

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AISIN SEKI CO. LTD.,
Petitioner,

v.

SIGNAL IP, INC.,
Patent Owner.

Case IPR2016-00369
Patent 5,732,375

Before MEREDITH C. PETRAVICK, JEREMY M. PLENZLER, and
JAMES A. TARTAL, *Administrative Patent Judges*.

TARTAL, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
37 C.F.R. § 42.108

Petitioner Aisin Seiki Co., Ltd. filed a Petition requesting an *inter partes* review of claim 11 of U.S. Patent No. 5,732,375 (“the ’375 patent”). Paper 1 (“Pet.”). Patent Owner Signal IP Inc., filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). We have jurisdiction under 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless . . . the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

Upon consideration of the Petition and the Preliminary Response, we conclude the information presented does not show a reasonable likelihood that Petitioner would prevail in showing the unpatentability of the challenged claim. Accordingly, we do not authorize an *inter partes* review to be instituted as to claim 11 of the ’375 patent.

I. BACKGROUND

A. *The ’375 Patent (Ex. 1001)*

The ’375 patent is titled “Method of Inhibiting or Allowing Airbag Deployment” and issued on March 24, 1998. The ’375 patent discloses that vehicles may have airbags for protecting passengers in a front passenger seat and that it is desirable to inhibit the airbags from deploying if the front passenger seat is occupied by a small child or an infant in a rear facing car seat. Ex. 1001, 1: 12–29. The ’375 patent, thus, discloses a method of detecting a type of seat passenger and determining the seating position of the passenger to allow or inhibit airbag deployment. *Id.* at 1:44–50.

The ’375 patent discloses a vehicle passenger seat having an array of pressure sensors. The array of sensors is depicted in Figure 7 of the ’375 patent, and Figure 7 is reproduced below.



Figure 7 depicts the seat having 12 sensors arranged as follows: 1) a left pair of sensors 1 and 2, 2) a right pair of sensors 11 and 12, 3) a front pair of sensors 6 and 7, 4) a rear pair of sensors 3 and 10, and 5) a center group of sensors 4, 5, 8, and 9. Ex. 1001 at 3:21–29.

Sensors 1–12 are also arranged in the overlapping localized areas as follows: 1) sensors 1, 6, 7 and 12 in a front group, 2) sensors 2, 3, 4, 5, 8, 9, 10, and 11 in a rear group, 3) sensors 1, 2, 3, 4, 5, 6, 8, and 9 in a left group, and 4) sensors 4, 5, 7, 8, 9, 10, 11, and 12 in a right group. *Id.* at 4:19–24.

An algorithm calculates a set of decision measures 40 based upon the output of the sensors. *Id.* at 3: 48–49; Fig. 4. The first decision measures are a total force, which is the sum of the sensor output values, and a fuzzy contribution for the total force. *Id.* at 3:49–67. The second decision measures are a load rating for each sensor, a total load rating, and a fuzzy contribution for the total load rating. *Id.* at 4:1–17. The load rating is a measure of whether the sensor is detecting some load, and the total load rating is the sum of the load ratings for each sensor. Ex. 1001 at 4:2–4, 9–11. The third decision measures are a force and fuzzy contribution for each

pair of sensors and for the center group. *Id.* at 4:30–47.

The algorithm also checks for force concentration. *Id.* at 4:18. The '375 patent states:

[A] check is made for force concentration in a localized area.
. . . The algorithm determines if the pressure is all concentrated in one group by summing the load ratings of the sensors in each group and comparing to the total load rating. If the rating sum of any group is equal to the total rating, a flag is set for that group (all right, all front etc.).

Id. at 4:18–24.

Based upon the set of decision measures, a decision algorithm determines whether airbag deployment should be allowed or inhibited. *Id.* at 4:64–66. The decision algorithm is depicted in Figure 8, and Figure 8 is reproduced below.

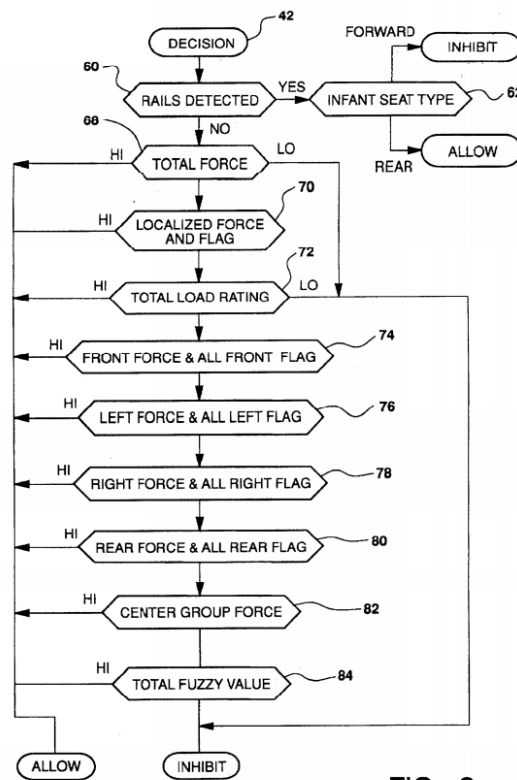


FIG - 8

Figure 8 depicts a flow chart of the deployment decision algorithm.

Whenever an inhibit or allow decision is made, that decision is controlling and all other conditions lower on the chart are bypassed. *Id.* at 5:9–11.

First, the decision algorithm determines if rails of an infant seat are detected and whether the infant seat is forward or rear facing. *Id.* at 4:65–5:9. Deployment is allowed for a forward facing seat and inhibited for a rear facing seat. *Id.* at 5:1–3.

If rails are not detected <60>, the total force is compared to high and low thresholds <68>. If it is above the high threshold deployment is allowed and if below the low threshold the deployment is inhibited. Otherwise, if the localized force for a sensor group is above a threshold and the flag corresponding to that group is set <70>, deployment is allowed. If not, the next step is to compare the total load rating to high and low thresholds <72>. Deployment is allowed if the rating is above the high threshold and inhibited if below the low threshold. Each of the sensor pairs for front, left, right, and rear are compared to threshold values <74–80>. If any of them are above its allowed. If not, the center group force is compared to a threshold <82> to decide upon allowance. Finally, the total fuzzy value is compared to a threshold <84> to allow deployment if it is sufficiently high, and if not the deployment is inhibited.

Id. at 5:12–27.

B. Challenged Claim

Claim 11 of the '375 patent is independent and recites:

11. A method of airbag control in a vehicle having an array of force sensors on the passenger seat coupled to a controller for determining whether to allow airbag deployment based on sensed force and force distribution comprising the steps of:

- measuring the force sensed by each sensor;
- calculating the total force of the sensor array;
- allowing deployment if the total force is above a total threshold force;

assigning a load rating to each sensor based on its measured force, said load ratings being limited to maximum value;

summing the assigned load ratings for all the sensors to derive a total load rating; and

allowing deployment if the total load rating is above a predefined total load threshold, whereby deployment is allowed if the sensed forces are distributed over the passenger seat, even if the total force is less than the total threshold force.

Ex. 1001, 7:1–20.

C. *Related Proceedings*

Both parties state that the '375 patent is the subject of numerous district court proceedings, including *Signal IP, Inc. v. Toyota Motor North America, Inc. et al*, Case No. 2-15-cv-05162 in the U.S. District Court for the Central District of California. Pet. 1; Paper 4, 2–3.

The '375 patent was the subject of *Ex Parte* Reexamination No. 90/013,386; however, claim 11 was not reexamined. See Pet. 12.

Claims of the '375 patent other than claim 11 were the subject of a petition for *inter partes* review, which was denied in *American Honda Motor Co., Inc., v. Signal IP, Inc.*, Case IPR2015-01003 (Paper 11, October 1, 2015).

Claim 11 of the '375 patent was the subject of a petition for *inter partes* review, which was denied in *Toyota Motor Corporation v. Signal IP, Inc.*, IPR2016-00291 (Paper 13, June 10, 2016).

D. Asserted Grounds of Unpatentability

Petitioner contends that claim 11 is unpatentable as obvious under 35 U.S.C. § 103(a) over: (1) Schousek¹ and Tokuyama,² (2) Tokuyama and Mazur,³ and (3) Schousek, Zeidler,⁴ and Mano.⁵ Pet. 5–6.

II. ANALYSIS

A. Claim Construction

Petitioner acknowledges that the '375 patent expired on December 1, 2015. See Pet. 13. “[T]he Board’s review of the claims of an expired patent is similar to that of a district court’s review.” *In re Rambus, Inc.*, 694 F.3d 42, 46 (Fed. Cir. 2012). Specifically, because the expired claims of the patent are not subject to amendment, we apply the principle set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)), that “words of a claim ‘are generally given their ordinary and customary meaning,’” as understood by a person of ordinary skill in the art in question at the time of the invention. “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*,

¹ U.S. Patent No. 5,474,327, issued December 12, 1995 (Ex. 1002, “Schousek”).

² JP 06-022939, published March 25, 1994 (Ex. 1003 and Ex. 1004 (English translation) “Tokuyama”).

³ U.S. Patent No. 5,454,591, issued October 3, 1995 (Ex. 1011, “Mazur”).

⁴ U.S. Patent No. 5,612,876, issued March 18, 1997 (Ex. 1013, “Zeidler”).

⁵ M. Morris Mano, *Digital Logic and Computer Design*, ©1979 Prentice Hall, Inc. (Ex. 1014, “Mano”).

415 F.3d at 1312–17). Moreover, only terms which are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

For purposes of this Decision, the only term requiring specific discussion is “load rating,” recited in claim 13. According to Petitioner:

The ’375 patent does not expressly define the term “load rating.” An example is provided in the specification where a “load rating” varies between 0 and 4. (See [Ex. 1001] at 4:6–9; *see also* 6.) Claim 11, however, is not limited to this example. Instead, the ’375 patent confirms that “[t]he load rating is a measure of whether the sensor is detecting some load...” (*Id.* at 4:2–4.) Thus, while a load rating can vary between 0 and 4 (or 0 and some other number), it can also simply be binary value that varies between 0 and 1. In other words, a “load rating” is simply a numerical value indicating “whether [each] sensor” in the “sensor array” is “detecting some load.” (See Ex. 1009, at ¶ 49.)

Pet. 15.

Patent Owner does not dispute Petitioner’s proposed construction, stating “a load rating, according to the ’375 [p]atent is a measure of whether a given sensor is detecting some load.” Prelim. Resp. 3, 16 (citing Ex. 1001, 4:1–4). We agree with the parties that a “load rating” is a measure of whether a given sensor is detecting some load.

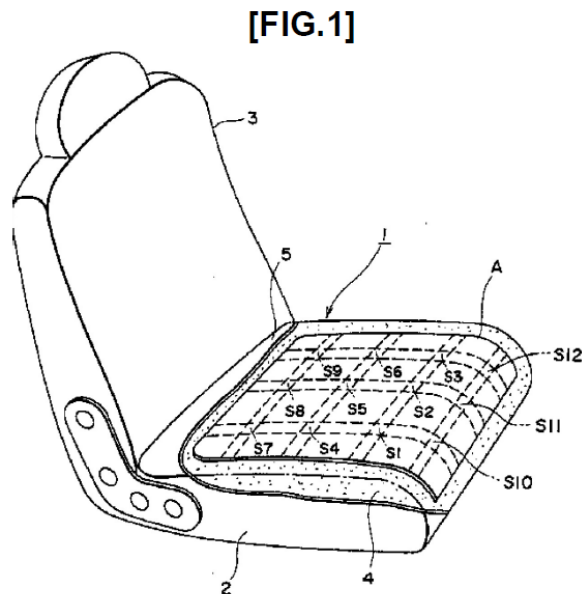
B. Asserted Obviousness Over Schousek and Tokuyama

Petitioner contends claim 11 of the ’375 patent would have been obvious over Schousek and Tokuyama. Pet. 25–42. Petitioner provides a claim chart identifying how it contends each feature of claim 11 is disclosed by the asserted references, and relies upon the Declaration of Dr. Stephen W. Rouhana for support. *Id.* at 35–42; *see also* Ex. 1009.

Claim 11 requires, among other things, assigning a load rating to each sensor based on its measured force, and then “summing the assigned load ratings for all the sensors to derive a total load rating” (the “summing limitation”). Airbag deployment is allowed if the total load rating is above a predefined total load threshold. Petitioner relies only on Tokuyama as disclosing the summing limitation. See Pet. 25 (“Schousek discloses all the limitations required by claim 11 except the use of “load rating[s],” a “total load rating,” or a “total load threshold.”). Our discussion focuses on the summing limitation because Petitioner has not adequately shown that Tokuyama discloses this feature of the claim.

Tokuyama describes a “seat load detection apparatus, used in a seat of an automobile such as a private vehicle, for detecting the presence or absence of sitting by a passenger.” Ex. 1004 ¶ 1.

Figure 1 of Tokuyama is reproduced below.



Tokuyama Figure 1 shows automobile seat 1 with load detection body A disposed between cushion material 4 and surface sheet 5. Ex. 1004 ¶ 11.

Load detection body A includes nine load detection units (S1 to S9) disposed on the upper surface side of seat unit 2 and three load detection units (S10 to S12) disposed near the front edge of seat unit 2. *Id.* at ¶¶ 13–14. In determining whether to deploy the airbag, Tokuyama uses a microprocessor “by way of an ON-OFF judgment as to whether a current is flowing in each load detection unit S1 to S12” to distinguish whether a load in the seat is due to a person or something else. *See id.* at ¶ 29. If all 12 load detection units are OFF it is determined that no load is acting on the seat. *Id.* at ¶ 31. If at least one of the load detection units is on, then “it is determined whether four or more of the nine load detection units S1 to S9 are ON,” and if “fewer than three of the nine load detection units S1 to S9 are ON, it is decided that it is a load due to something other than a person.” *Id.* More particularly, if the set of load decision units S2, S5, and S8, located in a vertical row in the middle of the seat, are all OFF, or the set of load decision units S4, S5, and S6, located in a horizontal row in the middle of the seat, are all OFF, then it is decided that it is a load due to something other than a person. *Id.* Additional determinations concerning the load on the seat are made by evaluating the total value of the current flowing between the conductors, which corresponds to load pressure. *Id.*, *see also id.* at ¶¶ 16–17.

According to Petitioner, Tokuyama’s “ON-OFF judgment”:

is a binary process: either the sensors are ON (which can be thought of as assigning a value of “1” to each sensor) or OFF (which can be thought of as assigning a “0”). As explained above, a “load rating” is simply [a]n indication of whether a sensor is “detecting some load.” [] Thus, by converting each sensor measurement into an “ON” or “OFF,” Tokuyama’s apparatus determines whether each of its sensors is detecting

some load and “assign[s] a load rating to each sensor based on its measured force” as required by the final limitations of claim 11.

Pet. 30.

Patent Owner has not disputed, and we assume for purposes of this Decision, that Tokuyama’s application of an “ON-OFF judgment” to load detection units corresponds to “assigning a load rating,” as claimed. We are not persuaded, however, that Petitioner has sufficiently shown that Tokuyama discloses “summing the assigned load ratings for all the sensors to derive a total load rating,” in light of Petitioner’s limited explanation:

Tokuyama makes a passenger/no passenger classification based in part on whether “four or more of the nine load detection units S1 to S9 are ON.” (Tokuyama Ex. 1003, at ¶ 0031; Fig. 7.) In other words, Tokuyama’s apparatus determines a “total load rating” by adding up the number of sensors that are ON, and compares this “total load rating” to a “total load threshold” of 4 as part of its classification algorithm. (*Id.*; see also Ex. 1009, [Andrews Dec.] at ¶ 76.)

Pet. 30–31.

Contrary to Petitioner’s argument, there is no express disclosure in Tokuyama that it is “adding up” the number of sensors that are ON. We are not persuaded that Petitioner has carried its burden by merely arguing that “[i]n other words, Tokuyama’s apparatus determines a ‘total load rating’ by adding up the number of sensors that are ON,” or that “this determination amounts to adding up the sensors’ load ratings.” Pet. 30; Ex. 1009, ¶ 66 (emphasis added). Petitioner’s interpretation of Tokuyama is supported only by a limited explanation in the Declaration of Dr. Rouhana, which states:

In [Tokuyama] step (b), “it is determined whether four or more of the nine load detection units S1 to S9 are ON. If fewer than

three of the nine load detection units S1 to S9 are ON, it is decided that this is a load due to something other than a person.” ([Ex. 1004 ¶ 31, Fig. 7].) This is a binary process: either the sensors are ON (which can be thought of as assigning a value of “1” to each sensor) or OFF (which can be thought of as assigning a “0”). . . . And, Tokuyama makes a passenger/no passenger classification based in part on whether “four or more of the nine load detection units S1 to S9 are ON.” (*Id.*) In other words, Tokuyama’s apparatus determines a “total load rating” by adding up the number of sensors that are ON, and compares this “total load rating” to a “total load threshold” of 4 as part of its classification algorithm.

Ex. 1009, ¶ 76.

Thus, from the evidence relied on by Petitioner, Tokuyama determines whether a certain number of sensors is on, but Tokuyama provides no indication that it is “adding up” sensor ON information. Dr. Rouhana’s testimony is not persuasive because it is conclusory and provides no explanation of why one of ordinary skill in the art at the time of the invention would have understood Tokuyama to be applying a binary system based on numerical values for ON and OFF, much less summing those numerical values to add up the load ratings of the sensors. Tokuyama does not state that it assigns a numerical value to any load rating, and in fact utilizes information to make determinations based not only on how many of the twelve load detection units are ON or OFF, but also about which of those units are ON or OFF. Petitioner does not explain how such location information would be reflected were Tokuyama properly viewed as a simple binary system. Petitioner also neglects to address how Tokuyama’s exclusion of three of the twelve sensors from its determination of whether four or more of the load detection units are ON relates to the requirement of claim 11 of summing the assigned load ratings for *all* the sensors.

Petitioner's contentions are not supported by sufficient evidence to suggest that any set of load rating values is summed, or needs to be summed, for Tokuyama to operate, even if Petitioner contends that conceptually it "amounts to" adding values up.

"Any judgment on obviousness is in a sense necessarily a reconstruction based on hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper." *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971). In this case, Petitioner provides no sufficient explanation or evidence that Tokuyama contemplated "summing the assigned load ratings," as claimed, and instead suggests that by considering the disclosure of the '375 patent, Tokuyama can be thought of as accomplishing the same task. There is no persuasive evidence that such reasoning is limited to the level of ordinary skill in the art at the time of the claimed invention. Moreover, reasoning that the disclosure of Tokuyama "amounts to" what is disclosed in the '375 patent necessarily includes knowledge gleaned from the '375 patent. As a result, we are not persuaded that Petitioner has sufficiently demonstrated Tokuyama discloses "summing the assigned load ratings for all the sensors to derive a total load rating," as required by claim 11. Accordingly, we conclude that Petitioner has not presented sufficient information to establish a reasonable likelihood of prevailing in showing the unpatentability of claim 11 of the '375 patent as obvious over Schousek and Tokuyama.

C. Asserted Obviousness Over Tokuyama and Mazur

Petitioner contends claim 11 of the '375 patent would have been obvious over Tokuyama and Mazur. Pet. 42–54. With regard to the summing limitation, Petitioner again relies only on Tokuyama. *Id.* at 53. For the same reasons discussed above with respect to the Schousek and Tokuyama combination, we are not persuaded that Petitioner has sufficiently demonstrated Tokuyama discloses “summing the assigned load ratings for all the sensors to derive a total load rating,” as required by claim 11.

Accordingly, we conclude that Petitioner has not presented sufficient information to establish a reasonable likelihood of prevailing in showing the unpatentability of claim 11 of the '375 patent as obvious over Tokuyama and Mazur.

D. Asserted Obviousness Over Schousek, Zeidler, and Mano

Petitioner contends claim 11 of the '375 patent would have been obvious over Schousek, Zeidler, and Mano. Pet. 54–60. With regard to the summing limitation, Petitioner relies only on Zeidler and Mano. *Id.* at 59. Our discussion again focuses on the summing limitation because Petitioner has not adequately shown that Zeidler and Mano disclose this feature of the claim.

Zeidler is a “device for detecting seat occupancy in a motor vehicle, especially for inhibiting airbag release when a seat is unoccupied.” Ex. 1013, Abstract. Zeidler uses a seat occupancy sensor with a front sensing region and a rear sensing region, each of which can be evaluated separately. *Id.* In Zeidler a simple algorithm is used to determine whether to deploy the airbag based on seat occupancy logic signals “V” from the front sensing region and “H” from the rear sensing region having “the

occupancy status ‘1’ for an occupied sensing region and ‘0’ for an unoccupied sensing region.” *Id.* at 3:34–4:5. If the rear sensing region is occupied (in which case the “H” signal is “1”), then the airbag is deployed. *Id.* If the rear sensing region is not occupied (in which case the “H” signal is “0”), then the airbag is inhibited. *Id.*; *see also* Pet. 24–25.

Mano appears to be a text book titled *Digital Logic and Computer Design*. Petitioner provides no description of Mano, stating only that “[i]t would have been obvious to use conventional binary logic, as in Mano, Ex. 1014, at pp. 25–29, 39–42, and 47–53 to achieve the desired control of airbag deployment.” Pet. 56. In particular, according to Petitioner:

If this binary logic were used in the combination of Schousek and Zeidler, 0 would be the “predetermined total load threshold,” the “maximum value” would be 1, and the “total load rating” for all sensors would be the final binary output of either 0 or 1. If the output exceeds the “threshold” 0, deployment would be allowed. (Ex. 1009 at ¶ 104).

Pet. 56.

Petitioner offers no sufficient reason why Mano’s “binary logic” would have been used at the time of the invention in Zeidler’s device or simple algorithm. Nor does Petitioner explain any sufficient rationale for why one of ordinary skill in the art would have applied the binary logic of Mano to Zeidler. Indeed, Petitioner offers no sufficient explanation for how its purported use of Boolean arithmetic comports with “summing,” as that term is used in the ’375 patent.

We agree with Patent Owner, that “*Zeidler* does not teach any scheme employing Boolean arithmetic in order to determine whether the sum of any assigned load ratings determine whether or not airbag deployment should be allowed.” Prelim. Resp. 21. As Patent Owner notes, “*Zeidler* is clear that

whether or not airbag deployment is permitted depends on the output values of individual seat sensing regions, not their sum.” *Id.* Petitioner’s argument that “a boolean function combining a logic OR operation ($x + y$), i.e., a Boolean sum, and a logic AND operation ($x \cdot y$), i.e., a Boolean product, can be used to achieve the same result as the Table from Zeidler,” is unsupported by a sufficient rationale and reflects an improper reconstruction based on knowledge gleaned only from applicant’s disclosure. *See In re McLaughlin*, 443 F.2d at 1395. Indeed, the Petition is devoid of any explanation as to why a Boolean function combining a Boolean sum and a Boolean product would have been encompassed by the summing limitation of the ’375 patent. We further agree with Patent Owner that if the values assigned to the V and H signals were applied as a simple summing operation, Zeidler does not teach a total load threshold of “0” or “1” because it inhibits airbag deployment both when only the front sensing region is occupied, that is, when the value of logic signal V is 1 and H is 0, as well as when no sensing region is occupied (in which case both V and H are 0). *See Prelim. Resp.* 22. Thus, Zeidler inhibits airbag deployment under certain circumstances when the sum of the V and H signals is 0 or 1. Contrary to its assertion, Petitioner has not persuasively shown that if the output exceeds the “threshold” 0, deployment would be allowed. *See Pet.* 56.

Accordingly, we conclude that Petitioner has not presented sufficient information to establish a reasonable likelihood of prevailing in showing the unpatentability of claim 11 of the ’375 patent as obvious over Schousek, Zeidler, and Mano.

III. CONCLUSION

We determine that Petitioner fails to demonstrate a reasonable likelihood of prevailing on any of the asserted grounds of unpatentability.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that institution of *inter partes* review is *denied* as to the challenged claim of U.S. Patent No. 5,732,375.

IPR2016-00369
Patent 5,732,375

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