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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte WEIDE LIU, BADRI VEERARAGHAVAN,
CECIL V. FRANCIS, YIWEN CHU, and JING FANG

Appeal 2018-001076
Application 14/441,486
Technology Center 1700

Before GEORGE C. BEST, MONTE T. SQUIRE,
and MICHAEL G. McMANUS, *Administrative Patent Judges*.

McMANUS, *Administrative Patent Judge*.

DECISION ON APPEAL

The Examiner finally rejected claims 16–24 of Application 14/441,486 under 35 U.S.C. § 103. Final Act. (Sept. 14, 2016) 4–15. Appellants¹ seek reversal of these rejections pursuant to 35 U.S.C. § 134(a). We have jurisdiction under 35 U.S.C. § 6.

For the reasons set forth below, we AFFIRM.

¹ 3M Company and 3M Innovative Properties Company are identified as the real parties in interest. Appeal Br. 3.

BACKGROUND

The disclosure of the present application provides a “conductive resilient hollow microsphere comprising a conductive layer enclosing a resilient polymeric hollow microsphere.” Spec. 1. Such conductive microspheres may be used in the manufacture of conductive adhesives. *Id.* at 1–2.

Claim 16 is illustrative of the subject matter on appeal and is reproduced below:

16. A conductive resilient hollow microsphere comprising a conductive layer enclosing a resilient polymeric hollow microsphere.
Appeal Br. 9 (Claims App.).

REJECTIONS

The Examiner maintains the following rejections:

1. Claims 16 and 18 are rejected under 35 U.S.C. § 103(a) (pre-AIA) as obvious over Darvell et al.² in view of Rowitsch.³ Final Act. 3-4.
2. Claim 17 is rejected under 35 U.S.C. § 103(a) (pre-AIA) as obvious over Darvell in view of Rowitsch as informed by Garner.⁴ *Id.* at 4.

² US 4,855,170, issued Aug. 8, 1989 (“Darvell”).

³ US 2007/224395 A1, published Sep. 27, 2007 (“Rowitsch”).

⁴ US 4,075,138, issued Feb. 21, 1978 (“Garner”).

3. Claims 19–24 are rejected under 35 U.S.C. § 103(a) (pre-AIA) as obvious over Darvell in view of Rowitsch and further in view of Ellis et al.⁵ *Id.* at 4–11.

DISCUSSION

Rejection 1. The Examiner rejected claims 16 and 18 as obvious over Darvell in view of Rowitsch. *Id.* at 3–4. The Examiner found that Darvell teaches a resilient polymeric hollow microsphere but does not teach a conductive layer enclosing a resilient polymeric hollow microsphere. *Id.* at 3. The Examiner further finds that Rowitsch teaches a conductive hollow microsphere comprising a conductive layer enclosing a polymeric hollow microsphere. *Id.* The Examiner does not find that Rowitsch teaches resilience. *Id.* The Examiner further finds that it would have been obvious to enclose the resilient polymeric hollow microsphere of Darvell within the conductive layer of Rowitsch in order to provide an adhesive having improved storage stability/shelf life, drying rate, and tack. *Id.*

Appellants seeks to rebut the Examiner’s prima facie case of obviousness by demonstrating unexpected results. Specifically, Appellants argue that the microspheres exhibit an unexpectedly improved compressibility and resilience. Appeal Br. 5–6.

Appellants may show that a claimed invention has an unexpected property relative to the prior art “with evidence that the claimed invention exhibits some superior property or advantage that a person of ordinary skill in the relevant art would find surprising or unexpected.” *In re Mayne*, 104

⁵ US 2005/0095370 A1, published May 5, 2005 (“Ellis”).

F.3d 1339, 1343 (Fed. Cir. 1997). An examination for unexpected results is a factual, evidentiary inquiry. *Id.*

“It is the established rule that ‘objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support.’” *Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 965 (Fed. Cir. 2014) (quoting *In re Tiffin*, 448 F.2d 791, 792 (CCPA 1971)). This is as true for evidence of unexpected results as it is for any other type of objective evidence of non-obviousness. *See In re Peterson*, 315 F.3d 1325, 1330 (Fed. Cir. 2003) (“the applicant's showing of unexpected results must be commensurate in scope with the claimed range”); *In re Clemens*, 622 F.2d 1029, 1035 (CCPA 1980) (“In order to establish unexpected results for a claimed invention, objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support.”).

Appellants assert that the improved compressibility and resilience are the “unexpected” result of their discovery that “using vapor deposition \geq about 2Pa, under conditions such that the metal vapor condenses onto the substrate with low energy, it is possible to coat metal (e.g., silver), onto resilient polymeric hollow microspheres without collapsing the microspheres.” Spec. 6.

Appellants argue that the conductive resilient hollow microspheres of Examples 1 to 4 of the Specification show improved compressibility relative to nickel particles (Comparative Example A) and silver-coated glass bubbles (Comparative Example B). Appeal Br. 5; *see* Spec. 18–19. Appellants further argue that the conductive resilient hollow microspheres of Examples 6 to 8 of the Specification show both improved compressibility and resilience (“recovery”). Appeal Br. 5.

A silver coating was applied to the microspheres of Examples 1–4 at a pressure of 1 mPa. Spec. 17. Table 1 in the Specification indicates that the microspheres of Examples 1–4 are compressible but do not exhibit “recovery.”⁶ That is, the microspheres of Examples 1–4 are not resilient. Accordingly, they do not fall within the scope of claim 16 or its dependents. Further, the reported results of testing the microspheres of Examples 1–4 suggests one may achieve compressibility *without* using the high pressure metal application described in the Specification. As a consequence, Appellants have not shown that obtaining a conductive compressible hollow microsphere is an unexpected result of their high pressure metal deposition process.

The primary thrust of Appellants’ argument is that the claimed invention is nonobvious because the compressibility of the microspheres is unexpected. Appeal Br. 4–6. One may, however, also view Appellants’ brief as arguing that the resilience of the microspheres is also an unexpected benefit.

A silver coating was applied to the microspheres of Examples 6–8 at higher pressures (Ex. 6, 3.3 Pa; Ex. 7, 6.7 Pa, Ex. 8, 10 Pa). Spec. 20, Table 2. Each of the coated hollow spheres of Examples 6–8 are stated to exhibit both compressibility and resilience (recovery). *Id.*

We credit the inventors’ statement in the Specification that the condensation of metal on hollow microspheres at higher than normal

⁶ The Specification includes a description of a “Resiliency Test” indicating that a sample of microspheres having an initial volume of 0.9 mL would be considered resilient if it recovered to a volume of at least 0.8 mL after compression under a pressure of 20 MPa. Spec. 16.

pressures yields the unexpected benefit of not collapsing the microspheres. Spec. 6; *see In re Marzocchi*, 439 F.2d 220, 224 (CCPA 1971).

Despite this, it is not apparent that the unexpected benefit (recovery) is commensurate in scope with the claims. While claim 16 merely states that the microsphere is “resilient,” such term must be construed in light of the Specification. As noted above, the Specification indicates that a 0.9 mL sample of microspheres is resilient where it recovers to a volume of at least 0.8 mL after compression (that is, it recovers 8/9 of its original volume). Spec. 16. We adopt this guidance for purposes of claim construction.

Appellants have not supplied information indicating that the tested microspheres exhibit the entire claimed range of resilience (greater than 8/9 recovery). It may be, for example, that none of Appellants’ samples exhibit recovery beyond 0.81 mL after compression. In such a case, Appellants’ would be seeking claim coverage for recovery to, for example, .89 mL, despite the absence of commensurate results.

In view of the foregoing, we determine that Appellants have not demonstrated unexpected results commensurate in scope with the claims sufficient to rebut the prima facie case of unpatentability.

CONCLUSION

The rejection of claims 16–24 is affirmed.

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

AFFIRMED