UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ANDREW D. DELANO, BRANDON A. RUBENSTEIN, and EUGENE MIKSCH

Appeal 2007-3851
Application 10/419,373[1]
Technology Center 2800

Decided: June 25, 2008

Before JOSEPH F. RUGGIERO, JOHN A. JEFFERY, and MARC S. HOFF, *Administrative Patent Judges*.

HOFF, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 from a Final Rejection of claims 1-19.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

Appellants' invention relates to a variable-gap thermal interface device for transferring heat from a heat source to a heat sink. The device

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[1] Application filed April 21, 2003. The real party in interest is Hewlett-Packard Development Company, L.P.
[2] Claims 20-27 are also pending, and stand allowed by the Examiner.

includes a multi-axis rotary spherical joint comprising a spherically convex surface in slidable contact with a spherically convex surface having the same radius of curvature, a block having a proximal end rotatably coupled with the heat sink, and a shim having a substantially uniform thickness separating a first surface that thermally communicates with the distal end of the block from a second surface that thermally communicates with the heat source (Spec. 2).

Claim 1 is exemplary:

A variable-gap thermal-interface device for transferring heat from a heat source to a heat sink, said device comprising;

a multi-axis rotary spherical joint comprising a spherically concave surface having a first radius of curvature in slideable contact with a spherically convex surface having said first radius of curvature;

a block having a proximal end rotatably coupled with said heat sink through said rotary spherical joint and having a distal end opposite said proximal end; and

a shim having a selectable substantially uniform thickness in at least one direction separating a first surface and a second surface opposite said first surface, said first surface thermally communicating with said distal end of said block and said second surface thermally communicating with said heat source.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Currie	5,162,974	Nov. 10, 1992

Claims 12, 13, 18, and 19 stand rejected under 35 U.S.C. § 112, second paragraph, as omitting essential structural cooperative relationships or elements.

Claims 1, 2, and 4-19 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Currie.

Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Currie.

Appellants contend that the Examiner erred in holding that claims 12, 13, 18, and 19 omit essential elements, because the claims are clear and a compressive load may be between a heat sink and a heat source (Br. 5), and that the Examiner erred in rejecting the claims over Currie because Currie does not teach a heat spreader having a selectable *substantially uniform* thickness, but rather has a step profile (App. Br. 5).

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the Briefs and the Answer for their respective details.

ISSUE

There are two principal issues in the appeal before us.

The first issue is whether the Examiner erred in holding that claims 12, 13, 18, and 19 omit essential elements so as to be indefinite under § 112, second paragraph.

The second issue is whether claims 1, 2, and 4-19 are anticipated based on a finding that Currie teaches a shim having a selectable substantially uniform thickness.

FINDINGS OF FACT

The following Findings of Fact (FF) are shown by a preponderance of the evidence.

The Invention

1. According to Appellants, they have invented a variable-gap thermal interface device for transferring heat from a heat source to a heat sink (Spec. 2).

2. The device includes a multi-axis rotary spherical joint comprising a spherically convex surface in slidable contact with a spherically convex surface having the same radius of curvature (Spec. 2).

3. The thermal interface device further includes a block having a proximal end rotatably coupled with the heat sink, and a shim having a substantially uniform thickness separating a first surface that thermally communicates with the distal end of the block from a second surface that thermally communicates with the heat source (Spec. 2).

Currie

4. Currie teaches a heat sink assembly for cooling integrated circuit packages mounted on a printed circuit board (col. 2, ll. 8-10).

5. Currie's Figure 4 shows "[a]n enlarged view of the two-section heat collector of FIG. 3" (col. 5, ll. 29-30).

6. Heat spreader 40 has a step profile, rather than a substantially uniform thickness (Fig. 4).

7. Currie teaches that heat spreader 40 "serves to spread the heat to a larger area than the originating active area on the integrated circuit package" (col. 4, ll. 6-8).

8. Heat spreader 40 is *affixed* to an integrated circuit package (col. 4, ll. 5-6).

PRINCIPLES OF LAW

Anticipation is established when a single prior art reference discloses expressly or under the principles of inherency each and every limitation of the claimed invention. *Atlas Powder Co. v. IRECO, Inc.*, 190 F.3d 1342, 1347 (Fed. Cir. 1999); *In re Paulsen*, 30 F.3d 1475, 1478-79 (Fed. Cir. 1994).

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc*., 127 S.Ct. 1727, 1734 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) objective evidence of nonobviousness, or so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 127 S.Ct. at 1734 ("While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.")

ANALYSIS

Rejection of claims 12, 13, 18, and 19 under 35 U.S.C. § 112, second paragraph

The Examiner argues that the claims at issue omit essential structural cooperative relationships, in that because parent claim 1 recites a shim having a uniform thickness, compressive loading cannot be applied between a heat sink and a heat source, but rather must be applied from above, e.g. by a spring (as illustrated at Figure 1 of the application)(Ans. 3-4). The Examiner asserts that the instant application "is only directed to the embodiment shown in Fig. 2 and described in paragraphs [0016] and [0017]" (Ans. 6).

We are not persuaded by the Examiner's arguments. First, Appellants are not restricted to claiming only that which is described as being part of a particular embodiment. Second, we agree with Appellants' position that the Examiner indicated agreement with Appellants' submitted Summary of Claimed Subject Matter in the Brief, which includes disclosure of the subject matter of claims 12 and 18. Finally, we observe that the language of claim 12,[3] "compressive loading applied between said heat sink and said heat source," need not be interpreted to require that the element applying the loading is physically present in-between the heat sink and heat source, but merely that such loading is caused to exist along a path including the two elements.

[3] The language of claim 18 is nearly identical.

As a result, we find that the language of claims 12, 13, 18, and 19 does not omit essential structural cooperative relationships, and we find error in the Examiner's rejection under 35 U.S.C. § 112, second paragraph.

Claims 1, 2, and 4-14

We select claim 1 as representative of this group, pursuant to our authority under 37 C.F.R. § 41.37(c)(1)(vii).

Appellants argue that the Examiner erred in holding that Currie teaches all the elements of claim 1, because Currie does not teach a shim having a selectable substantially uniform thickness in a first direction separating a first surface and a second surface opposite said first surface (the second surface thermally communicating with the heat source) (Br. 5). The Examiner contends that heat spreader 40 of Currie is shown in Figure 3 to have a substantially uniform thickness, and that Currie discloses specific dimensions for the heat spreader that suggest that its thickness is uniform (Ans. 7-8; Currie, col. 5, l. 19).

We agree with Appellants. While it is true that Figure 3 of Currie does illustrate heat spreader 40, Currie specifically characterizes Figure 4 as "[a]n enlarged view of the two-section heat collector of FIG. 3" (FF 5). In this enlarged view, heat spreader 40 has a step profile, rather than a substantially uniform thickness, just as Appellants argue (FF 6).

The Examiner's position with regard to the step profile of heat spreader 40 illustrated in Figure 4 of Currie is that claim 1 is to be interpreted to require that "said shim must be flat between a surface of a heat generating electronic component and a respective surface of a heat-transferring block" (Ans. 7-8). In the Examiner's view, Currie's heat

spreader is "substantially flat, (excluding non-participating in a thermal path side steps)" (Ans. 8). We agree with Appellants, however, that the Examiner's interpretation impermissibly attempts to modify the teachings of Currie in order to meet Appellants' claims (Reply Br. 5). Further, Currie explicitly teaches that heat spreader 40 "serves to spread the heat to a larger area than the originating active area on the integrated circuit package" (FF 7). It is therefore clear that the side portions of Currie's heat spreader *do* in fact participate in the thermal path. As a result, we decline to adopt the claim interpretation advanced by the Examiner.

Because we find that Currie does not teach a shim having a selectable substantially uniform thickness, we find that the Examiner has failed to establish a prima facie case of anticipation with regard to claims 1, 2, and 4-14. We therefore find error in the Examiner's rejection of claim 1, 2, and 4-14 under 35 U.S.C. § 102(b).

Claim 3

Appellants assert the patentability of claim 3 based upon the same reasons presented in favor of the patentability of parent claim 1. For the reasons indicated in connection with claim 1 *supra*, we do not find that Currie teaches or suggests the limitations of independent claim 1, let alone dependent claim 3. Accordingly, we find error in the Examiner's rejection of claim 3 under 35 U.S.C. § 103(a).

Claims 15-19

We select claim 15 as representative of this group, pursuant to our authority under 37 C.F.R. § 41.37(c)(1)(vii).

Appellants assert that Currie does not teach inserting a shim to fill a gap between the heat source and the multi-axis rotary spherical joint, as claim 15 requires (Br. 6). Appellants refer to column 4, lines 5-6 of Currie, which teach that heat spreader 40 is *affixed* to an integrated circuit package (FF 8).

Neither the Final Rejection nor the Examiner's Answer offer any rebuttal to Appellants' argument for the patentability of claim 15. We have reviewed the Currie reference, and we agree with Appellants that Currie does not teach *inserting* heat spreader 40 to fill a gap. We therefore find error in the Examiner's rejection of claims 15-19 under 35 U.S.C. § 102(b).

CONCLUSION OF LAW

We conclude that Appellants have shown that the Examiner erred in rejecting claims 12, 13, 18, and 19 under 35 U.S.C. § 112. We further conclude that Appellants have shown that the Examiner erred in rejecting claims 1-19 under 35 U.S.C. §§ 102 and 103. On the record before us, claims 1-19 have not been shown to be unpatentable.

DECISION

The Examiner's rejections of claims 1-19 are reversed.

REVERSED

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