UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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*Ex parte* GIOVANNI FREZZA

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Appeal 2008-4132
Application 09/997,995
Technology Center 2800

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Decided: September 19, 2008

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Before PETER F. KRATZ, KAREN M. HASTINGS, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134 the final rejection of claims 19, 21, 22, 24, 27-29, 31-33, 36, and 40-43. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

We AFFIRM.

INTRODUCTION

Appellant's invention is directed to a packaged integrated electronic device, the package being formed with a window so that the contained

electronic device can at least partially be accessed from outside the package (Spec. 1:7-11).

Claims 19, 22, and 40 are illustrative:

> 19. A packaged electronic device ready for electronic use, comprising:
>
> a semiconductor-integrated electronic circuit including a pressure sensor;
>
> a plastic protective package surrounding and supporting the electronic circuit, the protective package having a window over the pressure sensor of the electronic device such that the pressure sensor can be at least partially activated from outside of said protective package; and
>
> a projecting portion of elastic material projecting from a surface of the electronic device into the window, the projecting portion being structured to enable the pressure sensor to be activated through the projecting portion when the electronic device is in use, wherein said projecting portion is shaped to form a ring on the electronic circuit.
>
> 22. A packaged electronic device ready for electronic use, comprising:
>
> a semiconductor-integrated electronic circuit;
>
> a plastic protective package surrounding and supporting the electronic circuit, the protective package having a window over a portion of the electronic device such that the electronic device can be at least partially activated from outside of said protective package; and
>
> a projecting portion of elastic material projecting from a surface of the electronic device into the window, the projecting portion being structured to enable the electronic device to be activated through the projecting portion when the electronic device is in use, wherein said projecting portion is surrounded by dyke or barrier formed on a surface of the electronic circuit.

40. The device of claim 22 wherein the window is defined by tapering walls that taper inwardly toward said electronic circuit.

The Examiner relies on the following prior art references as evidence of unpatentability:

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|---|---|---|
| Yamawaki | 4,894,707 | Jan. 16, 1990 |
| Grider | 5,105,262 | Apr. 14, 1992 |
| Nomura | 5,948,991 | Sep. 7, 1999 |

The rejections as presented by the Examiner are as follows:

1. Claims 33, 40, and 42 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.
2. Claims 33, 40, and 42 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.
3. Claims 19, 21, 22, 24, 27-29, 31-33, 36, and 40-43 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Grider in view of Nomura.
4. Claims 19, 21, 22, 24, 27-29, 31-33, 36, and 40-43 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamawaki in view of Nomura.

Appellant separately argues independent claims 19 and 22 with regard to the § 103 rejections. Accordingly, with regard to rejections 3 and 4 above, we address the rejection with regard to claims 19 and 22.

Appellant argues claims 33, 40, and 42 as a group with regard to rejections 1 and 2 above. Pursuant to 37 C.F.R. § 41.37(c)(1)(vii), we select

claim 40 as the representative claim of the group on which to render our opinion.

## OPINION

### 35 U.S.C. § 112, FIRST PARAGRAPH, REJECTION: WRITTEN DESCRIPTION

Appellant argues that the Examiner has not provided any reasons in support of the § 112, first paragraph, rejection, instead relying on conclusory statements (Br. 7-8). Appellant further argues that the Specification provides written descriptive support for having a window with tapering walls that taper inwardly toward an electronic circuit as shown in Figures 4 to 8 (Br. 8). We agree.

The fundamental factual inquiry for determining adequacy of the written description is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed. *In re Wertheim*, 541 F.2d 257, 262 (CCPA 1976). *See also*, *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991).

Appellant's Specification indicates that on the lead frame 20 is fixed an electronic circuit comprising an integrated electronic sensor 30 (Spec. 4). The Specification further indicates that lug 13 on the upper mold half, which is used to form the window, may be a truncated cone such that the "window 70 will show with tapering walls toward the sensor 30" (Spec. 5:24-25; 6:1-2). Appellant's Figure 5 shows the window 70 with tapering side walls toward the electronic sensor 30 and the Specification indicates that the

projecting portion 51 may be formed using a dyke or barrier (Figure 5; Spec. 6:5-24).

In light of Appellant's originally filed Specification and figures, we find that the subject matter of claim 40 is adequately supported so as to comply with the written description requirement of 35 U.S.C. § 112, first paragraph.

Accordingly, we do not sustain the Examiner's § 112, first paragraph, rejection of claims 33, 40, and 42 as failing to comply with the written description requirement.

35 U.S.C. § 112, FIRST PARAGRAPH, REJECTION: ENABLEMENT

Appellant argues that the subject matter of claim 40 is supported by an enabling disclosure in that the Specification describes that the mold used to form the window is a truncated cone and the projecting portion 51 may be formed by using a dyke or barrier such that the steps are within the skill of one in the art of plastic packaging (Br. 9). Appellant contends that the Specification describes forming the mold into a truncated cone shape such that one of ordinary skill in the art would certainly know how to make the window of the plastic protective package having tapering walls (Reply. Br. 3). We agree.

Determining enablement is a question of law based on underlying factual findings. *In re Vaeck*, 947 F.2d 488, 495 (Fed. Cir. 1991). The standard for determining whether the Specification meets the enablement requirement is whether the experimentation needed to practice the invention is undue or unreasonable. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

In the present appeal, the Specification clearly indicates that the upper mold half may have a truncated conic shape so as to form the encapsulating plastic above the sensor 30 and projecting portion 51 into a window 70 with side walls tapering toward the sensor 30 (Spec. 5:16-29; 6:1-2; Figure 3). Also, Figure 5 shows a tapering window 50 above sensor 30 and the Specification discloses that the projecting portion of Figure 5 may be formed using a dyke or a barrier (Spec. 6: 5-28; 7:1-13).

In light of these disclosures, we conclude that one of ordinary skill in the art would be capable of making or using the claimed invention without undue experimentation. In fact, Appellant's Figure 5 and its corresponding description in the Specification clearly instruct one of ordinary skill on how to make the claimed invention. Accordingly, we conclude that claim 40 is enabled. We do not sustain the Examiner's § 112, first paragraph, rejection of claims 33, 40, and 42 as failing to comply with the enablement requirement.

35 U.S.C. § 103 REJECTION: GRIDER IN VIEW OF NOMURA

Appellant argues that neither Grider nor Nomura disclose a projecting portion that is shaped to form a ring on the electronic circuit (claim 19) or the projecting portion is surrounded by a dyke or barrier formed on a surface of the electronic circuit (claim 22) (Br. 10-12). We agree.

The Examiner bears the initial burden of establishing a *prima facie* case. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). As part of a prima facie case of obviousness, all the claim features must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 985 (CCPA 1974). If examination at the initial stage does not produce a *prima facie* case of

unpatentability, then without more the applicant is entitled to grant of the patent. *Oetiker*, 977 F.2d at 1445.

The Examiner finds that Grider discloses

> a projecting portion of material (part of material 13 which is located directly above the electronic device) projecting from a surface of the electronic device into the window, the projecting portion being structured to enable the electronic device to be activated through the projecting portion when the electronic device is in use, wherein said projecting portion is surrounded by [a] dyke or barrier formed on a surface of the electronic circuit

(Ans. 5).

However, the Examiner points to no specific portion of Grider that discloses these claim features. Rather, the Examiner merely indicates that the part of material 13 which is located directly above the electronic device is a projecting portion, but no further explanation or indication is provided for what feature of Grider corresponds to the claimed window or the dyke or barrier, for example.

In fact, the Examiner initially treated the "projecting into the window" feature as a process limitation, not giving it patentable weight (Non-Final Office Action 6-7). After the Appellant correctly indicated that these features are not process limitations but are structural limitations, the Examiner appears to have withdrawn such an erroneous claim construction (Ans. 5-6). However, the Examiner failed to indicate where such features are taught or suggested by Grider or Nomura. We do not find the dyke or barrier, and a projecting portion projecting from a surface of the electronic device into a window features to be taught or suggested by Grider or Nomura.

Because we find that the Examiner has not established that all of the claim features are taught or suggested by Grider and Nomura, we do not sustain the Examiner's § 103 rejection of claims 19, 21, 22, 24, 27-29, 31-33, 36, and 40-43 over Grider in view of Nomura.

35 U.S.C. § 103 REJECTION OVER YAMAWAKI IN VIEW OF NOMURA

Appellant argues that Yamawaki and Nomura fail to teach or suggest a projecting portion that is shaped to form a ring on the electronic circuit (claim 19) or the projecting portion is surrounded by a dyke or a barrier formed on a surface of the electronic circuit (claim 22) (Br. 13-15). Appellant argues that there is no motivation to combine Nomura's pressure-sensitive chip with Yamawaki's sensor because Yamawaki discloses an optical sensor which requires the unobstructed view provided by the ring shaped wall 3, which would not be required by a pressure-sensitive chip (Br. 13-14). Appellant further argues lack of motivation for the combination of Nomura's pressure-sensitive chip with Yamawaki's semiconductor device for the following reasons: (1) Yamawaki places a rigid glass pane above the sensor, which would prevent a pressure sensor from properly functioning, (2) obviousness cannot be based on the mere fact that features from two references could have been combined, and (3) the Examiner's proposed modification of Yamawaki's sensor to have a pressure sensor would render Yamawaki's device unsatisfactory for its intended purpose (Br. 14).

With regard to the dyke or barrier feature of claim 22, Appellant argues that the combination of Yamawaki in view of Nomura would not satisfy the features of claim 22 for the following reasons: (1) Nomura's

protective covering 132 extends entirely across the surface of the sensor, such that combining Nomura's teaching with Yamawaki would have resulted in Yamawaki's wall 3 being completely covered by the protective covering 132 on three sides, (2) there is no suggestion in Yamawaki or Nomura for the combination of a protective covering 132 and wall 3, and (3) there is no suggestion that the elastic material of Nomura could or should be used to provide better protection to the Yamawaki device (Br. 15). Appellant contends that the Examiner engaged in impermissible hindsight in determining the invention would have been obvious over Yamawaki in view of Nomura (Br. 16).

We have considered Appellant's arguments and are unpersuaded for the reasons below.

Yamawaki discloses semiconductor device having a light transparent window (Yamawaki, col. 1, ll. 8-9). Yamawaki discloses forming a ring of silicon resin (i.e., an elastic material) on the surface of a wafer (Yamawaki, Figures 2a, 3b, and 5a; col. 2, ll. 63-65). Yamawaki cuts the wafer into chips and wire bonding is conducted (Yamawaki, Figures 2b-2d, 5b-5d; col. 2, ll. 65-67). The wire bonded chips are then inserted into molds and resin is injected to encapsulate the sensor and circuit and form a window above the chip (Yamawaki, Figures 2e-2g and 5e-5g; col. 2, l. 68; col. 3, ll. 1-10). A glass window material is placed over the window forming the semiconductor device having a light transparent window (Yamawaki, Figures 2g and 5g; col. 3, ll. 11-15).

Nomura discloses a semiconductor sensor that may be used as a pressure sensor (Nomura, col. 1, ll. 18-21). Nomura discloses that the pressure sensor has a case 20 made of resin (i.e., plastic) which includes a lid

30 with a hole for exposing the sensor to the atmosphere (Nomura, col. 4, ll. 48-51; col. 5, ll. 1-9). Nomura discloses encapsulating the sensor in a resin 3 prior to insertion in the case 20 (Nomura, col. 4, ll. 1-10). Nomura discloses that the device may be used for all semiconductor sensor devices such as "a composition sensor, an optical sensor . . . and the like in which the detecting operation is carried out under a state where semiconductor sensor chips undergo influence of detection atmosphere, in addition to the gas pressure" (Nomura, col. 9, ll. 56-63).

Contrary to Appellant's arguments, the above disclosures establish that Yamawaki discloses a projecting member shaped to form a ring (3) on an electronic circuit (1) which projects into a window (i.e., the void with sloping side walls shown in Figure 5f above the wall 3 and chip 1). Yamawaki's projecting member 3 is also surrounded by a barrier (i.e., the part of resin 9 adjacent the silicon resin wall 3). Accordingly, we find that Yamawaki discloses Appellant's argued claim features.

Regarding Appellant's motivation arguments, we disagree that Yamawaki's disclosure of an optical sensor with a ring-shaped silicon resin wall 3 would preclude substituting Nomura's pressure sensor for an optical sensor in Yamawaki's device. Yamawaki broadly discloses that the invention is a semiconductor device having a light transparent window (Yamawaki, col. 1, ll. 8-9). Nomura discloses that the teachings contained therein may be applied to all semiconductor sensor devices including optical sensors or pressure sensors (Nomura, col. 9, ll. 56-63). In other words, the teachings of the references taken as a whole would have suggested to one of ordinary skill in the art that Yamawaki's semiconductor devices may reasonably be modified to include a pressure sensor with a modified glass

pane to permit atmospheric access to the pressure sensor per Nomura's teachings. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) ("[T]he test is what the combined teachings of the references would have suggested to those of ordinary skill in the art."). Contrary to Appellant's argument, the Examiner is not combining Yamawaki's and Nomura's teachings merely because they could be combined, but, rather, because the references would have suggested the combination to one of ordinary skill in the art.

We are unpersuaded by Appellant's argument that there is no motivation for the combination because Yamawaki's optical sensor requires the ring shaped wall 3 (i.e., projecting portion) which would not be required by Nomura's pressure sensor because Nomura completely covers the top of the sensor with protective resin 132. Nomura discloses that the protective resin 132 needs to have a suitable hardness so as not to hamper the pressure detecting operation of the pressure sensor (Nomura, col. 7, ll. 24-26). In other words, Nomura recognizes that the protective resin affects the pressure sensing capabilities of the sensor such that it would have suggested to one of ordinary skill in the art to avoid such protective resin when it is possible to do so, or to have a resin with an appropriate hardness if the environment would not permit such avoidance. In light of the above findings, we determine that Nomura's teaching to place a protective resin 132 atop the pressure sensor would not militate against modifying Yamawaki's semiconductor device to have a pressure sensor with a ring of silicon resin, instead of a layer of protective resin, where the conditions permit.

We do not agree that Yamawaki's glass pane would prevent the pressure sensor from functioning properly such that there would be no motivation for the combination. As noted above, the combined teachings of

Yamawaki and Nomura would have included modifying the structure of the device in accordance with Nomura's teachings to permit the pressure sensor to function properly (i.e., having a hole in the lid). A person of ordinary skill is also a person of ordinary creativity, not an automaton. *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1742 (2007).

Modifying Yamawaki to have a pressure sensor would not have rendered the seminconductor device unsatisfactory for its intended purpose for two reasons. First, Yamawaki's broadest disclosure indicates that the invention is a semiconductor device having a light transparent window. Yamawaki's disclosure covers not only an optical device, but also other semiconductor devices. Second, Nomura discloses that semiconductor sensor devices include, for example, an optical sensor or a pressure sensor such that the teachings of the references, taken as a whole, would have suggested that Yamawaki's semiconductor devices include optical and pressure sensors. Accordingly, we do not determine that modifying Yamawaki's semiconductor device to have a pressure sensor would have rendered Yamawaki's device unsatisfactory for its intended purpose as a semiconductor device sensor.

Regarding the dyke or barrier feature of claim 22, Appellant's three arguments regarding the addition of Nomura's protective resin 132 over the entire surface of the pressure sensitive chip are without persuasive merit. The Examiner's rejection states that Yamawaki teaches both the ring-shaped projecting portion and the dyke or barrier portion such that Nomura's protective resin 132 is not a necessary part of the combination (Ans. 7 and 16). We agree.

As noted above, we find that Yamawaki's wall 3 is a ring-shaped projecting portion with regard to claim 19. We add that Yamawaki's wall 3 may also be considered the projecting portion with the regard to claim 22 and the portion of molding resin 9 adjacent to the wall 3 would serve as the barrier (Yamawaki, Figure 2f or 5f). Accordingly, Yamawaki discloses the argued claim features such that Nomura's protective resin 132, which may undesirably affect the sensing characteristics of the pressure sensor, would not be required to satisfy the argued claim features. Stated differently, in light of Nomura's disclosure regarding the protective resin 132 and its affect on pressure sensing, one of ordinary skill would have avoided the protective resin 132 when possible (e.g., where the atmosphere being sensed is not corrosive or harmful to the sensor). Therefore, the combination of Yamawaki in view of Nomura would have suggested a pressure sensor having Yamawaki's ring shaped wall 3 (i.e., projecting portion) surrounded by a barrier (i.e., the portion of resin 9 adjacent wall 3) as claimed without Nomura's protective resin 132 when possible. We are unpersuaded by Appellant's arguments regarding claim 22.

We do not agree that the modification of Yamawaki's device to have Nomura's pressure sensor and encapsulating resin block is based on impermissible hindsight. Rather, for the reasons noted above, the teachings of the references taken as a whole would have suggested the combination. *Keller*, 642 F.2d at 425.

We sustain the Examiner's § 103 rejection of claims 19, 21, 22, 24, 27-29, 31-33, 36, and 40-43 over Yamawaki in view of Nomura.

## DECISION

The Examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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