

IPR2024-00934 (U.S. Patent No. 7,496,342)

Patent Owner's Sur-Reply

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Texas Instruments Incorporated
Petitioner,

v.

PARKERVISION, INC.
Patent Owner.

U.S. Patent No. 7,496,342

Issue Date: February 24, 2009

Title: DOWN-CONVERTING ELECTROMAGNETIC SIGNALS, INCLUDING
CONTROLLED DISCHARGE OF CAPACITORS

Inter Partes Review No. IPR2024-00934

PATENT OWNER'S SUR-REPLY

TABLE OF CONTENTS

I.	Petitioner’s Reply Violates 37 C.F.R. §§42.6(a)(3) and 42.22(a)(2).....	1
II.	Petitioner Should Be Limited To Galton’s Original Simulations.....	2
III.	Petitioner’s Theories Are A Moving Target.....	4
IV.	The Claims Do Not Merely Pertain To Optimum/Workable Ranges.....	5
V.	Galton’s Histograms Are Unexplained And Should Be Disregarded.....	6
VI.	The Claims Require A Specific Configuration.....	7
VII.	Galton Failed to Perform The Necessary Discharge Calculations Using “Total Charge Stored” And Now Tries To Do So In Reply.....	7
VIII.	Galton New Calculations Of DeMaw Are Flawed.....	11
IX.	DeMaw Does Not Disclose The Claimed Discharge Percentage.....	13
A.	DeMaw JFETs Are Configured Not To Turn “Off.”	13
B.	Petitioner/Galton Changes Theories Regarding What It Means For a Switch To Be “Off.”	15
1.	Petitioner/Galton’s Original Theory Fails.....	15
2.	Petitioner’s Alternative Theory Is Belied By Galton And The Patent.....	20
C.	Petitioner Mischaracterizes Ricketts’ Opinion.....	21
D.	Petitioner/Galton’s Alternative Theory Is Arbitrary.....	22
E.	Petitioner Discussion About Inoperable Claims Is A Red Herring.	23
F.	The Transistor Chosen for DeMaw Is Highly Relevant.....	24
G.	Petitioner/Galton Inappropriately Relies on Oxner.....	25
H.	Ricketts Does Not Acknowledge That DeMaw Meets The Claimed Percentages.....	25

I.	Galton Has Not Shown That The Percentage He Calculated Is The Percentage When DeMaw’s JFET Is “Open.”	26
X.	MacNally	26
A.	MacNally Does Not Disclose The Claimed “Coupling”	26
B.	As shown above, for example, with regard to mixers and transistors <i>similar to Macnally</i> , Galton’s own references describe circuit operation in terms of conventional current, not electron flow. Current (I/i), highlighted above in purple, flows in the direction of the transistor arrows (blue). Macnally Does Not Disclose A “Switching Device”	36
C.	Macnally Does Not Disclose The Claimed Discharge Percentage.	38

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01291, Paper 75, 90-91 (P.T.A.B. Jan. 30, 2024).....	2
<i>Google LLC v. Parus Holdings Inc.</i> , IPR2020-00846, Paper 31,13-14 (P.T.A.B. Oct. 19, 2021)	2
Rules	
37 C.F.R. § 42.6(a)(3)	1
37 C.F.R. §§ 42.22(a)(2)	1

PATENT OWNER'S EXHIBIT LIST

Exhibit No.	Description
2001	Complaint, ParkerVision, Inc. v. Texas Instruments Inc., Case No. 6:23-cv-00384-ADA (WDTX)
2002	Agreed Scheduling Order, ParkerVision, Inc. v. Texas Instruments Inc., Case No. 6:23-cv-00384-ADA (WDTX)
2003	Dani Kass, "Catching Up On Patent Litigation With Judge Albright," LAW360 (Mar. 14, 2023)
2004	Sonrai Memory Ltd. v. Kingston Tech. Co., Inc., Case No. 6:21-cv-1284-ADA, Order Denying Kingston Tech. Co. and Kingston Tech. Corp.'s Opposed Motion to Stay Pending Resolution of Inter Partes Review, Dkt. 94 (W.D. Tex., Oct. 18, 2022)
2005	Docket Order, Kerr Machine Co. d/b/a Kerr Pumps v. Vulcan Industrial Holdings, LLC, No. 6:20-cv-00200 (W.D. Tex. Aug. 2, 2020)
2006	Statutory Disclaimer Under 37 CFR 1.321(a) and Electronic Acknowledgment Receipt dated August 28, 2024
2007-2020	RESERVED
2021	Declaration of Dr. David Ricketts
2022-2024	RESERVED
2025	Excerpts from Howe, R. et al., Microelectronics: An Integrated Approach
2026-2030	RESERVED
2031	Excerpt of Graf, R., Modern Dictionary of Electronics, Seventh Edition
2032	Rofougaran, A., et al., A 1 GHz CMOS RF Front-End IC for a Direct Conversion Wireless Receiver
2033	U.S. Patent No. 6,061,551
2034	Deposition Transcript of Ian Galton, dated March 12, 2025

2035	Sedra, Microelectronic Circuits (4th ed. 1998)
2036	Deposition Transcript of Ian Galton, dated February 28, 2025
2037	CMOS Analog Circuit Design
2038	Sze, Physics of Semiconductor Devices (2nd ed. 1981)
2039	Deposition Transcript of Ian Galton, dated April 14, 2025
2040	Email dated 2/28/2025 from Petitioner to Patent Owner
2041	Email dated 3/4/2025 from Patent Owner to PTAB
2042	Full Table of Contents for Excerpts from Howe, R. et al., Microelectronics: An Integrated Approach
2043	Full Table of Contents for Sedra, Microelectronic Circuits (4th ed. 1998)
2044	Full Table of Contents for CMOS Analog Circuit Design
2045	Full Table of Contents for Sze, Physics of Semiconductor Devices (2nd ed. 1981)
2046	Declaration of Taylor Lepore
2047	Deposition Transcript of Ian Galton, dated July 28, 2025

I. Petitioner's Reply Violates 37 C.F.R. §§ 42.6(a)(3) and 42.22(a)(2).

Petitioner's Reply improperly attempts to circumvent the word limits by incorporating arguments by reference from its expert declarations, in violation of 37 C.F.R. § 42.6(a)(3). Petitioner's Reply further fails to cite to the supporting expert declarations with the specificity required under C.F.R. § 42.22(a)(2).

Petitioner submitted two declarations from Dr. Galton ("Galton"): Ex.-1060, which spans **94 pages** (over **16,600 words/139 paragraphs**) of *substantive* analysis; and Ex.-1042, which spans **164 pages** (over **9,400 words/169 paragraphs**) of *substantive* analysis. But the Reply itself contains only short, conclusory arguments, followed by citations to numerous paragraphs in these declarations. *See, e.g.*, Reply, 2 (citing Ex.-1042, ¶¶16-144), 5-6 (citing Ex.-1042, *passim*), 10 (citing Ex.-1042, §§IV, VI), 11 (citing Ex.-1042, ¶¶18-76), 32 (citing Ex.-1042, ¶¶145-52); 2 (citing Ex.-1060, ¶¶18-32), 4 (citing Ex.-1060, ¶¶141-44), 7-9 (citing Ex.-1060, ¶¶10-17, 21-25), 20 (citing Ex.-1060, ¶¶49-56, 60-65), 27 (citing Ex.-1060, ¶¶97-98, 133-35), 40 (citing Ex.-1060, ¶¶54-66);.

Critically, the declarations contain specific arguments/analysis not found in the Reply. PO is unfairly prejudiced because it cannot possibly address even a fraction of Ex.-1060 (let alone Ex.-1042) within the sur-reply word limit. And, as discussed in Section II below, PO should not have had to address Ex.-1042 in its

POR. Moreover, Petitioner's vague and expansive citations force PO (and the Board) to wade through expert declarations just to piece together the bases for Petitioner's allegations.

Thus, PO respectfully requests that the Board decline to consider arguments/analysis/expert testimony and supporting exhibits not specifically discussed in the Reply. *See Apple Inc. v. Masimo Corp.*, IPR2022-01291, Paper 75, 90-91 (P.T.A.B. Jan. 30, 2024) (declining to consider expert testimony/supporting exhibits); *Google LLC v. Parus Holdings Inc.*, IPR2020-00846, Paper 31,13-14 (P.T.A.B. Oct. 19, 2021) (same).

II. Petitioner Should Be Limited To Galton's Original Simulations.

Petitioner seeks a do-over of its Petition. That is not permitted.

The Petition was supported by Galton's original declaration (Ex.-1003), which included simulation results (without any underlying data) that constituted the *only* evidentiary basis for Petitioner's invalidity theories. After the POPR criticized Galton's simulations, Galton corrected/re-ran them to address mistakes and deviations from the teachings of the prior art. PO only learned of these new simulations during Galton's deposition related to his original declaration.

Recognizing that (1) Petitioner would likely attempt to introduce these new simulations in its Reply, (2) Sur-Reply expert declarations are not permitted absent

extraordinary circumstances, and (3) Sur-Replies are word-limited, PO contacted the Board for guidance. The Board, however, could not guarantee that a Sur-Reply declaration would be permitted. PO was thus left in a difficult position: either (1) take the new simulations out-of-time and try to address them in the POR, or (2) risk having its expert precluded from responding and/or the new simulations admitted without opportunity for expert rebuttal.

Faced with uncertainty, PO had no real choice but to take out-of-time simulations before filing its POR. Yet, instead of providing minor corrections to simulations Galton claimed already existed, Petitioner took *10 days* (after PO requested these simulations) and produced a *169-page* second declaration (Ex.-1042) (longer than Galton's original declaration). The second declaration contained *over 20* new simulations/plots.

Petitioner now contends that PO agreed to receive the new simulations and had "ample" opportunity to address them in the POR. Reply,5-6. But this mischaracterizes the situation. PO did not consent to Petitioner's submission of untimely simulations. PO was compelled to address them to ensure its expert's analysis could be properly placed into the record. And PO was left with the unreasonable task of addressing about *250 pages* of substantive, expert analysis across Galton's two declarations (one of which was never

included/explained/referenced in the Petition at all).

This is not how IPRs are supposed to work. A petitioner is not entitled to revise its case after-the-fact simply because it made a mistake or later realized flaws in its theories. Nor should a PO be forced to speculate how new, undisclosed simulations (introduced for the first time on reply) might be used.

Accordingly, Petitioner should not be entitled to rely on any simulations (or expert testimony discussing/explaining those simulations) that were not included with the Petition.

III. Petitioner's Theories Are A Moving Target.

Unable to substantively address PO's criticisms of the theories advanced in the Petition, Petitioner/Galton simply change theories in the Reply. In doing so, they attempt to rewrite the narrative rather than defend what was originally presented.

As discussed below, Petitioner/Galton initially failed to use "total charge stored" (expressly recited in the claims) when calculating discharge percentages. In the Reply, Petitioner/Galton change their formula and introduce new calculations/plots based on a revised approach. Petitioner/Galton also change their theory of what it means for a switch to be "open"/off.

Petitioner is not permitted to fundamentally alter/replace its original theories

with new ones. The rules do not allow a party to say, in effect, “if you don’t like my original theory, here is a different one.” Yet that is precisely what Petitioner/Galton has done here.

Accordingly, the Board should decline to consider these new theories/evidence.

IV. The Claims Do Not Merely Pertain To Optimum/Workable Ranges.

Because claim 18 was previously invalidated, Petitioner implies that the challenged dependent claims are nothing more than the discovery of optimal/workable percentage ranges for capacitor discharge. Reply,3 (citing *DuPont*). Not so.

Claims 19-21 do not merely recite percentages; rather, they specifically require that discharge occur at a specific time—when a switch is *open*. Claim 18 contains no such limitation/requirement regarding the timing of discharge in relation to the state of the switch.

Thus, contrary to Petitioner’s assertion, claims 19-21 do not merely reflect the discovery of optimum/working ranges under a general condition disclosed in the prior art. Rather, they add specific and meaningful limitations that further distinguish/narrow the claim scope.

V. Galton's Histograms Are Unexplained And Should Be Disregarded.

Galton's histograms are the *sole* basis for Petitioner's assertion that the claimed discharge percentages are met. The histograms, however, just show the results/conclusions of an undisclosed process. Nowhere in Galton's original or second declaration, the Petition, or the Reply is there any explanation of how the histograms were created or what specific data was used to calculate the percentages. Nor does Galton provide any exemplary/sample calculations to support the percentages shown.

For the first time, in his Reply declaration (Ex.-1060, ¶¶57-58), Galton offers some minimal/cursory explanation. But this explanation appears nowhere in the Reply itself. It should therefore be disregarded on that basis alone.

Even then, his explanation is wholly incomplete. Galton provides only a few short snippets of script, which he states reflect modifications to the revised calculations submitted with his second declaration *not* to his original Python script. *Id.* Galton's Reply declaration therefore appears to rely on an undisclosed Python script that is *not* part of the record.

Galton further asserts that his modified script implements Dr. Ricketts's ("Ricketts") view of "total charge stored" for calculating capacitor discharge percentage. *Id.* It does not. As discussed in Section VIII below, Galton's script

explicitly removes the 12V bias voltage across each of DeMaw's capacitors—contrary to Ricketts's analysis. Even then, Galton does not explain the significance of Galton's modifications or how they affect his overall calculations.

With respect to Macnally, Galton merely refers to his DeMaw analysis, stating that the same modifications apply to the script used for Macnally histograms. *Id.*, ¶¶114–15. But this directly contradicts Galton's own statement that “[t]he voltage bias considerations only apply to DeMaw, and not to Macnally.” *Id.* ¶65. It remains unclear how Galton's script modifications were applied to Macnally or whether they were appropriate.

Galton's histograms are unreliable and fall far short of meeting Petitioner's burden. And without the histograms, all asserted Grounds fail because Petitioner cannot show the claimed discharge percentages.

VI. The Claims Require A Specific Configuration.

All challenged claims require *both*: (1) the capacitors discharge between 6% and 50% when a switch is “open”/off, *and* (2) the claimed percentage is calculated based on the “total charge stored therein [i.e., total charge stored on the capacitor].” Petitioner fails to show either. This is fatal to all Grounds.

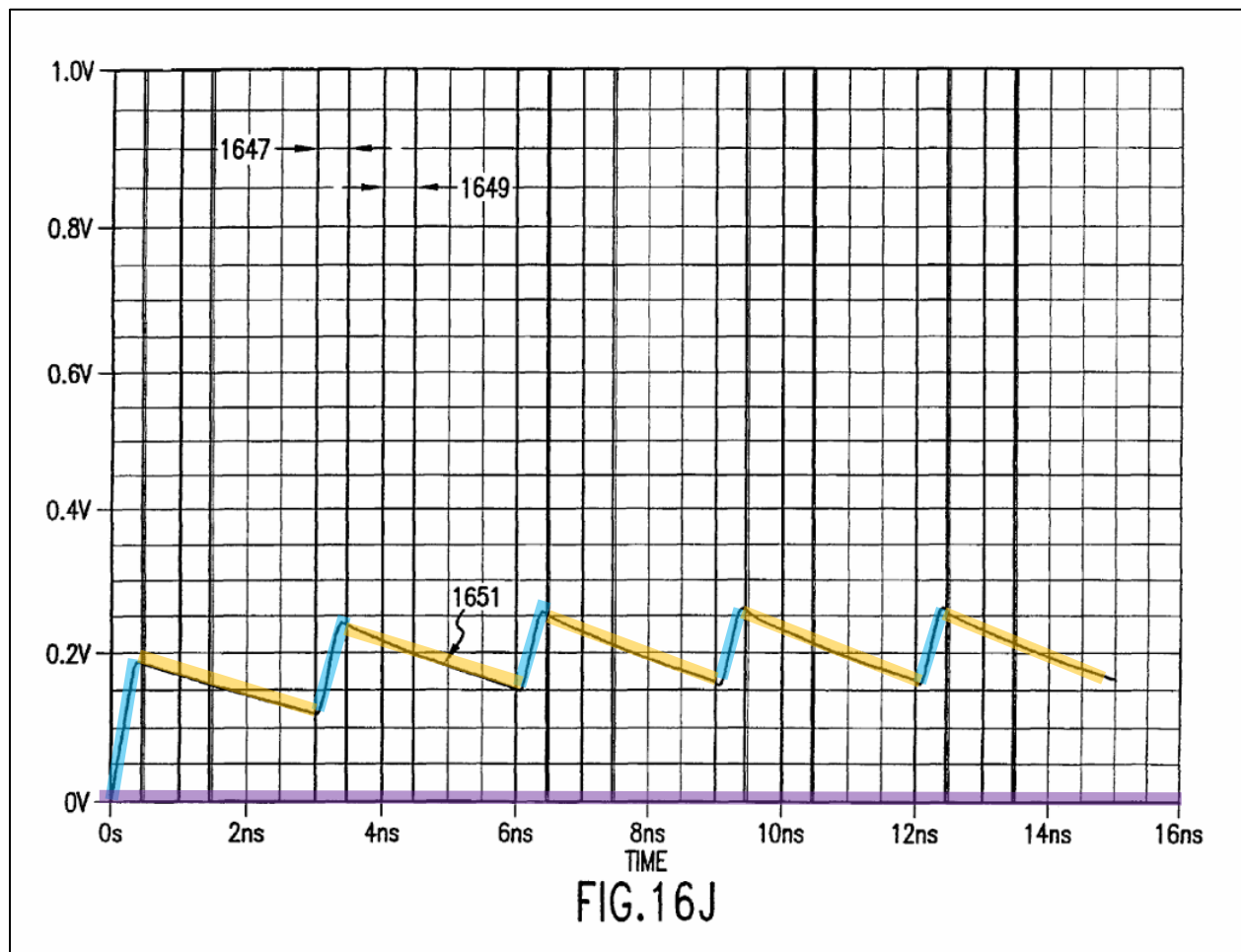
VII. Galton Failed to Perform The Necessary Discharge Calculations Using “Total Charge Stored” And Now Tries To Do So In Reply.

In the Petition, Petitioner/Galton disregarded the plain claim language when

calculating the discharge percentage. Thus, all Grounds fail.

The challenged claims expressly require that the discharge percentage be calculated based on the “*total* charge stored” in a capacitor: “the [first/second] capacitor discharges ... [X] percent of the *total charge stored therein*.” In other words, the proper calculation for calculating discharge percentages compares the amount of charge discharged during the switch's open/off state to the *total* charge stored in the capacitor at the beginning of that discharge cycle. There is nothing ambiguous about this.

Figure 16J of the '342 patent illustrates this concept.



As shown above, when a switch is closed/on, a capacitor charges (blue) and, when the switch is open/off, the capacitor discharges (orange). POR,19-20.

Critically, the capacitor never fully discharges to 0V (purple line), meaning some charge remains on the capacitor. That remaining charge becomes the initial condition for the next charging cycle. Ex.-1001,42:52-54. Thus, each successive charging cycle adds to the total charge already stored.

Although Petitioner discusses Figures 16A/16D/16H/16O, it notably omits

Figure 16J— which, unlike the others, depicts the capacitor's charging/discharging behavior.

For the Petition, Galton admitted he did *not* use “total charge stored therein” (i.e., on the capacitor) in his discharge percentage calculations. Instead, he compared the charge added to the capacitor during a *single* charging cycle to the amount discharged in the subsequent discharging cycle. Ex.-2047,14:2-16. But Galton's approach is flawed: it ignores that charge on the capacitor accumulates over *multiple* charging cycles and, thus, fails to reflect the “*total* charge stored” on the capacitor. By using the wrong calculation, Galton artificially overstates the percentage discharge. POR,89-90.

The POR identified this flaw in Galton's original methodology. In Reply, rather than offering any rational justification, Petitioner/Galton take a position that strains credibility. Reply,19-21. Petitioner/Galton attempt to *re-write* the claim language, asserting that “the change in the total charge stored during the aperture period...is the relevant charge.” *Id.*, 20. Not so. The claim language is “total charge stored therein,” not “change in” the “total charge stored therein.”

Petitioner/Galton also argue that their interpretation is consistent with the claim language, asserting the antecedent basis for “the total charge” (in claims 19-21) is “a charge on the capacitor when the [first/second] switching device is

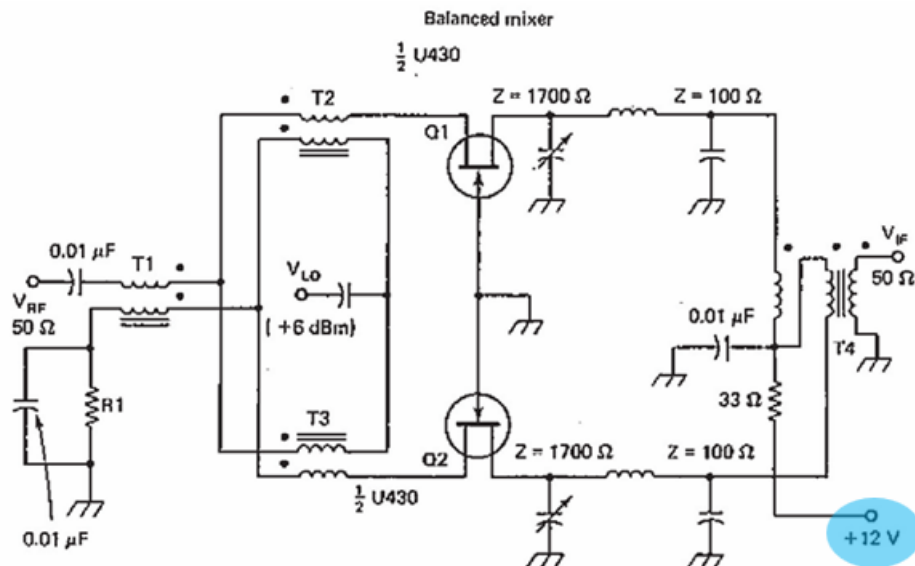
closed” in claim 18. *See* Reply,20 (citing Ex.-1060¶¶49-56,60-65). That too is incorrect. Petitioner/Galton ignore that claim 18 expressly recites “a *plurality* of charging and discharging cycles.” As discussed above, the patent teaches that charge builds up over multiple cycles because the capacitor does not fully discharge. Thus, “total charge stored” cannot simply refer to the charge added in a single charging cycle, as Petitioner/Galton suggest. Instead, it must account for charge accumulated over a *plurality* of cycles as claimed.

Attempting to change course, Galton introduces new calculations and histograms in the Reply, claiming his new analysis simply applies Ricketts’s interpretation of “total charge stored therein.” Ex.-1060,¶¶56-58. But, as discussed below, that is not what these new calculations actually do. And, though framed as rebuttal, Galton’s new calculations are part of a *new* theory that should not be considered.

Because all Grounds rely solely on Galton’s flawed simulations/calculations, Petitioner has failed to demonstrate that the challenged claims are invalid.

VIII. Galton New Calculations Of DeMaw Are Flawed.

DeMaw’s capacitors *always* have a 12V bias voltage across them (see below). Galton admits this. Ex.-2047,21:21-22:11.



In other words, this 12V is the baseline voltage on the capacitors. Additional charge is added on top of the 12V during each charging cycle. Because the 12V bias is always present, it is necessarily part of the “total charge stored” and must be included in the denominator when calculating discharge percentage. Galton’s new calculations, however, improperly *omit* this 12V¹ (Ex.-2047,25:16-22)—thereby reducing the denominator in his calculations and artificially inflating the resulting discharge percentage. And he never provides any analysis showing what the discharge percentage would be if the 12V were included.

¹ Contrary to Galton’s assertion, he does not use Rickett’s interpretation of “total charge stored.” Instead, unlike Ricketts, Galton removes the 12V bias voltage when calculating discharge percentages. Ex.-1060,¶61.

Instead, Galton now claims “it is necessary to omit the constant charge component caused by the bias voltage across the capacitor,” because “this voltage component never gets discharged.” Ex.-1060,¶61. Notably, Galton never identified this issue in his original declaration/calculations. Only now, in Reply, does he contend that excluding the bias is “necessary.” Regardless, the claims *require* including the 12V – it is part of the “total charge stored” on the capacitor.

To justify ignoring the 12V, Petitioner/Galton argue that the '342 patent “removes the bias voltage from its own plots,” citing Figure 16D and asserting the bias is 3.3V. Reply,20-21. This is a red herring. Tellingly, the cited specification (Ex.-1001,23:60–67,45:24–27) does not relate/refer to Figure 16D or identify 3.3V as a bias voltage. These assertions are unsupported and appear manufactured solely to support Petitioner/Galton's newly crafted theory.

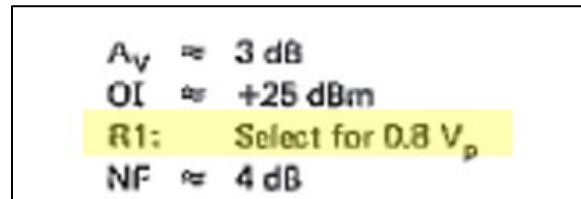
IX. DeMaw Does Not Disclose The Claimed Discharge Percentage.

A. DeMaw JFETs Are Configured Not To Turn “Off.”

Because the claims require specific discharge percentages when a switch is “open,” the key question is: when are DeMaw's JFETs “open” (i.e., off), and what is the percentage discharge of the “total charged stored” in DeMaw's capacitors

during that time?

Petitioner/Galton do not dispute that a POSITA understands that a JFET is effectively off/open when it *operates in* its pinch-off region. Ex.-2021, ¶ 136.



Ex.-1016, Fig. 6.7 (annotated).

DeMaw, however, specifically teaches *avoiding* pinch-off by biasing its JFETs at **80%** of the pinch-off voltage $V_{GS(OFF)}$ (i.e., V_p) (above). POR, 30; Ex.-2021, ¶¶ 199, 201-202. The Reply ignores this issue when arguing that DeMaw JFETs open/turn off.²

DeMaw intentionally biases its JFETs to *avoid* the pinch-off region, ensuring they do not open/turn “off.” *Id.* As shown in Section IX.B.1 below, Galton’s corrected DeMaw simulations (with the correct JFET model) confirm this behavior.

Notably, Petitioner attempts to downplay DeMaw’s *express* teaching as

² The Reply only discusses pinch-off in the context of using the correct voltage for simulations. Reply, 10-13.

merely a *recommendation*. Reply,10. But, under that logic, any teaching in a reference could be ignored, allowing a petitioner to rewrite prior art as needed to support invalidity—exactly as Petitioner/Galton try to do here. That is not the law.

Petitioner also insinuates that DeMaw's JFETs “open” (turn “off”) because the Federal Circuit invalidated claim 18 in view of DeMaw. Reply,1. But Petitioner improperly reads specification language—associating discharging with the *switch* being open/off—into claim 18 that is not there.

Regardless, claims 19-21 require specific discharge percentages when the switch is “open.” As discussed below, Petitioner has not shown this.

B. Petitioner/Galton Changes Theories Regarding What It Means For a Switch To Be “Off.”

After reviewing the POPR and POR, Petitioner evidently realized that its original theory underpinning all Grounds was untenable. So Petitioner/Galton changes theories in the Reply.

1. Petitioner/Galton's Original Theory Fails.

In the Petition, Galton unambiguously stated that “[t]he switches are off when their drain currents are zero and on when their drain currents are non-zero.”³ Ex.-1003,¶103. Galton reaffirmed this position during his deposition—

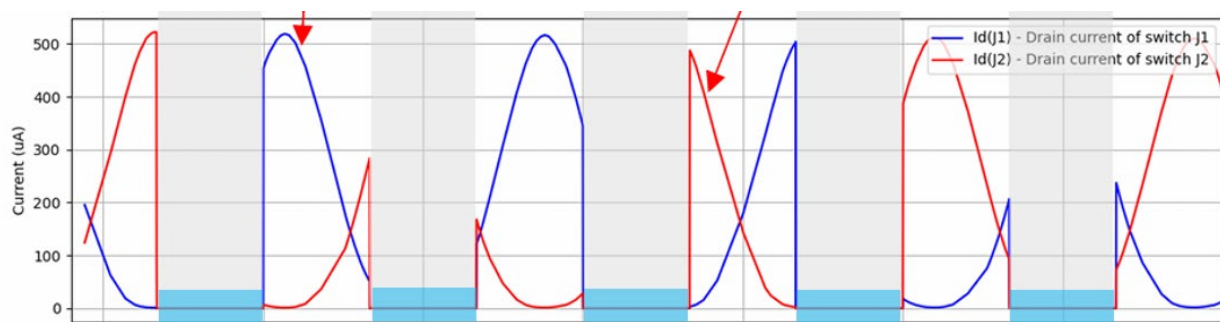
³ Unless otherwise noted, all emphasis has been added.

“open means... it doesn't conduct. Closed means *conduct*.” Ex.-2036,27:18-28:4.

In other words, Galton equated open/off with zero current flow and closed/on with non-zero current.

In the Reply, however, Petitioner/Galton now contradict this position, arguing that switches that are “not entirely off” (i.e., switches that are “on” (conducting current)) can nevertheless be considered “off”/open. Reply,1. In other words, Petitioner/Galton now assert that off/open can include when the switch is also on/closed. Petitioner/Galton's reversal is simply not credible.

Petitioner/Galton's problem stems from a mistake Galton made in his original DeMaw simulations. Galton admittedly used the wrong transistor model instead of the JFET disclosed in DeMaw. Ex.-2036, 51:14-52:3; 45:9-20; Ex.-2047,14:19-15:3; *id.* 17:22-18:7 (admitting that plots using different JFETs would not line up).



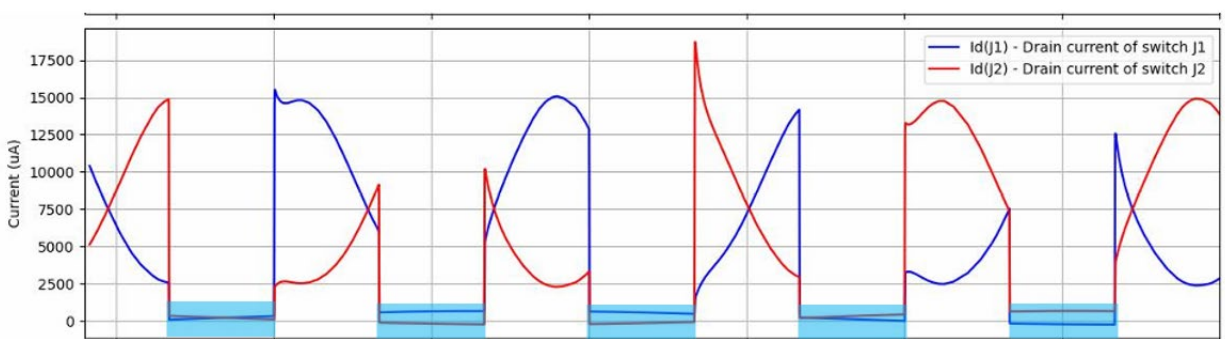
Ex.-1003,¶108.

As shown above, Galton's original DeMaw simulations using the incorrect

JFET model produced long, discrete periods of *zero* current (blue highlights), creating the illusion that the JFETs turned off/opened. But this contradicts DeMaw's express disclosure to avoid pinch-off (i.e., keep transistors on/closed). See Section IX.A.

Galton then used these incorrect simulations to calculate percentage discharge during periods he incorrectly *assumed* the switches were off/open. Thus, Petitioner's original theory in the Petition hinged on switches being off/open only when current was zero.

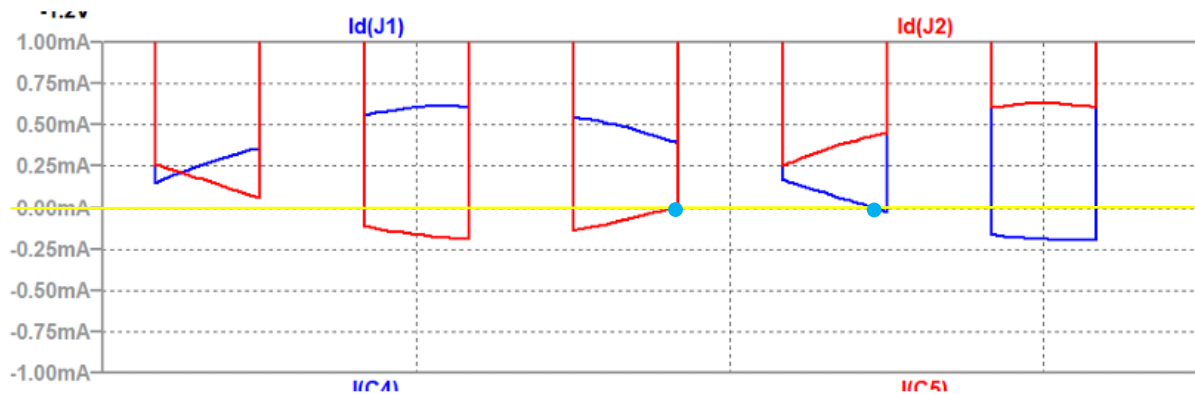
After the POPR, Petitioner/Galton changed their tune. Galton realized his transistor modeling error. Ex.-2036,51:14-52:3. So Galton re-ran his DeMaw simulations using the correct JFET model.



As shown above (Ex.-1042, ¶8), unlike his original DeMaw simulations, Galton's corrected simulations no longer show sustained periods of zero current. Instead, DeMaw's transistors always conduct current, consistent with DeMaw's

biasing at 80% of pinch-off. *See* Section IX.A.

This can be seen more clearly below from Ricketts's zoomed-in view of Galton's corrected DeMaw simulation.



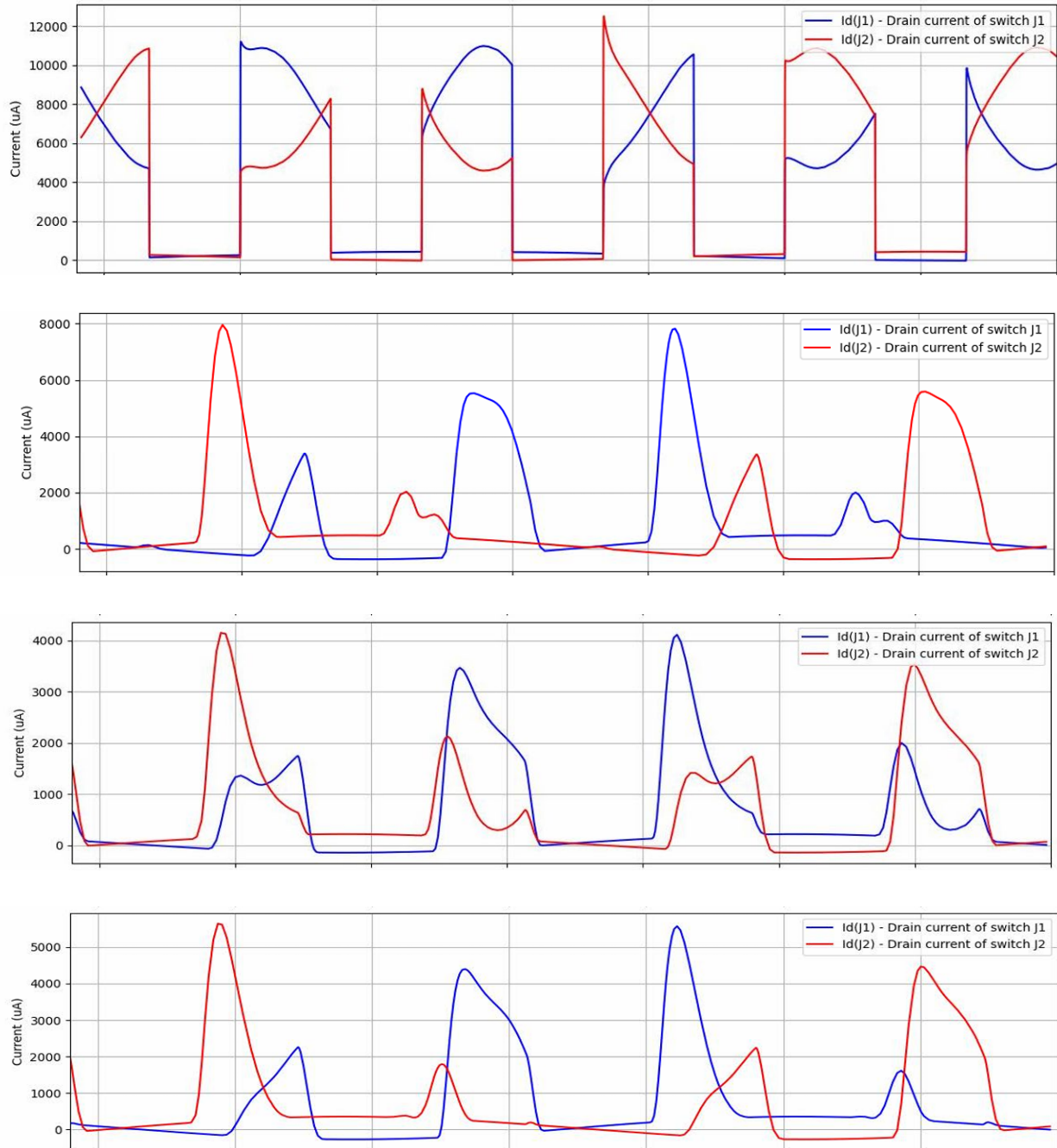
POR,51 (citing Ex.-2021,¶¶285-86).

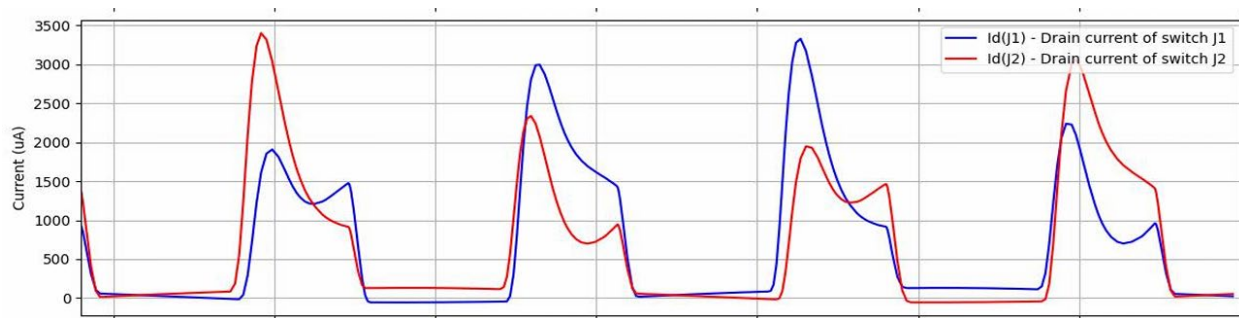
As shown above, aside from instantaneous transitions (blue dots), the drain current is never zero (shown by the yellow line). Thus, under Petitioner/Galton's original position, the switches never turn off/open.

As Ricketts explained, because of this configuration, there is no discharge percentages even close to approaching the claimed 6%-50% of the “total charge stored” when a switch is “open” as required by the claims. Ex.-2021,¶¶318, 329, 342, 352 (citing Appendix B).

Indeed, as shown below, using the correct JFET model, Galton ran numerous simulations for different DeMaw configurations trying to find something to support his/Petitioner's original theory. In every case, the result was the same—DeMaw's

JFETs remained closed/on (at times, conducting less current).





Ex.-1042, ¶¶14,22,28,34; see also *id.*, ¶¶40,46,53,59,65,73,79,86,92,98,104,110, 117,123,129,135,141.

As shown above, none of Galton's corrected DeMaw simulations (unlike the original, flawed simulations), exhibit sustained periods of zero current.

Consequently, Galton could not show the claimed percentage discharge when the switch is open/off (i.e., conducting zero current under his original theory).

Thus, under the theory in the Petition, Petitioner's invalidity case is dead in the water. Accordingly, Ground 1 fails.

2. Petitioner's Alternative Theory Is Belied By Galton And The Patent.

To salvage its case, Petitioner shifts to an alternative theory—one that contradicts its own expert.

In particular, Petitioner now argues that, regardless of whether current is flowing through a switch or not, the switch is open/off “between apertures” of the LO signal. Reply, 1 (citing Ex.-1001,38:4-15). This alternative theory broadens the open/off period to include substantial intervals when DeMaw's JFETs are actually

conducting (i.e., closed/on), thereby artificially inflating their discharge window.

POR,89-90. This is not credible because it contradicts the claim language.

Nevertheless, this alternative theory is belied by Galton admission that “[a] POSITA would recognize that the control signal being ‘between apertures’ does *not automatically imply an ‘off’ state* of the JFET.” Ex.-1060,¶38. Here, because the claims require the percentage discharge to occur when the switch is actually open/off, Petitioner’s “between apertures” theory fails..

To support its “between apertures” theory, Petitioner cites to Ex.-1001,20:1-11 and asserts that “off” means “not entirely on.” Reply,1. But the cited passage says no such thing. And Petitioner’s ambiguous metric is solely done to enable Petitioner to argue whatever it wants.

C. Petitioner Mischaracterizes Ricketts’ Opinion

Looking to find something to supports its alternative theory, Petitioner mischaracterizes Ricketts’s discussion of JFET operation in pinch-off. Ricketts explained that a JFET “effectively turns off” when operating *in its pinch-off region*. Petitioner seizes on this phrase to argue that JFETs never fully turn off. And the Reply repeatedly refers to DeMaw’s switch as “effectively turn[ing] off.” Reply,2,9,14,18. But, as Ricketts explains, DeMaw’s JFETs are biased to operate *outside* of pinch-off, *not* in pinch-off. Thus, Petitioner reliance on Ricketts is

misplaced.

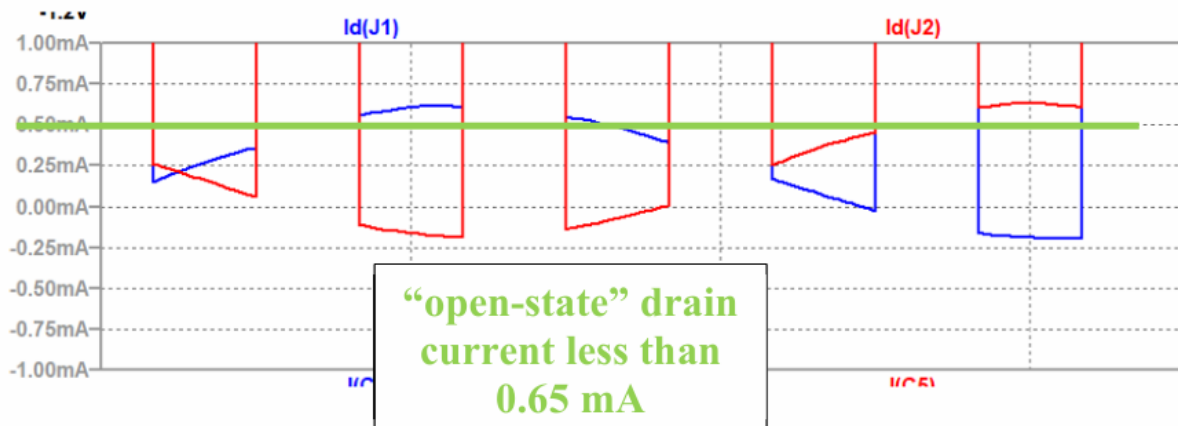
D. Petitioner/Galton's Alternative Theory Is Arbitrary.

It is Petitioner/Galton's burden to identify when the switches are "open" and demonstrate that the claimed percentage discharge occurs during that time. They have not done so.

Under Petitioner/Galton's "between apertures" theory, instead of "open" being "zero" current, a switch is also "open" at some *unspecified* non-zero current. This is not a reliable, reasonable, or credible analysis.

This ambiguity gives Petitioner the flexibility to label any condition as "open," and Petitioner exploits that flexibility. Specifically, Petitioner points to simulation results showing a "significant" drop in current and argue that this demonstrates the switches are "open." Reply, 14-15. But at best, this shows that DeMaw's JFETs are conducting less current—not that they are open/off, which Galton originally defined as zero current.

Further, Petitioner asserts that DeMaw's JFETs are fully "on" at 15mA, and, without providing any explanation, *arbitrarily* claims that any current below 0.65mA is "effectively" off. Reply, 12-14. Petitioner only relies on Galton say-so. And Galton provides no basis (objective or otherwise) for selecting 0.65mA as the cutoff.



Reply,13;Ex.-2021,¶285.

The reason for Galton's choice is apparent: as shown above, 0.65mA conveniently captures all the low, non-zero currents that would otherwise disqualify DeMaw under Galton's original theory. Galton chose this random/arbitrary threshold because it shows what he wants. Had Galon chosen a different threshold (e.g., 0.10mA), his analysis would completely fall apart. Invalidity cannot hinge on random/arbitrary thresholds (without any basis) designed to achieve a desired outcome.

E. Petitioner Discussion About Inoperable Claims Is A Red Herring.

To justify its alternative theory, Petitioner also discusses the distinction between real and ideal JFET behavior. Reply,2. Petitioner asserts that PO's interpretation—requiring open/off to mean fully off (zero current)—would render

the claims indefinite and/or inoperable (and excludes all real-world JFETs).⁴ Id.,2-

3. But this was Petitioner/Galton's *own* position, not PO's. Only now that there is a problem with their position do they back away.

For Petitioner to now argue about indefiniteness/inoperability is a red herring and disingenuous.

F. The Transistor Chosen for DeMaw Is Highly Relevant.

Petitioner asserts that the choice of JFET model used when simulating DeMaw is immaterial. Reply,5. Not so. As shown above, comparing Galton's original and corrected DeMaw simulations, the selection of the JFET significantly affects circuit behavior.

Different JFETs have different characteristics and operate differently depending on how they are configured. Ex.-2021,¶¶135-39. DeMaw discloses a specific JFET and explains how it is configured/setup. Petitioner cannot just ignore this express disclosure under the guise of optimization using a different JFET. Reply,7. Indeed, Petitioner/Galton has not explained why one would use one type of JFET over another. Petitioner cannot just swap components in and out of DeMaw, run simulations until they get to the claimed percentage, and then claim invalidity. That is pure hindsight.

⁴ This is not for an IPR to decide.

G. Petitioner/Galton Inappropriately Relies on Oxner.

In the Petition, Petitioner/Galton, spent considerable time distinguishing DeMaw from Oxner, concluding that “DeMaw is a *different* circuit than Oxner.” Pet.,9-10. But now, in Reply, Petitioner/Galton rely heavily on Oxner (including it as a new exhibit) to justify Galton’s DeMaw simulations. Reply,7; Ex.-1060,¶¶8-13,19,26 n.1,27,42,72,75-77.

Oxner, however, is not being used as part of a Ground for invalidity. Thus, Petitioner/Galton’s reliance on Oxner should be disregarded.

H. Ricketts Does Not Acknowledge That DeMaw Meets The Claimed Percentages.

Petitioner misrepresents Ricketts’s analysis. Reply,12. As discussed below in Section IX.I, Petitioner failed to calculate the percentage discharge using the “total charge stored,” as required by the claims. To illustrate this flaw, Ricketts ran simulations using Galton’s own assumption (which Ricketts explicitly identified as flawed)—namely, that there is “zero” current when the LO is high and this corresponds to the switch being “open.” Ex.-2021,¶424,Appendix B. Even under Galton’s mistaken premise, Ricketts found only a few instances where the discharge percentages fell within the claimed range.

But the claims require more—the percentages must occur when DeMaw’s JFETs are actually “open.”

Critically, Galton never conducted any simulation or testing to show that any discharge percentage (based on “total charge stored”) occurs while the JFETs are actually open/off. And Petitioner conveniently ignores Ricketts’s express conclusion: Ricketts’ calculated percentages “do *not* reflect when the switch is open [*i.e.* “off”], as required by the claim.” *Id.*, ¶426. In fact, Ricketts’s simulations demonstrate that “the JFETs *never turn ‘off.’*” *Id.*, ¶¶318,329,342,352 (citing Appendix B). Instead, they conduct *continuously* in both directions—consistent with the expected behavior of a non-sampling mixer as disclosed in DeMaw.” *Id.*

I. Galton Has Not Shown That The Percentage He Calculated Is The Percentage When DeMaw’s JFET Is “Open.”

Even if Galton performed the correct calculation (he does not), he does so for discharge occurring “between apertures” and all of his histograms reflect this. Ex.-1060, ¶¶57-58 (pp.36-47); Ex.-2047,33:10-19. Galton, however, has not shown that DeMaw’s JFET are “open” for the entire time period “between apertures.” Thus, even if he can show certain percentage values, they are not the percentage when the switch is “open” as required by the claims.

X. MacNally

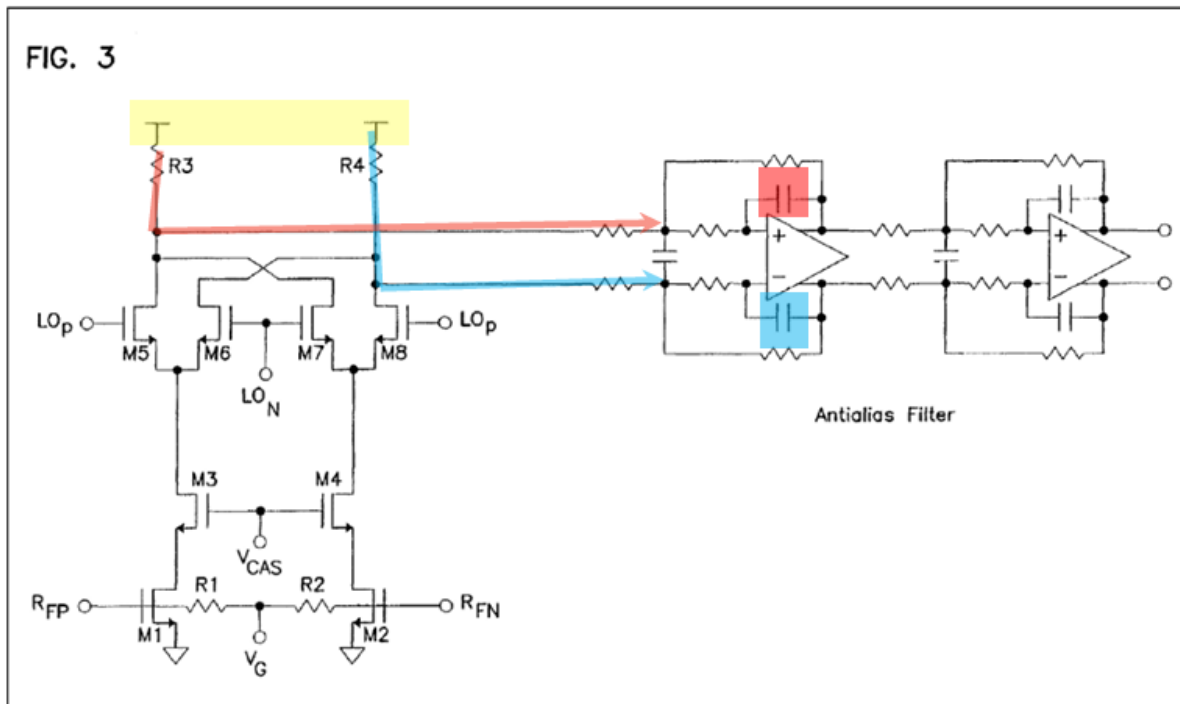
A. MacNally Does Not Disclose The Claimed “Coupling”

Petitioner does not dispute that “electrically coupling” the information signals to the capacitors requires the information signals themselves to “flow” to

the capacitors. Unable to show this, Petitioner changes theories.

Critically, Petitioner now concedes that Macnally's capacitors do *not* receive the R_{FP}/R_{FN} input signals (the alleged "information signals"). Instead, according to Galton, the signals received by Macnally's capacitors are "essentially" the same as R_{FP}/R_{FN} —a "translated" version (i.e., representation) of the information signals. Ex.-1060, ¶86 ("A POSITA would understand that the information signal applied at the gate-side of M1 and M2 is essentially the same information signal on the drain current flowing through M1 and M2... the information and inverted information carried by the RF_P and RF_N inputs *are translated* to the current flowing in the mixer."); Reply, 23-25.

As explained in the POR, the only current that flows to Macnally's capacitors comes from the power supply (yellow) (below)—not R_{FP}/R_{FN} signal paths. POR, 93-94.



Id.; Ex.-2021, ¶¶452-53.

Unable to reconcile this with the claim language, Petitioner is forced to admit that the current/energy reaching the capacitors flows from the power source/supply, but then attempts to downplay this as irrelevant: “*That energy propagating the information signal and inverted information signal comes from the power supply is not relevant to the claims.*” Reply, 27. To the contrary, it is highly relevant.

While R_{FP}/R_{FN} (the alleged information signals) *affect* the flow of current from the power source (POR, 36,97), it is current from the power source, *not* R_{FP}/R_{FN} themselves, that flows to the capacitors.

Notably, Petitioner carefully chooses its words to obfuscate all of this. But a simple review of the wording demonstrates Petitioner effectively concedes that, contrary to the claims, R_{FP}/R_{FN} are *not* what flow to the capacitors.

In particular, Petitioner recognizes that R_{FP}/R_{FN} causes Macnally's transistors M1/M2 to behave as "variable resistor[s]." Reply,24. This, in turn, causes the bias current (which is the current coming from the power source) to "*vibrate at the same frequency as the $[R_{FP}]$ input signal.*" *Id.* The vibration "communicat[es] the information from the $[R_{FP}]$ input signal to the bias current." *Id.* This is why Petitioner refers to information carried by the R_{FP}/R_{FN} inputs as being "*translated.*" *Id.*, 24-25.

Tellingly, instead of focusing on the actual claim language, Petitioner attempts to shift the discussion to one about communicating information signals across different wires and different charge carriers. *Id.*,24-27. In doing so, Petitioner cites a passage from the '342 patent discussing "electrically coupled" and asserts the Macnally is consistent with this passage. *Id.*,Reply,25-26. Not so.

Notably, Petitioner purposefully cuts-off the passage to omit the key language that explains "electrically coupled" (highlighted below).

In step 6204, the received RF information signal is electrically coupled to a capacitor. For the receiver shown in FIG. 16O, the RF signal is electrically coupled to the carrier(+) port of receiver 1602 and capacitor 1604. When used herein,

Ex.-1001,49:43-46 (annotated).

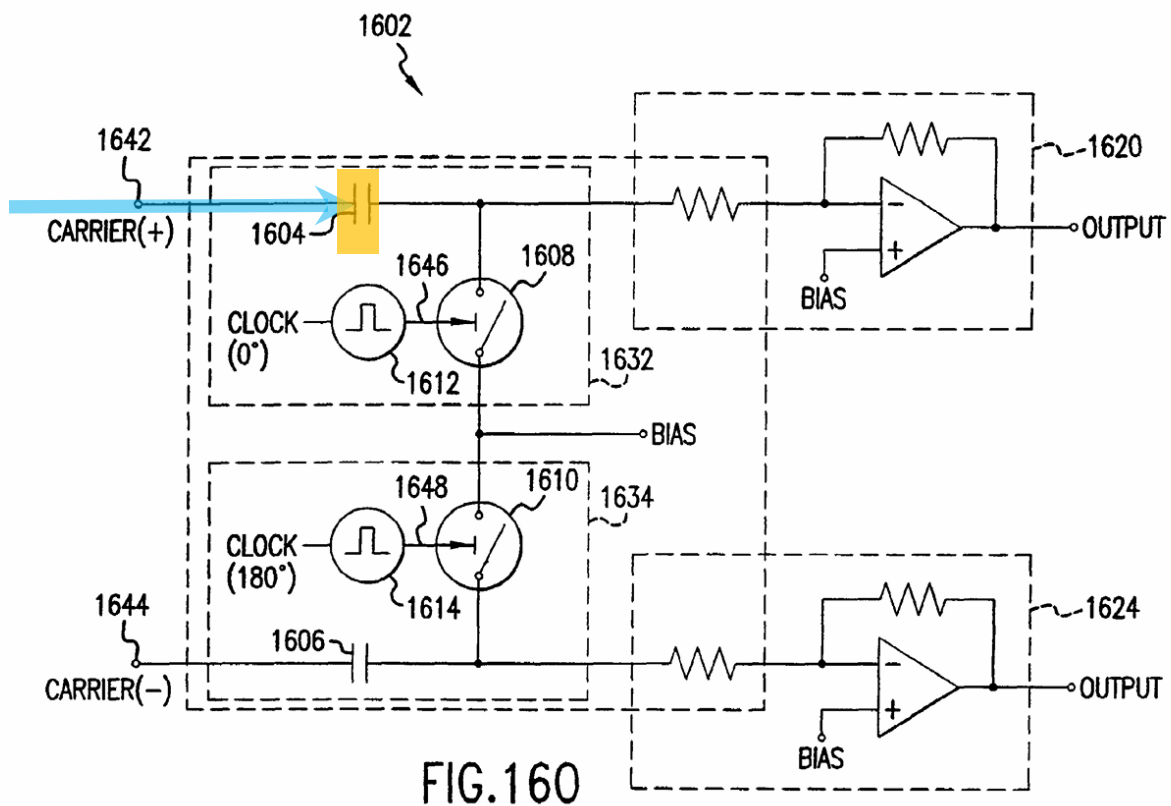


FIG.16O

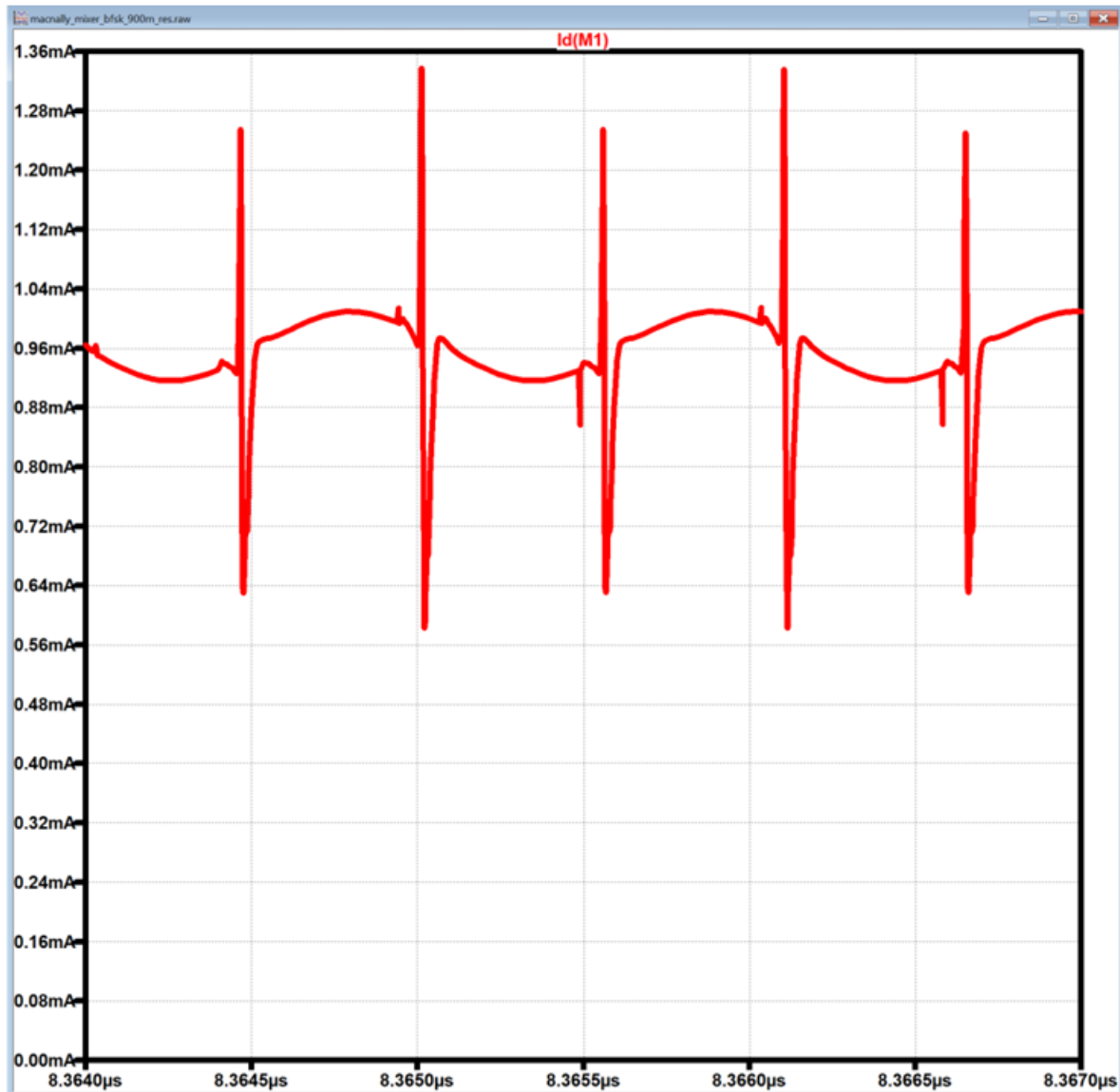
Id., Fig. 16O (annotated).

As shown above, in Figure 16O, the information signal (blue) is “electrically coupled” to capacitor 1604 (orange) because the signal itself reaches the capacitor.

This is not what happens in Macnally. Whereas current/energy from the RF signal in Figure 16O flows to the capacitor, in Macnally, the current flowing to the

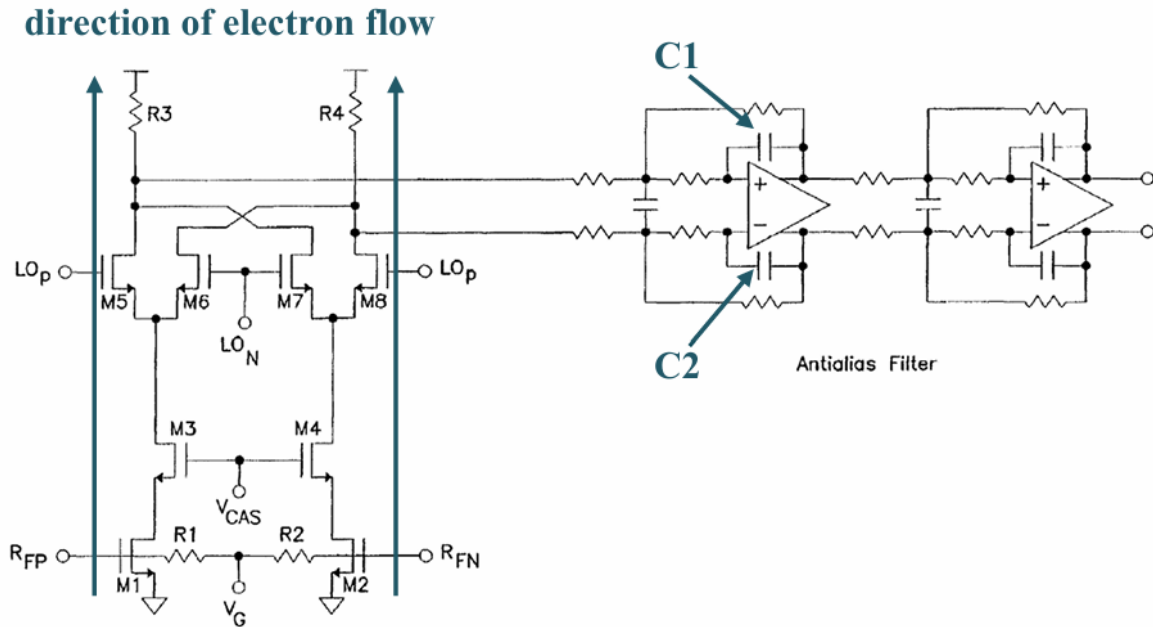
capacitors originates from a different part of the circuit—the power supply—not from the transistors M1/M2 to which R_{FP}/R_{FN} are input.

Finally, Petitioner/Galton has no response to Ricketts's testing of MacNally's circuit (using Galton's own data) which, as shown below, demonstrates that current never becomes negative and, thus, only flows in one direction (downward). POR,95-97.



Ex.-2021, ¶457.

Without any way to counter Ricketts's testing (based on Galton's own data), Petitioner asserts that the flow of electrons supports Petitioner's position. Petitioner annotates Macnally as shown below.



Reply,28.

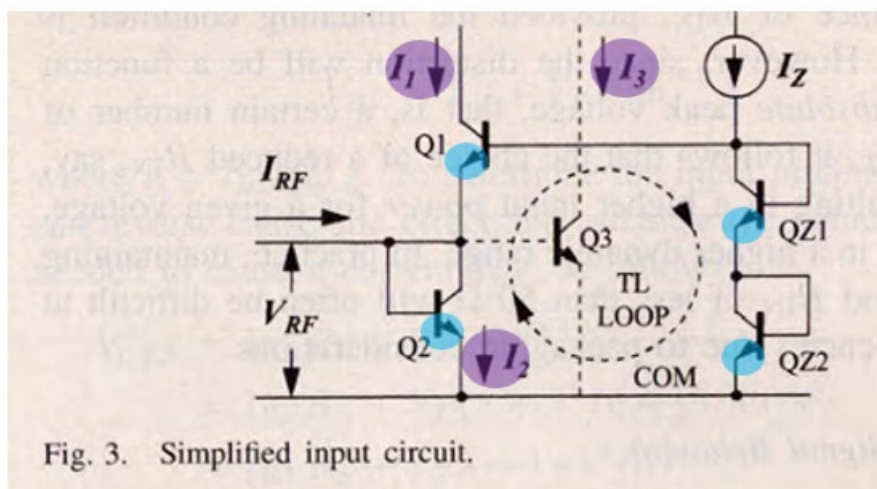
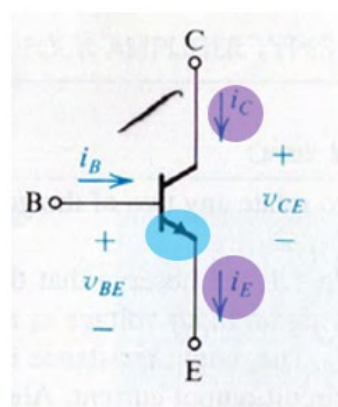
But, as shown above, the electrons *from ground*—not R_{FP}/R_{FN} —flow upward through R3 and R4 to the power source (yellow highlight in PO's annotation).

Petitioner agrees: “In Macnally electrons flow *from ground* through transistors M1-M8...” *Id.*,27-28. Thus, even under Petitioner's electron flow theory, the information signal is not “electrically coupled” to the capacitors as claimed.

Notably, Petitioners tries to pull a fast-one. The Reply states “In Macnally *electrons flow from ground through* transistors M1-M8 and resistors R3 and R4 and *capacitors C1 and C2.*” *Id.* But Galton never corroborates that electrons from ground flow to capacitors C1/C2 as illustrated by Petitioner. Instead, Galton specifically omits any mention of electrons flowing to capacitors C1/C2 and stated

that the electrons simply go to the power supply: “electrons actually flow upward through transistors M1– M8 and resistors R3 and R4 *toward the positive power supply terminal.*” Ex.-1060, ¶134; *see also id.*, ¶135 (“flow of electrons ... is toward the positive power supply terminal”).

Regardless, the claims should be analyzed from the point of view of conventional current as Ricketts does, not flow of electrons. Petitioner offers no evidence to the contrary other than Galton's bald assertions/say-so. Notably, the technical references relied on by Petitioner/Galton use the standard conventional current notation (the letter “I”/“i”) to analyze current flow. See Ex.-2047, 33:20-34:15, 38:9-13, 38:22-40:22, 41:19-42:3, 42:8-10, 48:1-5 (recognizing conventional current is commonly used).



Ex.-1045,13; Ex.-1048,40.

B. As shown above, for example, with regard to mixers and transistors *similar to Macnally*, Galton's own references describe circuit operation in terms of conventional current, not electron flow. Current (I/i), highlighted above in purple, flows in the direction of the transistor arrows (blue). Macnally Does Not Disclose A "Switching Device"

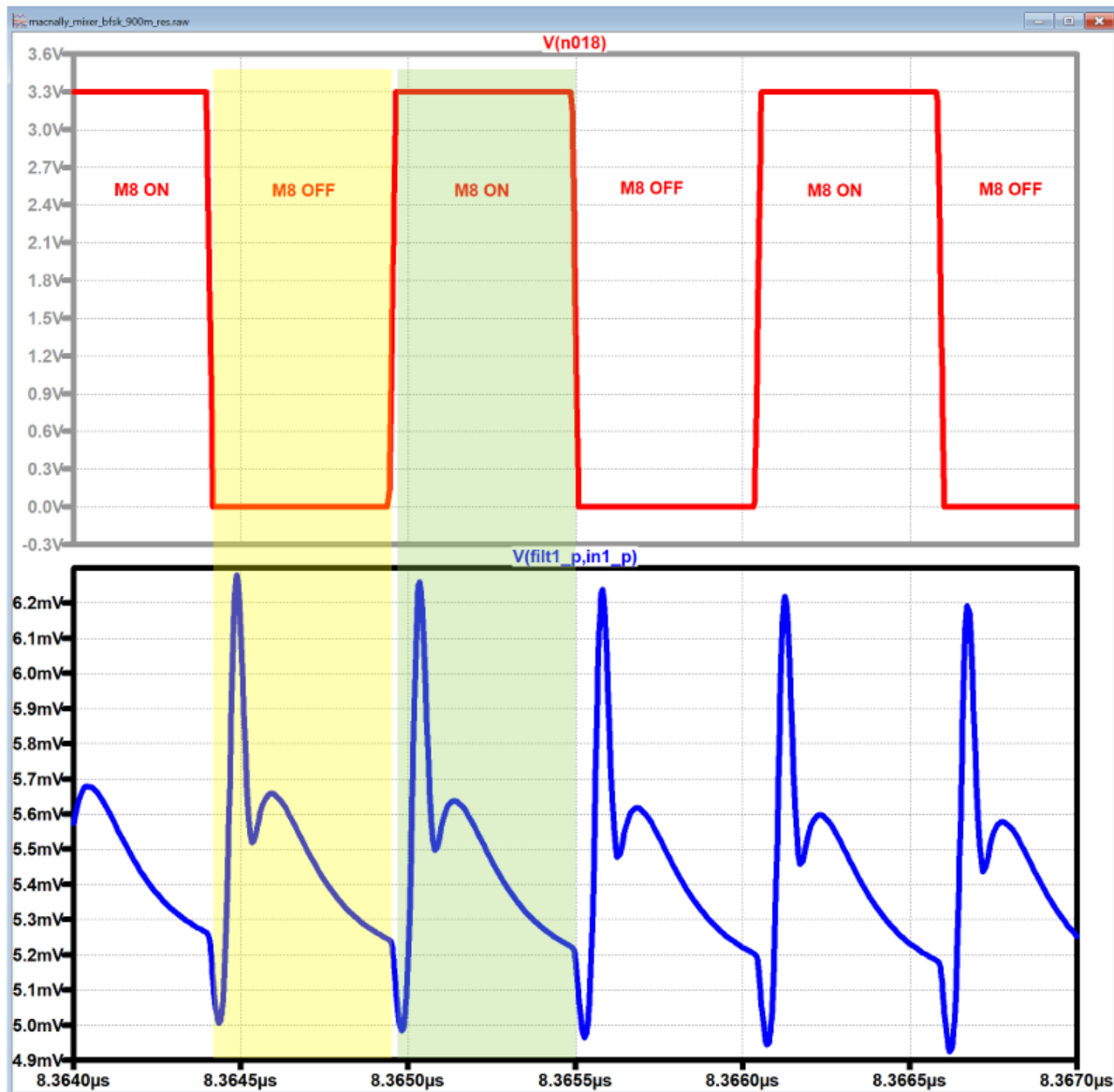
Tellingly, Petitioner's discussion of "switching device" is just a bunch of handwaving. Petitioner completely ignores the claim construction which requires that M5/M8 (the alleged switching device) open and close *a circuit*. Petitioner fails to counter PO's argument in the POR and identify *any circuit* that is being opened and closed by M5/M8.

Instead, Petitioner just discusses that Macnally refers to M5 and M8 as "switches." Reply, 28-29. But merely pointing out that the word "switch" is used in Macnally does not satisfy Petitioner's burden to show the construction is met. Further, merely asserting that M5/M8 *themselves* open and close (*id.*) also does not address the claim construction. The construction requires the switches open and close *a circuit*.

The relevant circuit in Macnally includes the capacitors. M5/M8 cannot open the circuit because, when M5/M8 are "off," M6/M7 are "on" and vice versa. In other words, there is always a continuous flow of current to the capacitors.

As shown below, using M8 as an example, regardless of whether M5/M8 is "on"/closed (green shaded area) or "off"/open (yellow shaded area), Ricketts

showed that the charge is materially the same. POR,98. This means that the circuit is continuously conducting, not switching. *Id.*,99.



Id.,98; Ex.-2021,¶462.

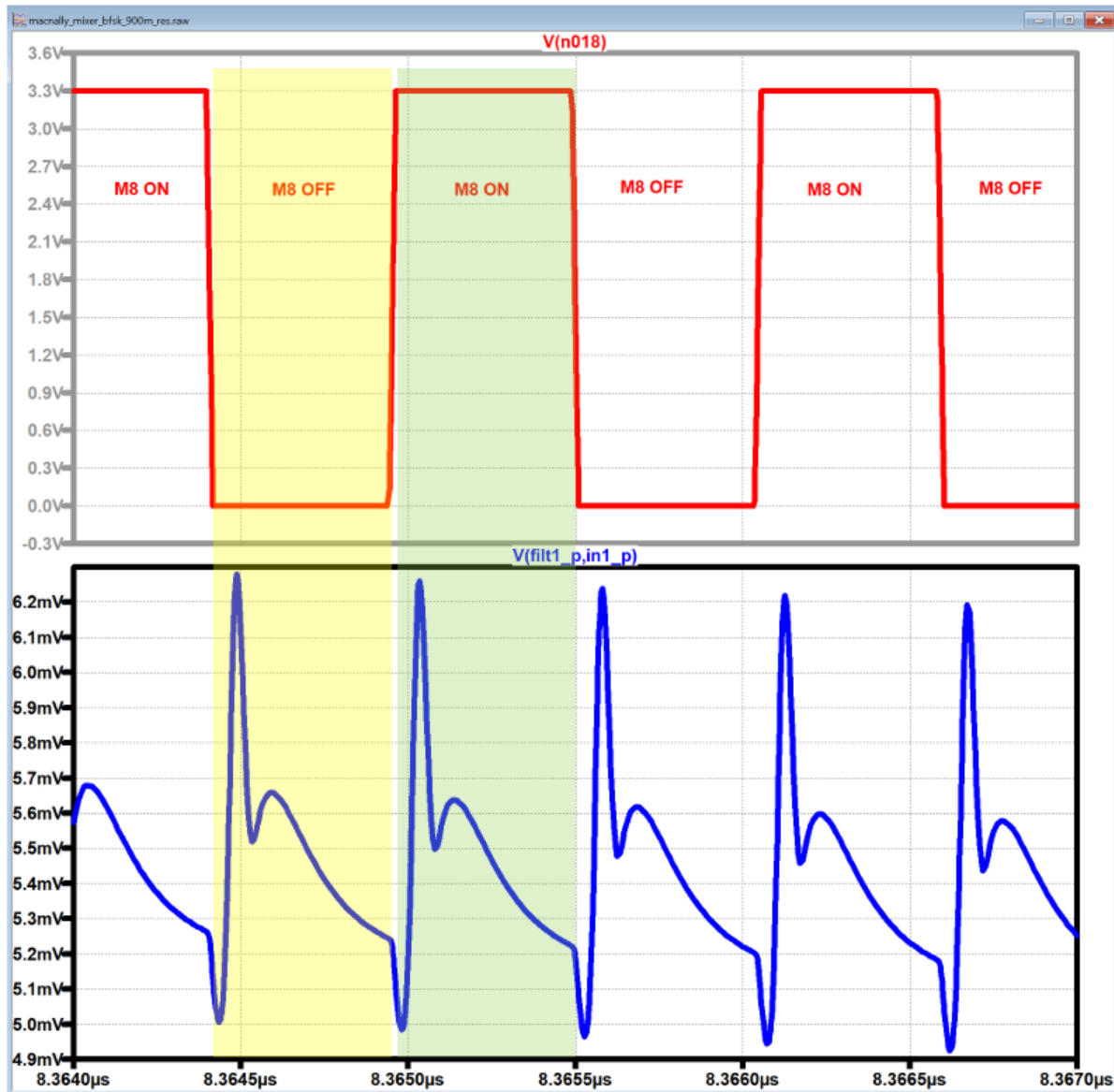
Petitioner has no response. So Petitioner inexplicably begins to discuss down-conversion. Whether down-conversion occurs says nothing about M5/M8

opening and closing a circuit as required by the construction. More importantly, down-conversion occurs in all sorts of way. And Petitioner has not tied Macnally's down-converting to the act of opening and closing a circuit.

C. Macnally Does Not Disclose The Claimed Discharge Percentage.

Petitioner *solely* relies on Galton's histograms to prove the claimed discharge percentages. Critically, Galton has done nothing to show the percentages in any of his histograms occur only when M5/M8 (the alleged switches) are "open" as required by the claims. This is fatal to his analysis.

As shown below, using M8 as an example, Ricketts illustrated that when M5/M8 are "open"/off both charging (each portion of blue line sloping up) and discharging (each portion of the blue line sloping down) occur.

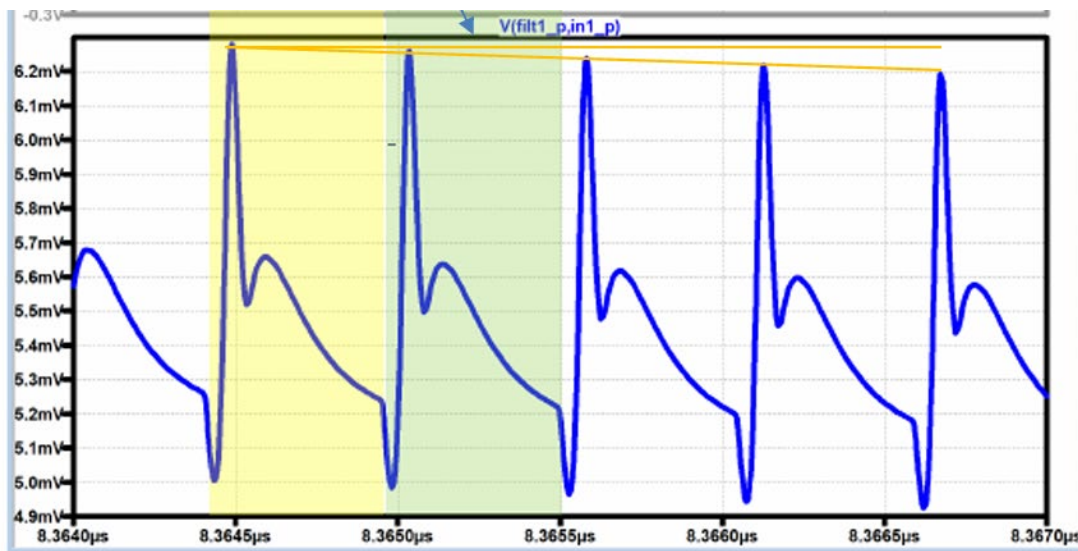


Ex.-2021, ¶462.

Petitioner/Galton does not dispute that Macnally's capacitors both charge *and* discharge when M5 or M8 is "open." Yet Galton provides no explanation of whether/how he factored this into his calculations of percentage discharge.

Finally, as shown below from Ricketts's simulation results (which

Petitioner/Galton annotated with yellow lines), according to Petitioner/Galton, “[t]he slope represents the rate of discharge of the capacitor.” Reply,30. Just looking at this figure demonstrates that, there is barely any discharge from the capacitor from one cycle to the next— certainly nothing close to the claimed percentages.



Ex.-2021, ¶462 (excerpted).

As shown above, the discharge from one cycle (one peak of the blue line) to the next is very small. From cycle-to-cycle, the discharge is only a fraction of 0.1mV. The total charge is approximately 6.2mV. Under Petitioner/Galton's view of what the above plot shows, the percentage discharge of total stored charge is well less than 1.6% ($0.1\text{mV}/6.2\text{mV}$) – outside of the claimed ranges.

Finally, as discussed above in Section V, Galton has not explained any of his

histograms nor did he show his work behind how he got to the claimed percentages. He shows no exemplary calculations. He just shows percentages on a graph. This is far from meeting his burden of proof for invalidity. In his Reply declaration, whatever little he has, he does not provide a complete explanation of how he got to his percentages.

Petitioner/Galton cannot possibly meet their burden to show invalidity by just pointing to bars on a histogram without any explanation.

Dated: August 4, 2025

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that this Patent Owner's Response complies with the type-volume limitation of 37 C.F.R. § 42.24(b) because it contains 5,541 words, as determined by the word-processing program used to prepare the brief, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a)(1).

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CERTIFICATE OF SERVICE

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