THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte UWE BOCK and JOACHIM GLUCK

Appeal No. 1999-0422
Application No. 08/628,805[1]

HEARD: November 17, 1999

Before STONER, Chief Administrative Patent Judge, FRANKFORT and BAHR, Administrative Patent Judges.

BAHR, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's refusal to allow claims 9, 10, 15, 16 and 18 as amended after the final rejection in Paper Nos. 11 and 14. Claims 19 and 20, the only other claims remaining in the application, have been

[1] Application for patent filed April 5, 1996.

indicated as allowable by the examiner (advisory action, Paper No. 12) and are not involved in this appeal.[2]

## BACKGROUND

The appellants' invention relates to a heat exchanger for cooling semi-conductor components comprising a base section and cooling fins attached to and projecting from the base section. Each fin has a wavy profile in the region where it joins the base section. An understanding of the invention can be derived from a reading of exemplary claim 9, which appears in the appendix to the appellants' brief.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Hess 5,014,776 May 14, 1991
Serizawa et al. (Serizawa) 5,542,176 Aug. 6, 1996
(filed Jan. 30, 1995)

The following rejection is before us for review.

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[2] In the amendment filed August 25, 1997 (Paper No. 11), after the final rejection, claims 11-14 and allowable claim 17 were canceled and claim 20 was substituted for canceled claim 17. Additionally, claim 19 was amended to depend from new claim 20.

Claims 9, 10, 15, 16 and 18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Serizawa in view of Hess.

Rather than reiterate the conflicting viewpoints expressed by the appellants and the examiner with regard to the merits of this rejection, reference is made to the brief (Paper No. 15) and reply brief (Paper No. 17) and the answer (Paper No. 16) for the respective positions of the appellants and the examiner.

## OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellants' specification and claims[3], to the applied prior art references, and to the respective positions articulated by the appellants and the examiner. As a consequence of our review, we make the determinations which follow.

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[3] We note that "the base" (as distinguished from the "base section") in claim 9, line 8, as reproduced in the appendix to the brief, lacks clear antecedent basis in the claim. Although this does not render the scope of the claim indefinite, this informality is deserving of correction in the event of further prosecution before the examiner.

Before addressing the examiner's rejections based upon prior art, it is essential that the claimed subject matter be fully understood. Analysis of whether a claim is patentable over the prior art under 35 U.S.C. §§ 102 and 103 begins with a determination of the scope of the claim. The properly interpreted claim must then be compared with the prior art. Claim interpretation must begin with the language of the claim itself. See Smithkline Diagnostics, Inc. v. Helena Laboratories Corp., 859 F.2d 878, 882, 8 USPQ2d 1468, 1472 (Fed. Cir. 1988). Accordingly, we will initially direct our attention to appellants' claim 9 to derive an understanding of the scope and content thereof.

Claim 9 recites a heat exchanger comprising a base section and cooling fins attached to and projecting out from the base section, with each fin being secured in a groove in the base section. Further, the fins are profiled, at least in the region where they join the base section, into a wavy form such that the distance between two planes defined by the wave peaks of the wavy profile "corresponds approximately" to the width of the grooves.

The term "approximately" is a term of degree. When a word of degree is used, such as the term "approximately" in claim 9, it is necessary to determine whether the specification provides some standard for measuring that degree. See Seattle Box Company, Inc. v. Industrial Crating & Packing, Inc., 731 F.2d 818, 826, 221 USPQ 568, 573-74 (Fed. Cir. 1984).

In the present case, we have reviewed the appellants' disclosure to help us determine the meaning of "corresponds approximately." The appellants' specification states: (1) at page 1 that each fin is "secured in a groove or the like recess in the base section," (2) at page 3 that cooling fin plates 16 are "clamped in grooves 14 in the base section 12" and (3) at pages 2 and 3 that the sheet forming each fin is wavy along its longitudinal axis, the wave peaks of the wavy form define a plane (E) on each side of the sheet parallel to the longitudinal axis, and the transverse distance across the longitudinal axis between the two planes (E) "corresponds to the width i of the grooves" (page 3). Additionally, the appellants' Figure 6 shows the distance between the planes (E)

being equal to the dimension (i), which denotes the width of the grooves.

One of ordinary skill in the art at the time of the appellants' invention would have understood from the above-noted disclosure that the distance between the planes defined by the wave peaks is equal to or slightly larger than (within engineering tolerances) the width of the grooves so that the wavy profile of the fins will fit snugly within the grooves so as to be secured or clamped therein. Accordingly, we interpret the language "corresponds approximately" in claim 9 as meaning equal to or slightly larger than (within engineering tolerances).

With this understanding, we turn now to the prior art applied by the examiner.

Serizawa discloses a radiation plate for cooling semiconductor substrates (column 1, line 14) comprising a base (10) having grooves (12) therein and thin plate fins (14) having engaging portions (16) for securing the fins in the grooves. As explained in detail from column 4, line 33, to column 5, line 13, the fins are inserted into the grooves (12) in a horizontal direction from the ends of the grooves; after

insertion of the fins into the grooves, pressure deformed portions (17) are formed by the application of pressure by a pressure blade (74) to firmly fix each fin (14) to the wall surface of a groove.

Hess discloses a heat emitting unit comprising a main body (2) and long, thin, flat extruded ribs (3,4) provided with foot profiles (9) for insertion into grooves (16,17) in the main body. The lateral surfaces of the ribs are provided with "structures 8 in order to achieve an enlargement of the [heat transfer] surfaces" (column 5, lines 25-27). The channels (16,17) have undercut configurations and cross-sections which match but are slightly larger than the foot profiles (9) of the ribs (column 5, lines 39-40). The ribs are inserted into the channels from the side and are secured from falling out in other directions by the undercut configuration of the channels. Keyways (19) are provided between and parallel to the channels for receipt of a chisel (20) for pressing and deforming the lateral areas of the channels as indicated by arrows in Figure 3 to secure the foot profiles in the channels and ensure a good heat transfer junction.

The examiner finds that Serizawa discloses all of the features of claim 9 "with the exception of the fins shaped in the form of a wave such that the wave peaks correspond approximately to the width of the groove" (answer, page 4). It is the examiner's position, however, that it would have been obvious to one of ordinary skill in the art at the time of the appellants' invention to employ wavy fins in the Serizawa device, "where the wave peaks on the fin correspond approximately to the width of a groove formed in a base for the purpose of increasing the heat transfer surface area of the fins" (answer, page 4).

From our viewpoint, while Hess may have suggested the provision of ridges or projections on the lateral surfaces of the fins of Serizawa to increase the heat transfer surfaces thereof, Hess does not appear to have taught or suggested provision of any such ridges or projections "in the region where [the fins] join the base," as required by claim 9. Figure 3 of Hess, for example, does not illustrate any "structures" (8) in the foot profile region which lies in the channel (16,17).

Further, we find no teaching or suggestion in either Hess or Serizawa to form the wavy profile of the fins such that the distance between two planes (E) defined by the wave peaks of the profile is equal to or slightly larger than the width of the grooves of the base, as required by claim 9. The examiner's apparent reliance on the illustrations of Figures 2 and 3 of Hess for such a teaching (note answer, page 5) is speculative at best and is thus unsound.[4]

For the foregoing reasons, we do not find the combined teachings of Serizawa and Hess sufficient to have suggested the subject matter of claim 9. Accordingly, we shall not sustain the examiner's 35 U.S.C. § 103 rejection of claim 9, or claims 10, 15, 16 and 18 which depend therefrom.

## CONCLUSION

To summarize, the decision of the examiner to reject claims 9, 10, 15, 16 and 18 under 35 U.S.C. § 103 is reversed.

REVERSED

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[4] Rejections based on 35 U.S.C. § 103 must rest on a factual basis. In making such a rejection, the examiner has the initial duty of supplying the requisite factual basis and may not, because of doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 177 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968).

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