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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte EDGAR R. ZUNIGA-ORTIZ,
RICHARD J. SAYE and LANCE C. WRIGHT

Appeal 2010-009427
Application 11/050,059
Technology Center 2800

Before CARL W. WHITEHEAD, JR., ERIC S. FRAHM and
ANDREW J. DILLON, *Administrative Patent Judges*.

WHITEHEAD, JR., *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants are appealing claims 3 and 13.¹ Appeal Brief 2. We have jurisdiction under 35 U.S.C. § 6(b) (2012).

We affirm.

Introduction

“The present invention is related in general to the field of electrical systems and semiconductor devices and more specifically to thermally enhanced semiconductor devices having integrated metallic chip support and heat spreader.” Specification 1.

Illustrative Claims

A copy of appealed claims 3 and 13 is reproduced below.

3. An apparatus comprising:

a leadframe of a sheet metal including:

a plurality of segments co-planar to a first plane operable as electrical connectors to a heat-generating object; and

a plurality of U-shaped couplers of said sheet metal, each U- shaped coupler including two wings extending approximately at right angle with respect to the first plane and a bottom approximately parallel to the first

¹ “Claims 3, 5, 13, 15, and 16 are pending, of which no claim is allowed. Among the pending claims, claims 3, 14, and 16 stand rejected, and claims 5 and 15 are objected to. Claim 3 and claim 13 are the only two independent claims. Claims 5 depends from claim 3, and claims 15 and 16 depend from claim 13. Claims 1, 2, 4, claims 6 through 12, and claim 14 are canceled from this examination. Claims 5, 15, and 16 are not under this appeal.” Appeal Brief 2.

plane; and

a metallic heat spreader having a central pad suitable for mounting the heat-generating object, and a plurality of handles each having a tip portion dimensioned to fit between the wings of the U-shaped coupler, wherein said handles are secured to the leadframe by the wings of the U-shaped couplers.

13. A manufacture comprising:

a leadframe of a sheet metal including:

a plurality of segments of the sheet metal defining a first plane, connected to a semiconductor chip; and

a plurality of U-shaped couplers of said sheet metal each including two wings extending approximately at right angle with respect to the first plane and a bottom approximately parallel to the first plane; and

a metallic heat spreader having a central pad spaced from said first plane, and plurality of handles attached to said central pad, wherein said plurality of handles each having a tip portion dimensioned to fit between the wings of the U-shaped coupler and secured by the wings of the U-shape couplers said handles attached to said central pad;

the semiconductor chip mounted on said spreader central pad; and

encapsulation material covering said chip, filling said gap, and exposing a spreader surface and handle ends.

Rejection on Appeal

Claims 3 and 13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Chiang (U.S. Patent Number 5,822,848; issued October

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20, 1998) and Chiu (U.S. Patent Number 6,326,679 B1; issued December 4, 2001). Answer 3-7.

Issue on Appeal

Do Chiang and Chiu, either together or in combination, disclose a lead frame including a plurality of U-shaped couplers for securing handles of a heat spreader as described in the claims?

ANALYSIS

We have reviewed the Examiner's rejections in light of Appellants' arguments that the Examiner has erred. We disagree with Appellants' conclusions. We concur with the findings and reasons set forth by the Examiner in the action from which this appeal is taken and the reasons set forth by the Examiner in the Answer in response to Appellants' Appeal Brief. However, we highlight and address specific findings and arguments for emphasis as follows.

Appellants contend that Chiang's U-shaped couplers are actually metal troughs having four edges with a partially opened top to "allow the V-shaped metal hook to be mechanically latched to it." Appeal Brief 5. Appellants submit that Chiang's troughs do not anticipate the claimed invention because "a U-shaped coupler is a three-sided structure – a bottom and two wings perpendicular to the bottom" and therefore the combination makes the claimed structure to have a shape of a capital letter U while Chiang has four sides – "a three sided trough and a partially opened top side." *Id.* Appellants further argue that the claims require that the two wings of the U-shaped coupler secure the tip portion of the heat spreader and

Chiang does not disclose this limitation. *Id.* “Chiang disclose the V-shaped hook to be ‘latched to the partially opened top;’ it does not disclose a handle secured by the two wings of a coupler.” Appeal Brief 6.

We do not find Appellants’ arguments to be persuasive because Chiang discloses a U-shaped coupler “including two wings extending approximately at right angle with respect to the first plane” as shown in Figures 9A-D. The use of the transition word “comprising” means that the claims do not limit the couplers to having only three sides and therefore the fact that Chiang discloses “four sides” does not distinguish the claims over Chiang. *See* Answer 8. Further, the claims do not explicitly state that the handle of the heat spreader is secured by two wings of the coupler as Appellants argue, however it is evident that the V-shaped metal hooks of the leadframe is secured by at least two “wings” or sides of Chiang’s couplers. *See* Figures 9A-D.

Appellants further argue that the combination of Chiang and Chiu is improper because the Examiner fails to set forth any reason for combining Chiang and Chiu in “the way as described in claim 3.” Appeal Brief 7. The Examiner finds:

[R]earranging the mechanical couplers and the plurality of handles of Chiang, would not modify the operation of the device, since the function of the [sic] these parts, the mechanical couplers and handles, would still remain the same. Furthermore, the overall structure of the device would remain substantially identical to structure taught by Chiang, since Chiang teaches a plurality of handles which are inserted into mechanical couplers to attach the lead frame and heat sink assembly (Fig. 7; col. 7: Ins. 42-56, col. 8: Ins. 1- 17). Regarding KSR and the rationale for modifying the Chiang reference, note that it would have

been obvious to try an rearrange the couplers and handles of Chiang, in view of Chiu, because the specific placing of the couplers on the leadframe and the handles on the heat spreader are neither critical, nor do they yield unpredictable results; and note the applicant has not stated otherwise.

Answer 10-11.

We agree with the Examiner's findings. Appellants have not indicated any criticality in regard to the mechanical couplers nor has an unexpected benefit been noted by Appellants. *See* Appeal Brief 4-9. The U-shaped couplers merely operate as a mechanical coupler would. "Common sense teaches, however, that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *KSR Int'l v. Teleflex Inc.*, 550 U.S. 398, 420 (2007). Further, we find that the Examiner has satisfied the test for obviousness by showing some articulated reasoning with some rational underpinning for support (Answer 5-6.). *See KSR Int'l., Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Therefore we sustain the Examiner's rejection of claim 3.

Appellants argue that Chiu fails to disclose that "the ends of the heat spreader be exposed through the encapsulation material" and therefore claim 13 distinguishes over the Chiang/Chiu combination. Appeal Brief 8-9. However, the Examiner finds that Chiu discloses, "The heat sink may be a heat spreader that will be buried in an encapsulating package or a heat slug that extends outside of an encapsulating package." Chiu, column 5, lines 15-18. Chiu teaches that it is well known to dissipate the heat generated from a semiconductor device to the ambient surroundings via a heat slug or

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spreader. We agree with the Examiner's findings that it would have been obvious in view of Chiu's teachings, to modify Chiang's invention by exposing the handle ends of the heat spreader through the encapsulation to aid in heat dissipation. *See* Answer 6. Therefore we sustain the Examiner's rejection of claim 13.

DECISION

The obviousness rejection of claims 3 and 13 are 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). *See* 37 C.F.R. § 41.50(f).

AFFIRMED

Vsh