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HUGH P. GORTLER 23 Arrivo Drive Mission Viejo, CA 92692			SHAKERI, HADI	
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patents.gortler@att.net
patentadmin@boeing.com

1 We sustain the rejection of claims 1, 4-6 and 45. We do not sustain
2 the rejection of claim 31. We dismiss the appeal as to claims 7-9 and 24-29.
3 Claims 2, 3, 10-23, 30 and 32-44 are cancelled. The Examiner rejects under
4 35 U.S.C. § 103(a):

5 claims 1, 4-6, 8, 31 and 45 as being unpatentable over
6 Tokiwa (US 6,247,999 B1, issued Jun. 19, 2001); either Visser
7 (US 6,634,929 B1, issued Oct. 21, 2003) or Ettinger (US
8 6,422,921 B1, issued Jul. 23, 2002); and Salamon (US
9 5,380,387, issued Jan. 10, 1995);

10 claims 7 and 24-28 as being unpatentable over Tokiwa;
11 either Visser or Ettinger; Salamon; and Ohmi (US 5,931,722;
12 issued Aug. 3, 1999); and

13 claims 9 and 29 as being unpatentable over Tokiwa;
14 either Visser or Ettinger; Salamon; and Volat (US 5,138,798,
15 issued Aug. 18, 1992).

16 The Notice of Appeal filed March 11, 2009 states that the Appellants
17 “hereby [appeal] to the Board of Patent Appeals and Interferences [now the
18 Patent Trial and Appeal Board] from the last decision of the examiner.”
19 Page 1 of the Appeal Brief filed May 11, 2009 states that the “rejections of
20 claims 1, 4-6, 8, 31 and 45 are being appealed.” (*See also* Br. 6). The
21 Appeal Brief explicitly states which claims are addressed by each argument
22 (*see, e.g.*, Br. 6, 9 and 11) and does not include any argument addressed to
23 the rejections of claims 7-9 and 24-29. The Appellants have declined to file
24 a Reply Brief. Since the Appellants’ submissions unequivocally indicate
25 that they do not intend to pursue an appeal from the rejections of claims 7-9
26 and 24-29, we DISMISS the appeal as to those claims. *See Ex parte*

1 *Ghuman*, 88 USPQ2d 1478, 1480 (BPAI 2008)(precedential). We note that
2 § 1215.03 of the MANUAL OF PATENT EXAMINING PROCEDURE states that a
3 “withdrawal of the appeal as to some of the claims on appeal operates as an
4 authorization to cancel those claims from the application.”

5 Of the claims at issue in this appeal, claims 1, 31 and 45 are
6 independent. Claim 45 recites:

7 45. Apparatus for lapping a compound
8 surface, the apparatus comprising:

9 a robot arm;

10 an end effector having a longitudinal axis,
11 the end effector including a lapping plate, a
12 flexible layer of pitch on the lapping plate, and a
13 lapping pad on the layer of pitch; and

14 a joint for coupling the end effector to the
15 robot arm, the joint allowing the end effector to
16 move about multiple axes, but preventing axial
17 rotation about the longitudinal axis of the end
18 effector.²

19 wherein the robot arm presses the end
20 effector against the surface and moves the end
21 effector along the surface during material removal
22 without rotating the end effector.

23

24 ISSUES

25 The Appellants argue the rejections of the independent claims
26 separately. Each dependent claim is grouped with the independent claim
27 from which that dependent claim ultimately depends. (*See generally* Br. 7-

² Claim 45 as drafted by the Appellants appears to have two terminal periods.

1 11). Only issues and findings of fact contested by the Appellants have been
2 considered. *See Ex parte Frye*, 94 USPQ2d 1072, 1075-76 (BPAI 2010).

3 Three issues are dispositive of this appeal:

4 *First*, does Tokiwa describe an apparatus including a
5 robot arm, an end effector and a joint for coupling the end
6 effector to the robot arm, “the joint allowing the end effector to
7 move about multiple axes, but preventing axial rotation about
8 the longitudinal axis of the end effector?” (*See Br. 6-7; see also*
9 *Br. 9*).

10 *Second*, do the evidence and technical reasoning
11 underlying the rejection of claim 45 adequately support the
12 conclusion that one of ordinary skill in the art would have had
13 reason to modify the end effector of the apparatus described by
14 Tokiwa to include a lapping plate, a flexible layer of pitch on
15 the lapping plate and a lapping pad on the layer of pitch? (*See*
16 *Br. 7; see also Br. 9-10*).

17 *Third*, do the evidence and technical reasoning
18 underlying the rejection of claim 31 adequately support the
19 conclusion that one of ordinary skill in the art would have had
20 reason to perform a method for lapping a curved surface
21 including the step of using a robotic arm to move an end
22 effector to lap a section of the curved surface without rotating
23 the lapping pad? (*See Br. 11*).

FINDINGS OF FACT

The record supports the following findings of fact (“FF”) by a preponderance of the evidence.

1. Tokiwa describes a mold polishing device. The mold polishing device includes a robot arm 22 and an end effector in the form of a polishing tool 35. (Tokiwa, col. 6, ll. 30-33, 41-48 and 51-54; *see id.* figs. 2 and 3).

2. Tokiwa’s polishing tool 35 includes a polishing disk (*i.e.* pad) 39 integrally fixed to the lower end portion of a polishing member holding ring 36. (Tokiwa, col. 7, ll. 63-66). Figures 3 and 10 of Tokiwa depict the polishing pad 39 as being coupled to the ring 36 through a layer 39a. Tokiwa does not identify the layer 39a.

3. Tokiwa’s end effector, that is, polishing tool 35 is coupled to the robot arm 22 through a universal joint *J* included in a ring holder 30. (*See* Tokiwa, figs. 3 and 10).

4. More specifically, Tokiwa’s mold polishing device includes a pneumatic spindle 24 integrated with the robot arm 22. The pneumatic spindle 24 includes a rotary spindle member 25 which mounts the polishing tool 35. (Tokiwa, col. 6, ll. 46-48).

5. Even more specifically, Tokiwa’s ring holder 30 includes a vertical rod 31. The rotary spindle member 25 collet chuck mechanism 26 serves as a fastener for engaging the vertical rod 31. (Tokiwa, col. 7, ll. 30-35).

6. Tokiwa’s ring holder 30 also includes a horizontal rod 32 and horizontal latch pins 33 which couple the polishing tool 35 to the vertical rod 31. In other words, the horizontal rod 32 and the horizontal latch pins 33 engage the polishing tool 35 to constitute the universal joint *J* for coupling

1 the end effector, that is, polishing tool 35, to the robot arm 22 through the
2 vertical rod 31 and the pneumatic spindle 34. (*See* Tokiwa, col. 8, ll. 26-31).

3 7. The universal joint *J* permits the end effector, that is, the
4 polishing tool 35, to pivot along pitch and yaw axes relative to the rotary
5 spindle member 25 and the vertical rod 31. (*Id.*) Figures 3 and 10 of
6 Tokiwa indicate that the universal joint *J* prevents axial rotation of the
7 polishing tool 35 about a longitudinal axis of the polishing tool 35 relative to
8 the rotary spindle member 25 and the vertical rod 31.

9 8. Tokiwa teaches that, during a polishing operation, a built-in air
10 motor rotates the rotary spindle member 25. (Tokiwa, col. 6, ll. 49-51; *see*
11 *also id.*, col. 1, ll. 29-33). Tokiwa's mold polishing device includes an air
12 motor regulator 14 for adjusting the rotational speed of the rotary spindle
13 member 25 and the polishing tool 35. (Tokiwa, col. 6, ll. 54-57). Tokiwa
14 does not suggest any reason why one of ordinary skill in the art might have
15 either conducted a polishing operation without rotating the polishing tool 35
16 relative to the robot arm 22; or adjusted the rotational speed of the rotary
17 spindle member 25 to zero before or during a polishing operation.

18 9. Visser describes a method of grinding glass using a flexible
19 abrasive article. (Visser, col. 4, ll. 55-65). Visser further describes adhering
20 a flexible abrasive article in the form of a pad to a grinding platform by
21 means of a pressure sensitive adhesive such as rosin. (Visser, col. 14, ll. 24-
22 33 and col. 20, ll. 12-26). Rosin is a form of pitch. (*See* Salamon, col. 1, ll.
23 36-39).

24 10. Salamon teaches that it was known to block, that is, adhere,
25 lens blanks to blocking tools for use in grinding and polishing operations by
26 means of pitch. (Salamon, col. 1, ll. 24-31).

ANALYSIS

1

2 *First Issue*

3 With regard to claim 45, Tokiwa describes an apparatus including a
4 robot arm 22, an end effector 35 and a joint *J* for coupling the end effector
5 35 to the robot arm 22. (See FF 1 and 3-6). The joint *J* allows the end
6 effector 35 to move about multiple axes, but prevents axial rotation of the
7 end effector 35 about the longitudinal axis of the end effector 35. (See FF 7;
8 *see also* Ans. 5, ll. 13-15).

9 With regard to claim 1, the term “non-rotatable plate” is sufficiently
10 broad to encompass a plate incapable of rotation relative to the recited base.
11 The Appellants do not formally define the term “non-rotatable plate” in the
12 Specification. The interpretation by which the term “non-rotatable plate” is
13 consistent with the disclosure of page 3, line 22 through page 5, line 9 of the
14 Appellants’ Specification, which describes various embodiments of lapping
15 plates as being non-rotatable but does not specify non-rotatability relative to
16 any other particular part.

17 Tokiwa describes an apparatus including a robotic arm 22 and a
18 pivoting end effector 30, 35. (See FF 1 and 3-7). The pivoting end effector
19 30, 35 includes a base 31 attached to the robotic arm 22 through the
20 pneumatic spindle 24. (See FF 4-6). The pivoting end effector 30, 35 also
21 includes a plate 36 configured to transmit movements for lapping a curved
22 surface. That is, the end effector 30, 35 is coupled to the robot arm 22 (see
23 FF 6 and 7) in a manner capable of transmitting movement from the robot
24 arm 22 to the end effector 35 for lapping a curved surface. The plate is non-
25 rotatable relative to the base 31. (FF 7; *see also* Ans. 4, l. 22 – 5, l. 13).
26 Therefore, Tokiwa describes a robotic system including a robotic arm and a

1 pivoting end effector unit, the pivoting end effector unit including a base
2 attached to the robotic arm and a non-rotatable plate having a planar surface,
3 the non-rotatable plate configured to transmit movements for lapping the
4 curved surface.

5 *Second Issue*

6 With regard to claim 45, Visser teaches that it was known to use a
7 pitch, namely, rosin, to adhere a lapping or polishing pad to a support. (FF
8 9). It would have been obvious in view of this teaching to merely substitute
9 a layer of pitch adhesive for the means, not explicitly identified, used by
10 Tokiwa to integrally fix Tokiwa's polishing disk or pad 39 to the lower end
11 portion of a polishing member holding ring 36. *See KSR Int'l Co. v.*
12 *Teleflex, Inc.*, 550 U.S. 398, 416 (2007)("[W]hen a patent claims a structure
13 already known in the prior art that is altered by the mere substitution of one
14 element for another known in the field, the combination must do more than
15 yield a predictable result."). The Appellants suggest no reason why one of
16 ordinary skill in the art would not have been able to implement this
17 substitution. Neither do the Appellants suggest that the results of this
18 substitution would not have been predictable. Therefore, the Examiner
19 correctly concludes that it would have been obvious "to modify the
20 invention of Tokiwa by using rosin in attaching the pad to the plate as taught
21 by Visser for a secure attachment." (Ans. 3, ll. 19-21).

22 Tokiwa's apparatus, once modified in view of the teachings of Visser,
23 would have satisfied each limitation recited in the body of claim 45.
24 Therefore, the Examiner has a sound basis for belief that Tokiwa's
25 apparatus, once modified in view of the teachings of Visser, would have
26 been capable of performing the functional limitation "for lapping a

1 compound surface” recited in the preamble of claim 45. Since the
2 Appellants have not produced evidence contradicting this sound basis for
3 belief, the Examiner correctly concluded that the subject matter of claim 45
4 as a whole would have been obvious.³ *See In re Best*, 562 F.2d 1252, 1254-
5 55 (CCPA 1977) (quoting *In re Swinehart*, 439 F.2d 210, 212-13 (CCPA
6 1971)).

7 Claim 1 recites a robotic system including “pitch for adhering the
8 lapping pad to the lapping plate, the pitch flowably deformable by pressure
9 and conforms the lapping pad to the work surface.” Tokiwa’s apparatus,
10 once modified in view of the teachings of Visser, would have included a
11 layer of pitch for adhering the polishing disk 39 to the polishing member
12 holding ring 36. The Examiner has a sound basis for belief that this layer of
13 pitch would have the property of flowable deformability by pressure, since
14 neither claim 1 itself nor the Specification (*see, e.g.*, Spec. 3, ll. 12-21)
15 indicates that the property of flowable deformity by pressure is limited to
16 any particular pitch layer composition or arrangement. Since the Appellants
17 have not produced evidence contradicting this sound basis for belief, the
18 Examiner correctly concludes that the subject matter of claim 1 as a whole
19 would have been obvious.⁴ *See Best* at 1255.

³ The prima facie case of obviousness presented by the Examiner is more persuasive than the unsupported arguments on page 8 of the Appeal Brief regarding the advantages of “the apparatus of claim 45” or the asserted synergistic combination of element recited in claim 45. *See In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997).

⁴ The prima facie case of obviousness presented by the Examiner is more persuasive than the unsupported arguments on page 10 of the Appeal Brief regarding the advantages of “the system of claim 1” or the asserted synergistic combination of element recited in claim 1.

1 We sustain the rejection of claims 1, 4-6, 8 and 45 under § 103(a) as
2 being unpatentable over Tokiwa, Visser and Salamon. Since our decision
3 sustaining this ground of rejection constitutes a general affirmance of the
4 decision of the Examiner to reject claims 1, 4-6, 8 and 45, 37 C.F.R.
5 § 41.50(a)(2009), we do not separately address the rejection of claims 1, 4-6,
6 8 and 45 under § 103(a) as being unpatentable over Tokiwa, Ettinger and
7 Salamon.

8

9 *Third Issue*

10 Claim 31 recites a method for lapping a curved surface including the
11 step of “using the robotic arm to move the end effector to lap a section of the
12 curved surface to the curvature of the conformed pitch without rotating the
13 lapping pad.” Tokiwa teaches polishing a mold using a robotic arm 22
14 which simultaneously moves an end effector 30, 35 across the surface of the
15 mold and rotating the end effector 30, 35 relative to the robotic arm 22. (*See*
16 *FF 8*). The movement imparted by the robotic arm 22 includes a rotational
17 component. The Examiner does not appear to articulate a reason why one of
18 ordinary skill in the art might have modified the polishing method described
19 by Tokiwa such that the robotic arm 22 would have moved the end effector
20 to lap a section of the curved surface to the curvature of the conformed pitch
21 without rotating the lapping pad. We do not sustain the rejection of claim 31
22 under § 103(a) as being unpatentable over Tokiwa; either Visser or Ettinger;
23 and Salamon.

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DECISION

We AFFIRM the Examiner's decision rejecting claims 1, 4-6, 8 and 45.

We REVERSE the Examiner's decision rejecting claim 31.

AFFIRMED-IN-PART

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