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The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 10

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JON M. LESKO and TIMOTHY M. SAMARAS

Appeal No. 96-2893
Application 08/370,153¹

ON BRIEF

Before THOMAS, JERRY SMITH and LALL, *Administrative Patent Judges*.

LALL, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 24. Claims 1-24 were rejected in the final rejection mailed on September 11, 1995. No amendments after final rejection were made. Accordingly, claims 1-24 remain pending in this application, and the rejection of all of these claims is on

¹ Application for patent filed January 9, 1995.

appeal before us.

The disclosed invention pertains to an apparatus for obtaining thermographic images of surfaces within a combustion chamber in an internal combustion engine during its operating state. The apparatus uses the conventional spark plug hole for fitting an image sensing assembly to obtain a picture of the temperature distribution on various surfaces within the combustion chamber. Claims 1, 6, 11 and 19 are the independent claims. Claims 2-5, 7-10, 12-18 and 20-24 respectively depend from these independent claims. Claim 1 is the broadest claim.

Representative claim 1 is reproduced as follows:

1. A thermal imaging system for use in an internal combustion engine having a cylinder with a head and a hole extending through said head into said cylinder, said thermal imaging system comprising:

a lens;

a spark plug having a housing, said spark plug being inserted in said hole in said cylinder head;

an optical housing extending through said spark plug housing, said optical housing having an internal passageway with a distal portion for supporting said lens to provide a field of view within said cylinder and project an image of said field of view through said internal passageway; and

camera means for receiving and recording said image provided by said optical housing.

The examiner relies on the following references:

A complete list is as follows:

Appeal No. 1996-2893
Application 08/370,153

[The examiner has left out Boning et al., he has added Damson et al., Laurenz and Szilagyi in his listing of the references. They are not used in the rejection before us. Also, the Zhao et al. publication which was used as an alternate to Compton in the final rejection was not listed in the examiner's answer].

Harbert	2,841,979	July 8, 1958
Compton et al. (Compton)	3,584,509	Jun 15, 1971
Metz	3,759,151	Sep.18, 1973
Burkel et al. (Burkel)	4,409,815	Oct. 18, 1983
Dietz et al. (Dietz)	4,419,212	Dec. 6, 1983
Boning et al. (Boning)	4,446,723	May 8, 1984

SAE publication entitled "The Cylinder Head Temperature Measurement by Thermal Imaging Technique" by Zhao et al., October 7-10, 1991.

Claims 1, 4-6, and 9-14 stand rejected under 35 U.S.C. § 103 as being unpatentable over the basic combination of Boning, Dietz and Metz. Claims 2, 7, 15, 17, 19-20, 22, and 24 stand rejected under 35 U.S.C. § 103 as being unpatentable over the basic combination considered further with Burkel. Claims 3, 8, 16, 18, 21 and 23 stand rejected under 35 U.S.C. § 103 as being unpatentable over the basic combination considered further with Compton or Zhao. [Note that the examiner's reliance on the mere basic combination in the above rejection of claims 21 and 23 is misplaced. He also needs Burkel as he did for the rejection of claim 19 in the final rejection. As it turns out, this is inconsequential].

The examiner further rejected claims 1, 3-6, 8, 10-11, and 16 as being obvious

Appeal No. 1996-2893
Application 08/370,153

under 35 U.S.C. § 103 over Harbert. He also rejected claims 2, 7, 15, 19, 21 and 24 as being unpatentable over Harbert in view of Burkel. All these rejections are enumerated in the answer and incorporated from the final rejection.

Rather than repeat the arguments of appellants or the examiner, we make reference to the brief and the answer for the respective details thereof.

OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellants' argument set forth in the brief along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 1-24. Accordingly, we reverse.

We now consider the rejections under 35 U.S.C. § 103 in view of the evidence presented in the record. In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness.

Appeal No. 1996-2893
Application 08/370,153

See *In re Fine*, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (CCPA 1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), *cert. denied*, 488 U.S. 825 (1988); *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), *cert. denied*, 475 U.S. 1017 (1986); *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a *prima facie* case of obviousness. Note *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

A: Regarding Rejection of Claims 1, 4-6, 9-14

The examiner has rejected these claims over Boning in view of Dietz and Metz. We take claim 1 as the exemplary claim. The examiner states that Boning shows the spark plug structure having a light guide in the center. Dietz is used to supply the lens to replace the pick up tip 13 in Boning. Still further, the examiner uses Metz to supply to the

above modified Boning structure the claimed camera means [answer, page 3, final rejection, pages 2-4].

The appellants argue that the claimed invention is fundamentally different from the prior art. The base reference, Boning, is related to a knock sensor. It measures the overall temperature within the combustion chamber. It could not be used to provide images from within the combustion chamber. Boning provides only the overall luminosity within the combustion chamber [brief, page 5]. The appellants further argue that Dietz also is concerned with a knock sensor device and the disc 6 in figure 1c is not a lens but a plain disc to merely pass the light through. Dietz only senses the light from combustion, whereas the claimed invention has a lens that gathers and transmits coherent light from the cylinder "to provide" an "image" of the "field of view" [brief, page 6]. Appellants further state that the use of the camera of Metz in Boning is inappropriate as the Metz camera is used for inspecting surfaces within the combustion chamber while the engine is not operating [brief, page 7].

The examiner responds that the probe in Boning does transmit the "image" of thermal variation in the combustion chamber, and disc 6 of Dietz can be ground to form a lens [col. 4, lines 10-25] to focus light from the combustion chamber. The examiner further responds that Metz is used simply to show that a camera can be used to record images of the inside of a combustion chamber in an internal combustion engine. The examiner

justifies the combination of Boning, Dietz and Metz by asserting that both Boning and Dietz are related to recording signals of light or thermal variations in a combustion chamber, and Metz's camera can replace simply the optical evaluation stage or unit in the above combination for the thermographic image of the combustion process of an internal combustion engine [answer, pages 7 and 8].

The appellants have made it abundantly clear that the invention is concerned with taking thermographic or visual images while the engine is operating. A lens is needed to focus the optical or thermal radiation to yield a coherent image of the radiating body, not just one point or event. The claimed device provides a field of view within the cylinder and projects an image of the same onto a camera film. This yields a thermographic image of the surfaces within the cylinder. It is this interpretation of the claim that we have considered in our ruling. A knock sensor device which is pretty typical of the prior art is concerned with an event sensing, or an overall state of combustion in the combustion chamber. Neither Boning nor Dietz relates to the subject of the invention as interpreted above. Both are event sensors and record the overall luminosity or combustion. Metz does not cure this deficiency.

The other independent claims 6 and 11 both have further limitations than claim 1. Since the above combination does not support the rejection of claim 1, it cannot support the rejection of claims 6 and 11 either. Claims 4, 5, 9, 10, 12, 13 and 14 which depend on

these independent claims cannot likewise be rejected on the above evidence.

B. Regarding Rejection of Claims 2, 7, 15, 19-20, 22 and 24

These claims are rejected on the combination of Boning, Dietz and Metz as discussed above, and further in view of Burkel. Since Burkel does not overcome the deficiencies noted in the combination of Boning, Dietz and Metz, the examiner's rejection of these claims fails for the same reasons discussed above in section **A**.

C. Regarding Rejection of Claims 3, 8, 16, 18, 21 and 23

These claims are rejected on the combination of Boning, Dietz and Metz as discussed above, and further in view of Compton or the Zhao publication. [Note that the examiner really needs Burkel as well for the rejection of claims 21 and 23 because they depend on claim 19, for which Burkel was used. However, for this decision this omission is unimportant]. Again since neither Compton nor Zhao can cure the shortcomings of the combination of Boning, Dietz and Metz, the examiner's rejection of these claims falls for the reasons advanced in section **A**.

D. Regarding Rejection of Claims 1,3-6,8,10-11, and 16.

The examiner has rejected these claims as being obvious over Harbert alone. We again take the broadest claim, claim 1, as the exemplary claim. The examiner states that Harbert discloses a combustion study device which observes and records combustion

within an internal combustion engine. According to the examiner, Harbert has everything except a lens. The examiner asserts that since Harbert discloses the use of a camera, it would have been obvious to form a lens from the machining or polishing of the quartz or sapphire rod in Harbert, for the purpose of focusing the light onto the photoelectric element or camera [answer, page 4, final rejection, pages 9,10].

The appellants argue that Harbert, also, only discloses the sensor to study the overall luminosity from the combustion phenomena in the cylinder. It does not contemplate taking the thermal images from within the combustion chamber. Even though Harbert mentions a camera to record the luminosity within the combustion chamber, it is only a picture or image of a point in the chamber [brief, pages 11 and 12].

The examiner responds by basically repeating his contention in the final rejection that the presence of the camera in the Harbert device suggests the modifying of Harbert's quartz rod into a lens which will then produce a thermographic image [answer, page 10].

We again deal with the fundamental difference between prior art such as Harbert and the invention of claim 1. The difference is that the invention contemplates taking a thermographic image of a field of view rather than an overall image of a point.

As we discussed in section A above, we rely on the applicants' specification on the explanation of this difference. As such, we find that Harbert does not teach or disclose the invention of claim 1. We agree with the appellants that the examiner's position is

unsupported by the record in this case.

Since claim 1 is the broadest claim and other claims contain further limitations, Harbert also cannot meet the other claims. Accordingly, the examiner's rejection of the other above listed claims over Harbert also fails.

E. Regarding rejection of Claims 2, 7, 15, 19, 21, 24

The examiner has rejected these claims as being obvious over the combination of Harbert as applied above and Burkel. The additional reference, Burkel, is used to teach the use of spinel as the material for the making of the lens [answer, page 4, final rejection, pages 10 and 11].

Since Burkel does not overcome the deficiencies of Harbert noted above, the examiner's rejection of these claims fails for the same reasons discussed above in section **D**.

Since we are of the view that the prior art applied by the examiner does not support the examiner's rejection, we do not sustain the rejection of independent claims 1, 6, 11 and 19. Therefore, we also do not sustain the rejection of dependent claims 2-5, 7-10, 12-18 and 20-24.

In summary, we have not sustained any of the examiner's rejections of the claims on appeal. Therefore, the decision of the examiner rejecting claims 1 through 24 is reversed.

Appeal No. 1996-2893
Application 08/370,153

REVERSED

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Administrative Patent Judge)	
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)	
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JERRY SMITH)	
Administrative Patent Judge)	APPEALS AND
)	
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