UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD
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MICRO MOTION, INC.,

Petitioner,

v. Inter Partes Review
No. IPR2014-00392
INVENSYS SYSTEMS, INC.,

Patent Owner.

Patent No. 8,000906
Issue Date: August 16, 2011
Title: DIGITAL FLOWMETER Volume II
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Continued Videotaped Deposition
of
JEFFREY S. VIPPERMAN, Ph.D.
Reston, Virginia
Thursday, December 11, 2014
9:13 a.m.

Pages: 94 - 176

Reported by: Amy E. Sikora-Trapp, RPR, CRR,
Former CSR-NY, CLR

Videotaped Deposition of
JEFFREY S. VIPPERMAN, Ph.D., held at the offices of:
DLA Piper LLP (US)
11911 Freedom Drive, Suite 300
Reston, Virginia 20190-5602

Pursuant to notice, before Amy E. Sikora-Trapp, Registered Professional Reporter, Certified Realtime Reporter, Former Certified Shorthand Reporter (NY)(license unrenewed), Certified LiveNote Reporter, and Notary Public within and for the Commonwealth of Virginia.

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December 11,2014

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P R O C E E D I N G S
Whereupon,
JEFFREY S. VIPPERMAN, Ph.D.,
called as a witness, having been first duly sworn by the Notary Public (Amy E. Sikora), was examined and testified further as follows:
THE VIDEOGRAPHER: This is volume two, tape number one of the videotaped deposition of Dr. Jeffrey Vipperman, taken in the matter of Micro Motion, Inc., Petitioner, versus Invensys Systems, Inc., Patent Owner, in the United States Patent and Trademark Office before the Patent Trial and Appeal Board, inter partes review number IPR2014-00392.
This deposition is being held at the DLA Piper LLP, located at 11911 Freedom Drive, Reston, Virginia, on December 11, 2014, at approximately 9:13 a.m.
My name is Orson Braithwaite, here with our court reporter, Amy Sikora-Trapp, and we are from Sound Deposition Services.
For the record, will counsel please introduce themselves.
MR. JOHNSON: Jeffrey Johnson from DLA Piper, on behalf of Invensys Systems, Inc.

and the deponent.
MR. HEINTZ: James Heintz from DLA Piper, on behalf of the same parties.
MR. COSTAKOS: Chuck Costakos, Foley & Lardner, on behalf of petitioner Micro Motion, Inc.
THE VIDEOGRAPHER: Now will the court reporter please swear or affirm the witness.
P R O C E E D I N G S
Whereupon,
JEFFREY S. VIPPERMAN, Ph.D.,
called as a witness, having been first duly sworn by the Notary Public (Amy E. Sikora), was examined and testified as follows:
EXAMINATION (Cont'd.) BY COUNSEL FOR THE PETITIONER
BY MR. COSTAKOS:
Q. So, Dr. Vipperman, I assume you haven't had any substantive conversations with counsel?
A. That's correct.
Q. Okay. Between the time we started yesterday and now?
A. That's correct.

Q. Okay. I'm going to hand you what has been previously marked as Exhibit 1067.
(Exhibit Number 1067 previously marked.)
MR. COSTAKOS: And just for the record, this is the model D meter supplement slug flow and loading/unloading instruction manual.
Q. So this supplement relates in part to batching; is that right?
A. Can I just have a minute, please?
Q. Yeah, sure.
A. Okay. Yes, this is a add-in for the model D meter that helps for the operation of running a single batch of fluid through the flowmeter. It helps correct for the fact that the model D cannot maintain oscillation during the course of one batch, and it sort of inhibits the -- the signal as to cut down on the erroneous readings.
(Discussion off the record.)
Q. Okay.
MR. COSTAKOS: I move to strike the last part of that answer as nonresponsive.
Q. So this model D supplement is meant to handle the situation of separate batches

flowing through the flowmeter?
A. It -- it discusses how to handle a batch at a time.
Q. Okay.
A. And it suggests that the meter is -- is off in between batches.
Q. So if you look at the second page of the document, which is the page that says, "Slug Flow Inhibit Setup Instructions"?
A. Okay.
Q. Okay. Under "Scope," you'll see there's a reference to batching tanks.
Do you see that?
A. Okay.
Q. You see that it says that; right?
A. I see that it says that, yes.
Q. Okay. And it says that the slug flow inhibit board is intended for use in systems susceptible to slug flow and on loading/unloading applications.
Do you see that?
A. I do.
Q. Okay. And loading/unloading applications would include separate batches flowing through the flow tube; right?

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A. Right. So subject to my prior comments, that's true.
Q. Okay. And in this slug flow manual, it describes, under 2.0, principles of operation, you'll see there's a second paragraph there?
A. Okay.
Q. Okay. And there it's describing operation without the slug flow supplement where it says, "In some instances, when the flowmeter is filled with fluid from an initially empty state, the vibrating U-tubes become unbalanced, causing the flow rate indication to jump excessively high."
You see that?
A. I see that.
Q. Okay. So with the model D by itself, during the transition from empty to full, vibration of the U-tubes may become unbalanced; agree?
A. Well, I think that condition occurs with the model D whether or not the slug flow board is there, but -- but, yes, generally.
Q. So with or without the slug flow add-on, during the transition from empty to full,

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the vibrating U-tubes may become unbalanced?
A. Right. So what we would have there is a situation within an uncontrolled vibration that's -- that could potentially be subject to stall, so . . .
Q. Okay. And so what the slug flow inhibit board does is, when it detects such a condition, for example, during transitions from empty to full and full to empty, it will inhibit the output of pulses; right?
A. Right. So the -- the model D has essentially lost oscillation and so the slug flow board sees that it's producing a mass flow rate that's excessively high, you know, beyond the capability of the meter, and it will kick in and inhibit the -- the measurement output or -- right.
Q. And it detects that the readings are excessively high by monitoring the vibration of the flow tubes; right?
A. Well, in the paragraph you were just in it says, to minimize errors -- well, starting back a sentence further, it talks about the U-tubes becoming unbalanced causing the flow rate indication to jump excessively high. To

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minimize errors associated with this occurrence, the board also monitors the signal-out voltage. If the signal-out voltage exceeds 3.5 volts, the board will inhibit the output of flow pulses. And that's because the full-scale calibration of the meter corresponds to a voltage of 3.1 volts.
So really we're monitoring the voltage of the output board which presumably is high because, you know, the oscillation is unbalanced, at best, and lost all together, at worst.
Q. Okay. You'll see what it does in the first paragraph under principles of operation it says it monitors the density of the fluid in the sensor tube.
You see that?
A. I see that.
Q. Okay. And so it monitors the density by monitoring the vibration of the flow tube; right?
A. So then it goes on to say, typically, fluid densities will range between .5 specific gravity and 3.0 specific gravity. However, gas densities are much less than .5 specific gravity. Therefore, the board is

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normally set up to inhibit the output of flow pulses when the fluid density is less than .5 standard gravity.
So this sounds to me like it's a transition from full to empty. And it's being -- sounds like it's being very proactive, and if the specific gravity drops below .5, it inhibits the pulses so that there's no output of the meter because, you know, the tough part of the transition is coming up.
Where the next paragraph sounds like it's -- it characterizes starting from an initially empty state and the tubes become unbalanced, so this is the part where I was talking about before where it's monitoring the signal-out voltage and it would correspond an empty to full transition.
Q. Okay. So the slug flow inhibit board monitors the density of the fluid by monitoring the vibration of the flow tube; right?
A. That's true, subject to the -- my previous qual -- qualifications.
Q. The density is a function of the frequency of the oscillation of the flow tube?
A. True, prior to my previous

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qualifications.
Q. So what the slug flow inhibit board does is, if the density that is detected by monitoring the vibration of the flow tubes falls below .5 specific gravity, it will inhibit the output of pulses?
A. Right. So again, since the fluids can have specific gravities that are higher, say, between .5 and 3.0, then it knows that if it drops below .5 we're going from a full to empty transition and it would inhibit the pulses.
Q. Likewise, if the flow tube were -- were simply empty, it would inhibit the output of pulses; right?
A. Perhaps. My impression with this meter is that you just run a single batch at a time.
Q. Right. My question, though, was if the meter were empty, so just filled with gas, then the specific gravity would be below .5 and the inhibit board would inhibit the output of flow pulses?
A. Perhaps. I don't see where it says, but that seems like it could be true.
Q. If you look at page five of the

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document, beneath the part that says table 2.
Do you see that?
A. Uh-huh.
Q. Okay. You see in the first sentence under there it says that new switch settings can be calculated if a specific gravity inhibit point other than 0.5 SG is desired --
A. Yes.
Q. -- end quote.
Do you see that?
A. Yes.
Q. So the inhibit point is adjustable by the user?
A. Yes. So it seems.
Q. On page two -- excuse me, page three of the document, it has a 3 in the middle and a 2 over on the right-hand of the page. It says, "Loading/Unloading." Okay.
It says that if the board is going to be used in a loading and unloading application.
Do you see that up at the top?
A. I do.
Q. That is a batching application; right?

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A. It would be at least -- it would be -- it would be one batch.
Q. It would at least be one batch; agree?
A. I think the system's designed to do a batch at a time, when you consider the steps one through five that are down below there. So . . .
Q. But unloading --
MR. COSTAKOS: Strike that.
Q. But loading/unloading relates to a batch; agree?
A. I would consider one or the other to be a batch, and perhaps -- I -- I would consider one or the other, either loading or unloading, to be a batch.
Q. Okay. You mentioned before the steps one through five. You'll see under step five it says, the amount of time required before the downstream valve can be fully opened is typically less than two minutes.
Do you see that?
A. Yes.
Q. So the transition from empty to full is on the order of two minutes or less; is

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that fair?
A. Well, if we -- if we back up to step two, we're instructed, close the upstream valve. And step three we open the downstream valve to allow one quarter or less of the normal fluid flow. This will minimize the amount of fluid missed at start-up, which is the -- the issue at hand that shows that this setup does not maintain oscillation because we're missing fluid.
Then we slowly open -- in step four, we slowly open the upstream valve to force the air out and slowly fill the meter. This slow opening minimizes the shock to the meter and reduces recovery time, again suggesting that this combination has trouble maintaining oscillation through the transition.
And then it says, in step five, once it begins counting in a normal manner, slowly open the downstream valve until it's fully open.
So it sounds like the transition from empty to full has already occurred at -- at step four because we slowly force the air out.
Q. Okay. So the recommended procedure in steps one through five is to slowly

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fill the flowmeter with fluid?
A. Correct. To minimize the shock and reduce recovery time.
Q. Okay. So the transition from empty to full in this recommended procedure will be done slowly to minimize the shock and reduce recovery time?
MR. JOHNSON: Objection, form.
A. Can you please repeat the question.
MR. COSTAKOS: Can you read it back, please.
(Record read.)
A. Okay. So I think back to the passage we read that talked about filling the flow tubes causing an unbalanced vibration condition, and I think that relates here, because in step three we're talking about minimizing the fluid missed on start-up, and then in step four we're talking about the slow transition from empty to full to reduce the shock to the meter and reduce the recovery time because, again, it's not maintaining oscillation.
And so when we reduce the recovery time, we're also minimizing the amount of fluid

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missed on start-up in step three.
Q. So you said before that your view was that this procedure related to separate batches?
A. Yes.
Q. Or a batch at a time I think is the way characterized it; is that fair?
A. Yes.
Q. Okay. And if you look on the second paragraph on this page, it says, "In loading/unloading applications, the meter is typically empty on start-up, a batch is run and the meter is purged of liquid at the end of the run."
Do you see that?
A. I do.
Q. Okay. So the notion here is that this procedure, which is in steps one through five, would be repeated when a batch is run, and then the batch would be run and then the meter would be purged of liquid, and then the procedure would be run again?
MR. JOHNSON: Objection, form.
A. So I would consider this a single run, this process that you just read back.

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Q. Right. My question was that the way it would work is that you would run this single run, as you described it, and then, as described in that sentence that I just read to you, the meter would be purged of liquid at the end of the run; correct?
A. Correct.
MR. JOHNSON: Objection, form.
Q. And then the meter would be able to process another batch; correct?
MR. JOHNSON: Objection, form.
A. Are -- are you asking me if that's what you're reading from the sentence?
Q. I'm asking you if that's how this meter would work.
MR. JOHNSON: Objection, form. Objection, scope.
Q. Let me ask it -- let me ask it this way: This section here describes loading and unloading applications; right?
A. Yes.
Q. Okay. And it describes a procedure which we've just walked through for processing a single batch; correct?
A. Yes.

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Q. Okay. And then it says that the meter is purged of liquid at the end of the run; correct?
A. The sentence one says that, yes.
Q. Okay. And then the meter could be used after the meter has been purged of liquid at the end of the run to process a second batch using the same procedure; right?
MR. JOHNSON: Objection, form. Objection, scope.
A. Well, I would like to point your attention to the paragraph just before figure two on page 3. It says, just as with slug flow, the slug flow inhibit board will prevent a portion of the fluid flow from being counted during loading or unloading. The amount of fluid not counted will depend upon the piping arrangement, the meter location, the fluid properties, the flow rate and the purging method. However, if the start-up and purge operation is always performed in the same manner, the amount of fluid not measured by the flowmeter can be characterized.
And then on section 3.2.1 below figure two it says, calculating the loading/unloading correction factor. Step one,

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