

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROBERT S. FORREST and
DOUGLAS J. WALDRON

Appeal 2008-3399
Application 10/639,033
Technology Center 1700

Decided: July 18, 2008

Before JEFFREY T. SMITH, LINDA M. GAUDETTE, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 the final rejection of claims 1-4, 6-9, 11-16, 18, 20, 32, and 33.¹ We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

¹ Appellants indicate that the present appeal involves claims 1-20, 32, and 33 which were finally rejected by the Examiner (Br. 1). However, claims 5, 10, 17, and 19 are not rejected as indicated by Appellants. Rather, these claims

We REVERSE.

INTRODUCTION

Appellants claim a method of forming a workpiece to a desired non-planar configuration with a friction stir forming tool defining a shoulder and a pin, comprising, in relevant part, providing a die having a non-planar contour surface corresponding to the desired configuration of the workpiece; urging the shoulder of the forming tool against the workpiece and at least partially penetrating the workpiece with the pin such that the workpiece is bent against the contour surface; and adjusting the tool in a predefined path corresponding to the contour surface of the die at least partially during said urging step such that the shoulder urges the workpiece to the desired configuration (claim 1).

Claims 1 and 11 are illustrative:

1. A method of forming a workpiece to a desired non-planar configuration with a friction stir forming tool defining a shoulder and a pin, the method comprising:

providing a die having a non-planar contour surface corresponding to the desired configuration of the workpiece;

supporting the workpiece at least partially against the die;

urging the shoulder of the forming tool against the workpiece and at least partially penetrating the workpiece with the pin such that the workpiece is bent against the contour surface;

are objected to as being dependent upon a rejected base claim (Final Office Action 7). Accordingly, claims 5, 10, 17, and 19 are not on appeal.

rotating the pin of the tool within the workpiece at least partially during said urging step to plasticize a portion of the workpiece; and

adjusting the tool in a predefined path corresponding to the contour surface of the die at least partially during said urging step, such that the shoulder urges the workpiece to the desired configuration and the tool forms a friction stir formed region having a refined grain structure in the workpiece.

11. A method of forming a workpiece having first and second opposite sides to a desired, non-planar configuration, the method comprising:

providing at least one friction stir forming tool, the at least one tool defining first and second shoulders, the shoulders configured in an opposing configuration and directed generally inward with at least one pin extending at least partially therebetween;

supporting the workpiece between the first and second shoulders, such that the first shoulder is directed toward the first side of the workpiece and the second shoulder is directed toward the second side of the workpiece;

urging the first shoulder against the first side of the workpiece and the second shoulder against the second side of the workpiece;

rotating the at least one pin within the workpiece at least partially during said urging step to plasticize a portion the workpiece; and

adjusting the at least one tool along a predefined path at least partially during said urging step, such that the shoulders urge the workpiece to the desired, non-planar configuration and the at least one pin forms a friction stir formed region having a refined grain structure in the workpiece.

The Examiner relies on the following prior art references as evidence of unpatentability:²

Riggio	6,003,228	Dec. 21, 1999
Holt	6,070,784	Jun. 6, 2000
Iwashita	6,601,751 B2	Aug. 5, 2003

The rejections as presented by the Examiner are as follows:

1. Claims 1-3, 6, 8, 9³, 11, 14-16, 18, 20, 32, and 33 are rejected under 35 U.S.C. § 102(b) as being unpatentable over Holt.
2. Claim 7 is rejected under 35 U.S.C. § 103 over Holt in view of Riggio.
3. Claims 4, 12, and 13 are rejected under 35 U.S.C. § 103 over Holt in view of Iwashita.

² The Examiner refers to Ezumi 6,193,137 B1 and Whitehouse 6,247,634 B1 in the Response to Arguments section of the Answer as merely showing that it is well known in the art that friction stir operations create significant pressure on workpieces (Ans. 20). The Examiner has not relied on Ezumi or Whitehouse in any of the rejections of record. Because the Examiner has not included Ezumi or Whitehouse in the statement of any of the rejections, we shall not consider the disclosures of these references in our assessment of the Examiner's rejections. *In re Hoch*, 428 F.2d 1341, 1342 n. 3 (CCPA 1970) (*stating*, "Where a reference is relied on to support a rejection, whether or not in a 'minor capacity,' there would appear to be no excuse for not positively including the reference in the statement of the rejection.").

³ Claim 9 was inadvertently omitted from the statement of the § 102 rejection. However, claim 9 is clearly addressed in the body of the § 102 rejection (Ans. 4). Appellants have not argued claim 9 or indicated any confusion regarding whether claim 9 is rejected under § 102. Accordingly, we determine that the Examiner's omission of claim 9 from the statement of the rejection is harmless error.

Appellants separately argue claims 1, 3, 4, 7, 11, 14, 16, 32, and 33. For reasons evident below, we address independent claims 1 and 11 with regard to each of the rejections.

OPINION

With regard to claim 1, Appellants argue that Holt does not teach the claim features: “urging the shoulder of the forming tool against the workpiece and at least partially penetrating the workpiece with the pin such that the workpiece is bent against the contour surface” and “adjusting the tool in a predefined path corresponding to the contour surface of the die at least partially during said urging step, such that the shoulder urges the workpiece to the desired configuration” (Br. 6). Appellants contend that Holt’s workpiece is already in a bent shape prior to forming and is not formed “to a desired non-planar configuration” (Br. 8). Appellants argue that Holt’s disclosure to balance the forces of the friction stir welding device using rollers provides no indication that the workpiece is bent against the backup roller (i.e., urging the workpiece against the die using the shoulder of the friction stir welding tool) (Br. 9).

Regarding claim 11, Appellants argue that Holt fails to teach “[t]he at least one tool is adjusted along a predefined path such that the shoulders urge the workpiece to the desired, nonplanar configuration” claim feature (Br. 14).

We have considered Appellants’ arguments and cannot sustain the Examiner’s rejections for the reasons below.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior

art reference. *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997). Inherent anticipation of a claim feature cannot be based on possibilities or probabilities; the mere fact that a certain thing may result from a given set of circumstances is not sufficient. *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981). In relying upon a theory of inherency, the Examiner has the initial burden to provide a basis in fact and/or technical reasoning to reasonably support that the alleged inherent characteristic necessarily flows from the teachings of the applied prior art. *Ex parte Levy*, 17 USPQ2d 1461, 1463-64 (BPAI 1990).

Holt discloses a method for friction stir welding together cylindrical, dome-like or flat members using a contact backup roller as a welding platen (Holt, col. 1, ll. 5-9). Holt discloses using an internal backup roller 46 and other rollers 50, 52a, 52b to balance the forces of the friction stir welding device (Holt, col. 6, ll. 1-26). Holt further discloses that the internal backup roller 46 serves as a single contact point to react to significant forces created by friction stir welding (Holt, col. 6, ll. 62-64). Holt's friction stir welding tool may rotate with the spindle 32 or remain stationary while the workpiece rotates to weld the dome and the cylinder members together so as to form a circumferential weld (Holt, col. 7, ll. 28-47). Holt's Figure 4 shows how the friction stir welder 58 is positioned relative to internal backup roller 46 so that the welder 58 follows the weld line 56 to weld the dome and cylinder workpieces together.

The Examiner finds “it is inherent that the workpiece is bent against the contour surface because the internal backup roller is contoured and the weld is formed on the contoured surface in order to form a circumferential weld” (Ans. 3). The Examiner further finds that Holt adjusts the tool in a

predefined path corresponding to the contour surface of the die at least partially during the urging step as recited in claim 1 (Ans. 3) and Holt adjusts the at least one tool along a predefined path at least partially during said urging step such that the shoulders urge the workpiece to the desired non-planar configuration as recited in claim 11 (Ans. 4-5). We do not agree.

Appellants' claim 1 recites "adjusting the tool in a predefined path corresponding to the contour surface of the die at least partially during said urging step, such that the shoulder urges the workpiece to the desired configuration." Holt never discloses adjusting the friction forming tool 58 in a predefined path "corresponding to the contour surface of the die at least partially during said urging step." Rather, Holt discloses that the friction spin welding tool 58 and the internal backup roller 46 may rotate relative to workpieces. Holt further discloses that the internal back up roller 46 serves as a single contact point to react to significant forces created by friction stir welding (Holt, col. 6, ll. 62-64).

These Holt disclosures indicate that the friction stir welding tool 58 is not adjusted in a predefined path *corresponding to the contour surface of the die* as claimed. Rather, the welding tool simply presses against a single line on the roller at any given time to balance the forces and maintain the existing shape of the workpieces. Furthermore, we do not find that Holt's welding method urges the shoulder of the forming tool against the workpiece "such that the workpiece is bent against the contour surface" because Holt's method simply maintains the existing shape of the workpiece (i.e., the weld formed between the dome and cylindrical portions merely retains the pre-welded shape of the dome and cylindrical portion after welding).

For the same reason, we cannot sustain the rejection of claim 11. Specifically, claim 11 recites “adjusting the at least one tool along a predefined path at least partially during said urging step, such that the shoulders urge the workpiece to the desired, non-planar configuration and the at least one pin forms a friction stir formed region having a refined grain structure in the workpiece.” In our reading of claim 11, the feature “such that the shoulders urge the workpiece to the desired, non-planar configuration” indicates that the workpiece changes shape. However, Holt’s process merely maintains the shape of the weld of the device rather than changing the shape as indicated in the claim.

We add that the Examiner has not shown it to be inherent that Holt’s workpiece is bent against the contour surface of internal backup roller 46 because the internal backup roller is contoured and the weld is formed on the contoured surface in order to form a circumferential weld. Rather, as we understand Holt’s disclosure, the internal backup roller 46 merely provides a single line of contact to maintain the existing shape of the cylinder and dome during the friction stir welding. In fact, that Holt does not disclose that the workpiece is bent against the contour surface of the backup roller is further underscored by Holt’s disclosure that a backup roller 74 may be used to form a flat weld in a friction stir welding process (Holt, col. 8, ll. 50-60; Figure 6B). In other words, Holt discloses that the backup rollers 46, 74 are used to maintain the existing shape of the workpieces being welded, not to bend the workpieces. The Examiner’s initial burden to provide a basis in fact or technical reasoning to establish inherency of the argued claim features has not been satisfied. *Levy*, 17 USPQ2d at 1463-64.

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For the above reasons, we do not sustain the Examiner's § 102 rejection of claims 1-3, 6-9, 11, 14-16, 18, 20, 32, and 33.

Because we do not sustain the rejection of independent claims 1 and 11, the § 103 rejections of dependent claims 4, 7, 12, and 13, which depend or ultimately depend on either claims 1 and 11 cannot be sustained.

Accordingly, we do not sustain the § 103 rejection of claim 7 over Holt in view of Riggio and the § 103 rejection of claims 4, 12, and 13 over Holt in view of Iwashita.

DECISION

The Examiner's decision is reversed.

REVERSED

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