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EXAMINER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte THOMAS HARTMANN
and DIETER NUETZEL

Appeal 2015-004234
Application 13/082,772
Technology Center 1700

Before ADRIENE LEPIANE HANLON, TERRY J. OWENS, and
BRIAN D. RANGE *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

The Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1–12 and 21. We have jurisdiction under 35 U.S.C. § 6(b).

The Invention

The Appellants claim a brazing process. Claim 1 is illustrative:

1. A process for brazing two or more parts comprising:
inserting of a braze with a composition consisting of $\text{Ni}_{\text{res}}\text{Cr}_a\text{B}_b\text{P}_c\text{Si}_d$ with 20 atomic percent $< a < 22$ atomic percent; 1.2 atomic percent $\leq b \leq 3.6$ atomic percent; 12.5 atomic percent $\leq c \leq 14.5$ atomic percent; 0 atomic percent $\leq d \leq 1.5$ atomic percent; incidental impurities ≤ 0.5 atomic percent; and residual Ni, between two or more parts to be joined to

form a joint, wherein the parts to be joined having a higher melting temperature than the braze;
heating the joint to a temperature of between 1020°C and 1070°C;
cooling the joint to form a brazed connection between the parts wherein the brazed connection has a solder seam wherein the loss of solder seam mass after ageing for 1000 hours at 70°C in a corrosion medium with a pH value < 2 and SO₄²⁻NO₃⁻Cl⁻ ions is less than 0.08%.

The Reference

Hartmann (as translated) DE 10 2007 049 508 A1 Apr. 23, 2009

The Rejection

Claims 1–12 and 21 stand rejected under 35 U.S.C. § 103 over Hartmann.

OPINION

We affirm the rejection.

The Appellants argue the claims in two groups: 1) claims 1, 2, 4–12, and 21, and 2) claim 3 (App. Br. 3–9). We therefore limit our discussion to claim 3 and one claim in the other group, i.e., claim 1. Claims 2, 4–12, and 21 stand or fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv) (2012).

Claim 1

Hartmann brazes parts using, as a brazing composition, Ni_{Rest}Cr_aB_bP_cSi_d where, in atomic percent, $2 \leq a \leq 30$, $0.5 \leq b \leq 14$, $2 \leq c \leq 20$, $0 \leq d \leq 14$ and incidental impurities are ≤ 0.5 , residual Ni (¶¶ 2, 57). The brazing composition can be in the form of a foil having a liquidus temperature of less than 1080 °C (¶ 22).

The Appellants assert that the Examiner has not established that “one of ordinary skill would have been motivated to troll through the large

number of combinations of amounts and elements disclosed by Hartmann et al. in search of an improved corrosion resistance that Hartmann et al. does not disclose exists” (Reply Br. 4).

Hartmann’s composition component ranges encompass those of the composition recited in the Appellants’ claim 1. As stated in *In re Peterson*, 315 F.3d 1325, 1329–30 (Fed. Cir. 2003):

In cases involving overlapping ranges, we and our predecessor court have consistently held that even a slight overlap in range establishes a *prima facie* case of obviousness

. . . .

Selecting a narrow range from *within* a somewhat broader range disclosed in a prior art reference is no less obvious than identifying a range that simply *overlaps* a disclosed range. In fact, when as here, the claimed ranges are completely encompassed by the prior art, the conclusion is even more compelling than in cases of mere overlap.

As for the corrosion resistances of the Appellants’ claim 1 compositions, those corrosion resistances are a characteristic of Hartmann’s compositions which fall within that claim. See *In re Papesch*, 315 F.2d 381, 391 (CCPA 1963) (“From the standpoint of patent law, a compound and all of its properties are inseparable; they are one and the same thing”).

The Appellants assert that Thomas Hartmann’s Declaration (submitted Feb. 12, 2014) “presents results which establish that, by operating within the ranges recited in the claims, an unexpectedly superior increase in corrosion resistance is obtained as compared to alloys having only slightly different amounts of Si. This is true despite the presence of the same amount of chromium in the alloy” (App. Br. 5).

The Declaration compares $\text{Ni}_{61.8}\text{Cr}_{21.5}\text{P}_{13.5}\text{Si}_1\text{B}_{2.4}$, which is within claim 1, to $\text{Ni}_{58.6}\text{Cr}_{21.5}\text{P}_{13.5}\text{Si}_4\text{B}_{2.4}$, which is outside claim 1, and shows that after 1000 hours of exposure to exhaust gas condensate the mass loss of brazing foils having those compositions are, respectively, about 0.06–0.07 % and about 0.13 % (Decl. ¶¶ 13, 15).¹ The Declaration states that the mass loss difference is surprising “at least in part, because the chromium content for these alloys is the same, and because the silicon content difference is so small” (Decl. ¶ 16), and because, after 300 hours, the mass loss difference “increases with increasing exposure time” (Decl. ¶ 17).

We have begun anew and determined that due to the following deficiencies in the evidence relied upon by the Appellants, the totality of the evidence and argument supports a conclusion of obviousness of the claimed process. *See In re Rinehart*, 531 F.2d 1048, 1052 (CCPA 1976).

First, it is not enough for the Appellants to show that the results for the Appellants’ invention and the comparative examples differ. The difference must be shown to be an unexpected difference. *See In re Freeman*, 474 F.2d 1318, 1324 (CCPA 1973); *In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972). The Declaration does not establish that one of ordinary skill in the art would not have expected the Appellants’ composition’s higher Ni content to increase its corrosion resistance. The Appellants’ Specification states that Si, the content of which is higher in the comparative composition, reduces a Ni-Cr brazing alloy’s melting and processing temperatures, not that it improves the alloy’s corrosion resistance (Spec. pp. 1–2).

¹ “The lower the mass loss, the more corrosion resistant is the brazed joint” (Decl. ¶ 13).

Second, the evidence is not commensurate in scope with the claims. *See In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983); *In re Clemens*, 622 F.2d 1029, 1035 (CCPA 1980). The Appellants' claim 1 encompasses a Cr content range of greater than 20 to less than 22 atomic %, but the only composition in the Declaration within claim 1 has 21.5 atomic % Cr which is near the upper limit of that range. The Appellants indicate that increasing the Cr content of a Ni-based brazing alloy improves its corrosion resistance (Spec. p. 1). The Declaration does not establish that the corrosion resistance of a Ni-based alloy containing 21.5 atomic % Cr is representative of the corrosion resistance of such an alloy containing only slightly more than 20 atomic % Cr.

Claim 3

Claim 3 depends from claim 1 and requires that “the braze is inserted in the form of a paste.”

The Appellants assert that “[n]owhere does Hartmann et al. teach or suggest inserting the brazing alloys disclosed therein in the form of a paste, and the Office has provided no reason for one of ordinary skill in the art to deviate from the express teachings of Hartmann et al. to use a brazing foil” (App. Br. 9).

The Appellants acknowledge the availability of Ni-Cr brazing alloys in the form of a pastes and foils (Spec. p. 2). Hartmann discloses that Ni-Cr brazing alloys are available in the form of a powder which can be mixed with organic binders and solvents (to form a paste) but, relative to ductile foil brazes, have the disadvantage that decomposition of the binding agents and solvents can lead to inadequate flow and wetting behavior and consequently to a bad connection (§ 6). The record does not indicate that

Appeal 2015-004234
Application 13/082,772

this disadvantage would have caused one of ordinary skill in the art to consider brazes in the form of a paste to be unsuitable for use. Hence, we conclude that use of Hartmann's brazing alloy in paste form would have been prima facie obvious to one of ordinary skill in the art.

For the above reasons we are not persuaded of reversible error in the rejection.

DECISION/ORDER

The rejection of claims 1–12 and 21 under 35 U.S.C. § 103 over Hartmann is affirmed.

It is ordered that the Examiner's decision 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