

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 BERND K. APPELT, JEFFREY D. GELMORE,
SUNG KWON KANG, VOYA R. MARKOVICH,
KOSTAS PAPATHOMAS, and
SAMPATH PURUSHOTHAMAN

Appeal 2006-2265
Application 10/375,333
Technology Center 1700

Decided: September 6, 2006

Before PAK, WALTZ, and TIMM, *Administrative Patent Judges*.

WALTZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal from the primary Examiner's final rejection of claim 12. The remaining claims pending in this Application are claims 1 through 11, which stand withdrawn from consideration as drawn to

a non-elected invention (Final Office Action dated Aug. 19, 2005, page 2).

We have jurisdiction pursuant to 35 U.S.C. § 134.

According to Appellants, the invention is directed to a conductive material used for filling through holes or vias to Z-connect two or more layers of circuitry or conductor runs, where the conductive material includes a core-shell material with a core of organic material and a shell of metal, all dispersed in a liquid media of an organic resin (Br. 2-3). Claim 12 is the only claim on appeal and a copy of this claim may be found in the “Claim Appendix” attached to Appellants’ Brief.

The Examiner has relied upon the following references as evidence of obviousness:

Cranston	US 4,902,857	Feb. 20, 1990
McArdle	US 5,769,996	Jun. 23, 1998
Kang	US 5,837,119	Nov. 17, 1998
Watanabe	US 6,328,844	Dec. 11, 2001

Claim 12 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Cranston or Kang in view of McArdle or Watanabe (Answer 3 and 4).¹

¹ In the interests of judicial economy, we have combined the two rejections stated by the Examiner on pages 3 and 4 of the Answer into one rejection since these rejections involve the same claim, the same secondary references applied for the same reasons, and the alternate primary references are relied upon for the same basic structure (see the Answer 3-4). We also note that Appellants present the same arguments for each stated rejection (Br. paragraph bridging pages 5-6) and the Examiner states that the issues in each

We AFFIRM these rejections essentially for the reasons stated in the Answer, as well as those reasons set forth below.

OPINION

The Examiner finds that Cranston discloses an electrically conductive paste comprising a polymeric matrix material enclosing particles of nickel or glass spheres that have an electrically conductive solder alloy coating (Answer 3). The Examiner further finds that the solder coating of Cranston is fused since it is made from very low melting point temperature solders, and the polymeric material of Cranston constitutes a three-dimensional lattice network of a “third phase,” the particles define a “second phase,” and the fused solder defines a three-dimensional lattice of a “first phase” (*id.*).

The Examiner presents similar findings regarding Kang, except that the core particles of Kang are exemplified as copper (Answer 4-5). The Examiner finds that both Cranston and Kang differ from claim 12 on appeal in not requiring that the second phase comprise an organic composition having a higher melting point than the metal first phase (Answer 3 and 5). Appellants agree with these findings (Br. 3, penultimate line).

rejection “are essentially the same” (Answer 8, penultimate line). Accordingly, we will consider all the references in one ground of rejection.

The Examiner applies McArdle for the disclosure that, in the field of providing conductive particles in a matrix to form conductive pathways, it was well known that electrically conductive particles constituted polymeric cores (e.g., polystyrene) or glass cores, each coated with a conductive metal, including low melting point solders (Answer 3-4). The Examiner also finds that Watanabe teaches that polystyrene cores coated with solder were well known in the art as conductive particles suitable for making electrical interconnections for circuit interconnect structures (Answer 4). From these findings, the Examiner concludes that it would have been obvious to one of ordinary skill in this art at the time of Appellants' invention to have used polystyrene cores for the glass or copper cores in the particles of Cranston or Kang, as taught by McArdle or Watanabe, with a reasonable expectation of successfully forming conductive articles (Answer 4). The Examiner further finds that Cranston and Kang both teach that the core of the particles should remain unmelted and intact while the solder coating is fused, and thus the Examiner concludes that it would also have been obvious to the artisan that the core melting point must be higher than the metal (solder) melting point (Answer 4 and 5-6). We agree.

Appellants argue that neither McArdle nor Watanabe teach that the second phase "*must* be an organic with a higher melting point than the first

phase metal" (Br. 4). Appellants argue that while it is true that the acceptable metal may have a lower melting point than the second phase organic material, it is not required (*id.*). Appellants argue that the Examiner cannot pick and choose from a given reference, and there is no suggestion in any of the references concerning the relationship of the various melting points (Br. 4-5).

We do not find Appellants' arguments persuasive. The Examiner has presented technical reasoning and evidence to support the position that the core of the particles must have a higher melting point than the first phase metal coating, as required by claim 12 on appeal, since both Cranston and Kang teach that the solder coating melts or fuses and metallurgically bonds while the cores of the particles remain intact and unmelted (Answer 6-7; see Cranston, col. 2, ll. 52-55, and col. 3, ll. 32-40; and Kang, Figure 3). Appellants have not rebutted this evidence and reasoning (see the Br. and Reply Br. in their entirety).

Furthermore, we note that McArdle teaches that various research in the prior art of anisotropically conductive adhesives employed particles in a polymeric matrix that were conductive metal *or* non-conductive particles (plastic or glass) with a thin metal coat (McArdle, col. 1, ll. 25-31). This teaching, especially in addition to the teaching at col. 10, ll. 30-37,

establishes the equivalence of polystyrene and glass cores in metal coated conductive particles in this art. This provides the requisite motivation for making the substitution for the core material of Cranston or Kang. *See In re Fout*, 675 F.2d 297, 301, 213 USPQ 532, 536 (CCPA 1982) (“Express suggestion to substitute one equivalent for another need not be present to render such substitution obvious”). We also note the preference taught by Watanabe for using polystyrene core materials with a conductive metal or solder coating (Watanabe, col. 4, ll. 22-32).²

For the foregoing reasons and those stated in the Answer, we determine that the Examiner has established a prima facie case of obviousness in view of the reference evidence. Based on the totality of the record, including due consideration of Appellants’ arguments, we determine that the preponderance of evidence weighs most heavily in favor of obviousness within the meaning of § 103(a). Therefore we affirm the Examiner’s rejections of claim 12 under § 103(a) over Cranston or Kang in view of McArdle or Watanabe.

² We further note that Kang teaches that the prior art has used electrically conductive particles which were “plastic balls coated with nickel or gold,” i.e., an organic composition coated with a conductive metal (see Kang, col. 2, ll. 62-63).

OTHER ISSUES

In the event of further or continuing prosecution of this Application, the Examiner and Appellants should review the patentability of claim 12 with respect to the written description requirement of the first paragraph of 35 U.S.C. § 112. We note that the original disclosure of a three phase conductive article is limited to the disclosure in the Specification at page 18, l. 10 to page 19, l. 1. We further note that claim 12 as now written is not an original claim. While the written description in the original specification is limited to an embodiment where the core is an organic material and the shell is a metal such as copper, tin or combinations thereof, claim 12 on appeal is not limited to this embodiment but includes the metals of another embodiment (Specification, page 18, ll. 14-17).

SUMMARY

The rejections of claim 12 under 35 U.S.C. § 103(a) over Cranston or Kang in view of McArdle or Watanabe are affirmed. Therefore the decision of the Examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).

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AFFIRMED

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