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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HARRI LASAROV and PEKKA KILPI

Appeal 2011-010593
Application 11/523,140
Technology Center 1700

Before PETER F. KRATZ, CATHERINE Q. TIMM, and KAREN M. HASTINGS, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 from the Examiner's decision to reject claims 1, 3-5, 7-10, 23, and 24 under 35 U.S.C. § 103(a) as obvious over Naritomi[1] in view of Suefuji[2]. We have jurisdiction under 35 U.S.C. § 6(b).

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[1] Naritomi et al., US 2006/0257624 A1, pub. Nov. 16, 2006.
[2] Suefuji et al., US 4,802,831, patented Feb. 7, 1989.

We AFFIRM.

The claims are directed to a method of forming plastic-acceptor hybrid components (Spec. 1:6-11). The method involves injection compression molding plastic onto an acceptor component, such as a metal component (Spec.3:13-21). The acceptor component has a roughened surface containing micro-holes that fill with the plastic so the plastic becomes anchored to the component (Spec. 3:23-25; 8:28-29; and 10:22-25). Claim 1 is illustrative:

> 1. A method comprising:
>
> (a) providing an acceptor component having a roughened surface area comprising micro-holes having a depth of 0.1 to 250 μm and width of 0.1 to 250 μm;
>
> (b) inserting said acceptor component into a mould cavity of an injection compression moulding tool;
>
> (c) injecting plastic into said mould cavity to form a plastic-acceptor hybrid component; subsequently applying pressure to said mould cavity; and
>
> (d) removing the plastic-acceptor hybrid component from the injection compression moulding tool.

(Claims App'x. at Br. 15.)

Appellants present separate arguments for claims 1, 3, 5, 9, and 23. Therefore, we decide the issues arising for those claims. The other claims stand or fall together with the argued claim from which they depend. 37 C.F.R. § 41.37(c)(1)(vii)(2007).

OPINION

Claim 1

Naritomi teaches injection molding a thermoplastic resin composition onto a roughened aluminum alloy component inserted into the mold (*see, e.g.*, Naritomi, ¶¶ [0001], [0029], [0050], and [0055]). There is no dispute that Naritomi teaches roughening to the extent required by claim 1 (Br. 8-11). Naritomi provides evidence that it was known in the art to perform the injection molding process so that the thermoplastic resin composition is fixed to the surface of the shaped aluminum alloy by entering the recesses or engaging the projections created by roughening, this is accomplished by heating the aluminum alloy to a temperature close to the melting temperature of the thermoplastic (Naritomi, ¶¶ [0025] and [0055]).

The Examiner acknowledges that Naritomi does not teach applying pressure to the mold cavity after injecting the plastic (Ans. 3). However, the Examiner finds that Suefuji provides a reason to use an injection compression process to form the component of Naritomi "because both [references] relate to plastic and metallic hybrid components in which a prescribed surface roughness of the metallic component is used presenting a reasonable expectation of success and Suefuji teaches that the process produces a part with a uniform thickness." (Ans. 4.)

While Suefuji teaches injection compression molding a resin onto the roughened surface of a metallic base member placed in a mold cavity, Suefuji's resin is thermosetting, not thermoplastic (Suefuji, col. 2, l. 36 to col. 3, l. 3). Appellants contend that because Suefuji does not apply a thermoplastic resin as taught by Naritomi, an ordinarily skilled artisan would

not have looked to the teachings of Suefuji, and one of ordinary skill in the art would not have combined the teachings of Suefuji and Naritomi with a reasonable expectation of success (Br. 8-11).

We agree with the Examiner that the manner of solidifying the resin in the process of insert injection molding would not have dissuaded one of ordinary skill in the art from either looking to Suefuji for its teaching of more precisely forming the metal-plastic composite component by compressing the injection molded material after the injection molding step, or from including the compression step in the process of Naritomi. No matter whether the resin solidifies by cooling or by curing, one of ordinary skill in the art would have recognized that further compressing the solidifying resin would lead to a more uniform thickness product as taught by Suefuji.

It is clear from both references that it was known in the art of insert injection molding to roughen the insert to increase its ability to bond to the injected resin (Naritomi, ¶¶ [0022] and [0025]; Suefuji, col. 10, ll. 33-34), and it was also known in the art that applying pressure after injection molding forms the resin to more precise dimensions (Suefuji, col. 14, ll. 59-62). Using these two known process steps together for the predictable result of forming the thermoplastic-metal composite component of Naritomi with more precise dimensions would have been obvious to one of ordinary skill in the art.

A preponderance of the evidence supports the Examiner's conclusion of obviousness.

Claim 3

Claim 3 requires that the pressure applied in the compression step force the injected plastic into the micro-holes of the roughened surface of the acceptor component. Appellants contend that Naritomi teaches a method of filling the micro-holes without applying pressure after injection, and, therefore, the additional force applied by Suefuji would not necessarily, or inherently, force the plastic into the micro-holes (Br. 11). However, both Naritomi and Suefuji desire to force the injected resin into the roughened surface, and it is reasonable to conclude that the extra force applied in the compression step would force the thermoplastic into the micro-holes even further. Additionally, as the Examiner points out, the process suggested by the references is substantially the same as Appellants' process (Ans. 4-5 and 7). Appellants have not provided any convincing reason why applying force as taught by Suefuji to the process of Naritomi would not result in the same result Appellants achieve .

Claim 5

Claim 5 depends from claim 4, which depends from claim 1. Claims 4 and 5 recite:

> 4. The method according to claim 1, wherein said acceptor component is selected from the group consisting of a metal, carbon fibre composites, ceramics and glass.
>
> 5. The method according to claim 4, wherein said metal component is selected from the group consisting of aluminium, beryllium, titan [sic, titanium], copper and iron.

(Claims App's. at Br. 15.)

Appellants contend that Naritomi teaches using an aluminum alloy insert, but claim 5 is limited to a pure metal and does not encompass alloys of metal (Br. 12). To support their argument, Appellants contend that the Specification distinguishes the use of an alloy from a pure metal in stating:

> The term "metal" refers to, but is not limited to the pure metal, such as aluminium, beryllium, titan [sic, titanium], copper or iron, but may be directed to any kind of alloys, such as different kind of steels, cast iron or brass.

(Spec. 5:26-28.)

Claim 4 allows the acceptor component to be a metal. According to the Specification, a "metal" may be an alloy. Therefore, Naritomi's aluminum alloy meets the requirements of claim 4.

Claim 5 does not limit the Markush group of claim 4. Instead it refers to a "metal component." But "metal component" as recited in claim 5 has no antecedent basis in claim 4 or claim 1. Claim 5 does not further limit the acceptor component of claim 4 in the manner assumed by Appellants. After reviewing the scope of claim 5, we cannot say that claim 5 is clear enough to exclude the aluminum alloy of Naritomi.

We add that even if claim 5 properly excluded alloys, there can be no real argument that pure metal inserts, such as aluminum inserts, would not have been an obvious substitute for the aluminum alloy insert of Naritomi. One would have selected a metal or metal alloy that provided the desired properties for the end use. Naritomi suggests as much when stating that the the object of Naritomi's invention was "to integrate a high-strength engineering resin with metals, such as magnesium, *aluminum*, alloys of these metals, stainless steel and other iron alloys, so firmly that the resulting

integrated article would permanently maintain the strength at a practical level" (Naritomi, ¶ [0003] (emphasis added).).

Claim 9

Claim 9 depends from claim 1 and further requires that the applied pressure be in the range of 300 to 3000 bars. The Examiner finds that the pressure is a matter of routine optimization (Ans. 5). Appellants disagree (Br. 12-13).

The teaching of the general condition of applying pressure to compress resin in Suefuji suggests to one of ordinary skill that routine experimentation would be required to find the workable or optimal levels of the pressure variable when applying the pressure teaching of Suefuji to the process of Naritomi. The facts support as obviousness conclusion. *In re Aller*, 220 F.2d 454, 456 (CCPA 1955).

Claim 23

Claim 23 depends from claim 1 and further requires a step of "heating the acceptor component to a temperature close to that of the injected plastic before injecting the plastic into the mould cavity."

Appellants contend that the paragraph within Naritomi cited by the Examiner, i.e., paragraph 92, makes no mention of the temperature of the injected thermoplastic resin (Br. 13). Appellants then refer to a paragraph in their Specification stating that the temperature gradient between the *plastic mold* and the *metal component* are minimized and substantially the same and giving some example temperature differences (Br. 13, discussion Spec. 8:1-6). As pointed out by the Examiner, the discussion of the mold and metal component temperatures in Appellants' Specification has little relevancy:

the claim is directed to the temperature difference between the *acceptor component* and the plastic, not the difference between the temperature of the *mold* and plastic. It is not clear what range of temperatures is encompassed by the word "close" in the claim. In any case, Naritomi specifically teaches heating the metal component to a temperature close to the melting temperature of the plastic resin (Naritomi, ¶ [0055]).

CONCLUSION

We sustain the Examiner's rejection.

DECISION

The Examiner's decision is affirmed.

TIME PERIOD FOR RESPONSE

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

AFFIRMED

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