

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TRW AUTOMOTIVE US LLC,
Petitioner,

v.

MAGNA ELECTRONICS INC.,
Patent Owner.

Cases IPR2014-00256, IPR2014-00260, and IPR2014-00264
Patent 7,459,664 B2

Before JUSTIN T. ARBES, BENJAMIN D. M. WOOD, NEIL T.
POWELL, and JO-ANNE M. KOKOSKI, *Administrative Patent Judges*.

POWELL, *Administrative Patent Judge*.

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

I. INTRODUCTION

TRW Automotive US LLC (“TRW”) filed three Petitions requesting *inter partes* review of claims 1, 2, 4, 13–25, 27–31, 32, 34–40, 42–45, 48–53, and 55–59 of U.S. Patent No. 7,459,664 B2 (Ex. 1002,¹ “the ’664 patent”), as listed in the following chart.

Case No.	Claims	Petition Paper No.
IPR2014-00256	2, 4, 13, 19, 20, 24, 25, 27–31, 32, and 34	1
IPR2014-00260	1, 14–18, 21–23, 35, 37–39, 42, 44, 53, and 55–59	1
IPR2014-00264	33, 36, 40, 43, 45, and 48–52	1

On June 26, 2014, we instituted an *inter partes* review of claims 1, 2, 4, 13, 14, 16, 17, 20–24, 27–30, 32, 34–36, 39, 42, 43, 45, and 49–52 on three grounds of unpatentability (Paper 16, “Dec. on Inst.”). Additionally, we consolidated the proceedings of IPR2014-00260 and IPR2014-00264 with the proceeding of IPR2014-00256. Dec. on Inst. 2.

Magna Electronics Inc. (“Magna”) filed a Patent Owner Response (Paper 23, “PO Resp.”). TRW filed a Reply (Paper 26, “Reply”).

An oral hearing was held on February 19, 2015. A transcript of the hearing is included in the record. Paper 35 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6(b). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

¹ For the purposes of clarity and expediency, we use IPR2014-00256 as representative of the three proceedings. Unless otherwise noted, all citations to “Pet.” and “Ex.” refer to the Petition and exhibits, respectively, in IPR2014-00256.

For the reasons that follow, we determine that TRW has shown, by a preponderance of the evidence, that claims 1, 2, 4, 13, 14, 16, 17, 20–24, 27–30, 32, 34–36, 39, 42, 43, 45, and 49–52 of the '664 patent are unpatentable.

A. *The '664 Patent (Ex. 1002)*

The '664 patent describes “[a]n image sensing system for a vehicle.” Ex. 1002, Abstract. The image sensing system operates to detect certain external light sources, including oncoming headlights, leading taillights, road markers, and lane markers. *Id.* at col. 3, ll. 16–21; col. 12, ll. 61–63. The '664 patent discloses performing various control functions based on the detection of light sources. For example, based on the detection of oncoming headlights or leading taillights of other vehicles, the system can control the headlights of the vehicle that includes the system. *Id.* at col. 2, ll. 25–30; col. 6, ll. 40–42. Additionally, based on the detection of lane markers, the system may assist with steering or provide a warning to the vehicle’s driver. *Id.* at col. 12, ll. 61–63. Figure 2 of the '664 patent is reproduced below.

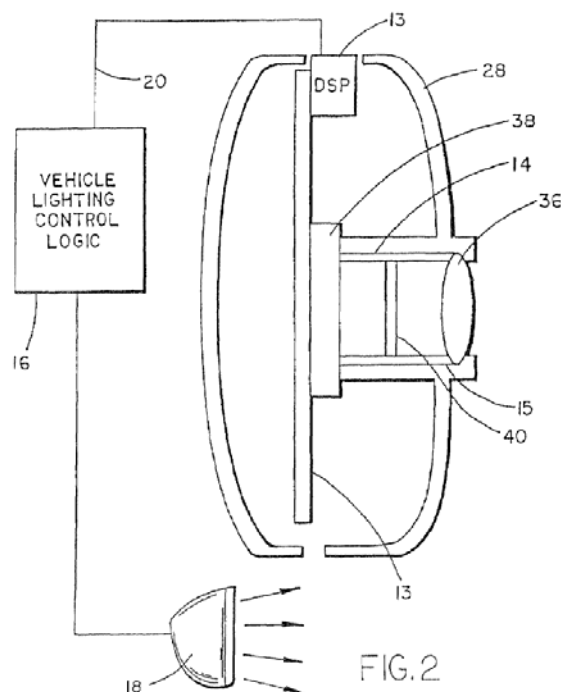


Figure 2 shows components of one embodiment of the system. *Id.* at col. 3, ll. 35–37. The system includes imaging sensor module 14. *Id.* at col. 3, ll. 58–62. Imaging sensor module 14 includes optical device 36, e.g., a lens, array 38 of photon-accumulating light sensors, and filter array 40. *Id.* at col. 4, ll. 39–44. The '664 patent discloses that array 38 may be implemented using a variety of different technologies, including a charge couple device (CCD) array, a complementary metal oxide semiconductor (CMOS) array, a hybrid of CCD and CMOS, or other photosensing technologies like a charge injection device (CID), a metal oxide semiconductor (MOS), photo diodes, and the like. *Id.* at col. 8, ll. 57–64. The system also includes digital signal processor 13 and lighting control logic module 16 connected to imaging sensor module 14 and headlamps 18. *Id.* at col. 3, ll. 58–66. The '664 patent discloses that these components may form part of vehicle headlight dimming control 12, shown in Figure 1, which is reproduced below.

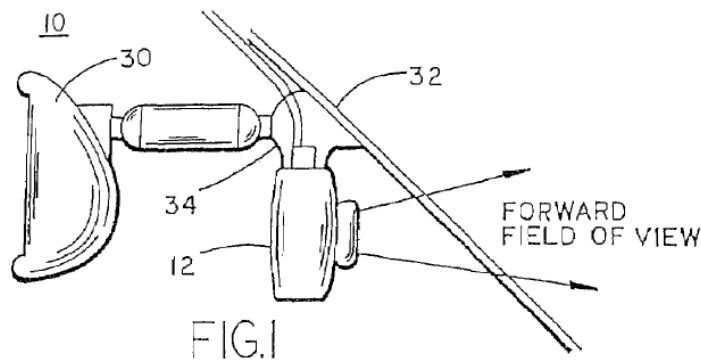


Figure 1 shows headlight dimming control 12, rearview mirror 30, windshield 32, and bracket 34. *Id.* at col. 3, ll. 58–60; col. 4, ll. 19–23. The '664 patent discloses that bracket 34 may fixedly mount imaging sensor module 14 “to, or near, the vehicle’s windshield 32.” *Id.* at col. 4, ll. 19–22.

The '664 patent indicates that some light sources constitute objects of interest and other light sources do not constitute objects of interest. For example, the '664 patent states that “headlights of oncoming vehicles and taillights of leading vehicles are of interest to the control, irrespective of separation distance from the controlled vehicle, if the source is on the central axis of travel of the vehicle.” *Id.* at col. 2, l. 66–col. 3, l. 2. The '664 patent further states that off-axis headlights and taillights also may be of interest, “but only if the source has a higher intensity level and is spatially larger.” *Id.* at col. 3, ll. 2–5. The '664 patent also suggests that some light sources may be objects that are not of interest, such as “streetlights and reflections of the controlled vehicle’s headlights off signs, road markers, and the like.” *Id.* at col. 3, ll. 16–21.

The '664 patent discloses using various aspects of the light received by the system to identify accurately objects of interest. For example, the '664 patent discloses that its system may detect “spectral signatures” to identify taillights and headlights. *Id.* at col. 10, ll. 50–64. This technique leverages the fact that taillights are required to use red spectral bands and headlights “have a visible spectral signature which is predominantly white light.” *Id.* at col. 10, ll. 54–56, 60–61.

The '664 patent also discloses discriminating between light sources based on their location within the image. For example, the '664 patent discloses that “[a]dditional discrimination between oncoming headlights and leading taillights may be accomplished by taking into account the relative location of the source of light within the scene.” *Id.* at col. 9, ll. 44–47.

The '664 patent further discloses that “[p]attern recognition may be used to further assist in the detection of headlights, taillights, and other

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