
12 rotated the crawler track as well, so now it's not
13 pointing straight ahead anymore.

14 So you go out towards the crawler track,
15 you pull out a different pin, and you rotate the
16 crawler track back so that it's facing forward and
17 you put the locking pin back in.

18 Q. The Commander III has a hydraulic steering
19 cylinder linkage to the jacking column, correct?

20 A. Yes.

21 Q. And this steering cylinder steers and
22 maintains the crawler track; is that correct?

23 A. Yes, it steers the crawler track.

24 Q. And does it maintain the crawler track as
25 well at a position?

1 A. It tries to. You're trying to keep it
2 straight ahead.

3 Q. And it's straight ahead against the
4 straight line -- strike that.

5 A. Yes. I mean, I'm using straight ahead in
6 whatever direction that the operator is trying to
7 get the machine to go. Generally, straight ahead
8 would be the paving direction.

9 Q. And, for example, that stringline that you
10 used in construction, your straight ahead is in
11 reference to that stringline for paving; is that
12 correct?

13 A. Yeah, I think that's a good way to think
14 about it.

15 Q. So steering accuracy is pretty important
16 for the slipform paver?

17 A. Yeah, it's pretty important. I mean, you
18 don't want to get too far off. I mean, you can't
19 drive these things perfectly straight, but you're
20 not going to want to swing, you know, 6 inches off
21 to the right when you're supposed to be going
22 straight ahead.

23 Q. Do you have any understanding of what
24 factors go into making sure Commander III's steering
25 cylinder is able to steer and maintain the crawler

1 track?

2 A. Yes.

3 Q. Can you explain those factors?

4 A. Well, one of the factors would be that --
5 well, we actually kind of talked about some of this
6 before, so I'll just repeat it, that steering
7 cylinder can only turn the crawler track so many
8 degrees.

9 I'm not exactly sure what that is, but it
10 can't turn it, you know, 180 degrees around. So if
11 you need to turn it that far, you're not going to be
12 able to do it without disconnecting it and moving
13 some other stuff. So there's a limited range of
14 steering angles that the Commander III has.

15 There's also a limited speed at which you
16 can do that. You can't instantaneously take one of
17 these crawler tracks and just have it jump
18 30 degrees to the right.

19 And then there's some ground of
20 properties. Like, if you were driving this crawler
21 track along a certain kind of surface, it would also
22 be easier or harder to turn. So I would call those
23 environmental factors.

24 And then, of course, it also depends on
25 sort of the load that you're pushing that day and

1 the direction you're pushing, up or down.

2 So there's quite a few environmental
3 factors that would have relatively small effects on
4 that, but there's a number of things that limit how
5 far and how fast that crawler track can be turned.

6 Q. And when you say "load," is that the
7 machine load on the crawler track?

8 A. Yeah, sort of the overall weight of the
9 machine, how much concrete -- how much cement it has
10 in front of it or concrete it has in front of it,
11 the particular slipform that you're pushing.

12 Some of these slipforms, they're harder to
13 push than others because you're pushing more
14 concrete out in front of them and you're applying
15 more forces to the machine.

16 So the machine can have different amounts
17 of forces applied to it, which means that the
18 crawler track itself is subject to different amount
19 of forces.

20 Q. Dr. Singhose, did you look at the claims
21 and specification of the '749 patent to find
22 references to make your invalidity opinion?

23 A. I didn't quite hear the first part of your
24 question. What did I refer to?

25 Q. I'll repeat that question.

1 Did you look at the claims and
2 specification of the '749 patent to find references
3 to make your invalidity opinion?

4 A. Yes.

5 Q. And how did you do that?

6 A. How did I do my invalidity analysis?

7 Q. Correct.

8 A. Yeah. Well, my first step is to -- this
9 is my own personal method -- you know, basically
10 read the abstract, look at the pictures, read some
11 paragraphs that seem informative.

12 And then I tend to go to the end of the
13 patent and go to the claims once I have a general
14 understanding of what's going on. And then I read
15 those claims. Generally, I read the -- the
16 independent claims, right, first.

17 And then I would -- with the understanding
18 of what's an independent claim, I would probably go
19 back and start reading the specification front to
20 back with those claim terms in mind, especially the
21 ones that were not jumped out at me as perfectly
22 clear.

23 And then I would get back to the claims,
24 and then I would do essentially claim construction.
25 I would go through there and make sure I understood

1 each term.

2 And then once I understood the claims in
3 that sense, I would, you know, probably do the
4 dependent claims as well. But, at that point, I
5 think I would have a good understanding of what the
6 patent was claiming.

7 And, at that point, then I would go look
8 for those disclosures of that -- of those same
9 elements in prior art.

10 Q. So using the patent as a guide to find
11 references; is that correct?

12 A. Well, I mean, I would use the patent
13 certainly to understand the claims, right? Anytime
14 you just jump to the back and read the claims,
15 there's going to be uncertainty in what some of
16 those terms mean, so I'm using the specification to
17 understand the terms in the claims. That's the
18 process I was describing.

19 Q. How much time did you put in to preparing
20 your declarations for these two proceedings?

21 A. How much time did I put in? Well, for
22 this particular one, as you probably know, there's a
23 number of IPRs that are associated with this
24 litigation.

25 So is your question about this one

1 particular one or this whole body of work?

2 Q. For these two proceedings.

3 A. Oh. That would be tough to say. I mean,
4 I've worked on this case for quite a while, and
5 there was this whole part which was the preliminary
6 injunction which you're aware of.

7 I don't think I can just branch off the
8 part that I spent on this because actually the work
9 that I did on preliminary injunction also included
10 this understanding the patents and looking for it.

11 So -- but to give you one number, I've
12 probably worked on this case a couple hundred hours.

13 (Exhibit 1006 previously marked
14 in a prior deposition.)

15 BY MS. FULLER:

16 Q. Dr. Singhose, can I direct you to -- give
17 me one second -- Exhibit 1006, which is the Rio
18 reference?

19 A. I have a lot of binders here. Give me a
20 second.

21 Q. Sure. Take your time.

22 A. Okay. I found it.

23 Q. There's probably thousands of papers in
24 those binders.

25 A. Yeah.

1 Q. So, specifically, can we look at Figure 1
2 of Rio?

3 A. Okay.

4 Q. So in Figure 1, there is Nos. 12, 14, 18,
5 and 20.

6 Do you see that?

7 A. Yes.

8 Q. 12, 14, 18, and 20 refer to round engaging
9 units, correct?

10 A. That's probably correct.

11 Q. If you need to look at the reference a
12 little bit more before you make a statement, let me
13 know.

14 A. Okay.

15 Q. So 12 and 14 are front ground engaging
16 units. Can you explain what ground engaging units
17 do for the machine?

18 MR. MROZ: Objection -- objection:
19 Mischaracterizes the figure.

20 THE WITNESS: Okay. I better check
21 the numbers to make sure since I wasn't sure you
22 were using the right numbers. Let me just check
23 what the patent says 12 and 14 are.

24 BY MS. FULLER:

25 Q. Pardon me. Let me strike that -- withdraw

1 that question and I'll restate the question.

2 MS. FULLER: Brie, I'm going to
3 withdraw that question.

4 BY MS. FULLER:

5 Q. Dr. Singhose, 14 and 16 are front ground
6 engaging units, correct?

7 A. Yes, that is correct.

8 Q. And what do these front ground engaging
9 units do for the milling machine?

10 A. Well, one of the primary functions is they
11 support it. They hold it off the ground. Without
12 those, the frame would just be dragging along the
13 ground. So they lift the frame off the ground.

14 They also allow it to travel forward.
15 They are crawler tracks. And then since they're at
16 the front and you can see in the dotted lines that
17 they're able to steer these, so they provide
18 steering for the machine as well.

19 Q. And directing you to Column 4, Line 14
20 through 15, they use a hydraulic steering cylinder
21 to provide the steering; is that correct?

22 MR. MROZ: Objection: Form.

23 THE WITNESS: You had directed me to
24 some specific lines. Which were those lines again?
25 I basically read the paragraph, but I wanted to know

1 exactly what you were talking about.

2 BY MS. FULLER:

3 Q. Sure. Lines 14 through 15.

4 A. Okay. So I read that. I read 14 through
5 15. If you could ask your question again, that
6 would be useful.

7 Q. These lines refer to a hydraulic cylinder
8 to provide steering; is that correct?

9 A. Yes. These lines mention one possible way
10 of steering is with a hydraulic cylinder.

11 Q. And this hydraulic cylinder is similar to
12 Commander III's steering cylinder?

13 A. Well, this is a very conceptual
14 description of a hydraulic cylinder. In fact, Rio
15 is saying -- Rio is not saying you have to use a
16 hydraulic cylinder. This is just an example. It's
17 saying such as a hydraulic cylinder.

18 So there's no details about the specific
19 size and shape and configuration that we have like
20 we have for the C3.

21 But, generally, yes, this -- this listing
22 here, this description here would be a hydraulic
23 cylinder that extends in and out; and that would
24 have to be coupled to some sort of linkage to cause
25 the rotation of the crawler track.

1 Q. Now, directing your attention to the rear
2 ground engaging units, 18 and 20, what are the
3 purpose of the rear ground engaging units?

4 A. Well, they would nominally have the same
5 purpose as the front, that is to elevate the machine
6 off the ground, to allow it to go forward, and, you
7 know, to also steer.

8 The steering ability I think is not really
9 showing up in Figure 1, but certainly later figures
10 show that you could steer the rear ground engaging
11 members as well.

12 Q. In Rio, the steering for the rear ground
13 engaging figures is Ackerman steering, the
14 reference; is that correct?

15 A. I mean, I'm not sure that that's required
16 by Rio. It could be mentioned in here. That's just
17 a way of steering tracks a little bit different so
18 when you're going around a corner, they don't tear
19 up the ground as much.

20 But steering comes down to rotating the
21 ground engaging member about a vertical axis to some
22 amount.

23 Q. What's Ackerman steering? Do you have an
24 understanding of what that is?

25 A. Yeah. I mean, it's essentially an idea

1 that if you're going around a curve, you should
2 steer your inside tracks a little bit different than
3 your outside tracks, because if you steer them the
4 same amount, one's going at a tighter radius than
5 the other. So if you steered them with the same
6 angle, they would tend to skid. So you change the
7 angles a little bit so that they go around the curb
8 and don't skid as much.

9 And Ackerman is just this guy who came up
10 with these formulas for how to determine those
11 angles based on the radius of curvature for each of
12 the two crawler tracks that you're trying to rotate.

13 Q. So, Dr. Singhose, I would like to direct
14 you to Column 6, Lines 38 through 55. Would you
15 like a minute to review that passage?

16 A. Column 6, starting at which line? 38?

17 Q. Line 38 through 55.

18 A. Okay.

19 Q. I'll give you a minute to review that
20 passage.

21 A. Okay. I've reviewed that paragraph.

22 Q. Rio describes an anti-rotate device 90
23 that locks the inner tubular member in the rear
24 ground engaging unit. That's correct, right?

25 A. Yes.

1 Q. Why does Rio utilize an anti-rotate
2 device?

3 A. Well, it actually says its reason in the
4 paragraph. Let me pull that out for you.

5 It lists its reason. It says, "This
6 permits locking the inner tubular member 58 and the
7 one ground engaging unit 20 against unintentional
8 rotational movement when steering control of the one
9 ground engaging unit 20 is not desired."

10 That's what it's listing as its reason for
11 that.

12 Q. So it is -- a fair assessment is that when
13 Rio does not want to steer the rear ground engaging
14 units, it uses a locking mechanism, correct?

15 A. I didn't quite hear the front part of it.
16 You said when it does not want to steer?

17 Q. Correct.

18 A. I mean, that's not exactly the same
19 motivation as listed here. Basically it's trying to
20 lock that crawler track in position, so when it's
21 driving and it hits something, it doesn't -- it
22 doesn't turn the crawler track unintentionally.

23 Q. So it maintains the crawler track at the
24 position it wants, correct?

25 A. Yes, that's correct. That locking

1 mechanism tries to lock it in the position once it
2 gets there.

3 Q. And Rio's rotary actuator, then, to
4 provide rotational forces, the anti-rotate device
5 would have to unlock; is that correct?

6 A. Yeah. I'm pretty sure you have to do that
7 or the machine would break one way or the other.
8 Those two would be fighting each other, so you would
9 have to pull the pin out if you want to rotate them
10 without causing some damage.

11 Q. So, Dr. Singhose, you testified earlier
12 that with the steering cylinder, you can steer and
13 maintain the collar track. That's correct?

14 A. Again, I didn't hear the first part of
15 that question.

16 Q. Am I -- are you just -- am I too soft?

17 A. Yeah, you're a little bit soft.

18 Q. Okay. Let me try --

19 A. I tried to turn up my volume here, but I
20 think I'm volumed out.

21 Q. All right. I'll get a little closer to my
22 speaker.

23 You testified earlier that with the
24 steering cylinder, it can steer and maintain the
25 crawler track, correct?

1 MR. MROZ: Objection: Form.

2 THE WITNESS: I'm not sure I
3 testified to that. I testified that it could steer
4 and it can certainly maintain the crawler track to
5 within some resistance of these unintentional
6 forces.

7 But with the steering cylinder, if you
8 were driving forward and it hit a big obstacle and
9 it created enough torque, then the steering cylinder
10 would be pushed out of position as well.

11 BY MS. FULLER:

12 Q. In Rio's design, Rio does not contemplate
13 the rotary actuator maintaining the crawler track in
14 a position, correct?

15 A. I mean, in my reading of this, it actually
16 contemplates maintaining it. In fact, it tries to
17 maintain it in the forward direction the whole time
18 the leg is being slewed, being rotated.

19 I think that's one of its main disclosures
20 is that it can maintain that crawler track in the
21 forward direction while the swing leg is moving.

22 Q. So then you have to use an anti-rotate
23 device to lock it in place to prevent unintentional
24 movement, right?

25 A. Yes. I'm not sure that you have to use

1 it. I think what we were reading was sort of a
2 thing that you could do, an optional thing.

3 I'd have to read the patent log closer to
4 say that Rio says you have to use that.

5 Q. In the embodiments, though, it uses an
6 anti-rotate device?

7 MR. MROZ: Objection: Form.

8 THE WITNESS: Again, without reading
9 the patent all the way through and reminding myself
10 what all the different embodiments are, I couldn't
11 say yes to that.

12 But certainly some of the embodiments have
13 that locking -- anti-rotate device that we just
14 talked about.

15 BY MS. FULLER:

16 Q. Okay. So, Dr. Singhose, I want to direct
17 your attention back to Column 4, Line 14 through 15.
18 Let me know when you are back there.

19 A. Okay. I'm there.

20 Q. So Rio is referencing using a hydraulic
21 steering cylinder in this passage for its front
22 ground engaging units.

23 And in your obviousness analysis, you
24 state that it would be obvious to replace
25 Commander III's steering cylinder with a rotary

1 actuator.

2 Why did Rio not find it obvious if it's
3 using a steering cylinder for the front ground
4 engaging units?

5 MR. MROZ: Objection: Form.

6 THE WITNESS: Yeah. I mean, I would
7 think that the -- you're asking me a question sort
8 of beyond the scope of what I know about.

9 But I would guess that the people who
10 created Rio probably knew they could use a rotary
11 actuator for the front, but they're just describing
12 a certain embodiment of their invention. They're
13 really focusing on the rear of this machine, so they
14 probably just briefly described how the front would
15 work.

16 But I don't think they're disclosing that
17 that's the way you have to do the front.

18 BY MS. FULLER:

19 Q. And when you say "focusing on the rear,"
20 the rear ground engaging units, that's what they're
21 focusing on, correct?

22 A. I think so. I mean, Rio describes a whole
23 machine and describes its nominal function, how
24 different parts would work. But certainly it
25 focuses on the rear swing leg.

1 And that seems to be, as lawyers might
2 call it, the inventive component of this. So
3 they've spent a lot of time talking about that part
4 of it and not so much about the other parts of the
5 machine.

6 Q. And what is the difference between the
7 rear swing leg of Rio compared to the front swing
8 leg?

9 MR. MROZ: Objection.

10 THE WITNESS: I don't think -- I
11 don't think they've described the front of this
12 machine having swing legs. I mean, it could have
13 swing legs, but they've just described it sort of
14 generally as having crawler tracks that can be
15 steered.

16 But I don't think that they've gone into
17 detail about how those could be put on a swing leg
18 out there.

19 BY MS. FULLER:

20 Q. I must have misunderstood your testimony
21 because you had answered Rio's rear swing leg. Were
22 you referring to Rio's rear crawler track?

23 A. I'm not sure which you're referring to, so
24 I'll try to just clarify this quickly.

25 I think the focus on Rio, the inventive

1 nature is the combination of the rear swing leg and
2 that crawler track, right? They have the ability
3 with the sensors they've put on and the control
4 system they've disclosed to coordinate the motion of
5 that swing leg in and out and to counter-rotate or
6 accurately control the crawler track while they're
7 doing that.

8 That component of the machine I think is
9 what Rio focuses on.

10 Q. And it's between the projecting position
11 and the retracted position, correct?

12 A. Yes. That's one aspect of Rio that
13 they've focused on is describing how their invention
14 works when it has -- when it has two positions that
15 they call projecting and retracted, I think.

16 Q. And what is the projecting position?

17 A. Projecting position -- well, I mean,
18 there's many projecting positions because once you
19 get outside the frame, you're projecting away.

20 But, generally, it's the extreme position
21 where they rotate the crawler -- they rotate the
22 swing leg sort of as far as they can; and during
23 that, they're moving the crawler track further and
24 further away from the frame.

25 And they do that for a couple of reasons.

1 One is to make the machine more stable in the sort
2 of left/right tilting sense, but they can also move
3 that swing leg out to the side to go around an
4 obstacle.

5 Q. And then the retracted position, what is
6 that position?

7 A. Retracted position is when they swing the
8 leg in so that the crawler track is basically
9 completely inside the frame, and they do that so
10 then they're able to mill up really close to
11 obstacles. They've made the machine narrower so
12 they're able to go right up along a wall or a curb
13 and grind up the road very close to that obstacle.

14 Q. So, Dr. Singhose, can I direct you to
15 Industrial Accessibility, which is in Column 7,
16 starting at Line 45. Let me know when you get
17 there.

18 A. I'm there.

19 Q. So Rio can't change the positions of the
20 rear ground engaging units on the fly, right? The
21 machine has to stop?

22 A. That's not the way I read this patent.
23 They may have described a certain embodiment as
24 stopping and swinging the leg in.

25 But they've gone to some special effort

1 here to create a machine that, while you're swinging
2 the leg in, the crawler track is -- you know,
3 continues to point forward. That tells me that they
4 really want to allow this to be done while you're
5 driving.

6 It's important that you keep your crawler
7 track straight ahead while you're driving, so that
8 seems to be a real clear motivation for coming up
9 with what they did.

10 I think you also could jack it up and
11 rotate it in. And while you're doing that rotation,
12 you could keep the crawler track straight ahead.

13 But, honestly, it's not that important to
14 keep it straight ahead while you're jacked off the
15 ground, so I think they want to allow their machine
16 to do this while it's driving forward.

17 Q. So in Rio's description, however, it
18 states that an operator stops the machine and jacks
19 up the lifting column, correct?

20 A. Yeah. I believe this -- I didn't reread
21 this section, but I'm familiar with it, and I know
22 that they do describe one way of using their
23 technologies to stop it.

24 I don't know what kind of detail they go
25 into without rereading it, but you might put a

1 woodblock under the milling machine and then jack it
2 off the ground and perform the rotation there. You
3 might need to block it because it might, you know,
4 tilt sideways during that process.

5 But, yeah, I -- I'm sure that's one way
6 that they described their invention can work.

7 Q. And how would the invention work if they
8 had the machine still running?

9 A. Oh. Well, if you're grinding up the road
10 with this and you're going straight ahead and you're
11 seeing that you're coming up to an obstacle, you
12 could initiate Rio's technology and it would start
13 bringing the crawler track in, the swing leg in;
14 and, at the same time, it would be counter-rotating
15 the crawler track so that you kept driving straight
16 ahead with that.

17 And it would just operate the same way.
18 It would bring the swing leg in and counter-rotate
19 the track in a coordinated manner while you're
20 driving forward.

21 And so before you got to that obstacle,
22 you would've retracted the crawler track inside the
23 frame and you could just keep driving, you know,
24 past the obstacle and then extend the leg back out
25 after you cleared the obstacle.

1 MR. MROZ: We've been going for about
2 an hour now. Is it okay if we do about a ten-minute
3 break?

4 THE WITNESS: Certainly.

5 MR. MROZ: Yep. Works for me.

6 (11:06 a.m. EST - Recess.)

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1 (At 11:18 a.m. EST, with parties present
2 as before, the following proceedings were had,
3 to-wit:)

4 BY MS. FULLER:

5 Q. Dr. Singhose, do you know how much
6 steering force is required to steer Commander III?

7 A. No. In fact, nobody knows that because
8 that all depends on a bunch of conditions like we
9 talked about before, environmental conditions, the
10 load on the machine.

11 We could obviously get an estimate of
12 that, the amount of foot-pound torque for each of
13 the crawler tracks, but I don't know that off the
14 top of my head.

15 Q. Is steering torque crucial in the design
16 consideration?

17 A. Yes.

18 Q. What exactly is steering torque?

19 A. Well, steering torque I think in the way
20 that you're using it would be the amount of torque
21 that would need to be applied to turn the crawler
22 track.

23 And the reason why there's no answer is
24 because if you tried to turn it really fast, you'd
25 need a lot more torque. And if you're trying to

1 turn it into an obstacle or up a hill, you need more
2 torque.

3 So there's -- you know, you could run this
4 machine up against an obstacle and you couldn't
5 steer it, so the amount of torque would be really
6 large or even until something broke.

7 But you would want to have a target value
8 so that you could steer it under the expected
9 operating conditions.

10 Q. How about backlash? Can you provide an
11 explanation of what backlash is?

12 A. Yes, I can.

13 Backlash is a phenomenon that occurs when
14 you're generally rotating or moving a machine
15 component in one direction and then you stop it and
16 you want to go in the other direction.

17 When you do that in almost all machines,
18 you would have to turn the actuator backwards for a
19 little bit before anything happened because there
20 would be slop in the components.

21 So you drive it one direction; you start
22 to turn around. You apply some energy to the
23 actuator, the actuator moves, but nothing else moves
24 for just a little bit of time or distance. That gap
25 is referred to as backlash.

1 Q. Can you get undesirable backlash due to
2 insufficient stiffness of mechanical components?

3 A. Yes.

4 Q. And what causes that?

5 A. Well, if you have insufficient stiffness,
6 that means that you're pushing it one direction, you
7 stop, and you try to go the other direction; but
8 it's like a spring.

9 So it'd be like you pulling on something
10 with a Slinky. You pull one end of the Slinky, the
11 other side doesn't go for a while. So that's where
12 you get backlash due to insufficient stiffness.
13 That's an exaggeration so you can visualize it.

14 But, actually, any piece of material that
15 you pull back the other direction, it actually has
16 to stretch a deflect a little bit before its far end
17 starts moving. So if you have stuff that's too
18 flexible, you end up getting a lot of backlash.

19 Q. I like that analogy, the Slinky. I don't
20 think I've heard a Slinky for the last, like, ten or
21 fifteen years.

22 A. I used to love Slinkies.

23 Q. Me too as a child.

24 A. Yeah.

25 Q. How about tilting? Can you provide an

1 explanation on tilting?

2 A. I'm not understanding the word. Tilting?

3 Q. Tilting moments, T-I-L --

4 A. Oh, A tilting moment.

5 Sure. I mean, as applied to these
6 machines, you -- tilting would be turning slightly
7 to the side.

8 If you're driving forward, for example,
9 and you went through -- one of your crawlers went
10 through a gutter or a hole, you would tilt to that
11 side. You don't want your machine to do that, so
12 you want to design it so that it resists tilting
13 moments so it stays upright even when these tilting
14 moments are applied to it so it doesn't tip over.

15 Q. Tipping over would not be a good thing, I
16 would assume, for a large machine.

17 A. Yeah. If these tipped over, they're done
18 for; but it's hard to imagine one of these tipping
19 over unless you're making a road on the edge of a
20 cliff.

21 Q. True.

22 A. But they can certainly wobble; and when
23 they wobble, then the cement that you're making is
24 not flat.

25 Q. Yes.

1 A. That's why you want to control the tilting
2 moment on these for the most part, not actually
3 tilting over, but just having an uneven surface that
4 you're making.

5 Q. And in concrete paving, you do not want
6 uneven surfaces, correct?

7 A. Yeah. I mean, they're all uneven to some
8 degree, but you don't want a lot of unevenness.

9 MS. FULLER: So I have no further
10 questions.

11 MR. MROZ: Okay. Give me five
12 minutes. I'll pop back on in five minutes.

13 MS. FULLER: Perfect.

14 (11:23 a.m. EST - Recess.)

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1 (At 11:26 a.m. EST, with parties present
2 as before, the following proceedings were had,
3 to-wit:)

4 CROSS-EXAMINATION

5 BY MR. MROZ:

6 Q. Dr. Singhose, do you remember earlier when
7 Ms. Fuller was asking you about reviewing the patent
8 and looking at the claims and looking at prior art?

9 A. Yes.

10 Q. She asked if -- well, she was asking how
11 you did your invalidity analysis?

12 A. Yes.

13 Q. Did you use hindsight in performing your
14 invalidity analysis?

15 A. No.

16 Q. Why is that?

17 A. Well, my understanding of hindsight is I
18 used the -- I used the claim terms as my guide for
19 looking for prior art, and then I assemble prior art
20 that, you know, forms each of those steps. That's
21 not the process that I performed.

22 Q. And what's the process you performed?

23 A. Well, I guess I explained it poorly. I
24 went through there and I did claim construction,
25 understood the terms.

1 And then I went and looked at related
2 prior art and analyzed, you know, scope of the prior
3 art and the problems that were addressed in the
4 prior art, and I just look for prior art that was
5 addressing those same kinds of problems and looked
6 for sort of motivations to combine those, and the
7 motivations to combine are in those prior art.

8 And the motivations in the prior art is
9 what drove me to assemble them together, not the
10 recipe that's written down in these asserted
11 patents.

12 MR. MROZ: Okay. No further
13 questions.

14 MS. FULLER: Give me five minutes.

15 MR. MROZ: Okay.

16 MS. FULLER: We'll come back on.

17 Thanks.

18 (11:27 a.m. EST - Recess.)

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1 (At 11:31 a.m. EST, with parties present
2 as before, the following proceedings were had,
3 to-wit:)

4 MS. FULLER: Dr. Singhose, at this
5 time, we have no further questions. Thank you.

6 THE WITNESS: Thank you.

7 (11:32 a.m. EST - Adjournment.)

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1 C E R T I F I C A T E

2 STATE OF NEBRASKA)
3 COUNTY OF DOUGLAS) ss.

4 I, Brianne L. Starkey, RPR, CRR, General
5 Notary Public within and for the State of Nebraska,
6 do hereby certify that the foregoing testimony of
7 WILLIAM SINGHOSE, Ph.D., was taken by me in
8 shorthand and thereafter reduced to typewriting by
9 use of Computer-Aided Transcription, and the
10 foregoing fifty-eight (58) pages contain a full,
11 true and correct transcription of all the testimony
12 of said witness, to the best of my ability;

13 That I am not a kin or in any way
14 associated with any of the parties to said cause of
15 action, or their counsel, and that I am not
16 interested in the event thereof.

17 IN WITNESS WHEREOF, I hereunto affix my
18 signature and seal this 28th day of July, 2021.

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BRIANNE L. STARKEY, RPR, CRR
GENERAL NOTARY PUBLIC

22

23 My Commission Expires:

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