

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 12

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte GREGORY B. HOTCHKISS  
and GARY D. STEVENS

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Appeal No. 2000-0811  
Application 08/964,734<sup>1</sup>

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ON BRIEF

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Before LEE, GARDNER-LANE and MEDLEY, Administrative Patent Judges.

LEE, Administrative Patent Judge.

**DECISION ON APPEAL**

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's rejection of appellants' claims 1-7, 9, 10 and 12-16.

**References relied on by the Examiner**

Trabucco (Trabucco '848)	5,381,848	Jan. 17, 1995
Hayes	5,861,323	Jan. 19, 1999
Trabucco (Trabucco '737)	5,899,737	May 04, 1999

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<sup>1</sup> Application for patent filed November 5, 1997. The real party in interest is Texas Instruments Incorporated.

Appeal No. 2000-0811  
Application 08/964,734

### **The Rejections on Appeal**

Claims 1-6, 12, and 14-16 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Trabucco '737.

Claims 7, 9 and 10 stand rejected under 35 U.S.C. § 103 as being unpatentable over Trabucco '737 and Hayes.

Claim 13 stands rejected under 35 U.S.C. § 103 as being unpatentable over Trabucco '737 and Trabucco '848.

### **The Invention**

The invention relates generally to the field of electronic device packaging and more particularly to a method for attaching solder members to a substrate. Claim 1 is the only independent claim of all the claims on appeal and is reproduced below:

1. A method for attaching solder members to a substrate comprising the steps of:

providing a substrate having specified solder member receiving locations thereon;

forming a decal comprising a sheet having thereon a plurality of solder members removably secured to said sheet and at locations on said sheet designed to replicate said solder member receiving locations on said substrate;

aligning the decal with said first substrate to cause said solder members to align with said solder receiving locations; and

transferring the plurality of solder members on the decal to the first substrate.

Appeal No. 2000-0811  
Application 08/964,734

### Discussion

The rejection of claims 1-7, 9 and 12-16 is **affirmed**. The rejection of claim 10 is **reversed**.

Our affirmance of a rejection is based only on the arguments presented by the appellant in this appeal. Arguments not raised are not before us, not at issue, and regarded as waived. A reversal of any rejection on appeal should not be construed as a ruling that the appellants' claims are patentable over prior art. We address only the positions and rationale set forth by the examiner and on which the rejection on appeal is based.

The findings contained in our discussion are supported by a preponderance of the evidence.

#### A. The Anticipation Rejection

Anticipation is established only when a single prior art reference discloses, either expressly or under the principles of inherency, each and every element of the claimed invention. In re Spada, 911 F.2d 705, 707, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990); RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed.Cir. 1984). See also In re King, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986); Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984). The

Appeal No. 2000-0811  
Application 08/964,734

prior art reference must either expressly or inherently describe each and every limitation in a claim. Verdegaal Bros. v. Union Oil Co., 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir.), cert. denied, 484 U.S. 827 (1987).

One of the steps recited in claim 1 is this: "forming a decal comprising a sheet having thereon a plurality of solder members removably secured to said sheet . . . ." The appellants argue (Reply at 2): "Only those decal materials which can be formed into a sheet in the manner of a decal are included, thus eliminating ceramics and metal which are not flexible from the group of possible decal sheets listed at page 12, lines 23 and 24." In that connection, the appellant's brief on page 3 relies on the following definition for "decal" in Random House Webster's Unabridged Dictionary, Second Edition, 1998 -- a specially prepared paper bearing a picture or design for transfer to wood, metal, glass, etc.

Both the appellants' reliance on dictionary definition to limit the material suitable for making a decal and the appellants' reference to the specification as only setting forth possible materials including unsuitable materials for making the decal are without merit. The specification on page 12, lines 21-25 states:

Appeal No. 2000-0811  
Application 08/964,734

Although a variety of materials may be used, it is desirable that the substrate 111 comprise materials that can withstand the heat incurred during the transfer process and to which solder will not stick. For example, **suitable materials include** plastic, aluminum, silicon, quartz, or ceramics. Alternatively, materials that will burn off during a transfer process, such as paper, may be used. (Emphasis added.)

The above-quoted explanation of what materials should be used to make the decal does not merely set forth a list of specific materials which are merely possible but which may not be suitable. Rather, it states that although a variety of materials may be used, some are more desirable and the suitable materials include plastic, aluminum, silicon, quartz, or ceramics. They are suitable because they can withstand the heat incurred during the solder member transfer process and thus the solder member would not stick to them. Additionally, the specification identifies paper as an alternative suitable material. Paper is suitable for a different reason, i.e., that it burns off during a solder member transfer process.

The dictionary definition offered by the appellants limits a decal to paper material. As noted above, the appellants' specification, however, has a much broader selection insofar as suitable materials for a decal in the context of the appellants' invention is concerned. Moreover, on page 13, lines 22-23, and on page 15, lines 23-24, the appellants' specification further

Appeal No. 2000-0811  
Application 08/964,734

gives a specific example of a material suitable for forming the decal, i.e., aluminum. The appellants' own definition overrides any contrary definition from a dictionary.

The appellants appear to argue that Trabucco's masking plate 18 cannot be a "decal" within the meaning of the appellants' claims because of the material with which it is made, a metal or a ceramic. For reasons discussed above, the argument is rejected. Note that in column 2, lines 57-60, Trabucco '737 states:

Masking plate 18 is preferably made of an inert and unsolderable material, such a ceramic, tungsten or graphite for example, although the invention is not limited thereto.

Ceramics is one of the suitable materials identified in the appellants' own specification for forming the "decal."

Appellants then argue that the solder balls of Trabucco '737 "are never removably secured as the appellant has claimed, since they are never secured in the first place." In its reply brief, the appellants state on page 2: "[t]he solder members must be removably secured to the decal, such as with an adhesive capable of losing its adhesive strength." We find, however, that the solder balls of Trabucco are removably secured to the masking plate 18 by physical confinement. As is described in column 2, lines 64-65 of Trabucco '737, "a preformed solder ball 24 is

Appeal No. 2000-0811  
Application 08/964,734

placed into each of holes 23 in masking plate 18" (see Figure 1). The walls of the holes retain and confine the solder balls in place for the next step of the procedure. The examiner correctly points out that a similar embodiment is described in the appellants' specification in Figures 9 and 10. Additionally, we find that the appellants' disclosed embodiment in Figures 6 and 7 also illustrate similar physical confinement of the solder balls. These embodiments are without the inclusion of an adhesive layer.

The term "removably secure" is not defined in the specification, which discloses many different ways of forming the solder balls on a decal, some of which employ an adhesive layer and some do not. In all instances, however, the solder balls are confined and precluded from rolling around or off their intended location on the decal. For example, in the specification on page 13, lines 24-29, it is stated (relative to Figures 6 and 7):

Bosses 612 (on the decal) may comprise a variety of configurations. For example, bosses 612 may be formed with a configuration of a frustum, as shown in FIGURE 6, or other suitable configurations that are operable to retain a solder ball. Bosses 612 should be formed with a depth sufficient to retain solder balls 114. For example, in one embodiment, bosses 612 are formed with a depth of approximately eighty percent the diameter of solder balls 114. The formation of bosses 612 is illustrated at step 820 in the flow chart shown in FIGURE 8.

Appeal No. 2000-0811  
Application 08/964,734

With respect to a different embodiment shown in Figure 9, the specification on page 15, lines 25-26 states:

Apertures 912 are formed with a size and configuration operable to firmly hold solder balls 114.

We do not see how these other embodiments which do not make use of an adhesive layer, fail to "removably secure" the solder balls in some meaningful way. The solder balls are subsequently transferred from the decal to a substrate and so they are removable from their initially placed location on the decal. While in their initially placed location, the solder balls are confined and precluded from moving away. Thus, the solder balls were secured before their removal. Claim 1 does not specifically require securing the solder balls by an adhesive layer. Rather, when interpreted as broad as the specification reasonably permits, it includes all the different disclosed manners in which the solder balls remain confined prior to removal from the decal.

In his answer on page 4, the examiner states that "[s]older members place[d] in apertures of a plate or sheet will remain in said apertures during normal processing stages until said solder members are transferred and soldered to a final substrate." The appellants in its reply brief argues that the statement is incorrect. The appellants state on page 3 of the reply brief: "Solder balls held in apertures have a tendency to drop out of

Appeal No. 2000-0811  
Application 08/964,734

the aperture and are therefore ultimately not transferred to the solder receiving region of the package. This is precisely the reason for this invention."

We disagree with the appellants. The appellants' own specification as discussed above includes embodiments which simply place solder balls in holes or apertures without an adhesive layer and does not indicate that there is any serious or debilitating problem. While using an adhesive layer may provide a better hold on the solder balls, appellants' claim 1 is sufficiently broad to cover all manners of removably securing the solder balls in place, as is described in the appellants' own specification, and is not limited to use of an adhesive layer. The appellants' own specification refutes counsel's argument that **the precise reason** for the invention is that solder balls held in apertures have a tendency to drop out of the aperture. The claimed invention includes securing the solder balls without using an adhesive layer.

Accordingly, we reject the appellants' argument that the solder balls of Trabucco '737 are not removably secured to plate 18. The appellants have not persuaded us why the solder balls of Trabucco '737 are not sufficiently held or confined in place so as to be removably secured relative to the masking plate 18 prior

Appeal No. 2000-0811  
Application 08/964,734

to attachment to another substrate by being melted and fused by exposure to energy beam 32 (see column 3, lines 46-49 of Trabucco '737).

With regard to each of dependent claims 2-6, 12 and 14, the appellants only reiterate the added feature of the respective dependent claim and then concludes that "[n]o such step is taught by Trabucco in the combination as claimed." On page 3 of Paper No. 6, the examiner specifically pointed out where in Trabucco '737 is each of the added features disclosed. The appellant does not point out and explain why the examiner's specific findings on page 3 of Paper No. 6, which refer by page and line number to Trabucco, '737 are wrong. It appears that the appellants' argument is only that because Trabucco '737 does not disclose use of a "decal" as is argued in connection with independent claim 1, everything that has to do with a "decal" in the added feature is necessarily not described or disclosed. If the appellants are arguing something else, then the argument has not been adequately presented or explained and thus we have not been shown any error by the examiner in connection with what the examiner has determined.

For the foregoing reasons, we sustain the rejection of claims 1-6, 12, and 14-16 as being anticipated by Trabucco '737.

B. The Obviousness Rejection

With respect to claims 7, 9 and 10, the appellants argue that relative to the features of independent claim 1, Hayes does not cure the deficiencies of Trabucco '737. However, as is discussed in connection with the rejection of independent claim 1, there is no deficiency in Trabucco '737. The appellants further argue by merely concluding that the prior art does not teach or suggest the feature added (1) by claim 7 about affixing an adhesive film to the second substrate, (2) by claim 9, about placing a plurality of solder members on a plurality of portions of an adhesive film, and (3) by claim 10, about applying light source to the adhesive film to cause the adhesive film to lose at least a portion of its adhesive properties.

The examiner specifically relied on Hayes for the additional features of claims 7 and 9. With respect to claims 7 and 9, the examiner determined that Hayes discloses affixing an adhesive film to a second substrate and using it to secure a pattern of solder balls. Our review of Hayes at a glance reveals adhesive layer 26. In column 5, lines 48-51, Hayes states: (If desired, an adhesive layer 26 may be placed on the lower surface 28 and/or the upper surface 30 of the array membrane 22 as shown in FIG. 3.)" Also, in column 6, lines 34-37, Hayes indicates that the

Appeal No. 2000-0811  
Application 08/964,734

adhesive layer is to attach and ensure that the solder or metal balls 86 will not fall out of apertures 24 during later handling of the array 20. Evidently, the examiner's position has some plausible basis in the record and cannot be dismissed out of hand. The appellants, however, fail to explain why Hayes' adhesive layer 26 is inapplicable or how its combination with the teachings of Trabucco '737 is erroneous or improper.

Accordingly, we will sustain the rejection of claims 7 and 9.

Claim 10 depends from claim 7. With respect to claim 10, however, the examiner has not pointed to any disclosure either in Trabucco '737 or Hayes which meets the added feature of "applying a light source to the adhesive film to cause said adhesive film to lose at least a portion of its adhesive properties." Instead, in pages 4-5 of paper No. 6, the examiner states:

Light sensitive adhesive film is used in many semiconductor applications in which a temporary securement is desired, and would have been an obvious embodiment to Trabucco.

The examiner does not cite to any prior art reference to support the above-quoted determination. Furthermore, the appellants evidently dispute the examiner's finding. In this circumstance, it is incumbent upon the examiner to locate appropriate prior art to support its unsubstantiated conclusion. That, however, the

Appeal No. 2000-0811  
Application 08/964,734

examiner has not done. Accordingly, the rejection cannot be sustained.

Claim 13 depends from claim 1 and adds the feature that the plurality of solder members comprises a plurality of solder columns. We take this feature to mean that the solder members are arranged in the shape of columns and not that each solder member is itself an extended column that continues for a distance. For this feature, the examiner relied on Trabucco '848. We can see that recesses 430 for holding solder members in a mold are arranged in the configuration of columns in Figure 4b of Trabucco '848. See column 7, lines 12-18. The examiner in his answer specifically refers to such recesses. Thus, the examiner's position has a plausible basis. The appellants, however, do not explain why the examiner's view with regard to Trabucco '848 or how Trabucco '848 is combined with Trabucco '737 is erroneous or improper. We are unpersuaded by the appellants' mere conclusion that the prior art does not suggest the subject matter of claim 13. Accordingly, we will sustain the rejection of claim 13.

Appeal No. 2000-0811  
Application 08/964,734

**Conclusion**

The rejection of claims 1-6, 12, and 14-16 under 35 U.S.C. § 102(e) as being anticipated by Trabucco '737 is **affirmed**.

The rejection of claims 7, and 9 under 35 U.S.C. § 103 as being unpatentable over Trabucco '737 and Hayes is **affirmed**.

The rejection of claim 10 under 35 U.S.C. § 103 as being unpatentable over Trabucco '737 and Hayes is **reversed**.

The rejection of claim 13 under 35 U.S.C. § 103 as being unpatentable over Trabucco '737 and Trabucco '848 is **affirmed**.

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

**AFFIRMED-IN-PART**

JAMESON LEE	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
SALLY GARDNER-LANE	)	APPEALS AND
Administrative Patent Judge	)	INTERFERENCES
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SALLY C. MEDLEY	)	
Administrative Patent Judge	)	

Appeal No. 2000-0811  
Application 08/964,734

Appeal No. 2000-0811  
Application 08/964,734

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