

United States Court of Appeals  
for the Federal Circuit

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GENERAL PROTECHT GROUP, INC.,  
*Appellant,*

and

WENZHOU TRIMONE SCIENCE & TECHNOLOGY  
ELECTRIC CO., LTD.,  
*Appellant,*

and

SHANGHAI ELE MANUFACTURING  
CORPORATION,  
*Appellant,*

v.

INTERNATIONAL TRADE COMMISSION,  
*Appellee,*

and

PASS & SEYMOUR, INC.,  
*Intervenor.*

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2009-1378, -1387, -1434

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On appeal from the United States International Trade  
Commission in Investigation No. 337-TA-615.

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Decided: August 27, 2010

WILLIAM F. LONG, Sutherland Asbill & Brennan LLP, of Atlanta, Georgia, argued for appellant General Protecht Group, Inc. With him on the brief were ANN G. FORT and JOSHUA D. CURRY.

LEI MEI, Mei & Mark LLP, of Washington, DC, argued for appellant Wenzhou Trimone Science & Technology Electric Co., Ltd. With him on the brief was REECE W. NIENSTADT.

TONY D. CHEN, Caywin Law Group, of Los Angeles, California, argued for appellant Shanghai Ele Manufacturing Corporation.

PAUL M. BARTKOWSKI, Attorney, Office of the General Counsel, United States International Trade Commission, of Washington, DC, argued for appellee. With him on the brief were JAMES M. LYONS, General Counsel, and WAYNE W. HERRINGTON, Assistant General Counsel.

MARK J. ABATE, Goodwin Procter LLP, of New York, New York, argued for intervenor. Of counsel were ANKUR P. PAREKH, ANDREW N. STEIN, CALVIN E. WINGFIELD, JR.; JENNIFER A. ALBERT, of Washington, DC; and CHARLES H. SANDERS, of Boston, Massachusetts. Of counsel on the brief were GEORGE R. MCGUIRE and DAVID L. NOCILLY, Bond, Schoeneck & King, PLLC, of Syracuse, New York.

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Before NEWMAN, DYK, and PROST, *Circuit Judges*.

Opinion for the court filed by *Circuit Judge DYK*.

Dissenting opinion filed by *Circuit Judge NEWMAN*.

DYK, *Circuit Judge*.

General Protecht Group, Inc. (“GPG”), Wenzhou Trimone Science and Technology Electric Co., Ltd. (“Trimone”), and Shanghai ELE Manufacturing Corp. (“ELE”) appeal from a final determination of the International Trade Commission (“Commission”) that the importation into the United States, sale for importation, or sale within the United States of certain ground fault circuit interrupters (“GFCIs”) violated section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337. The Commission issued limited exclusion orders against the importation of GFCI products from each of the three appellants. *See In re Certain Ground Fault Circuit Interrupters & Prods. Containing Same*, Inv. No. 337-TA-615 (Int’l Trade Comm’n Mar. 9, 2009) (“Final Determination”). The Commission found that devices manufactured by appellants infringe U.S. Patent Nos. 7,283,340 (“the ’340 patent”), 5,594,398 (“the ’398 patent”), and 7,164,564 (“the ’564 patent”), and that none of these patents is invalid or unenforceable.

We hold that the Commission erred in three respects: (1) GPG’s 2003 and 2006 GFCIs and ELE’s 2006 GFCIs do not infringe the ’340 patent, because they do not have a “detection circuit” as claimed in the patent; (2) Trimone’s 2006 GFCIs and ELE’s 2006 GFCIs do not infringe the ’340 patent, because the “load terminals” of the patent do not include receptacle outlets; and (3) GPG’s 2006 GFCIs do not infringe the ’398 patent, because GPG performs the function of the “latching means” in a substantially different way than the structure disclosed in the patent. We remand for further proceedings in these respects. We affirm the Commission’s determination in all other respects.

#### BACKGROUND

GFCI receptacles are the electrical outlets found commonly in bathrooms and kitchens. Typically, they can

be identified by the “test” and “reset” buttons positioned between the two electrical sockets. GFCIs are designed to protect people from potentially fatal electrical shocks by cutting off the flow of electricity—or “tripping”—when the device detects a “ground fault.” A GFCI detects a ground fault when the electrical current flowing from the GFCI to a connected device on the “hot” prong of the socket does not match the current flowing from the connected device back to the GFCI on the “neutral” prong of the socket. This indicates that electrical current is leaking out along an unintended path, possibly through a person. This may be due to an exposed wire or the connected device’s being dropped in water, for example.

Pass & Seymour, Inc. (“Pass & Seymour”) is the assignee of various GFCI patents. In September 2007, on a complaint filed by Pass & Seymour, the Commission initiated an investigation to determine whether violations of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) had occurred by the importation into the United States, the sale for importation, or the sale within the United States after importation of certain GFCIs that allegedly infringe some of Pass & Seymour’s patents. GPG, Trimone, ELE, and others were named as respondents.

On September 24, 2008, the Administrative Law Judge (“ALJ”) issued an initial determination finding violations of section 337 by each of the appellants. *See In re Certain Ground Fault Circuit Interrupters & Prods. Containing Same*, Inv. No. 337-TA-615 (Int’l Trade Comm’n Sept. 24, 2008) (“Initial Determination”). Appellants petitioned the Commission for review of the ALJ’s decision, and the Commission determined that it would review certain of the ALJ’s findings.

On March 9, 2009, the Commission issued its final opinion. With respect to the devices and claims involved in this appeal, the Commission, while modifying the ALJ’s claim constructions in a few respects, affirmed the find-

ings of infringement. GPG, Trimone, and ELE appealed. This opinion addresses that appeal. In certain other respects, the Commission reversed the ALJ's findings of infringement. Pass & Seymour appealed. In a separate opinion released today we address that appeal.<sup>1</sup>

Insofar as is pertinent here, the Commission issued a limited exclusion order prohibiting entry into the United States of GPG GFCIs found to infringe one or more of claims 1 and 7 of the '398 patent and claims 14 and 18 of the '340 patent; Trimone GFCIs infringing one or more of claims 14 and 18 of the '340 patent; and ELE GFCIs infringing one or more of claims 1, 7, and 8 of the '398 patent, claims 14, 18, and 30 of the '340 patent, and claims 1 and 15 of the '564 patent. The Commission's determination became final on May 8, 2009, at the conclusion of the sixty-day presidential review period. *See* 19 U.S.C. § 1337(j)(4). As noted, GPG, Trimone, and ELE timely appealed, and we have jurisdiction under 28 U.S.C. § 1295(a)(6).

## DISCUSSION

GPG, Trimone, and ELE raise numerous issues challenging the Commission's final determination, arguing that their accused devices do not infringe or that the asserted patents are invalid. We have considered appellants' arguments, and find most of them unpersuasive. Therefore, we affirm the Commission's determination in most respects, and we think an extended discussion of those points is unnecessary. We focus our discussion on only those issues as to which we conclude that the Commission was in error.

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<sup>1</sup> The Commission's determination and limited exclusion order also involved other respondents and products, and additional patents not included in either appeal.

We review the Commission’s final determination of a violation of section 337 under the standards of the Administrative Procedure Act (“APA”). *See* 19 U.S.C. § 1337(c). Under the APA, this court reviews the Commission’s legal determinations *de novo* and its factual findings for substantial evidence. *See* 5 U.S.C. § 706(2)(A), (E); *Honeywell Int’l, Inc. v. Int’l Trade Comm’n*, 341 F.3d 1332, 1338 (Fed. Cir. 2003). Claim construction is an issue of law and is subject to *de novo* review. *See Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1451 (Fed. Cir. 1998) (en banc).

### I The ’340 Patent

The Commission found that GFCI devices from each of the three appellants infringe the ’340 patent. GPG’s 2003 and 2006 GFCIs were found to infringe claims 14 and 18; Trimone’s 2006 GFCIs were found to infringe found to infringe claims 14 and 18; and ELE’s 2006 GFCIs were found to infringe claims 14, 18, and 30.

The ’340 patent is directed to a GFCI receptacle that “detects the wiring state of the device and inhibits operation if the device is miswired.” ’340 patent col.2 ll.29–31. When properly wired, the electrical source is connected to the GFCI’s “line terminals,” from which power flows into the rest of the device. However, there is a chance that an installer may accidentally miswire the electrical source to the device’s “load terminals,” which are normally intended for connection to downstream outlets that receive ground fault protection through the GFCI. If miswired, the devices do not protect against a ground fault. To effect the miswiring protection, the ’340 patent has a “detection circuit” to detect whether the GFCI device is properly wired to an electrical circuit, and “four sets of interrupting contacts” configured to make or break an electrical circuit between the line terminals and the load terminals,

depending on the signal from the detection circuit. Claim 14 is representative:

14. An electrical wiring device comprising:
  - line terminals and load terminals;
  - at least one *detection circuit including a circuit segment coupled between the line terminals and configured to generate a predetermined signal in response to detecting a proper wiring condition*, the predetermined signal not simulating a fault condition, a proper wiring condition being effected when the line terminals are connected to a source of AC power; and
  - an interrupting contact assembly coupled to the at least one detection circuit, the interrupting contact assembly including *four sets of interrupting contacts that are configured to provide electrical continuity between the line terminals and the load terminals in a reset state* and configured to interrupt the electrical continuity in tripped state, the interrupting contact assembly being substantially prevented from effecting the reset state absent the predetermined signal being generated by the at least one detection circuit.

'340 patent col.10 ll.7–25 (emphases added).

A “detection circuit”

ELE and GPG argue that their GFCIs do not infringe the '340 patent because their devices do not have a “detection circuit.” The ALJ construed “detection circuit” to mean “at least one detection circuit having a circuit segment connected between the line terminals and configured to generate a predetermined signal in response to

detecting a proper wiring condition, which occurs when the line terminals are connected to a source of AC power.” *Initial Determination*, slip op. at 85.<sup>2</sup> Appellants did not petition the full Commission for review of the ALJ’s construction. Thus, the Commission did not review the ALJ’s construction, and therefore adopted it. Neither ELE nor GPG challenges on appeal the appropriateness of the ALJ’s original claim construction. GPG, however, argues that the ALJ effectively modified the construction or misapplied it with respect to the GPG GFCIs.

ELE argues that the Commission erred in adopting the ALJ’s finding that its GFCIs infringe the ’340 patent, because its devices do not have a circuit that generates a “predetermined signal” when the circuit detects that the GFCI device is properly wired.<sup>3</sup> Rather, ELE claims that its GFCIs are designed to electrically isolate the load terminals, so that the devices simply only have power when an AC power source is properly wired to the GFCIs’ line terminals, and lack power when the power source is miswired to the load terminals.

The ALJ based his finding that the ELE 2006 GFCIs meet the “detection circuit” limitation on the testimony of

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<sup>2</sup> Claim 18 is dependent from claim 14, and thus has the same limitation. The language of independent claim 30 is slightly different from that of claim 14 with respect to this element. However, none of the parties has suggested that the difference in language represents any difference in scope. The ALJ treated the elements as identical. See *Initial Determination*, slip op. at 92.

<sup>3</sup> The dissent suggests that the parties did not raise this argument, but ELE clearly argued that “[b]y treating the ‘predetermined signal’ as including whatever AC power happens to arrive at a building from the local power plant, the Commission has broadened this limitation beyond all recognition and effectively reads it out of the claim.” Br. of Appellant Shanghai ELE Mfg. Corp. 42.

Pass & Seymour's expert, Dr. Tom Harman ("Dr. Harman"). At the hearing before the ALJ, Dr. Harman presented the circuit diagram for ELE's device and identified a portion of the device as the "detection circuit." *See* J.A. 40,396. He then identified the "predetermined signal" as electrical current flowing in from the hot line terminal, through the identified circuit, and out through the neutral line terminal. *Id.*

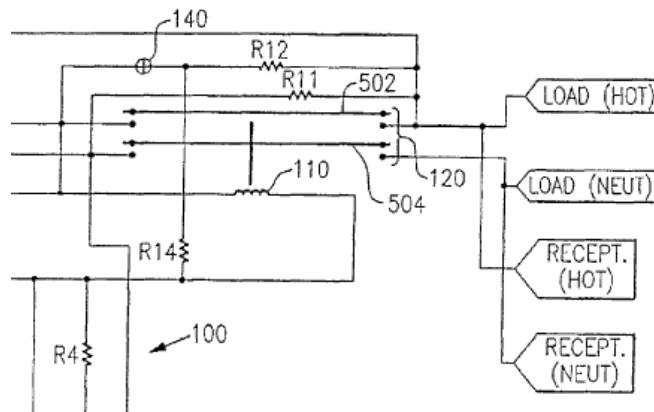
This testimony, however, is plainly inconsistent with the asserted claims of the '340 patent and the ALJ's construction. The construed claims require the "detection circuit" to "generate a predetermined signal in response to detecting a proper wiring condition." *Initial Determination*, slip op. at 85 (emphasis added). But as Dr. Harman's own testimony makes clear, his "predetermined signal" is merely the "current flow" originating from the hot line terminal. J.A. 40,396. The identified circuit does not generate this current; it is the current that comes from the AC power connection. So instead of detecting a proper wiring condition and generating a signal in response, as the properly construed claim requires, the accused GFCIs simply have power to operate, or not. Dr. Harman's testimony is not substantial evidence to support a finding that ELE's 2006 GFCIs infringe claims 14, 18, and 30 of the '340 patent.

While the focus of GPG's "detection circuit" argument is somewhat different than ELE's, GPG's 2003 and 2006 GFCIs also do not satisfy the "detection circuit" limitation for the same reason as argued by ELE. The circuits identified by Dr. Harman in the accused GPG devices do not generate any signal in response to detecting a proper wiring condition. Rather, the GFCIs either have power if properly wired, or they do not if miswired. AC current from the hot line terminal flows into each identified circuit when properly wired, but that AC current cannot be the "predetermined signal" because it is not generated

by the circuit. The Commission acknowledged that both ELE's and GPG's GFCIs work in the same way, by isolating the load terminals so that power only flows when the devices are wired properly to the line terminals. Oral Arg. at 21:31–46. Therefore, GPG's 2003 and 2006 GFCIs also do not infringe claims 14 and 18 of the '340 patent.

#### B “load terminals”

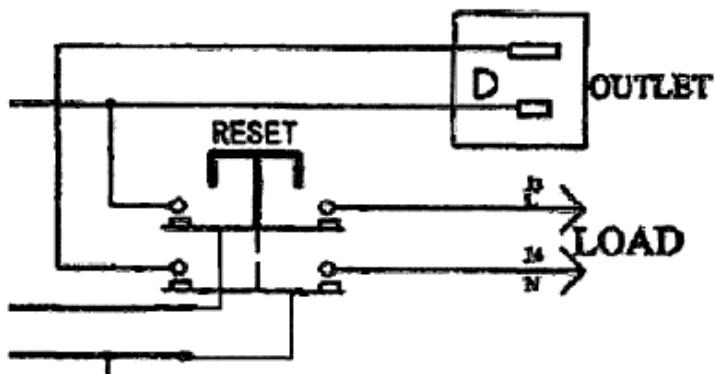
Trimone argues that its 2006 GFCIs do not satisfy the “four sets of interrupting contacts that are configured to provide electrical continuity between the line terminals and the load terminals in a reset state and configured to interrupt the electrical continuity in tripped state” limitation of the '340 patent. The ALJ construed “four sets of interrupting contacts” to mean “four pairs of electrical contacts that can separate from each other to interrupt the flow of electricity.” *Initial Determination*, slip op. at 89. The partial figure below, taken from Figure 1 of the '340 patent, shows a circuit interrupter, indicated by label number 120, having four pairs of electrical contacts—two on the line terminal side of the circuit (line terminals to the left side of the figure not shown) and two on the load terminal side of the circuit.



'340 Patent, Figure 1 (partial)

The other disclosed GFCI embodiments in the '340 patent all have the same basic circuit interrupter.

Trimone argues that its 2006 GFCI devices do not satisfy the “four sets of interrupting contacts that are configured to provide electrical continuity between the line terminals and the load terminals in a reset state and configured to interrupt the electrical continuity in tripped state” limitation of the '340 patent because its GFCIs have only two sets of contacts configured to make or break the circuit between the line terminals and the load terminals. The figure below shows Trimone's circuit interrupter (the wires in the lower left of the figure lead to the line terminals).



*Trimone 2006 GFCI Circuit Interrupter*

Trimone asserts that it was error for the ALJ to count the two sets of contacts in Trimone's GFCIs between the line terminals and the GFCI receptacle outlets—the electrical sockets on the face of the GFCI device—in finding the limitation satisfied, because receptacle outlets are not load terminals. The Commission and Pass & Seymour respond that receptacle outlets are also known as “user load terminals”; that someone of ordinary skill in the art would understand receptacle outlets to be a type of load terminal; and that any devices connected to a GFCI, including those connected to receptacle outlets, are con-

sidered “loads.” The issue is thus whether the term “load terminals” in the ’340 patent includes receptacle outlets.<sup>4</sup>

We start with the ’340 patent itself. A patent’s specification “is the single best guide to the meaning of a disputed term.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)) (quotation mark omitted). The ’340 patent never describes receptacle outlets as load terminals. In fact, the circuit diagram drawings in the ’340 patent all clearly label the load terminals separately from the receptacle outlets, as seen in the portion of Figure 1 above.

We have held that expert testimony can be useful in assisting a court “to establish that a particular term in the patent . . . has a particular meaning in the pertinent field.” *Phillips*, 415 F.3d at 1318. However, we have cautioned that “conclusory, unsupported assertions by experts as to the definition of a claim term are not useful to a court.” *Id.* The testimony relied on by the ALJ does not reveal that the term “load terminals” had a particular meaning in the art that included receptacle outlets. None of the experts identified a particular meaning in the art, and an expert’s subjective understanding of a patent term is irrelevant. *See Howmedica Osteonics v. Wright Med. Tech.*, 540 F.3d 1337, 1347 & n.5 (Fed. Cir. 2008) (holding that an inventor’s subjective intent in using a term is irrelevant, but that the inventor may testify as an expert on the established meaning of particular terms in the

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<sup>4</sup> This issue also applies to ELE’s 2006 GFCIs, which we have already concluded do not infringe the ’340 patent. Contrary to the dissent, ELE raises the load terminal issue. *See Br. of Appellant Shanghai ELE Mfg. Corp.* 44–45 (“Notably, the ’340 patent does not contemplate separating the downstream load terminals from the surface (‘face’) load or receptacle terminals as is done in ELE’s 2006 GFCIs.”).

relevant art); *Symantec Corp. v. Computer Assocs. Int'l*, 522 F.3d 1279, 1291 (Fed. Cir. 2008) (disregarding expert testimony that “simply recite[d] how each expert would construe [a] term . . . based on his own reading of the specification” because it did “not identify the ‘accepted meaning in the field’ to one skilled in the art”); *Sinorgchem Co., Shandong v. Int'l Trade Comm'n*, 511 F.3d 1132, 1137 n.3 (Fed. Cir. 2007) (“We attribute no weight to that testimony because the experts did not identify any evidence that those skilled in the art would recognize ‘controlled amount,’ or any term used in the specification, has an accepted meaning in the field of chemistry. Under such circumstances, testimony as to how one skilled in the art would interpret the language in the specification is entitled to little or no weight.”).

Moreover, contrary to the ALJ’s unsupported conclusion, the experts here never suggested that receptacle outlets, which they also called “user load terminals” or “user accessible load terminals,” could be referred to as simply load terminals. Rather, they were fastidious in referring to them as separate elements. *See* J.A. 40,377 (testimony of Pass & Seymour witness Jim Osterbrock) (“The G4 design separates the line terminals from the load terminals and user accessible load terminals.”); *id.* at 40,378 (“[W]e differentiate by calling them load terminals and user accessible load terminals.”); *id.* at 40,938 (testimony of Shanghai Meihao Electric Co. expert Dr. Mark Horenstein) (agreeing that “receptacles are also referred to as user accessible load terminals”). The testimony by Dr. Harman relied on by the ALJ does not mention receptacle outlets or user load terminals at all. *See id.* at 40,408. Furthermore, usage of the term “user load terminals” to refer to receptacle outlets in other patents does not help the patentee here. There is no evidence that a person of ordinary skill in the art would read the term “load terminals” to also include receptacle outlets, or user

load terminals, and there is nothing in the extrinsic evidence that in any way contradicts the meaning of the term “load terminals” apparent from the face of the patent.

Therefore, the ALJ erred in construing the term “load terminals” to also include receptacle outlets. As a result, under the proper construction of “load terminals,” Trimone’s 2006 GFCIs and ELE’s 2006 GFCIs have only two “sets of interrupting contacts that are configured to provide electrical continuity between the line terminals and the load terminals in a reset state and configured to interrupt the electrical continuity in tripped state,” and do not infringe the asserted claims of the ’340 patent.

## II The ’398 Patent

The Commission found that GPG’s 2006 GFCIs infringe claims 1 and 7 of the ’398 patent. GPG argues that the structure in its 2006 GFCIs for performing the function of the “latching means” in claims 1 and 7 is substantially different from that disclosed in the ’398 patent.

The ’398 patent discloses a new mechanical architecture for a GFCI receptacle, with detailed descriptions of an improved contact system that can move between a circuit-making position and a circuit-breaking position. The invention involves fixed contacts on the line terminal side of the device and fixed contacts on the load terminal side of the device, separated by a break in the device circuit that can be completed by a moveable conducting member when the device is in the reset, or circuit-making, state. The claims use means-plus-function language to define several elements, pursuant to 35 U.S.C. § 112 ¶ 6. Claim 1 is representative:

1. A ground fault interrupter (gfi) wiring device for connection in an electrical circuit, said device comprising:
  - a) housing means defining an enclosed space;
  - b) at least one pair of electrical terminals fixedly supported in spaced relation within said enclosed space;
  - c) a unitary, electrically conducting member carrying a pair of spaced electrical contacts;
  - d) mounting means for said conducting member to permit movement thereof between a first position, wherein said pair of contacts are in respective, circuit-making engagement with said pair of terminals, and a second position, wherein both of said pair of contacts are in spaced, circuit-breaking relation to said pair of terminals;
  - e) biasing means urging said conducting member toward movement to said second position;
  - f) *latching means releasably retaining said conducting member in said first position;* and
  - g) actuating means for releasing said latching means to permit said biasing means to move said conducting member to said second position in response to a predetermined fault condition in said electrical circuit.

'398 patent col.13 ll.24–46 (emphasis added). The element at issue here is the “latching means” element.

Claim 7 is a dependent claim that also requires the same “latching means” element.

“Literal infringement of a means-plus-function limitation requires that the relevant structure in the accused device perform the identical function recited in the claim and be identical or equivalent to the corresponding structure in the specification.” *Applied Med. Res. v. U.S. Surgical Corp.*, 448 F.3d 1324, 1333 (Fed. Cir. 2006). A structure in the accused device constitutes an equivalent to the corresponding structure in the patent only if the accused structure performs the identical function “in substantially the same way, with substantially the same result.” *Id.*; see *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 1364 (Fed. Cir. 2000) (stating that in order to literally infringe, “the accused structure must either be the same as the disclosed structure or be a section 112, paragraph 6 ‘equivalent,’ i.e., (1) perform the identical function and (2) be otherwise insubstantially different with respect to structure”).

The ALJ concluded that the function of the latching means is “releasably retaining the conducting member in the first position,” and that the structure described in the ’398 patent corresponding to that function is “a pin passing through a hole in the block having a shoulder that cooperates with a hole in the latch member and a spring biasing the pin to retain the conducting member in the first position, and equivalents thereof.” *Final Determination*, slip op. at 10. Under this construction, the ALJ found that “because [GPG’s 2006 GFCIs] contain a magnet capable of retaining an armature that is attached to the GFCI’s ‘mounting means,’” and because “[w]hen the armature is retained by the magnet, the conducting member is in a first (circuit-making) position with respect to the pair of terminals,” the GPG GFCIs satisfy the function of the latching means and contain a structural

equivalent to the latching means structure disclosed in the '398 patent. *See Initial Determination*, slip op. at 66.

The Commission did not modify the ALJ's definition of the function, but it did modify the identified structure "to include the entire 'latch member,' and not only the hole therein." *Final Determination*, slip op. at 11. Despite modifying the structure corresponding to the latching means, the Commission upheld the ALJ's finding that GPG's 2006 GFCIs contain structural equivalents to the structure identified in the '398 patent. *See id.* at 12.

GPG argues that the structure in its 2006 GFCIs performs the function of the latching means in a substantially different way than the structure disclosed in the '398 patent. GPG's structure, as the ALJ noted, uses only a magnet in order to retain the contacts of the conducting member in the first, circuit-making position. In contrast, the disclosed structure in the '398 patent employs a mechanical solution requiring the interaction of a number of separate parts, including a spring latching member, a pin with a shoulder extending through a hole in the spring latching member, and a spring biasing the pin to pull against the force of the spring latching member.

As we held in *Toro Co. v. Deere & Co.*, 355 F.3d 1313 (Fed. Cir. 2004), one system that accomplishes a function mechanically and another system that accomplishes the same function using magnetic force "function in fundamentally different ways." *Id.* at 1324. The Commission and Pass & Seymour argue that the ALJ's decision was supported by substantial evidence because of the testimony of expert witnesses that one of ordinary skill in the art would have considered the magnetic matching structure to be interchangeable with the mechanical structure of the '398 patent. *See Initial Determination*, slip op. at 67. However, the experts merely testified that magnets were well known as latches, not that they performed the latching means function in substantially the same way as

the mechanical latch disclosed in the patent. *See* J.A. 40,524 (testimony of Pass & Seymour expert Dr. Fred Stolfi) (“The use of a magnet as a latch is fairly common in other devices. You know, for example like a door latch often has a magnet catch. And there [are] patents that I have looked at that speak about a magnetic latch in a GFCI . . .”); *id.* at 40,750 (testimony of ELE expert Kenneth Eugene Haynes) (agreeing that “permanent magnets were known in the art of latching structures and GFCIs in the late 1980s and 1990s”); *id.* at 40,979 (testimony of GPG expert Dr. James Roberge) (agreeing that permanent magnets had been used in “latching relays” in the electrical industry to perform latching functions). This testimony “goes to the function or result of these systems, and begs the issue of the way in which [the mechanical] systems and [magnetic] systems actually work.” *Toro*, 355 F.3d at 1324. We therefore hold that substantial evidence does not support the Commission’s finding that the magnetic latching structure of GPG’s 2006 GFCI is equivalent to the mechanical structure disclosed in the ’398 patent corresponding to the latching means.

#### CONCLUSION

For the aforementioned reasons, we reverse the Commissions findings that GPG’s 2003 GFCIs infringe claims 14 and 18 of the ’340 patent; that GPG’s 2006 GFCIs infringe claims 1 and 7 of the ’398 patent and claims 14 and 18 of the ’340 patent; that Trimone’s 2006 GFCIs infringe claims 14 and 18 of the ’340 patent; and that ELE’s 2006 GFCIs infringe claims 14, 18, and 30 of the ’340 patent. We remand to the Commission to modify its limited exclusion order in accordance with this opinion.

**AFFIRMED IN PART, REVERSED IN PART, and  
REMANDED**

## COSTS

No costs.

United States Court of Appeals  
for the Federal Circuit

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*Appellant,*

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2009-1378,-1387,-1434

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Appeal from the United States International Trade  
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NEWMAN, *Circuit Judge*, dissenting.

With all respect to my colleagues on this panel, they have erred in law and in procedure, in their reversal of the findings and rulings of the Commission on the issues presented in this appeal. The Commission found infringement by some of the Ground Fault Circuit Interrupters of some respondents, *In re Certain Ground Fault Circuit Interrupters and Prods. Containing Same*, Inv. No. 337-TA-615 (Int'l Trade Comm'n Mar. 9, 2009), affirming with modifications the findings and rulings of the ALJ in *In re Certain Ground Fault Circuit Interrupters and Products Containing Same*, Inv. No. 337-TA-615 (Int'l Trade Comm'n Sept. 24, 2008) ("Initial Decision" or "I.D."). The Initial Decision of 170 pages and the Commission's supplemental rulings of 32 pages present a full understanding of the technology, with rigorous discussion of the evidence and extensive analysis, findings, and conclusions. This court now finds its own facts, applies theories that were not raised by any party, uses incorrect standards of review, and creates its own electrical technology contrary to the uniform and unchallenged expert testimony.

In the companion cross-appeal decided today by separate opinion, Appeal Nos. 2009-1338, -1369, taken by the patentee Pass & Seymour from the Commission's rulings adverse to it, the court deferentially affirms the Commission's findings of non-infringement, while in this appeal my colleagues act *de novo* to reverse the Commission's findings of infringement. In reversing the Commission, the court does not discuss the substantial evidence supporting the Commission's findings. In contrast to the companion appeal, the court bypasses the standards of APA review, and makes new finding and rulings on new theories, some of which were not presented and not argued by any party, and which are conspicuously incorrect. Further, despite its changes in claim construction, its new findings, and its *de novo* applications of law to fact, the court provides no opportunity for the patentee or the Commission to respond to the

court's new arguments and adjudications. I must, respectfully, dissent.

## DISCUSSION

The three appellants are Shanghai ELE Manufacturing Corp. ("ELE"), General Protecht Group ("GPC"), and Wenzhou Trimone Science and Technology Electric Co. ("Trimone"). The claim elements upon which my colleagues reverse the Commission are the "detection circuit" and "load terminals" of the '340 patent, and the "latching means" of the '398 patent.

### A.

#### **The '340 patent: "detection circuit . . . to generate a predetermined signal"**

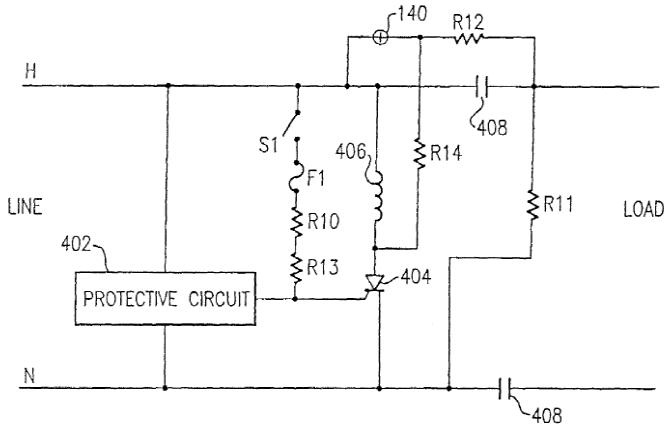
The Commission found infringement of the '340 patent by the 2006 model of the Ground Fault Circuit Interrupter ("Interrupter" or "GFCI") of ELE, the 2003 and 2006 models of GPG, and the 2006 model of Trimone. Claim 14 is representative; the clause at issue is:

at least one detection circuit including a circuit segment coupled between the line terminals and configured to generate a predetermined signal in response to detecting a proper wiring condition . . .

'340 patent col.10 ll.9–12. The ALJ heard testimony of expert witnesses for all parties, and found that "the concept of 'detection' is well understood in the context of circuits. In that regard, a circuit reacts in a particular way to a particular stimulus." *I.D.* at 85 (citing testimony of Pass & Sey-

mour's expert Dr. Harman,<sup>1</sup> Hr'g Tr. 1036:20–1040:13, J.A. 40444–45). Extensive testimony concerned the detection circuitry as described in the '340 patent and as embodied in each of the accused circuit interrupters. The ALJ found infringement as to this element, upon the same findings and arguments now adopted by my colleagues to contrary effect. However, sufficient evidence to reverse these findings and rulings has not been shown.

The '340 patent describes miswire protection through circuitry that repeatedly trips the Interrupter until a predetermined signal is provided that indicates proper wiring. The predetermined signal is an electrical signal that cuts off the circuit path that was causing the repeated tripping of the device. In patent Figure 4, shown below, the detection circuit consists of switch S1, fuse F1, and resistors R10 and R13:



*'340 Patent, Figure 4*

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<sup>1</sup> Thomas Harman of the University of Houston is a special expert to the committee of the National Electrical Code dealing with house wiring and safety devices. J.A. 40385. Dr. Harman's Ph.D. is in electrical engineering, and he is a master electrician who wrote the "Guide to the National Electrical Code." *Id.* at 40385–86.

When current flows through the detection circuit to the gate of rectifier 404, the device will trip by energizing solenoid 406, which opens interrupting contacts 408. '340 patent col.7 ll.11–16. When power is correctly wired to the line terminals, current passes through the detection circuit regardless of whether the interrupting contacts 408 are open or closed. With correct wiring, current will continue to flow “until such time as fuse F1 clears, after which it is possible to accomplish a resetting of the interrupting contacts 408.” *Id.* col.7 ll.24–26. The '340 specification explains that the detection circuit uses power from the line terminal to create a response, and this response is present only when the device is properly wired. When properly wired, the device is allowed to be reset. The embodiment shown in Figure 1 of the '340 patent illustrates the same principle, where the circuit trips in response to a simulated fault that is present until proper wiring has cleared the resistive elements, thereby permitting resetting. *See id.* col.4 ll.9–67.

The experts agreed on the technology as set forth in the patent and as embodied in the devices that the Commission found to be infringing. In ELE’s device the reset button is blocked until, when power is correctly wired to the line terminals, current passes through a circuit segment that signals a solenoid that unblocks the reset button. *See J.A.* 56301–09. The signal is not produced if power is incorrectly wired. Dr. Harman explained that the portion of the ELE circuitry configured to provide the signal when the device is properly wired is the detection circuit of the '340 patent, and generates the signal that allows the device to be reset. *See Hr’g Tr.* 844:13–850:6, *J.A.* 40396–97.

The Commission found that the ELE device indeed has a detection circuit that generates a signal. *See I.D.* at 91. “This circuit provides a predetermined signal upon proper wiring, and this signal does not simulate a fault condition.” *Id.* The presence of that signal allows ELE’s device to be

reset, as described and claimed in the '340 patent. Reversing the Commission, my colleagues find that the ELE device does not detect whether the wiring is proper and generate a predetermined signal in response; my colleagues find that ELE simply uses the available line voltage to allow the device to be reset when properly wired. However, as the Commission found, in ELE's device the reset state is prevented until power from a properly wired line terminal is used to energize a solenoid that moves the block, requiring detection of proper wiring. Substantial evidence supports the Commission's finding that the ELE device meets the "detection circuit" and "predetermined signal" limitations of the claims. Indeed no other finding is plausible; that is the purpose of the device. My colleagues do not explain their rejection of the Commission's findings, and indeed, I can discern no basis for such rejection.

The Commission also sustained the ALJ's findings with respect to the GPG devices. As GPG explained, if power is properly connected to the line terminals, then when the reset button is pushed a "reset solenoid" is energized that resets the device. *See* GPG Br. 15–16. GPG does not dispute that its Interrupters generate a predetermined signal. GPG states in its brief that "the predetermined signal is generated when GPG's products are miswired," GPG Br. 36 (citing J.A. 40969–70, testimony of GPG expert Dr. Roberge). GPG also states that "GPG does not take issue with the words used in the ID's construction of 'detection circuit.'" GPG Br. 27. Nonetheless, my colleagues negate the Commission's construction. This is inappropriate, for the Commission's construction is not disputed, as the experts agreed.

GPG did argue non-infringement on the Commission's construction, contending that its GFCIs do not infringe because one could theoretically avoid miswire protection by the following expedient: buy a GPG GFCI (sold in the

tripped state), properly wire it, reset it, and then uninstall and miswire it. GPG argued that the claim clause “configured to generate a predetermined signal in response to detecting a proper wiring condition,” which occurs when the line terminals are connected to a source of AC power, is not infringed if the signal can be sent when the AC power is connected to the load terminals. *See* GPG Br. 35–36. The Commission found that this theory did not avoid infringement. *I.D.* at 99 & n.23 (citing *z4 Techs., Inc. v. Microsoft Corp.*, 507 F.3d 1340, 1350 (Fed. Cir. 2007) (“[I]nfringement is not avoided merely because a non-infringing mode of operation is possible.”); *Golden Blount, Inc. v. Robert H. Peterson Co.*, 438 F.3d 1354, 1363 (Fed. Cir. 2006) (“[I]t matters not that the assembled device can be manipulated into a non-infringing configuration.”)).

The witnesses explained that in GPG’s devices the reset state is prevented until power from a properly wired line terminal is used to energize a solenoid that resets the device. The Commission found that “it is not possible to close the contacts to reset the GFCI without the predetermined signal.” *I.D.* at 97. While GPG describes the operation of its device as “inherent” miswire protection, the Commission determined that this is not different from the claimed detection, for the circuit generates a signal only when power is properly connected to the line terminals. *I.D.* at 97–98.

My colleagues do not discuss the support for the Commission’s findings that the ELE and GPG Interrupters have a detection circuit that generates a predetermined signal in response to proper wiring. These systems require detection of proper wiring and generation of a predetermined signal in response. Instead, the court creates its own, flawed, definition of “generate,” and finds non-infringement by ELE and GPG based on this definition. However, the definition of “generate” was not disputed by any party before the Com-

mission; thus the record is sparse and argument is nil.<sup>2</sup> The expert witnesses all understood the term in the same way, and directed their testimony to their opinions as to whether the term was infringed. Thus the ELE expert was of the opinion that the ELE device does not generate a “predetermined signal” because the ELE device does not sense a current threshold or time threshold. However, ELE’s expert admitted that the ELE circuit creates (i.e., generates) a current. J.A. 40818 (“Shanghai ELE . . . simply uses the available line voltage to create a current . . . ”). The panel majority does not discuss this evidence.

Instead, the court creates a theory not proposed by any party, and rules that a signal that originates from the line terminal is not generated by the detection circuit and thus is not “generated.” *See Maj. Op.* at 9 (“The identified circuit does not generate this current; it is the current that comes from the AC power connection.”). There is no support for this theory. The only signal generated in response to proper

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<sup>2</sup> The panel majority at footnote 3 disputes whether ELE raised the issue, citing ELE’s statement in its brief that “[b]y treating the ‘predetermined signal’ as including whatever AC power happens to arrive at a building from the local power plant, the Commission has broadened this limitation beyond all recognition and effectively reads it out of the claim.” The context of this statement reveals that ELE was concerned only with the “predetermined” nature of the signal and whether it is used to differentiate between correct or incorrect wiring. The sentence from ELE’s brief quoted by the majority is preceded by the statement that “[i]n order to find the ‘predetermined signal’ in ELE’s 2006 GFCIs, the Commission merely disregards this perspective and disregards the teachings of the ’340 patent’s specification about the meaning of “predetermined.” ELE Br. 42. The majority apparently does not credit any of ELE’s arguments regarding the “predetermined” nature of the signal. In any event, the issue is not waiver of the argument, but rather the complete lack of any disagreement among any of the parties regarding the term “generate,” contrary to this court’s *sua sponte* definition.

wiring as described in the '340 patent is “generated” in the same way as in the accused devices, that is, the detection circuit uses power from the properly wired line terminals to supply a signal (claim 14) or response (claim 30) that allows the device to be reset. That is how the Commission, and the parties, interpreted the term. The court’s new interpretation of “generate” was not debated and is not briefed.

On the record and proceedings in the Commission, substantial evidence supports the Commission’s findings and rulings as to this claim clause. The court’s reversal of the Commission is unwarranted. At a minimum, this new (incorrect) definition requires remand for the views of the parties and the Commission.

## B

### **The '340 patent: “interrupting contacts . . . load terminals”**

Another finding on which the court improperly reverses the Commission relates to the claim clause:

interrupting contact assembly including four sets of interrupting contacts that are configured to provide electrical continuity between the line terminals and the load terminals in a reset state and configured to interrupt the electrical continuity in tripped state

. . . .

'340 patent col.10 ll.17–22. The Commission construed this claim element as “four pairs of electrical contacts that can separate from each other to interrupt the flow of electricity,” *I.D.* at 89. ELE’s expert, Dr. Engel, stated that ELE’s Interrupters “absolutely” have “four sets of interrupting contacts under the plain meaning of that phrase.” J.A.

40840. The Commission's findings are well supported by substantial evidence.

Neither ELE nor Trimone disputes that its devices have four sets of interrupting contacts between the line and load. However, the court holds that two of these contacts are not connected to "load terminals" as required by the claim. The '340 specification explains that the purpose of the Ground Fault Circuit Interrupter is to remove power from the load terminals, by interrupting the circuit from the power source. '340 patent col.2 ll.8–10 ("Circuit interruption is typically effected by opening a set of contacts disposed between the source of power and the load."). A person of ordinary skill in this field would understand that the "interrupting contact assembly" of the clause is configured to interrupt the continuity between the power source (the line terminals) and load terminals such as receptacle outlets.

The '340 patent states:

The electric circuits may typically include one or more receptacle outlets and may further transmit AC power to one or more electrically powered devices, commonly referred to in the art as load circuits. The receptacle outlets provide power to user-accessible loads that include a power cord and plug, the plug being insertable into the receptacle outlet.

Col.1 ll.27-33. No one disputes that receptacle outlets are referred to in the electrical art as "user load terminals" or "user-accessible load terminals." Multiple witnesses testified that "load terminals" include user-accessible load terminals such as receptacle outlets, explaining that receptacle outlets are sometimes more specifically referred to as "user load terminals" or "user-accessible load terminals." Dr. Horenstein, an expert testifying on behalf of respondent Meihao, stated that "receptacles are also referred to as user

accessible load terminals,” J.A. 40938. Dr. Harman explained that “the load terminals would be the terminals for any other devices or outlets or appliances that would be connected to the device,” J.A. 40408; “The loads are on the right side labeled load and outlet receptacle,” J.A. 40401. ELE’s expert witness, Dr. Engel, likewise testified that in ELE’s design “there are two load terminals, so this, Your Honor, shows a wire going to a receptacle or a load terminal available on the face of the device, and this shows a wire going to a load terminal available on the side of the device.” J.A. 40819. ELE does not argue that the claimed “load terminals” do not include user load terminals such as the receptacle outlets shown in the ’340 patent.<sup>3</sup>

Contrary to this unanimity of experts, my colleagues dispose of the experts with the statement that “an expert’s subjective understanding of a patent term is irrelevant.” However, an expert’s testimony concerning the definition of a technological term in his field of expertise is highly relevant. An objective definition of a term of electrical art is not “subjective understanding.”

The Commission accepted the uniform extrinsic and intrinsic evidence, and proceeded on the premise that “user load terminals” are a form of “load terminal.” Yet the panel majority now reverses the Commission and rules that “load terminals” excludes “user load terminals.” This ruling is contrary to the patent specification and contrary to the

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<sup>3</sup> The majority at footnote 4 states that ELE indeed “raises the load terminal issue” by stating in its brief that the ’340 patent does not show separation of “the downstream load terminals from the surface (‘face’) load or receptacle terminals,” ELE Br. 44. Notably absent from the ELE briefs is any suggestion that “load terminals” do not include receptacle outlets. Indeed, the above-quoted portion of the ELE brief accepts that receptacles are surface load terminals, as ELE’s expert conceded, consistent with the testimony of other experts.

entire record. The panel majority, seeking support, simply argues that the experts were “fastidious” in referring to “user load terminals” separately from “load terminals,” Maj. Op. at 13, and indeed the experts differentiated the broader general term “load terminal” from the more specific “user load terminal” such as receptacle outlets. No one except this court proposes that “load terminal” by definition excludes user load terminals.

The Commission discussed Trimone’s attorney argument that, despite this uncontested understanding and usage, the ’340 patent claims exclude receptacle outlets from the scope of “load terminal.” The Commission heard this argument, and found no distinction between the meaning of “load terminals” in this electrical technology and the “load terminals” described and claimed in the ’340 patent. The Commission rejected Trimone’s argument, and declined to remove “user load terminals” from the scope of “load terminals.” The Commission explained that “the testimony of multiple witnesses confirms that outlets/receptacles have load terminals. The fact that one would be unlikely to miswire a GFCI by wiring AC power to the outlets/receptacles does not preclude them from being considered ‘load terminals’ in the context of miswiring protection.” *I.D.* at 89 (citations omitted).

It is simply incorrect for this court now to hold that “load terminals” exclude user load terminals. The Commission’s finding of infringement by the user load terminals is supported by substantial evidence; the court’s contrary finding is totally devoid of support. I must again dissent from my colleagues’ refusal to apply the proper standard of review and failure to credit the Commission’s correct rulings and findings.

C

**The '398 patent: “latching means”**

ELE does not dispute that its devices embody this element of the '398 patent. The Commission found, applying 35 U.S.C. §112 ¶6, that GPG's 2006 Interrupter includes latching structure equivalent to that described in the '398 patent. Although this finding is supported by substantial evidence, the panel majority rejects it.

Claim 1 of the '398 patent includes the following clauses:

f) latching means releasably retaining said conducting member in said first position; and

g) actuating means for releasing said latching means to permit said biasing means to move said conducting member to said second position in response to a predetermined fault condition in said electrical circuit.

'398 patent col.13 ll.41–46. The “first position” is a “circuit-making” position in which the conducting member completes the circuit in the Ground Fault Circuit Interrupter, allowing power to be delivered from line to load. The “second position” is the circuit-breaking position. The '398 patent describes a mechanical latching structure wherein the shoulder of a pin catches on a latch connected to the conducting member, and a spring biases the latch member and conducting member into the designated first position. If the latch is disengaged, the spring will bias the latch member and the conducting member into the circuit-breaking position.

The GPG 2006 Interrupter uses a permanent magnet to hold the conducting member in the first position, against the bias of a spring. The Commission found infringement in terms of §112 ¶6. The Commission received evidence of the known interchangeability of mechanical and magnetic latches, including expert testimony that prior art patents “speak about a magnetic latch in a GFCI,” J.A. 40524, and that “[t]he use of a magnet as a latch is fairly common in other devices,” *id.* The Commission found the fact that “at the filing of the ’398 patent, a person of ordinary skill in the art would have considered the magnetic latching structure in the GPG 2006 GFCIs to be interchangeable with the ‘latching means’ recited in claim 1.” *I.D.* at 67. The Commission explained that in these devices the mechanical and magnetic latches work in substantially the same way, for in both cases the force of the pin or the magnet overcomes the biasing force of a spring to hold the conducting members in the circuit-making position. *I.D.* at 66–67.

The court rejects the Commission’s finding of equivalency, without discussing the evidence for or against this finding. Instead, the court rules that there can never be equivalence between a mechanical latch and a magnetic latch, misciting *Toro Co. v. Deere & Co.*, 355 F.3d 1313 (Fed. Cir. 2004). *Toro* did not so hold. My colleagues remove from its context *Toro*’s quotation of the argument of the defendant Deere, *viz.* “Deere contends that this difference means the two systems accomplish clause (e)’s function in fundamentally different ways.” *Id.* at 1324. This was not a pronouncement of law for all mechanical-magnetic substitutions. On the facts of that case, the mechanical cam-follower that travels a slope, used in the *Toro* patent to lift a valve stem, was found to operate in a substantially different way from the magnetic solenoid used by Deere to create a magnetic force that pulls open a liquid valve. *Id.* This court in *Toro* affirmed the district court’s finding of non-equivalency for that system; the court did not establish a

universal law of non-equivalence for all systems and all mechanical/magnetic facts.

Equivalence is a question of fact to be determined “against the context of the patent, the prior art, and the particular circumstances of the case.” *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 609 (1950). As explained in *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, 520 U.S. 17, 36 (1997), “known interchangeability of substitutes for an element of a patent is one of the express objective factors noted by *Graver Tank* as bearing upon whether the accused device is substantially the same as the patented invention.” Substantial evidence supports the Commission’s finding that GPG’s 2006 Interrupter contains structure equivalent to the latching means described in the ’398 patent. There was no contrary evidence.

My colleagues on this panel disregard the rulings and findings of the Commission, and render de novo rules and findings on new theories to which the parties have had no opportunity to respond. This is an inappropriate appellate process.

I respectfully dissent.