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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOHN McKENNA BRENNAN, PATRICK J. CARBERRY,
JOSEPH MICHAEL FREUND, GEORGE JOHN LIBRICZ, JR., and
RALPH S. MOYER

Appeal 2012-008162
Application 11/048,968
Technology Center 2800

Before JOSEPH F. RUGGIERO, MAHSHID D. SAADAT, and KARL D.
EASTHOM, *Administrative Patent Judges*.

RUGGIERO, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Final Rejection of
claims 1-13. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

Rather than reiterate the arguments of Appellants and the Examiner, we refer to the Appeal Brief (filed Dec. 5, 2011), the Answer (mailed Feb. 29, 2012), and the Reply Brief (filed Apr. 30, 2012) for the respective details. We have considered in this decision only those arguments Appellants actually raised in the Briefs. Any other arguments which Appellants could have made but chose not to make in the Briefs are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

Appellants' Invention

Appellants' invention relates to an integrated circuit device including an integrated circuit element and a leadframe disposed on a substrate. The leadframe includes an encapsulant dam which has at least one chamfered edge to provide clearance for a wire feed during a wire-bonding process. (*See generally* Spec. 3:1-16).

Claim 12 is illustrative of the invention and reads as follows:¹

12. A leadframe for use with an integrated circuit device comprising at least one lead and at least one encapsulant dam disposed on the at least one lead, the encapsulant dam being part of the leadframe, wherein the at least one encapsulant dam has a cross-section with at least two substantially perpendicular adjacent sides and at least one chamfered edge between the two adjacent sides of the cross-section, and wherein the at least one chamfered edge provides clearance for a wire feed during a wire-bonding process.

¹ The copy of independent claim 1 in the Claims Appendix to the Appeal Brief is incorrect. This copy does not contain the language "the at least one encapsulant dam being part of the leadframe," which appears in the latest version of the claims as submitted in the Amendment filed October 25, 2010.

The Examiner's Rejections

The Examiner's Answer cites the following prior art references:²

Sabyeying	US 6,062,459	May 16, 2000
Houdeau	US 6,288,904 B1	Sep. 11, 2001
Toya	US 6,348,416 B1	Feb. 19, 2002
Huang	US 6,429,047 B1	Aug. 6, 2002
Takase	US 2004/0173877 A1	Sep. 9, 2004

Claims 1-5 and 7-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Houdeau in view of Sabyeying.

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Houdeau in view of Sabyeying and Huang.

ANALYSIS

Claims 1-5, 7, 8, and 11-13

With respect to the Examiner's 35 U.S.C. § 103(a) rejection of each of the appealed independent claims 1 and 12, Appellants' arguments initially focus on the contention that the Examiner has not provided a proper basis for the proposed Houdeau/Sabyeying combination. Appellants recognize that it has been held that if a known technique is used to improve one device, the use of such a technique to improve *similar* devices in the same way would have been obvious. Appellants, however, contend that Houdeau's and Sabyeying's devices are not such *similar* devices (App. Br. 4-5; Reply Br. 2-3). *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 417 (2007). According to Appellants, the wire bond clamp of Sabyeying is a tool which is used to

² The Toya and Takase references are cited as evidence in support of the Examiner's rejection, but are not included as part of the statement of the rejection.

temporarily secure a leadframe to a heater block only for the duration of a wire-bonding process while Houdeau's stiffening frame, in contrast, forms part of the completed chip module and is used during the encapsulation process rather than the wire-bonding process (App. Br. 4-6; Reply Br. 2-4).

Appellants' arguments are not persuasive. We find no error in the Examiner's determination that, while Houdeau's stiffening frame and Sabyeying's wire bond clamp have different functions, both references disclose analogous semiconductor devices in which wires are bonded to the leads of a leadframe (Ans. 10).

Further, contrary to Appellants' contention, we find that the Examiner (Ans. 4, 13, and 14) has provided an articulated line of reasoning with a rational underpinning to support the conclusion of obviousness for the proposed combination of Houdeau and Sabyeying. *KSR*, at 418. We agree with the Examiner that an ordinarily skilled artisan would have recognized and appreciated the obviousness of applying, to the stiffening frame support structure of Houdeau, Sabyeying's teaching (col. 5, ll. 37-39) of tapering the walls of a support structure to facilitate access to the leadframe and thereby improve the wire-bonding process.

We further agree with the Examiner (Ans. 12-13) that although Houdeau's explicit disclosure is directed to the use of the stiffening frame during an encapsulation process as argued by Appellants (App. Br. 5-6; Reply Br. 2-3), there is nothing in Houdeau's disclosure that would exclude the use of the stiffening frame during the wire-bonding process. As explained by the Examiner, an ordinarily skilled artisan would have recognized and appreciated that attaching Houdeau's stiffening frame 22 to the leadframe 23 before the wire-bonding step would have improved the

wire-bonding process since the leads would be firmly secured to the carrier before the leads are wire bonded to the chip (Ans. 12-13).

We further find unpersuasive Appellants' related argument that even if Houdeau's stiffening frame were attached prior to wire bonding, chamfering a corner of the stiffening frame would not improve wire feed clearance since the height of Houdeau's stiffening frame is substantially above the wire-bonding areas (App. Br. 6). As pointed out by the Examiner, there is nothing in the disclosure of Houdeau that limits the stiffening frame to any specific height or width, nor have Appellants provided evidence of any such height or width limitation (Ans. 13). Accordingly, we find no error in the Examiner's determination that Houdeau's stiffening frame would be sufficiently modified to provide proper clearance for wire bonding in accordance with the teachings of Sabyeying (*id.*).

Lastly, contrary to Appellants' contention (App. Br. 6-7), we find no error in the Examiner's further rationale (Ans. 6) for the proposed Houdeau/Sabyeying combination, i.e., chamfering the top corner of the stiffening frame encapsulant dam of Houdeau would improve the bonding between the encapsulant 24 and the encapsulant dam 22. The Examiner has provided evidence in the form of the Toya and Takase references which supports the Examiner's position that chamfering the corner region of a structure increases the surface area of the corner region, and such surface area increase would improve the adhesion between an encapsulating material and the side surface (Ans. 14). Appellants have not challenged the Examiner's proffered evidence in the Reply Brief.

For the above reasons, the Examiner's 35 U.S.C. § 103(a) rejection of independent claims 1 and 12, as well as dependent claims 2-5, 7, 8, 11, and 13 not separately argued by Appellants, is sustained.

Dependent claims 9 and 10

We also sustain the Examiner's obviousness rejection, based on the combination of Houdeau and Sabyeying, of dependent claims 9 and 10. With respect to claim 9, we agree with the Examiner (Ans. 16-17) that Appellants have provided no showing of the criticality of the 30 and 50 degree boundaries of the claimed wire feed angle range, nor any evidence showing that the device of the Houdeau/Sabyeying combination would be incompatible with the claimed wire feed angle range.

With respect to claim 10, we find no error in the Examiner's determination (Ans. 8) that the limitation directed to the matching of chamfered edge angle to the wire feed angle of a wire-bonding process is a product-by-process limitation and not entitled to patentable weight. As explained by the Examiner (Ans. 18), even though claim 10 does not require that the integrated circuit device be made using a wire-bonding process, the claim nonetheless contains a process limitation which is not entitled to patentable weight in a claim which is drawn to the structure of an integrated circuit device.

Dependent claim 6

The Examiner's obviousness rejection of dependent claim 6, in which Huang is applied to the Houdeau/Sabyeying combination to address the encapsulant dam lid features of the rejected claim, is also sustained. Appellants' arguments (App. Br. 10-11) are not persuasive of any error in

the Examiner's determination (Ans. 9) of the obviousness to the ordinarily skilled artisan of substituting the art recognized equivalent lid and air cavity chamber of Huang for the encapsulant filled cavity of Houdeau. As further explained by the Examiner (Ans. 19), Huang provides evidence of the equivalency of the two lid structures, as well as disclosing the two types of lid structures, i.e., air cavity and encapsulant, combined in one semiconductor package (Figs. 2 and 4; col. 5, ll. 7-11 and col. 6, ll. 51-58).

CONCLUSION OF LAW

Based on the findings of facts and analysis above, we conclude that the Examiner did not err in rejecting claims 1-13 for obviousness under 35 U.S.C. § 103(a).

DECISION

The Examiner's decision rejecting claims 1-13 under 35 U.S.C. § 103(a) 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)(v).

AFFIRMED

gvw