

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MARVIN GLENN WONG

Appeal 2006-1662
Application 10/453,119
Technology Center 2800

Decided: October 17, 2006

Before GARRIS, TIMM, and JEFFREY T. SMITH, *Administrative Patent Judges*.

GARRIS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal involves claims 1-22, the only claims pending in this application. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 134.

We AFFIRM.

INTRODUCTION

The claims are directed to a device for reinforcing a fragile substrate having an edge-mount connector and a method of “enforcing a fragile substrate” (Specification ¶ [0003]). Claims 1, 2 and 12 are illustrative:

1. A device comprising:
a fragile substrate;
a reinforcement plate bonded to the substrate to reinforce the substrate; and
an edge-mount connector mated with the substrate and the reinforcement plate.

2. The device of claim 1, wherein the reinforcement plate defines notches for receiving the edge-mount connector.

12. A method for enforcing a fragile substrate, the method comprising:
bonding a reinforcement plate to the fragile substrate to reinforce the substrate, the reinforcement plate including notches to receive an edge-mount connector; and
mating the edge-mount connector to the notches on the reinforcement plate, and to the fragile substrate.

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

Machado	US 5,041,016	Aug. 20, 1991
Hanato	US 5,414,220	May 9, 1995
Sakemi	US 5,713,126	Feb. 3, 1998
Farnsworth	US 6,144,560	Nov. 7, 2000

The rejections as presented by the Examiner are as follows:

1. Claims 1, 3, 5-7, 9, and 21 are rejected under 35 U.S.C. § 102(b) as being anticipated by Machado.
2. Claims 1, 3-4, and 8-11 are rejected under 35 U.S.C. § 102(b) as being anticipated by Hanato.
3. Claims 2, 17, 20, and 22 are rejected under 35 U.S.C § 103(a) as unpatentable over Hanato in view of Farnsworth.
4. Claims 12-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Machado in view of Sakemi.

Rather than reiterate the respective positions advocated by the Appellant and by the Examiner concerning these rejections, we refer to the Brief and Reply Brief and to the Answer respectively for a complete exposition thereof.

OPINION

Claims 1, 2, and 12 are the only claims argued separately by Appellant. Accordingly, claims 1, 2, and 12 are addressed in our decision below.

§ 102(b) REJECTION OVER MACHADO

Claim 1 is directed to a device including “a fragile substrate,” “a reinforcement plate bonded to the substrate to reinforce the substrate” and “an edge-mount connector mated with the substrate and the reinforcement plate.”

The Examiner rejected claim 1 under § 102(b) over Machado. The Examiner stated that Machado’s ceramic substrate card 40 and printed

wiring board 30 correspond to Appellant's "fragile substrate" and "reinforcement plate," respectively (Answer 3). The Examiner further indicated the printed wiring board 30 (i.e., the reinforcement plate) is bonded to the ceramic substrate card 40 (i.e., the fragile substrate) with adhesive 50. Finally, the Examiner indicated Machado's flexible link connector 10 (i.e., the edge-mount connector) is "mated with [ceramic] substrate [card] 40 and the reinforcement plate [i.e., printed wiring board] 30" (Answer 3).

Appellant argues "Machado lacks any teaching that printed wiring board 30 serves as a 'reinforcement plate' for the ceramic substrate card 40" (Br. 11). In regard to this argument, Appellant contends that Machado's disclosure of a flexible adhesive (i.e., polysulfide adhesive 50) coupled with Machado's intent to use the circuitry in a missile system, where excessive vibration and different rates of thermal expansion are present, demonstrate that printed wiring board 30 does not reinforce ceramic substrate card 40 (Br. 11). Rather, Appellant interprets Machado as teaching an arrangement of the ceramic substrate card 40 and the printed wiring board 30 that permits shifting, expansion, and contraction, but not reinforcement (Br. 11).

The Examiner responds that one skilled in the art viewing Machado's Figure 2 would "recognize that the printed wiring board 30 [i.e., reinforcement plate] would inherently reinforce the ceramic substrate card 40 [i.e., fragile substrate]" (Answer 10).

We agree with the Examiner.

Machado clearly discloses that the printed wiring board 30 (i.e., reinforcement plate) is bonded to the ceramic substrate card 40 (i.e., fragile substrate) (Machado, col. 5, ll. 11-14). Because the two pieces are bonded

together, it is reasonable to consider that some degree of reinforcement inherently is present in Machado's structure. *Ex Parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Int. 1990). Because no specific degree of reinforcement is recited in claim 1, any degree of reinforcement between the printed wiring board 30 (i.e., reinforcement plate) and the ceramic substrate card 40 (i.e., fragile substrate) would satisfy the claim. Accordingly, we find that Machado anticipates Appellant's claim 1.

Additionally, we are unpersuaded by Appellant's argument that Machado's bonding is flexible to allow for expansion, contraction and shifting of the ceramic substrate card 40 and the printed wiring board 30 relative to one another (Br. 11). In fact, Machado discloses that the plates are bonded to one another to reduce the relative displacement of one plate with respect to the other (Machado, col. 6, ll. 30-31). Machado further states that by bonding the corners of the ceramic substrate card 40 to the printed wiring board 30 the "relative displacement at the corners is decreased and therefore stress [on the wire leads 20] is decreased" (Machado, col. 6, ll. 31-35).

Minimizing "relative displacement" between the ceramic substrate card (i.e., fragile substrate) 40 and the printed wiring board 30 (i.e., reinforcement plate) necessarily implies that the ceramic substrate card (i.e., fragile substrate) 40 is attached to the printed wiring board 30 (i.e., reinforcement plate) with a bond strength sufficient to perform the aforementioned function. We find the strength of the bond between printed wiring board 30 (i.e., reinforcement plate) and ceramic substrate card 40 (i.e., fragile substrate) that is required to perform Machado's aforementioned

function (i.e., minimizing relative displacement), necessarily implies a reinforcement relationship between them.

We affirm the § 102(b) rejection over Machado of argued claim 1 and non-argued claims 3, 5-7, 9, and 21.

§ 102(b) REJECTION OVER HANATO

The Examiner also rejected claim 1 under § 102(b) over Hanato (Answer 4). The Examiner stated that Hanato discloses a reinforcement plate 4 (i.e., fragile substrate in claim 1) bonded to a metal plate 5 (i.e., reinforcement plate in claim 1) with connector 20 (i.e., edge-mount connector) mated with the reinforcement plate 4 and metal plate 5 via contact terminals 21 and 22 (Answer 5).

Appellant argues the Examiner's interpretation of Hanato is "unsupportable" (Br. 13). Appellant contends that Hanato's "reinforcement plate 4" corresponds to Appellant's claimed "reinforcement plate" rather than Hanato's metal plate 5 as the Examiner indicated in his rejection (Br. 13-14). Appellant further indicates that Hanato's reinforcement plate 4 reinforces the flexible wiring cable 10" such that plate 4 is disclosed as performing the reinforcement (Br. 13-14). Additionally, Appellant argues that Hanato never mentions that reinforcing plate 4 is "fragile" so it is not reasonable for the Examiner to interpret plate 4 as corresponding to the "fragile substrate" in the claims (Br. 14).

The Examiner responds that Hanato discloses at column 2, lines 66-68 that reinforcing plate 4 is made of ceramic, the same material Appellant uses to make their fragile substrate (Answer 11). The Examiner also states that one of ordinary skill in the art when viewing Hanato's Figure 1 would

“recognize that the metal plate 5 [i.e., reinforcement plate] would definitely reinforce the [reinforcement] plate 4 [i.e., fragile substrate]” (Answer 11).

Appellant counters that though Hanato discloses that the reinforcing plate 4 is ceramic, Appellant’s claim 1 does not require the fragile substrate be ceramic (Reply Br. 3). Appellant also argues that ceramics may contain various additives that make them more or less fragile (Reply Br. 3).

Appellant concludes that despite Hanato’s “plate 4 being ceramic”; Hanato does not disclose that plate 4 is fragile.

Appellant’s arguments are not persuasive.

Hanato discloses that reinforcement plate 4 (i.e., fragile substrate) and metal plate 5 (i.e., reinforcement plate) are bonded to one another (Hanato, col. 3, ll. 12-14). Because the two pieces are bonded together, it is reasonable to consider that some degree of reinforcement inherently is present in Hanato’s structure. *Ex Parte Levy*, 17 USPQ2d at 1464. Because no specific degree of reinforcement is recited in claim 1, any degree of reinforcement between the metal plate 5 (i.e., reinforcement plate) and the reinforcement plate 4 (i.e., fragile substrate) would satisfy the claim.

Moreover, we are unpersuaded by Appellant’s argument that Hanato’s reinforcement plate 4 (i.e., fragile substrate in claim 1) is not fragile.

Hanato’s reinforcement plate 4 and Appellant’s claimed “fragile substrate” are made of the same material, namely, ceramic.¹ Where the claimed and prior art products appear to be identical in structure or composition, it is appropriate to consider that the latter necessarily has the same characteristics as the former. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433

¹ Appellant discloses that the “fragile substrate” is made of ceramic (Specification ¶ [0011]).

(C.C.P.A. 1977). Because Hanato's reinforcement plate 4 and Appellant's "fragile substrate" are made of the same material, it is reasonable to consider that they must have the same material properties or characteristics (e.g., fragility).

Additionally, we note that "fragile" is a relative (and thus a very broad) term. A material is "fragile" relative to another material to which it is being compared. Appellant's argument, that "various additives [may be added to ceramics to] make them *more or less* fragile" (emphasis added) (Reply Br. 3), further indicates the relative nature of the term "fragile." We note that a premise to Appellant's argument is that ceramic is "fragile" by nature (i.e., that the fragility is always present though adjustable by manipulating the additives in the ceramic). Therefore, Appellant's argument further bolsters the Examiner's finding that Hanato's ceramic reinforcement plate 4 reasonably is considered "fragile."

Accordingly, we find that Hanato anticipates Appellant's claim 1.

We affirm the § 102(b) rejection over Hanato of argued claim 1 and non-argued claims 3, 4, and 8-11.

§ 103(a) REJECTION OVER HANATO IN VIEW OF FARNSWORTH

Claim 2 depends from claim 1 and further recites that the "reinforcement plate defines notches for receiving the edge-mount connector."

The Examiner rejected claim 2 under § 103(a) over Hanato in view of Farnsworth. The Examiner stated that Hanato does not disclose the "reinforcement plate [i.e., metal plate] 5 defines notches for receiving the edge-mount connector [i.e., connector 20]" (Answer 6). To cure this

deficiency, the Examiner found that Farnsworth teaches “notches 18 formed on the substrate 10 facilitate . . . alignment of the bond pads 14 with their corresponding conductive elements 35 of mating connector 30” (Answer 6). Based on Farnsworth’s disclosure, the Examiner concluded that it would have been obvious at the time the invention was made to “modify Hanato [] by constructing the plate 5 [i.e., reinforcement plate] as taught by Farnsworth [] in order to facilitate alignment [of] the connections between two connectors” (Answer 6).

Appellant argues that neither Hanato nor Farnsworth discloses a fragile substrate bonded to a reinforcement plate (Br. 15). Appellant reiterates his argument that Hanato does not disclose that reinforcement plate 4 (i.e., fragile substrate) is fragile or that metal plate 5 (i.e., reinforcement plate) is “substantial enough to provide any sort of additional reinforcement for the ‘reinforcement plate 4’ [i.e., fragile substrate]” (Br. 15).

The Examiner responds that Farnsworth is not cited for teaching bonding a fragile substrate to a reinforcement plate (Answer 11). Rather, Farnsworth is cited for his teaching of using notches for connector alignment (Answer 11).

We agree with the Examiner’s ultimate conclusion that Appellant’s claim 2 is unpatentable over Hanato in view Farnsworth.

Contrary to Appellant’s argument above, Hanato discloses the same structure recited in Appellant’s claim 1.² Hanato does not disclose using notches. However, Farnsworth discloses using “notches” to facilitate

² See our discussion of the § 102(b) rejection over Hanato earlier in this decision.

aligning bond pads with their corresponding terminals (Farnsworth, col. 4, ll. 39-42, Abstract). From such a teaching in Farnsworth, it would have been obvious to provide notches in Hanato's metal plate (i.e., reinforcement plate) 5 to facilitate alignment of the flexible wiring cable 10 with the contact terminal 21. Accordingly, Farnsworth's disclosure provides motivation for the combination.

We also find there is a reasonable expectation of success in combining Farnsworth's notches with Hanato's metal plate 5 (i.e., reinforcement plate). Farnsworth discloses using notches for the purpose of aligning the bond pads (14a, 14b, 14c) with the terminals (Farnsworth, col. 4, ll. 37-42). Combining Farnsworth's teaching of alignment notches with Hanato's metal plate (i.e., reinforcement plate) 5 would reasonably be expected to successfully align the wiring conductor (2) on the printed wiring cable (10) with contact terminal (21). As a result of such a combination, one would only need to provide the proper positioning of the notches on the metal plate 5 (i.e., reinforcement plate) so that Hanato's wiring conductor 2 would be properly aligned with the terminal 21.

Accordingly, we affirm the § 103(a) rejection over Hanato in view of Farnsworth of argued claim 2 and non-argued claims 17, 20, and 22.

§ 103(a) REJECTION OVER MACHADO IN VIEW OF SAKEMI

Claim 12 recites a "method of enforcing a fragile substrate" including the following steps: (1) bonding a reinforcement plate to a fragile substrate, the reinforcement plate having notches to receive the edge-mount connector and (2) mating the edge-mount connector to the notches on the reinforcement plate and to the fragile substrate.

The Examiner rejected claim 12 over Machado in view of Sakemi. The Examiner stated that Machado discloses a method of “enforcing” a ceramic substrate card (i.e., fragile substrate) 40 by bonding a printed wiring board (i.e., reinforcement plate) 30 to the ceramic substrate card (i.e., fragile substrate) 40 (Answer 8). The Examiner further stated that Machado discloses “mating the edge-mount connector [i.e., wire lead] 20 to the reinforcement plate [i.e., printed wiring board] 30, and to the fragile substrate [i.e., ceramic substrate card] 40” (Answer 8). The Examiner stated that Machado does not disclose that the printed wiring board (i.e., reinforcement plate) 30 has notches for receiving the edge-mount connector.

The Examiner relied on Sakemi’s teaching to provide notches in order to facilitate alignment of bond pads with their corresponding conductive elements (Answer 8). Based on Sakemi’s disclosure, the Examiner concluded that it would have been obvious at the time the invention was made to modify Machado by “constructing the [reinforcement] plate [i.e., printed wiring board] 30 as taught by Sakemi in order to facilitate alignment [of] the connections between [the] two conductive members” (Answer 8).

Appellant reiterates his previous arguments regarding Machado’s failure to teach “reinforcing the ceramic substrate card 40 with the printed wiring board 30” (Br. 16). Appellant contends that Machado allows some degree of movement and vibration between the ceramic substrate card 40 and printed wiring board 30, such that the printed wiring board 30 cannot be understood to reinforce the ceramic substrate card 40 (Br. 16). Appellant also argues that Sakemi’s notches 7 are better suited to aligning a rigid connector rather than Machado’s flexible connector (Br. 17).

The Examiner responds that Sakemi is only applied for his teaching of using notches to facilitate the connection/alignment between two conductors (Answer 11-12). The Examiner expounds that the notch 7 facilitates the connection between lead 3 of the connector main body 2 and the terminal 6 of the printed circuit board 5 without causing dislocation of the lead 3 from the terminal 6 in the lateral direction before and during the soldering step (Sakemi Figure 1).

We agree with the Examiner.

Machado teaches that each end (i.e., shank 25 and 28) of the wire lead 20 is placed on its corresponding bond pad (i.e., 32 or 42) and attached thereto by soldering (Machado, col. 6, ll. 15-17, col. 7, ll. 14-18). Likewise, Sakemi teaches that the lead 3 is placed into and cooperates with the slit (i.e., notch) 7 to provide a firmly coupled arrangement that prevents lateral dislocation of the lead 3 prior to and during soldering (Sakemi, col. 4, ll. 54-64). Sakemi's teaching would have motivated one of ordinary skill in the art to combine slits (i.e., notches) 7 with the pads 32, 42 on Machado's printed wiring board 30 (i.e., reinforcement plate) and ceramic substrate card 40 (i.e., fragile substrate) to facilitate aligning the wire leads 20 of the connector 10 to prevent lateral dislocation of the leads during soldering.

Moreover, as we aforementioned, both Sakemi and Machado disclose aligning and placing leads on bond pads prior to soldering. The similarity of Sakemi's and Machado's soldering technique indicates that placing Sakemi's slits (i.e., notches) 7 in the pads 32, 42 of Machado would reasonably be expected to successfully hold the leads 20 in place during soldering.

We affirm the § 103(a) rejection over Machado in view of Sakemi of argued claim 12 and of non-argued claims 13-19.

CONCLUSION

We have affirmed the § 102(b) rejection of claims 1, 3, 5-7, 9, and 21 over Machado.

We have affirmed the § 102(b) rejection of claims 1, 3, 4, and 8-11 over Hanato.

We have affirmed the § 103(a) rejection of claims 2, 17, 20, and 22 over Hanato in view of Farnsworth.

We have affirmed the § 103(a) rejection of claims 12-19 over Machado in view of Sakemi.

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

AFFIRMED

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