

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TRW AUTOMOTIVE U.S. LLC,
Petitioner,

v.

MAGNA ELECTRONICS INC.,
Patent Owner.

Case IPR2014-01351
Patent 8,513,590 B2

Before JAMES P. CALVE, MICHAEL J. FITZPATRICK, and
BARRY L. GROSSMAN, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. BACKGROUND

Petitioner, TRW Automotive U.S. LLC (“TRW”), filed a Petition (Paper 1; “Pet.”) seeking institution of an *inter partes* review of claims 60, 61, 69–74, 77, 78, 80, 83, 84, and 86–93 of U.S. Patent No. 8,513,590 B2 (Ex. 1002; “the ’590 patent”). Patent Owner, Magna Electronics Inc. (“Magna”), filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). Based on these submissions, we instituted trial as to all challenged claims of the ’590 patent. Paper 7 (“Institution Decision”).

After institution, Magna filed a Response (“PO Resp.”). Paper 9. TRW filed a Reply (“Pet. Reply”). Paper 14. TRW proffered the Declaration of Dr. Homayoon Kazerooni, Ph.D. (Ex. 1012, “Kazerooni Declaration”) with the Petition. Magna proffered the Declaration of Dr. Michael Nranian, Ph.D. (Ex. 2005, “Nranian Declaration”) with its Response. In addition, a First Rebuttal Declaration of Dr. Homayoon Kazerooni, Ph.D. (Ex. 1016, “Kazerooni Rebuttal Declaration”) was submitted by TRW.

Oral hearing was conducted on September 23, 2015, in conjunction with the hearing for IPR2014-01010. A transcript of the hearing is entered in the record as Paper 21 (“Hearing Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a).

A. *Related Proceedings*

The parties inform us that the ’590 patent is the subject of a co-pending district court case titled *Magna Electronics Inc. v. TRW Automotive Holdings Corp.*, Case 1:13-cv-00324 (W.D. Mich.). Pet. 3; Paper 5, 3.

B. The '590 Patent (Ex. 1002)

The '590 patent discloses a vehicle interior mirror assembly with housing 10, front end 12 of which attaches to a mounting button (not shown) on an interior surface of windshield 22. Ex. 1002, 3:23–29, 2:37–42; Fig. 2. Housing 10 is divided into two parts by internal wall 16. *Id.* at 3:29–31. First compartment 18 contains rain sensor 26, which is biased by steel spring 28 through an opening in the mounting button into optical contact with windshield 22. *Id.* at 5:62–6:2. Second compartment 20 has at least one electrical component (e.g., circuit board 30 and compass sensor). *Id.* at 6:7–12; Fig. 8. Figure 2, reproduced below, illustrates these features.

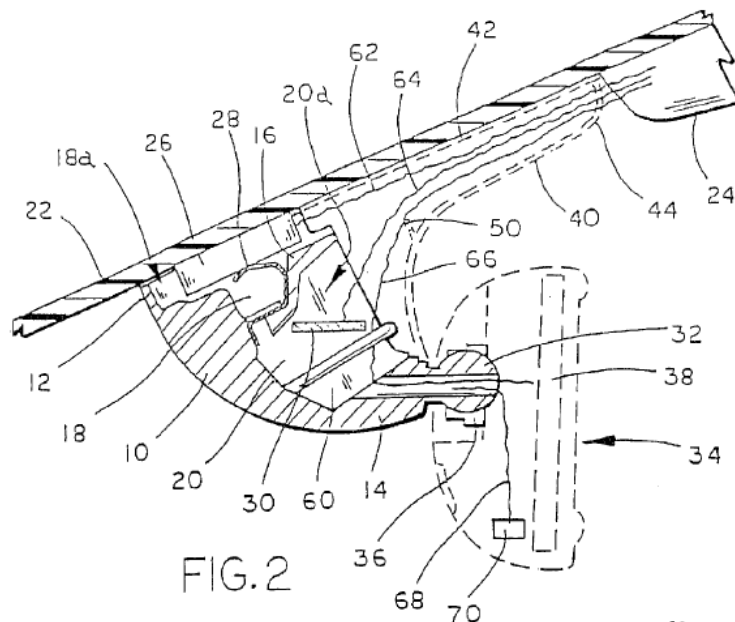


Figure 2 is a cross-section through the mirror assembly of Figure 1.

Rear end 14 of housing 10 has integral ball 32 for releasably and adjustably mounting rearview mirror unit 34 in a conventional manner. *Id.* at 6:13–15. Removable cover 40 mates with housing 10 around opening 20a of housing 10 and extends along windshield 22 to vehicle header 24. *Id.* at 6:54–56; Figs. 2, 7. Removable cover 40 protects compartment 20 and

component 30 against ingress of dust and other contaminants, and provides a conduit for electrical leads 62, 64, 66 from rain sensor 26, component 30, and electro-optic or other electrically operated mirror 38. *Id.* at 7:18–20. A camera (not shown) may be located on the housing or mirror unit or cover and arranged to look forwardly or rearwardly relative to the motion of the vehicle, or in another desired direction.¹ *Id.* at 7:47–50.

C. Illustrative Claim

Claims 60, 78, and 83 are independent. Claim 60 is illustrative of the claimed subject matter, and is reproduced below:

60. An accessory system for a vehicle, said accessory system comprising:
- a windshield of a vehicle equipped with said accessory system;
 - a receiving structure attached at an in-cabin surface of said windshield, wherein said receiving structure comprises a contiguous structure;
 - a structure attached at said receiving structure, wherein said structure comprises a portion that attaches at said receiving structure;
- wherein, with said structure attached at said receiving structure, a cluster of individual sensors resides on or near said in-cabin surface of said windshield, and wherein said cluster of individual sensors includes a forwardly-viewing camera;
- wherein said cluster of individual sensors further includes at least one selected from the group consisting of (i) a rain sensor, (ii) a compass sensor, (iii) a vehicle altitude sensor, (iv) a vehicle incline sensor, (v) a headlight

¹ The '590 patent claims priority to numerous parent applications. Ex. 1002, 1:9–37. Disclosure of a camera first appears in the parent U.S. Application No. 09/433,467, which was filed on November 4, 1999, and issued as U.S. Patent No. 6,326,613 B1.

intensity sensor, (vi) a daylight intensity sensor and (vii) a geographic positioning satellite sensor; and wherein at least one of (i) said structure is detachably attached at said receiving structure and (ii) said structure is attached at said receiving structure via a breakaway attachment.

D. The Prior Art

TRW relies on the following references:

Reference	Patent/Printed Publication	Date	Exhibit
Blank	US Patent No. 5,708,410	Jan. 13, 1998	1005
Schofield	US Patent No. 4,930,742	June 5, 1990	1006
Carter	US Patent No. 5,667,896	Sept. 16, 1997	1008
Anderson	US Patent No. 5,602,457	Feb. 11, 1997	1009
Kakinami	US Patent No. 5,096,287	Mar. 17, 1992	1010
Klappenbach	US Patent No. 5,710,633	Jan. 20, 1998	1011

E. The Asserted Grounds of Unpatentability

TRW challenges the patentability of claims 60, 61, 69–74, 77, 78, 80, 83, 84, and 86–93 of the '590 patent on the following grounds:

Reference(s)	Basis	Claims Challenged
Blank, Kakinami, Schofield	§ 103	60, 61, 70–74, 77
Blank, Kakinami, Schofield, Carter, Anderson	§ 103	69, 78, 80, 83, 84, 87–91, 93
Blank, Kakinami, Schofield, Carter, Anderson, Klappenbach	§ 103	86, 92

II. ANALYSIS

A. Claim Interpretation

In an *inter partes* review, claims of an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1278 (Fed. Cir. 2015). Claim terms are given an ordinary, customary meaning as understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

1. “bus communication” (Claims 70, 78, 84)

TRW asserts that the term “bus communication” should mean “[a] set of signal lines used by an interface system, to which a number of devices are connected, and over which information is transferred between the devices.” Pet. 9–10 (citing IEEE Standard 696 (Ex. 1004)). TRW also points out that the term “bus communication” only appears in the claims of the ’590 patent. *Id.* at 9. TRW asserts that recital of “CAN bus communication” in claim 39 as a type of bus communication supports a broader interpretation of “bus communication” in claims 70, 78, and 84. *Id.*; Pet. Reply 6.

Magna argues that “bus communication” is more than a set of signal lines used by an interface system and is a type of communication carried by a vehicle bus. PO Resp. 16. Magna also argues that such communications follow special requirements/protocols for message delivery, non-conflicting messages, minimum time of delivery, and EMF noise resilience. *Id.* Magna further argues that communication by a vehicle CAN bus is exemplary. *Id.* Dr. Nranian testifies that a bus communication is communication carried by a vehicle bus with special requirements/ protocols. Ex. 2005 ¶ 84.

We interpret “bus communication” as “information transferred over a set of signal lines between devices connected to the signal lines.” We are not persuaded that a bus must include an interface. The IEEE Standard 969 Interface Devices (Ex. 1004) defines a bus in that context. The ’590 patent discloses a CAN bus without disclosing an interface. Ex. 1002, 4:15–17. An ordinary meaning of “bus” includes “[a] set of signal lines to which a number of devices are connected and over which information is transferred between them.” See ANSI/IEEE Standard 1196-1987 IEEE Standard for a Simple 32-Bit Backplane Bus: NuBus (Ex. 3001).

The term “bus communication” does not appear in the ’590 patent specification apart from original claims 70, 78, and 84. See ’590 patent file history (Ex. 1003), 1003-479–1003-480. The ’590 patent discloses that:

Optionally, the electronic circuitry can be located/share components with/receive input from or deliver output electrical accessories in the vehicle, such as a CAN bus, electronically equipped mirrors such as lighted mirror and automatic dimming electro chromic mirrors, overhead consoles, and similar electrically functioning vehicle components.

Ex. 1002, 4:15–21. This disclosure lists CAN bus as an electrical accessory.

Magna argues that “‘bus communication’ is communication carried by a vehicle bus, with communication by a vehicle CAN bus being exemplary.” PO Resp. 16. Dr. Nranian testifies that vehicles use bus communications across components, “such as CAN or LIN bus.” Ex. 2005 ¶ 93. It is not clear whether communications protocols used over a CAN bus differ from those used over a LIN bus, other vehicle buses, or a bus generally.

Even if skilled artisans understand that communications over a CAN bus or vehicle bus use special protocols (see Ex. 2005 ¶ 84), claims 70, 78,

and 84 recite a “bus communication.” Magna has not apprised us of any basis for limiting “bus communication” to a CAN bus, or to communications carried over a CAN bus. Pet. Reply 5–6; *Howmedica Osteonics Corp. v. Wright Med. Tech., Inc.*, 540 F.3d 1337, 1345 (Fed. Cir. 2008) (“we have repeatedly held that the fact that the specification describes only a single embodiment, standing alone, is insufficient to limit otherwise broad claim language”); *Phillips v. AWH Corp.*, 415 F.3d 1301, 1323 (Fed. Cir. 2005) (although the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments). Claim 39 recites that a bus communication comprises a CAN bus communication, indicating a “bus communication” comprises other communications besides CAN bus communications.

Even if we could read features from the specification into the claims, the ’590 patent specification does not disclose any protocols for a CAN bus, vehicle bus, or bus communication generally. Magna has not identified any disclosure in the ’590 patent specification of such. Magna’s argument that a “vehicle bus” follows special requirements or protocols is not persuasive in the absence of a disclosure or evidence that “bus communications” use the same protocols as vehicle bus and CAN bus communications. PO Resp. 16.

Magna asserts that “[c]ommunication carried by a *vehicle bus* follow special requirements/protocols for message delivery, for non-conflicting messages, for minimum time of delivery, and for EMF noise resilience, *and the like*. PO Resp. 16 (emphasis added); Ex. 2005 ¶ 84. It is unclear which of these protocols is used by a bus communication or a CAN bus. It also is unclear which additional protocols are covered by “and the like.”

2. “*cluster of individual sensors*” (Claims 60, 77, 78, 83)

TRW asserts that the term “cluster of [sic, individual] sensors” is not present in the ’590 patent specification. Pet. 6. TRW also asserts that the ’590 patent describes a compact interior mirror system that includes a housing that accommodates “**a plurality of electrical accessories.**” *Id.* TRW further asserts that the “claims do not define any particulars of the ‘individual sensors’” and Magna has not shown how a “cluster of individual sensors” differs from a “cluster of sensors.” Pet. Reply 1. Magna does not propose a construction for this term. See PO Resp. 16–17.

We construe “cluster of individual sensors” as “a group of individual sensors or components of individual sensors positioned close together.” Pet. 6–7; Prelim. Resp. 11–12. This interpretation is consistent with an ordinary meaning of “cluster” which includes “a group of things or people that are close together” (Pet. 6) and the claims, which recite “a cluster of individual sensors resides on or near said in-cabin surface of said windshield.”

This interpretation is consistent with the ’590 patent specification, which discloses that housing 10 is divided by wall 16 into adjacent first and second compartments 18, 20. Ex. 1002, 3:29–31, Fig. 2. One embodiment contains rain sensor 26 in first compartment 18 and printed circuit board 30 bearing a compass sensor 30 in second compartment 20. *Id.* at 5:62–6:12, 7:52–55, Figs. 2, 8. The ’590 patent specification discloses that the housing may accommodate a plurality of electrical accessories. *Id.* at 6:42–44.

The ’590 patent further discloses that component 30 “can be *any* of a number of sensors or circuits which can be made small enough to fit in the compartment 20.” *Id.* at 7:64–67 (emphasis added). Preferably, component 30 is provided as a unitary module received in compartment 20. *Id.* at 7:67–

8:1. An ordinary meaning of “any” is one or more. Thus, the ’590 patent specification discloses that component 30 may include more than one sensor.

The ’590 patent specification discloses sensors that detect conditions outside the cabin and remote from the in-cabin surface where the cluster of individual sensors is located. Sensors for seat occupancy, air bag activation, vehicle speed governors, tire monitoring systems, remote fueling systems, and remote car door unlock systems (Ex. 1002, 8:17–32) would appear to include components outside of housing 10 even though other portions of those sensors are located on printed circuit board 30 inside housing 10.

B. Asserted Grounds of Unpatentability

*1. Obviousness of Claims 60, 61, 70–74, and 77
Over Blank, Kakinami, and Schofield*

a. Overview of Blank (Ex. 1005)

Blank discloses a vehicle information display concealed substantially by a rear view mirror and viewable by a vehicle operator. Ex. 1005, 1:15–18; Figs. 1, 2, 3A, 3B. Figures 1 and 3B of Blank are reproduced below.

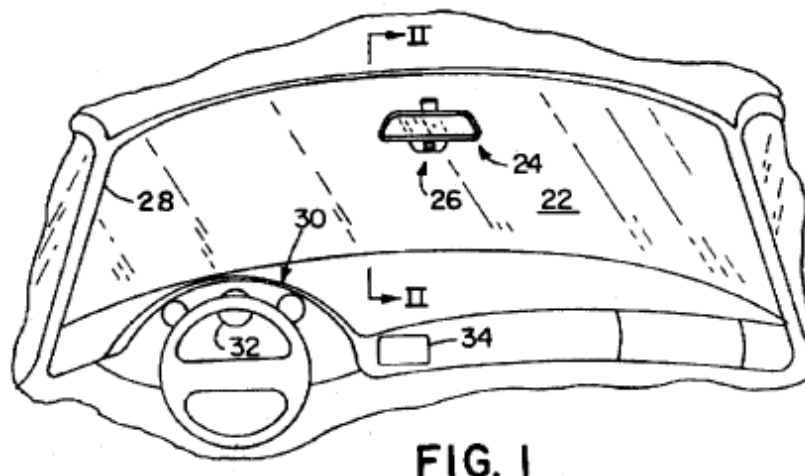


Figure 1 is an interior view of display 26 mounted behind rearview mirror 24.



Figure 3B is a side elevation view of an interior rearview mirror and information display assembly secured to a windshield-mounted button.

Blank discloses rearview mirror assembly 24 connected by support arm 42 to mount 44, which is fastened to inner surface 46 of windshield 22 by mounting button 70. *Id.* at 5:10–12, 6:11–13. Mount 44 includes coupler body 80 adapted to receive button 70 in a sliding fashion during installation to retain mount 44 on button 70. *Id.* at 6:34–58. Housing 110 has upper portion 114 coupled detachably to lower portion 118. *Id.* at 7:25–26. Upper portion 114 includes attachment member 112 that receives coupler body 80 to couple housing 110 to button 70. *Id.* at 6:64–67; 8:5–23, Figs. 4B, 6–8.

Blank also discloses an integrated compass module that houses the electronic circuit 150 of the compass and display 154, 254. Blank discloses that circuit board 150 is configurable for a variety of displays 154 including a standalone compass, clock, odometer, speed indicator, hazard warning indicator, turn indicator, thermometer (interior and exterior), trip computer, global positioning satellite system, cellular telephone, supplemental vision system (such as camera, sonar, infrared, and microwave detection), and/or warning lights (such as a low fuel indicator). *Id.* at 7:46–59. Display 154 may be analog and/or digital. *Id.* at 7:59–66. These features are illustrated in Figure 4B, which is reproduced below. *Id.* at 7:46–48.

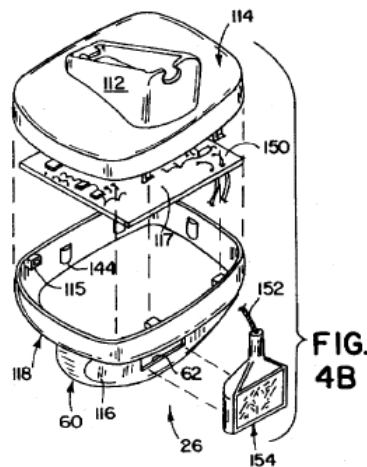


Figure 4B shows display 154 and circuit board 150 in housing 110.

b. Overview of Kakinami (Ex. 1010)

Kakinami discloses a video camera that takes pictures of scenes ahead of a vehicle. Ex. 1010, 1:5–8. Figure 2a, reproduced below, shows video camera 20 mounted in arm 11 supporting rear view mirror 1. *Id.* at 2:15–16.

Fig. 2a

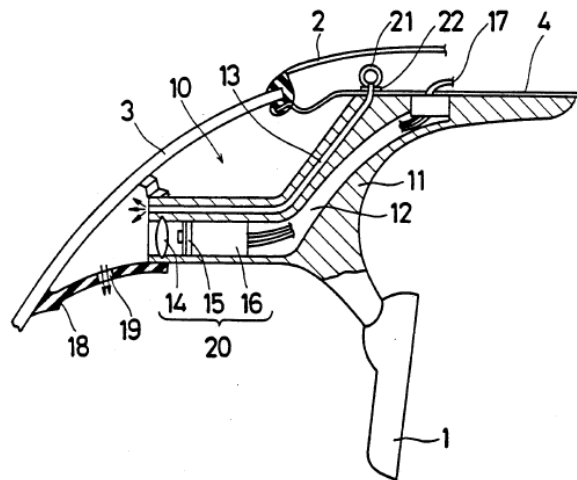


Figure 2a is a cross-section of a vehicle and video camera. Cable 17 extends from signal processing unit 16 of video camera 20 through passage 12 between vehicle roof 2 and ceiling 4 and connects to an image processing device (not shown). *Id.* at 2:26–32.

c. Overview of Schofield (Ex. 1006)

Schofield discloses a rearview mirror accessory mount with mounting adaptor 90 and receptacle 120 that house sensors such as headlight dimming sensor 130. Ex. 1006, 8:35–58. Figures 13 and 15 are reproduced below.

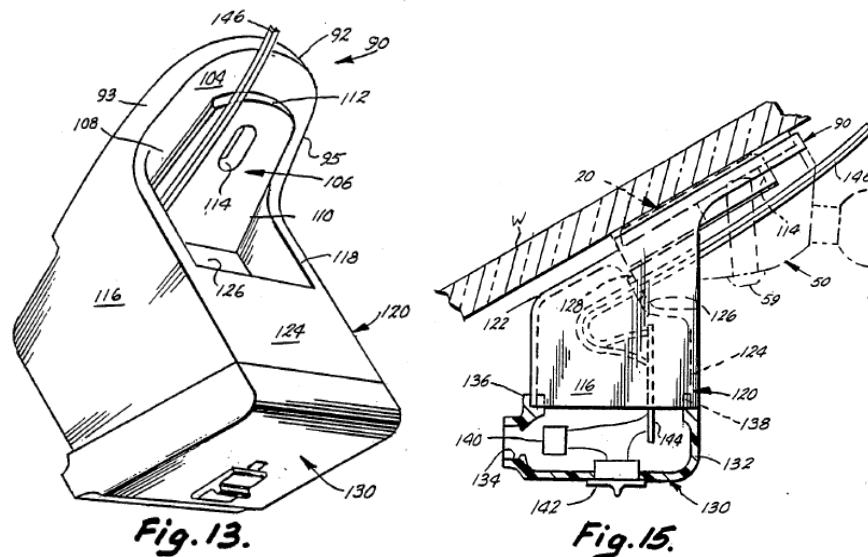


Figure 13 is a perspective view of a receptacle for a vehicle accessory. Figure 15 is a side view of the mounting adaptor of Figure 13. Receptacle 120 may support a compass sensor, radar detector, information display, garage door opener, rain sensor, or navigation receiver. *Id.* at 9:27–41.

d. Analysis

TRW asserts that claims 60, 61, 70–74, and 77 are unpatentable under 35 U.S.C. § 103(a) over Blank, Kakinami, and Schofield. Pet. 15–31. TRW supports its contentions with the Kazerooni Declaration. Ex. 1012.²

TRW asserts that Blank discloses all of the claimed features except a camera and cluster of sensors, which are taught by Kakinami and Schofield.

² The Petition erroneously refers to Dr. Kazerooni's Declaration as Exhibit 1013.

Pet. 16–17. TRW asserts that Blank discloses an accessory module attached at an inner surface of a windshield at mounting button 70, with housing 110 coupling to mount 70 via coupler body 80. *Id.* at 17–19, 25–26. TRW asserts that Blank strongly suggests a cluster of sensors by disclosing that the circuit board 150 within housing 110 comprises at least one of a variety of different sensors. *Id.* at 19 (citing Ex. 1005, 11:26–32 (claim 5)).

TRW contends that Schofield discloses a cluster of sensors located close together in a structure at an in-cabin surface of a windshield. *Id.* at 16–17, 19–20. TRW asserts that a skilled artisan would have been motivated to use a cluster of sensors in Blank’s module because Blank claims module 26 can be used for “at least one” sensor and Schofield teaches that a plurality of sensors can be located above and below an adapter. *Id.* at 19–21, 24–25.

TRW also asserts that, because Blank suggests a camera in module 26, and Kakinami discloses a video camera in a rear view mirror support, it would have been obvious to add camera 20 of Kakinami in Blank’s module facing forward as taught in Kakinami and suggested in Blank. *Id.* at 21–23.

Magna argues that Blank does not disclose a camera or a cluster of individual sensors in its module. PO Resp. 10, 18–23. Magna argues that Blank discloses an information display module connected to a rear view mirror mount, and adapted to contain a circuit board, but nothing else in the module. *Id.* at 18–19. Magna argues that claim 5 of Blank, which recites “said circuit comprises at least one device selected from [a] group of devices” does not suggest placing anything other than a circuit board in the module, and Blank only changes the size of the module to provide sufficient space to display information. *Id.* at 19, 21; Ex. 2005, ¶¶ 64–67. Magna asserts that Blank’s disclosure that circuit board 150 “may be configured for

any one of a number of other displays” suggests Blank’s display can display images from supplemental vision systems, but does not suggest locating a camera or sensor in the module. PO Resp. 20–21, 22; Ex. 2005 ¶¶ 63–65.

Magna’s arguments are not persuasive. Claim 5 of Blank recites the circuit in the module comprises “at least one device” that include compasses, GPS systems, cellular phones, warning lights, speed indicators, and hazard warning indicators. Ex. 1005, 11:26–32. The ’590 patent discloses sensors that include a compass sensor, GPS systems, cellular phone systems, and traffic warning systems. Ex. 1002, 6:32–36, 8:17–36. An ordinary meaning of “at least one” can be more than one. Dr. Kazerooni testifies that a skilled artisan would understand claim 5 of Blank to mean Blank’s module can accommodate a plurality of devices. Ex. 1012 ¶ 42. TRW asserts that this disclosure provides a motivation to add sensors to Blank’s module based on Schofield’s teachings. Pet. 19–20; Pet. Reply 2–4.

Magna argues that claim 5 of Blank does not suggest placing anything other than a circuit board in Blank’s module and, “[e]ven if a single circuit comprises more than one device, it does not constitute a cluster of *individual* sensors.” PO Resp. 19; Ex. 2005 ¶ 64. Dr. Nranian testifies that “Claim 5 simply describes possible configurations of the circuit that is on the circuit board” and “a single circuit that comprises more than one device is a multi-functional single circuit” not “a cluster of individual sensors.” Ex. 2005 ¶¶ 65, 70. Dr. Nranian also testifies that Blank’s module “is not on or near the in-cabin surface of the windshield.” *Id.* ¶ 65.

Magna’s arguments are not persuasive in view of our interpretation of “cluster of individual sensors” to mean “a group of individual sensors or components of individual sensors that are positioned close together.” The

'590 patent discloses that a printed circuit board (component 30) “can be any of a number of sensors or circuits which can be small enough to fit in the compartment 20.” Ex. 1002, 7:64–67, Figs. 8, 9. Component 30 preferably is a unitary module. *Id.* at 7:52–55 and 7:67–8:1. An ordinary meaning of “any” includes one or more. The '590 patent specification does not limit the sensors on component 30 to any *one of* a number of sensors or circuits. The '590 patent specification discloses that compartment 20, which contains component 30, “may contain a sensor or sensors.” *Id.* at 8:17–18. Blank also teaches that more than one sensor may be clustered on circuit board 150, as disclosed and claimed in the '590 patent. Dr. Nranian's testimony that a circuit with more than one device is multi-functional single circuit not a cluster of individual sensors is not supported by any other evidence of record or the '590 patent specification. See Ex. 2005 ¶ 70; Pet. Reply 1–2.

Dr. Nranian testifies that “Blank's module is not on or near the in-cabin surface of the windshield [because] Blank's module is spaced away from the windshield.” Ex. 2005 ¶ 65. But, our review of Blank reveals to us that it discloses module 26 near an in-cabin surface of windshield 22 (e.g., Ex. 1005, Fig. 3B) similar to the '590 patent's disclosure of rain sensor 26 and component 30 near windshield 22 (Ex. 1002, Figs. 8, 9).

Magna also argues that a skilled artisan would not have understood claim 5 of Blank as suggesting a cluster of individual sensors is received in the module because Blank only provides for changing the size of its module to provide sufficient space to display the information. PO Resp. 20–21; Ex. 2005 ¶ 69. Dr. Nranian testifies that a skilled artisan would have understood that “just because a circuit in Blank's module comprises a device does not suggest that the entire device is within Blank's module.” Ex. 2005

¶ 66. Dr. Nranian also testifies that a skilled artisan would have understood that the list of devices in claim 5 of Blank such as a supplemental vision system would not be wholly within Blank's module. Ex. 2005 ¶¶ 66, 67, 71.

We are persuaded that Blank teaches circuit board 150 includes more than one sensor based on the plain meaning of claim 5 and Dr. Kazerooni's testimony that a skilled artisan would understand from this language that Blank's module could accommodate a plurality of devices. Ex. 1012 ¶ 42. In view of this evidence, we see no impediment to placing more than one sensor on circuit board 150 or placing more than one circuit board in module 26 of Blank without altering its low profile. As shown in Figure 4B, circuit board 150 occupies a small portion of housing 111, so bosses or guides 144 are needed to hold circuit board 150 within housing 110. Ex. 1005, 7:30–33, Figs. 2, 3A, 3B. In view of the disclosure in the '590 patent specification of sensors that detect conditions away from rearview mirror 22 and windshield 34 (Ex. 1002, 8:17–36 (compartment 20 may contain a sensor(s) for vehicle altitude, seat occupancy, air bag activation enable/disable, vehicle speed governors, tire monitoring systems, remote fueling systems)), Blank's disclosure of multiple sensors in module 26 provides motivation to modify Blank to include a cluster of individual sensors as taught by Schofield, if not also disclosing a cluster of individual sensors.³ In any case, we do not consider Blank to teach away from including a cluster of individual sensors as taught by Schofield.

³ The '590 patent specification discloses that component 30 can be “any of a number of sensors or circuits” small enough to fit in compartment 20 and component 30 preferably is a unitary module. Ex. 1002, 7:65–8:1. The term “any” can mean one or more.

Magna's arguments are directed at physical incorporation of multiple sensors from Schofield into Blank's module. The test for obviousness is not whether the features of one reference can be incorporated physically into the structure of another reference but rather what the combined teachings of the references suggest to a skilled artisan. *See In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985) (en banc); *In re Yamamoto*, 740 F.2d 1569, 1573 (Fed. Cir. 1984); *In re Sneed*, 710 F.2d 1544, 1550 (Fed. Cir. 1983). We see no reason why a skilled artisan could not widen Blank's module housing 110 in a lateral direction to accommodate larger circuit boards 150 with multiple sensors or multiple circuit boards 150. Figures 1 and 3A of Blank depict module 26 concealed behind only a portion of the width of mirror assembly 40.⁴ A person of ordinary skill is a person of creativity, not an automaton. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

Magna acknowledges Schofield's disclosure of a system that supports a variety of different accessories but argues that this teaching does not teach a cluster of individual sensors. PO Resp. 23; Ex. 2005 ¶ 73. Magna argues that Schofield discloses only one sensor (a headlight sensor) in its mounting receptacle and teaches that a different accessory can replace the headlight sensor, but further argues that this arrangement is not a cluster of individual

⁴ The claims do not require the cluster of sensors to be inside a housing. The cluster of sensors "resides on or near said in-cabin surface of said windshield" when a structure is attached to the receiving structure. The '590 patent specification discloses sensors "*may be mounted under the cover 40, in addition to the component 30 in the compartment 20.*" Ex. 1002, 8:34–36 (emphasis added). The '590 patent also discloses that "a camera may be located *on the assembly for example on the housing, or mirror unit or cover.* *Id.* at 7:47–48 (emphasis added).

sensors. PO Resp. 24–25; Ex. 2005 ¶¶ 74–75, 79. Magna further argues that Schofield discloses mounting receptacles above and below an adaptor body, but each receptacle accommodates only a single accessory and this arrangement does not form a cluster of individual sensors. Pet. 25; Ex. 2005 ¶ 76. Magna argues that the sole example in Schofield of a compass sensor below and a compass display above the adapter body is not a cluster of individual sensors. Pet. 25; Ex. 2005 ¶ 77.

We are persuaded that Schofield discloses a cluster of individual sensors in view of Schofield’s teaching that support 120 may be used or modified to support other vehicle accessories. Ex. 1006, 9:27–32. Schofield discloses that accessories may be supported above and below adaptor 90 by separate supports with “shapes designed for and fitted to the particular accessory being supported.” Ex. 1006; 9:32–36; Pet. Reply 2; Pet. 19–20.

Dr. Kazerooni testifies that a skilled artisan would understand this disclosure to mean the supports could house other vehicle accessories. Ex. 1016 ¶¶ 6–7; Ex. 1012 ¶ 41. This arrangement would group a cluster of individual sensors on or near the in-cabin surface of the windshield in that two sensors would be placed at adapter 90 and, thus, at or near an in-cabin surface of a windshield, as claimed. Ex. 1006, 9:24–41, Fig. 15; Pet. 20; Ex. 1016 ¶ 7. The ’590 patent specification discloses a similar arrangement with rain sensor 26 and circuit board 30 grouped in housing 10 near windshield 22 and separated by internal wall 16. Ex. 1002, 3:23–42, Figs. 2, 8, 9; Pet. Reply 3–4. The ’590 patent specification’s disclosure that circuit board 30 may be “any of a number of sensors” (Ex. 1002, 7:64–8:1) also could be a cluster of sensors. The ’590 patent specification does not describe either arrangement as a cluster of sensors or a cluster of individual sensors. Thus,

we consider either arrangement as falling within the meaning of a cluster of individual sensors under a broadest reasonable interpretation.

We are not persuaded that Schofield's disclosure of sensors above and below adaptor body 90 is limited to an example of a compass sensor below and a compass display above adaptor body 90, as Magna asserts.⁵ PO Resp. 25; Ex. 2005 ¶ 77. We find persuasive the testimony of Dr. Kazerooni that Schofield teaches support 120 may be used or *modified* to support multiple vehicle accessories above and below adaptor 90 "with shapes designed for and fitted to the particular accessory being supported." Ex. 1012 ¶ 41; Ex. 1016 ¶ 7; Pet. 19–20. Schofield discloses mounting of increasing amounts of instrumentation and accessories (sensors) at the upper front windshield at a rearview mirror assembly. Ex. 1006, 1:37–65. Schofield discloses an adaptor that supports different supports for different vehicle *accessories* at the rearview mirror. *Id.* at 2:28–43. The accessories include a compass sensor, rain sensor, radar detector, navigation system receiver, information display, and garage door opener. *Id.* at 9:24–35; Ex. 1002, 8:17–34.

TRW and Dr. Kazerooni provide persuasive argument and evidence that a skilled artisan would have been motivated to place a cluster of sensors in Blank's module 26 in view of the teachings of Blank and Schofield. Pet. 19–21; Ex. 1012 ¶¶ 41–43; Ex. 1016 ¶ 8. In view of TRW's reliance on Blank's express teaching of multiple sensors in module 26 and Schofield's express teaching of a support with multiple accessories/sensors, as discussed above, TRW has not engaged in impermissible hindsight, as Magna argues.

⁵ Among sensors disclosed in the '590 patent specification are Internet *interfaces*. Ex. 1002, 8:29–30. Thus, even this example could constitute a cluster of individual sensors, as claimed.

PO Resp. 26. Nor do we consider Blank as teaching away from Schofield in view of these express teachings in the references. PO Resp. 41–43.

Magna’s assertion that a skilled artisan “would not have included a cluster of individual sensors, as taught by Schofield, in Blank’s module 26 instead of above and below the adapter as taught by Schofield” is not persuasive because it erroneously presumes that the law requires physically incorporating Schofield’s features into Blank. *See In re Etter*, 756 F.2d at 859 (“Etter’s assertions that Azure cannot be incorporated in Ambrosio are basically irrelevant, the criterion being not whether the references could be physically combined but whether the claimed inventions are rendered obvious by the teachings of the prior art as a whole.”); *In re Yamamoto*, 740 F.2d at 1573 (physical incorporation not required). Blank and Schofield teach the desirability of locating more than one accessory in a support at a windshield mount. Ex. 1005, 11:26–32; Ex. 1006, 2:28–43, 9:24–41; Pet. Reply 2–3; Pet. 21.

We also do not view Blank’s disclosure of housing 110 having a low profile to conceal it behind outline 54 of mirror 40 as teaching away from adding another housing above Blank’s mount 44, as taught by Schofield, with another sensor in that upper module. PO Resp. 41–43. As shown in Figure 3B of Blank, space exists above mount 44 to accommodate another support substantially concealed by rearview mirror 40. A skilled artisan also might expand Blank’s module 26 laterally to accommodate other circuit boards or sensors while maintaining “a low profile having a height less than either its length or width so that it can be concealed behind the outline 54 of mirror 40,” as Blank teaches. Ex. 1005, 7:1–3; Pet. Reply 20–21.

Magna asserts that Kakinami includes a forward-facing camera in an arm of a header-mounted rearview mirror, rather than a module like Blank's module. PO Resp. 11. Magna also argues that placing Kakinami's camera in Blank's module would change Blank's principle of operation of providing an information display without diverting a driver's attention or blocking the driver's view through the windshield. *Id.* at 38–39; Ex. 2005 ¶¶ 106, 107. Magna argues that the combination would require substantial reconstruction and redesign of Blank's module to accommodate Kakinami's camera, boot, and an opening for Kakinami's camera, and would not be concealed by the rearview mirror. PO Resp. 39–40; Ex. 2005 ¶¶ 108–116. Magna further argues that Blank disparages information displays that are integral with a mirror assembly, as is the case with Kakinami. *Id.* at 40.

Magna's arguments are not persuasive in view of TRW's contention that Kakinami teaches a camera in a mirror mount module (arm 11) similar to Blank's module 26 so that a skilled artisan would have been motivated to include Kakinami's camera 20 in Blank's module 26 at a rearview mirror. Pet. 22–23; Ex. 1012 ¶¶ 36–38. Blank discloses that circuit board 150 in module 26 may be configured for a camera. Ex. 1005, 7:51–59. Kakinami discloses rearview mirror mounts with a forward-facing camera. *See* Pet. 23; Ex. 1012 ¶ 36; Ex. 1010, 2:15–32, Fig. 2a. Whether Kakinami's camera is placed at Blank's module 26 below mount 44 or in a support module that is placed above mount 44 of Blank, as Schofield teaches two supports, and Kakinami shows a camera above rearview mirror, motivation exists to add a camera sensor to Blank's accessory system, as TRW contends. Pet. Reply 15–17; Pet. 23; *see* Ex. 2005 ¶¶ 114–115.

Adding a camera to Blank's module 26 does not appear to require a substantial reconstruction or redesign. PO Resp. 39–40; Ex. 2005 ¶¶ 105–107. Dr. Kazerooni testifies that configuring housings like Blank's module 26 to accommodate different accessories is a basic engineering task well within the level of ordinary skill. Pet. Reply 15–16; Ex. 1016 ¶¶ 21–23. Blank teaches that the size and shape of module 26 may be varied to provide sufficient space to display information. Ex. 1005, 3:8–11; see Pet. Reply 16; Ex. 1016 ¶ 22. Blank teaches that the injection molding process used to form housing 110 of module 26 permits formation of bosses 144 and tabs 114 in the interior chamber of module 26 to seat and secure circuit board 150 and display 154. Ex. 1005, 7:6–10; see Pet. Reply 16; Ex. 1016 ¶ 22.⁶ Blank discloses circuit board 150 as occupying only a portion of housing 110. See Ex. 1005, Figs. 4B, 8. Blank also teaches an opening (window 62) in housing 110 for display 154.⁷ *Id.* at 7:41–45, Figs. 4B, 6.

We are persuaded by TRW's contentions that these teachings would have motivated a skilled artisan to modify Blank's housing 110 to provide different shapes, sizes, and internal configurations of bosses to support other circuit boards, sensors, and cameras.

A supplemental vision system may use a rear backup camera located at the rear exterior of a vehicle or on the exterior body of the vehicle. PO

⁶ Schofield's teaching that support 120 may be modified to support different accessories with shapes designed for each particular accessory supported (Ex. 1006, 9:27–36) is evidence of the level of skill and understanding of skilled artisans to modify sensor modules and supports for different sensors.

⁷ Schofield's disclosure of light receiving opening 134 in a forward-facing portion of support 120 (Ex. 1006, 8:53–58, Fig. 15) is evidence of the level of skill and understanding of skilled artisans in modifying a sensor support.

Resp. 20–21; Ex. 2005 ¶¶ 66–68. A supplemental vision system could include a forward-facing camera to shoot scenes through a front windshield. Pet. 16, 22–23; Ex. 1012 ¶¶ 36–38. Kakinami teaches the advantages of mounting a camera inside a vehicle to view scenes ahead of the vehicle. Ex. 1010, 1:5–9, 1:37–64.

The '590 patent specification discloses sensors that detect things outside accessory housing 10. Ex. 1002, 8:17–33 (tire monitoring, speed governors, remote car door unlock, seat occupancy). Thus, placing a camera circuit of a supplemental vision system on circuit board 150 in module 26 of Blank discloses a camera sensor near an in-cabin surface of a windshield, as claimed. Blank's recognition of the desirability of including a camera circuit in module 26 also provides motivation to include Kakinami's camera and/or camera circuit in Blank's module 26.

For these reasons, based on the evidence of record and analysis above, and notwithstanding Dr. Nranian's testimony to the contrary, we determine that a skilled artisan would have been led by Blank to place a camera in Blank's module. Ex. 2005 ¶ 68. Kakinami expressly teaches a camera in a rearview mirror mount at or near an in-cabin surface of a windshield. See Pet. 22. TRW relies on Kakinami's teaching and Blank's configuration of circuit board 150 for a supplemental vision system as motivation to include Kakinami's camera in Blank's module 26. Pet. 22–23. Blank teaches how to place at least a camera circuit in module 26 (Ex. 1005, 7:51–58, Fig. 4b), and Kakinami teaches how to mount a camera in a mirror module/mount (Ex. 1010, 1:32–46, 2:15–32, Figs. 1, 2a, 3).

Blank's disclosure of a supplemental vision circuit in module 26 does not teach away from including Kakinami's camera at or in Blank's module

26 as Magna argues. PO Resp. 38–39; *see In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004) (prior art’s disclosure did not criticize, discredit, or otherwise discourage the claimed solution and therefore did not teach away). Displaying pictures captured by a forward-facing camera on Blank’s display 154 would not appear to divert or block a driver’s attention to any greater extent than displaying a speed indicator, hazard warning, turn indicator, GPS, or supplemental vision system disclosed by Blank. Ex. 1005, 7:51–59.

Dr. Kazerooni provides persuasive testimony that a skilled artisan would understand that signal processing unit 16 associated with Kakinami’s camera 20 could be incorporated into Blank’s circuit board 150 based on the express teaching in Blank that its circuit board 150 may be configured for a supplemental vision system with a camera, so Blank suggests incorporating electronic circuitry for a camera into its circuit board 150. Ex. 1012 ¶ 37. Dr. Kazerooni testifies that designing a housing to hold components therein is a basic engineering concept and a skilled artisan could include Kakinami’s camera in Blank’s module to fit behind rearview mirror. Ex. 1016 ¶¶ 22–23.

Dr. Nranian testifies that the proposed modification would require substantial reconstruction or a redesign of Blank or a change in the principle of operation. Ex. 2005 ¶¶ 106–110. Dr. Nranian does not elaborate on this opinion or explain what redesigns and reconstructions would be required.

We find persuasive the testimony of Dr. Kazerooni that designing a housing to hold components therein is a basic engineering concept within the level of ordinary skill in the art, particularly in view of, and as evidenced by, the disclosures of Blank and Schofield. Ex. 1016 ¶¶ 21–23. Blank discloses that circuit board 150 may be configured for a supplemental vision system. Ex. 1005, 7:51–59. TRW proposes to use this principle of operation and

include Kakinami's camera with Blank's module 26. Pet. Reply 15–17. As discussed above, Blank and Schofield disclose reconfiguration and redesign of accessory housings, both internally and externally, to accommodate a variety of different accessories. Ex. 1005, 3:8–11, 7:6–10; Ex. 1006, 9:24–36. Kakinami also discloses mounting of video camera 20, which includes lens 14, video device 15, and signal processing unit 16. Ex. 1010, 2:15–26, Fig. 2a. Physical incorporation is not required to demonstrate obviousness. See *In re Yamamoto*, 740 F.2d at 1573.

Figure 8 of Blank, reproduced below, illustrates circuit board 150 as occupying only a small portion of the interior space of module 26.

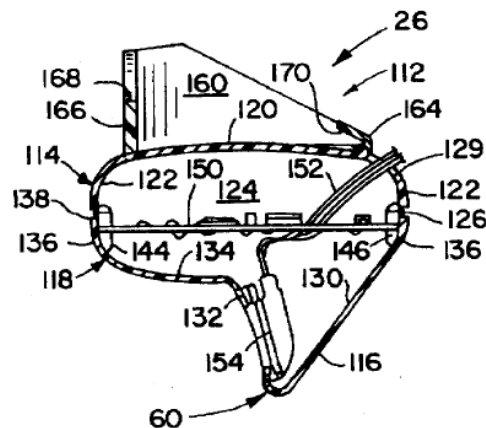


FIG. 8

Figure 8 is a sectional view of module 26 illustrating the relatively small amount of space occupied by circuit board 150, shown in cross-section as a thin line inside module 26.

In view of the foregoing, we do not credit Dr. Nranian's unsupported testimony that a skilled artisan would have been dissuaded from redesigning, or unable to redesign, Blank's module 26 to accommodate Kakinami's camera and circuits. Ex. 2005 ¶¶ 107–110. Kakinami discloses "a video camera is mounted in the arm 11 which also supports the rear view mirror

1.” Ex. 1010, 2:15–16, Fig. 1, 2a. This limited disclosure presumes a level of skill in the art needed to practice this aspect of the invention. As TRW points out, Blank also teaches the use of injection molding processes to form bosses and tabs that support circuit board 150 and display in housing 110. Ex. 1005, 7:1–10; Pet. Reply 16.

We are persuaded that a skilled artisan would include an opening in Blank’s module 26 for a forward-viewing camera of Kakinami in view of Blank’s disclosure of window 62 for display 154 and an opening for wires 152.⁸ Ex. 1005, 7:35–38, Figs. 4B, 8; Ex. 1016 ¶ 24. We also are persuaded that a skilled artisan could place a boot 18 around such an opening to seal a camera lens at the windshield, as Kakinami discloses. Ex. 1010, Fig. 1, 2a; Pet. Reply 18–19. Even if physical incorporation were the standard for obviousness, we are not persuaded that placing a boot around a forward-facing opening in Blank’s module 26 “would further enlarge the module and increase the obstruction to the driver’s vision.” See Ex. 2005 ¶ 109. Even if a boot extended above Blank’s module 26, it would be concealed by lobe 116, housing 110, and rearview mirror 40. See Ex. 1005, Figs. 2, 3A, 3B.

Because TRW proposes to include Kakinami’s camera 20 in Blank’s module 26 (Pet. Reply 18; Ex. 1012, ¶¶ 36–37), Blank’s alleged disparaging remarks about integral mirror mountings are not relevant. See PO Resp. 40–41; Ex. 2005 ¶ 111. Dr. Kazerooni states that Kakinami’s camera is small enough to fit behind a rearview mirror, so Blank’s module would remain concealed behind mirror 40. Ex. 1016 ¶¶ 23–24.

⁸ Schofield also discloses formation of opening 134 in support 120 for light sensor 140. Ex. 1006, 8:53–9:5, Fig. 15.

TRW proposes to cluster multiple sensors, as taught by Schofield, in Blank's module 26. Pet. Reply 19–20. Magna's arguments to the contrary appear to be based on perceived obstacles to physical incorporation of the prior art teachings. PO Resp. 42–43. Further, we see no reason why Schofield's teaching of separate supports for different accessories could not be incorporated into Blank's module 26, for example, by providing one sensor in upper portion 114 of module housing 110 and another sensor in lower portion 118 of housing 110 of module 26. Blank discloses housing 110 with space to accommodate two circuit boards 150. Ex. 1005, Fig. 8. Blank also teaches that sensors may be combined on circuit board 150. *Id.* at 11:26–32 (claim 5). See Pet. 20–21; Pet. Reply 19–20. Alternatively, we see no impediment to adding another module above Blank's mount 44 to support another individual sensor, as taught by Schofield, or extending module 26 laterally, as discussed above.

Magna argues that Kakinami's cable 17 does not convey video output with a bus communication. PO Resp. 26–27, 28–29. Magna also argues that Kakinami's cable 17 is not a set of signal lines used by an interface system. *Id.* at 27. Magna further argues that video cameras send video over cables using television transmission standards like NTSC, PAL, or SECAM analog encoding, rather than a bus communication, which follows special protocols for message delivery. *Id.* at 27–28. Magna contends the '590 patent teaches a CAN bus communication as an exemplary bus communication, and such vehicle bus communications are specialized communications networks with special requirements for message delivery. PO Resp. 29–30. Dr. Nranian testifies that a CAN bus communication does not transmit video data. Ex. 2005 ¶ 90. Magna asserts that a vehicle bus communication is a central

network that electronic units plug into without the need to wire components of a vehicle to one another, as with Kakinami's cable 17. *Id.* at 31–32.

Magna's arguments are not persuasive in view of our interpretation of “bus communication” as “information transferred over a set of signal lines between devices connected to the signal lines.” We do not credit testimony of Dr. Nranian that Kakinami's cable 17 does not convey video output via a bus communication (Ex. 2005 ¶ 88) because Dr. Nranian interprets “bus communication” as a “vehicle” bus that follows protocols for message delivery based on a CAN bus (Ex. 2005 ¶¶ 84, 85, 89–91). We do not read such unclaimed features of a CAN bus, which is recited in claim 39, into “bus communication” in claims 70, 78, and 84. Kakinami's cable 17 is a bus under our interpretation.⁹ *Id.* ¶ 86.

⁹ Magna and Dr. Nranian assert that Kakinami's cable 17 is not a set of signal lines used by an interface system and the direct connection of signal processing unit 16 of camera 20 to an image processing device (not shown) does not include any interface system. PO Resp. 27; Ex. 2005 ¶ 86. However, neither Magna nor Dr. Nranian identifies what constitutes an interface system in their view. The IEEE standard cited by TRW for a definition of “bus communication” states that typical elements of an “interface system” may include driver and receiver circuits, signal line descriptions, timing and control conventions, data transfer protocols, and functional logic circuits. Ex. 1004, 2. Even if “bus communication” required such an interface system, which it does not, a skilled artisan would understand that video signals sent over Kakinami's cable 17 with NTSC, PAL, or SECAM transmission standards—which Magna and Dr. Nranian contend would be used in Kakinami (PO Resp. 27–28; Ex. 2005 ¶¶ 86–97)—would be sent by a bus communication such as an I²C bus, as taught in Stenhouse (Ex. 1013, 2, 3), which provides an interface system. Pet. Reply 4–5; Ex. 1016 ¶¶ 13–16.

Dr. Nranian states that video signals sent over cable 17 of Kakinami would be sent by analog transmission protocols or standards, which differ from exemplary CAN bus communication protocols. Ex. 2005 ¶¶ 87–91. Dr. Kazerooni testifies that cable 17 does not transmit video using analog standards because “signal processing unit 16” transmits data to an image processing unit via cable 17. Ex. 1016 ¶ 14. Dr. Kazerooni also testifies that, even if Kakinami’s camera transmitted analog video signal as suggested by Dr. Nranian, the communications protocols identified by Dr. Nranian were transmitted via a bus communication such as I²C Bus communication so a skilled artisan would have understood cable 17 to be at least an I²C Bus at the time of the invention. *Id.* ¶¶ 14–16.

Based on all of the foregoing, we determine that Kakinami discloses a bus communication. Cable 17 is a set of signal lines that transmits signals from signal processing unit 16 to image processing unit (not shown). A bus communication may include a CAN bus communication but it is not limited to such a bus. Even if “bus communication” meant a set of communication protocols or standards for transmitting signals, Magna acknowledges that video signals are transmitted according to standards and protocols such as NTSC, PAL, and SECAM analog encoding. PO Resp. 27–28; Ex. 2005 ¶¶ 87, 91. TRW provides persuasive evidence that it was known to transmit video signals using these standards on an I²C Bus, as taught by Stenhouse (Ex. 1013).¹⁰ Pet. Reply 9–11; Ex. 1016 ¶¶ 14–16.

¹⁰ TRW relies on Stenhouse (Ex. 1013) as evidence of the understanding of skilled artisans regarding types of bus communications used to transmit video signals using NTSC, PAL, and SECAM encoding standards that Magna argues were used in Kakinami. Pet. Reply 4–5; PO Resp. 27–29; Ex.

Dr. Kazerooni also points out that Kakinami discloses cable 17 with three leads, which is characteristic of serial bus communications, which typically include ground, clock, and data lines. Ex. 1010, Fig. 2a; Ex. 1016 ¶ 16. Dr. Kazerooni also testifies that a skilled artisan would modify Blank to include Kakinami's bus communication cable 17, in a similar manner as Blank's conductor 52, to operate Kakinami's camera 20 to send image data to image processors for further predictable processing. Ex. 1012 ¶ 40.

Magna argues that Blank does not disclose a cover that "provides a conduit for electrical leads" as recited in claim 89 and as asserted by TRW. PO Resp. 36. Magna argues that placement of a conductor in Blank and other features related to the cover do not disclose that the cover provides a conduit for electrical leads, as claimed. *Id.* at 36–37; Ex. 2005 ¶ 104.

Magna's arguments are not persuasive in view of TRW's contentions that Blank discloses that circuit board 150 is powered through conductor 152 that extends through housing 110, as illustrated in Figure 8. Pet. 44; Pet. Reply 14–15; Ex. 1005, 7:30–35, Fig. 8. Moreover, Magna does not explain what features of the claimed conduit are not disclosed by Blank's cover, which provides an opening and path for conductor 152.

Level of Ordinary Skill in the Art

Magna argues that TRW and Dr. Kazerooni do not provide a coherent definition of a person of ordinary skill, and Dr. Kazerooni presents two definitions in his declaration. PO Resp. 55–56. Dr. Kazerooni states that:

In view of at least the types of problems encountered in the art, the prior art solutions to those problems and the high

2005 ¶¶ 87–88. TRW relies on Stenhouse to rebut Magna's contentions as to what features are disclosed by Kakinami. See 37 C.F.R. § 42.23(b).

sophistication of the technology, all as addressed herein, it is submitted that the person of ordinary skill in the art of the '590 Patent at the time of the invention would have had at least the qualifications of or equivalent to either a undergraduate degree in electrical engineering or mechanical engineering with course work or research in automobile accessory systems with at least two years of work making automobile accessory systems.

Ex. 1012 ¶ 30. This discussion appears in Dr. Kazerooni's Declaration in a section entitled "LEVEL OF ORDINARY SKILL." Ex. 1012 ¶¶ 29–30. This definition of a skilled artisan in paragraph 30 immediately precedes Dr. Kazerooni's discussion of the "STATE OF THE ART IN THE RELEVANT TIMEFRAME." See *id.* ¶¶ 31–48. This definition of a skilled artisan in paragraph 30 of Dr. Kazerooni's Declaration matches TRW's definition of a skilled artisan in the Petition and is cited as the basis of TRW's definition of a skilled artisan. See Pet. 17 (citing Ex. 1012 ¶¶ 29–30); Ex. 1012 ¶ 30.

Another definition of a skilled artisan appears in Dr. Kazerooni's Declaration in a section entitled "SUMMARY OF OPINIONS." Ex. 1012 ¶ 10. It is unclear what use, if any, is made of this definition. Accordingly, we understand TRW and Dr. Kazerooni to assert the same definition of a skilled artisan, which definition appears at page 17 of the Petition and paragraph 30 of Dr. Kazerooni's Declaration.

Dr. Kazerooni identifies November 4, 1999 as the priority date of the '590 patent invention. Ex. 1012 ¶ 26. Magna does not dispute this date. PO Resp. 57. Dr. Kazerooni testifies to the level of ordinary skill *at the time of the invention*. *Id.* ¶ 30. Dr. Kazerooni provides a detailed discussion of the state of the art *at the time of the invention* by discussing the disclosures of Blank, Kakinami, Schofield, Carter, Anderson, and Klappenbach. *Id.* ¶¶ 31–48. These references were filed and issued before November 4, 1999. TRW

sets forth where Blank, Kakinami, and Schofield disclose the remaining features of claims 60, 61, 70–74, and 77, and why it would have been obvious to combine their teachings to render obvious those claims. Pet. 15–31. Dr. Kazerooni provides testimony in support of TRW’s arguments. See Ex. 1012 ¶¶ 31–44.

TRW has demonstrated by a preponderance of evidence that claims 60, 61, 70–74, and 77 are unpatentable under 35 U.S.C. § 103(a) over Blank, Kakinami, and Schofield.

*2. Obviousness of Claims 69, 78, 80, 83, 84, 87–91, and 93
Over Blank, Kakinami, Schofield, Carter, and Anderson*

a. Overview of Carter (Ex. 1008)

Carter discloses a method for attaching vehicle accessories to glass. Ex. 1008, 1:12–14. Carter discloses that it is preferable to deposit a black, frit layer or coating 40 on inner surface 30 of glass panel 28 to conceal a portion of inner surface 30. *Id.* at 4:14–18; Fig. 2B. Carter also discloses that such an opaque coating 40 conceals from exterior view any adhesive or mounting member attaching window panel 28 to the vehicle. *Id.* at 4:18–22.

b. Overview of Anderson (Ex. 1009)

Anderson discloses photovoltaic solar cells laminated in a vehicle windshield. Ex. 1009, 1:10–12. The solar cell strings are located near a periphery of a windshield where visibility through the windshield is not needed. *Id.* at 4:64–66. Anderson further discloses that most windshields have a black frit border area 28 that is silk screened onto glass layers 12, 14 of the windshield 10 and clear openings 30 may be left in the outside glass layer 14 for solar cells 26. *Id.* at 4:66–5:2, Fig. 1. Anderson also discloses that the active portions of solar cell strings 26 that convert light photons into

electricity are aligned with openings 30 in frit area 28 to receive sunlight through windshield 10 as shown in Figure 1, reproduced below. *Id.* at 5:2–6.

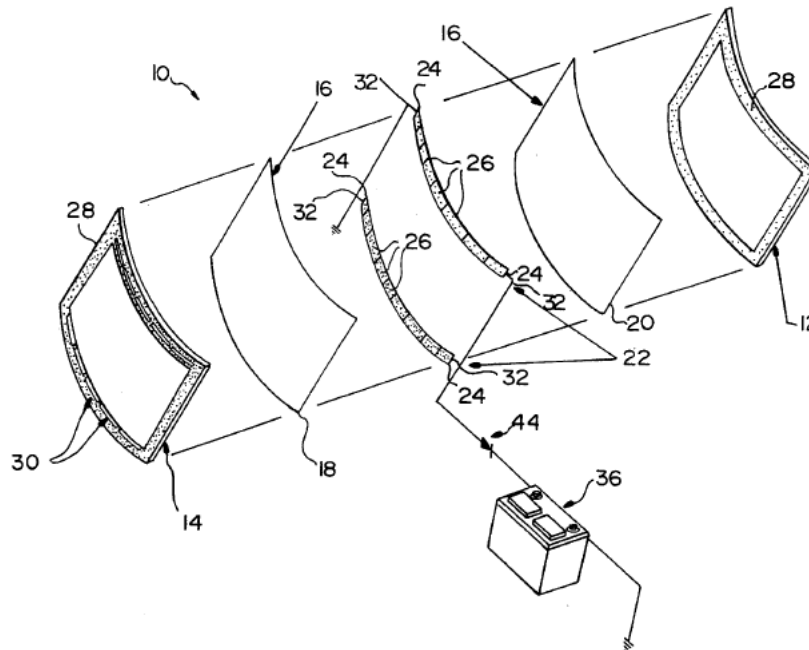


FIG. 1

Figure 1 is an exploded view of a windshield with solar cell layer.

c. Analysis

TRW asserts that claims 69, 78, 80, 83, 84, 87–91, and 93 are unpatentable under 35 U.S.C. § 103(a) over Blank, Kakinami, Schofield, Carter, and Anderson. Pet. 32–46.

Claim 69 depends from claim 60 and recites “said forwardly-viewing camera views through a light transmitting aperture established in a light absorbing hiding layer at said windshield.” Independent claims 78 and 83 recite that “at least one of said sensors views through said windshield via a light transmitting aperture established in a light absorbing hiding layer at said windshield.”

TRW asserts that Carter teaches a light absorbing hiding (frit) layer used to conceal entire accessories and accessory mounting members that are attached to or present at a surface of a window panel. Pet. Reply 21–22 (one or more accessories or accessory mounting members that are attached at a surface of a window panel are concealed by an opaque layer); *see* Pet. 34–36 (opaque coating 40 at peripheral edge 34 conceals adhesive or mounting member attaching window panel 28 to the vehicle from exterior view).

TRW asserts that Anderson teaches the formation of clear openings 30 in a frit layer 28 so solar cells can receive light through frit layer 28, and a skilled artisan would use such openings in a frit layer to allow cameras to receive light through the frit layer, as claimed. Pet. 36.

Magna argues that it would not have been obvious to combine Carter and Anderson to render obvious the subject matter of claims 69, 78, and 83. Magna argues that Carter does not disclose an opaque coating at a rearview mirror mount location on a windshield and provides no examples of coatings used with the rearview mirror. PO Resp. 47, 49–50. Magna also argues that even if a frit layer is placed over Blank’s mounting button 70, there is no need to include a clear opening in the frit layer, because Kakinami’s camera would have been placed in Blank’s module 26 below mounting button 70 and rearview mirror 40 with a clear view through windshield 22. Magna thus argues that a skilled artisan would not have turned Kakinami’s camera up so that it pointed through mirror mounting button 70 and frit layer, or extended the frit layer beyond mounting button 70 to cover the area in front of the camera where it would block the view of a driver. *Id.* at 50–53.

Carter teaches the use of a frit layer to hide places where a glass panel attaches to a vehicle’s structure, and places where accessories are attached to

a glass panel. Pet. Reply 21; Ex. 1008, 1:56–60. Carter uses frit layers 108, 170 in the middle of window panels 106, 166 in a vehicle roof to conceal overhead accessories and storage compartments 102, 162 that mount to an interior surface of window panels 106, 166. Ex. 1008, 7:6–22, 7:59–8:4, 8:33–43, Figs. 4C, 5C. Dr. Kazerooni testifies that Carter teaches frit layers that conceal accessories and mounting members. Ex. 1016 ¶ 28. Carter also indicates that “the basic concept can be applied to vehicle windscreens, side windows, backlights, and the like as well as other areas where it is desirable to depend a structure from a transparent or opaque, glass, plastic or laminate panel.” Ex. 1008, 11:19–26; Pet. Reply 22.

Although Carter expressly teaches the use of a frit layer to hide from exterior view accessory mounting points, Carter teaches that the frit coating “conforms substantially to the regions of the window panel which receive the accessory [which] is referred to as the *footprint* of the accessory.” Ex. 1008, 8:33–38. As shown in Figures 4 and 5 of Carter, frit layers 108, 170 conceal attachment members and accessories placed against an inner surface of window panels 106, 166 where the accessories and attachment members attach to window panels 106, 166. *See id.* at 7:6–22, 7:59–8:5; Ex. 1016 ¶ 28. Frit layers 108, 170 conform to the “footprint” or shape of the accessory that is adjacent to the upper window panels. Ex. 1016 ¶¶ 28, 29.

Carter discloses a frit layer that extends beyond an attachment point or footprint of an accessory in Figure 2C and Figures 3A–3E. Opaque layer 40 extends beyond where storage compartment 42 and outer wall 52 attach to inner surface 30 of window panel 28. However, opaque layer 40 extends only to a peripheral edge of window panel 28 to conceal the peripheral edge and structural features that are not meant to be seen. Ex. 1008, Fig. 3C.

Carter extends frit layer 40 from top wall 48 of storage compartment 42 only to gasket/grommet 36 at peripheral edge 34 of upper window panel 28. *See id.* at 3:59–61, Fig. 2C. Carter does not extend frit layer 40 to the front windshield. Thus, we are not persuaded that this teaching would have motivated a skilled artisan to extend a frit layer beyond the footprint of Blank’s mounting button 70 or mount 44 at windshield 22. The issue is not whether a skilled artisan could extend a frit layer beyond an attachment point or whether it would have been trivial to do so. *See* Pet. Reply 23. The issue is whether a skilled artisan would have been motivated to do so.

Figure 10 illustrates frit layer 308 placed around peripheral edge 306 of front windshield 300. Frit layer 308 hides the attachment point of visor assembly 310. Opaque layer 308 extends very slightly beyond the footprint of visor assembly 310. Ex. 1008, Fig. 11. Carter does not extend frit layer 308 over the windshield to conceal visor from view when it is deployed. *Id.*

Carter’s teachings apply to front, rear, side windows, and sunroofs. *Id.* at 18:19–34. Carter uses frit layers to conceal (1) footprints of vehicle accessories, i.e., the area where an accessory contacts a window panel, and (2) peripheral edges of glass panels. Although opaque layer 40 extends beyond a footprint of an overhead accessory in Figure 2C and 3A–3E, opaque layer 40 only extends from the footprint of top wall 48 to gasket 36 to the periphery of window panel 30. These embodiments teach not so much that a frit layer can extend beyond an immediate footprint but rather that a frit layer can extend uniformly along an entire peripheral edge of a window panel to cover footprints of accessories and other areas of a periphery where no accessories are attached. Figures 2B, 4C, 5C, 8, 9, and 10 illustrate this teaching and practice of Carter.

Although Carter also teaches use of a frit layer at a center portion of a glass panel in Figures 4C, 5C, and 9, TRW has not identified any teaching in Carter where a frit layer in a center of a glass panel is extended beyond a footprint of an accessory attached to a center portion of a glass panel. Nor has TRW identified any disclosure of frit layers used on front windshields to conceal rearview mirrors or rearview mirror accessory modules. *See* Pet. Reply 21–22; Ex. 1008, 1:19–24; PO Resp. 47; Pet. 34–35.

Carter also discusses concerns in the art for visual impairment caused by attaching accessories to windshields and overhead roofs. Ex. 1008, 1:19–24. In view of these teachings, we are not persuaded that a skilled artisan would have been motivated to extend a frit layer beyond an attachment point of Blank’s rearview mirror, particularly where mount 44 attaches at a center of windshield 22, not at a periphery of a windshield. Ex. 1005, Fig. 1, 2, 3A.

Because we are not persuaded that Carter discloses placement of a frit layer beyond the footprint of a rearview mirror mount, we are not persuaded that a skilled artisan would have been motivated to form an opening in a frit layer of Blank. Kakinami’s camera has an unimpeded forward view through windshield 22 if a frit layer is placed only at the footprint of mount 44 and is not extended beyond mount 44. PO Resp. 51. Thus, we are not persuaded that a skilled artisan would have extended a frit layer beyond mount 44 and button 70 and then formed an opening in that extended frit layer so a camera in module 26 could view through that opening. *See* Pet. Reply 21–22.

TRW has not established that claims 69, 78, and 83 are unpatentable over Blank, Kakinami, Schofield, Carter, and Anderson by a preponderance of evidence. Because claims 80, 84, 87–91, and 93 depend from claim 78 or 83, TRW also has not established that they are unpatentable over the same

art. *See In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988) (“Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious.”).

*3. Obviousness of Claims 86 and 92 Over
Blank, Kakinami, Schofield, Carter, Anderson, and Klappenbach
Analysis*

TRW relies on Klappenbach to disclose features of claims 86 and 92, which depend from claim 83. Pet. 46–47. Klappenbach does not overcome the deficiencies of Carter and Anderson for claim 83. Thus, TRW has not demonstrated that claims 86 and 92 are unpatentable.

III. CONCLUSION

TRW has demonstrated by a preponderance of evidence that claims 60, 61, 70–74, and 77 of the ’590 patent are unpatentable under 35 U.S.C. § 103(a) over Blank, Kakinami, and Schofield. TRW has not demonstrated by a preponderance of evidence that claims 69, 78, 80, 83, 84, 87–91, and 93 of the ’590 patent are unpatentable under 35 U.S.C. § 103(a) over Blank, Kakinami, Schofield, Carter, and Anderson, or that claims 86 and 92 of the ’590 patent are unpatentable under 35 U.S.C. § 103(a) over Blank, Kakinami, Schofield, Carter, Anderson, and Klappenbach.

IV. ORDER

In consideration of the foregoing, it is

ORDERED that claims 60, 61, 70–74, and 77 of the ’590 patent are held unpatentable; and

FURTHER ORDERED that this is a Final Decision. Parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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