

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 34

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte EDWIN G. SAWDON
and BRIAN D. PETIT

Appeal No. 2003-0693
Application No. 09/006,248

ON BRIEF

Before STAAB, McQUADE, and BAHR, Administrative Patent Judges.
STAAB, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal from the examiner's final rejection of claims 1-16, 18-27, 29, 31, 33-35 and 39-46. Claims 28 and 36-38, the only other claims currently pending in the application, have been allowed. The amendment after final filed on February 8, 2002 (Paper No. 22) has not been entered (see Paper No. 23).

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With reference to Figure 1, appellants' invention pertains to an end arm manipulator 21 comprising a base 31, one or more arms 37 pivotally mounted to the base, and a workpiece interfacing member (e.g., gripper 41) coupled to the end of each arm. As can be seen in Figures 2 and 3, the arms are pivotally mounted to the base by ball and socket joints 33, 35 that may be clamped to secure the arms at a desired angle relative to the base. Figure 3 shows a further feature of the invention, namely, the routing of fluid and/or electric lines 205, 231 through the interior of the ball 35 of the ball and socket joint and the interior of the arm 37. These lines are used for actuating the workpiece interfacing member coupled to the opposite end of the arm. The appealed claims are reproduced in the Appendix to the main brief.

The references relied upon by the examiner in the final rejection as evidence of obviousness are:

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|---------------------------------------|-----------|---------------|
| Giern et al. (Giern) | 2,310,025 | Feb. 02, 1943 |
| Kraus | 2,488,296 | Nov. 15, 1949 |
| Dailey | 4,214,739 | Jul. 29, 1980 |
| Susnjara | 4,378,959 | Apr. 05, 1983 |
| Kraft | 4,648,782 | Mar. 10, 1987 |
| Vachtsevanos et al. (Vachtsevanos) | 4,739,241 | Apr. 19, 1988 |
| Hayes | 4,787,613 | Nov. 29, 1988 |
| Larsson | 4,904,148 | Feb. 27, 1990 |
| Nicholson | 4,913,617 | Apr. 03, 1990 |
| Kawai | 4,922,782 | May 08, 1990 |
| Hurlimann | 5,020,323 | Jun. 04, 1991 |
| Herbermann (Herbermann '309) | 5,071,309 | Dec. 10, 1991 |

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| Blatt et al. (Blatt '276) | 5,135,276 | Aug. 04, 1992 |
| Blatt et al. (Blatt '566) | 5,152,566 | Oct. 06, 1992 |
| Herbermann et al. (Herbermann '097) | 5,733,097 | Mar. 31, 1998 |

The following rejections under 35 U.S.C. § 112, second paragraph, and 35 U.S.C. § 103(a) are before us for review:¹

- (1) claims 39 and 40, rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.
- (2) claims 1-16 and 18, rejected as being unpatentable over Blatt '276 in view of Hurlimann, Vachtsevanos, Kraft and Blatt '566;
- (3) claims 19-24 and 26, rejected as being unpatentable over Dailey in view of Hayes, Vachtsevanos, Herbermann '309, Larsson and Blatt '276;
- (4) claims 25, 27 and 46, rejected as being unpatentable over Dailey in view of Hayes, Vachtsevanos, Herbermann '309, Larsson, Blatt '276 and Giern;
- (5) claims 29, 31, 33 and 41, rejected as being unpatentable over Herbermann '097 in view of Blatt '566 and Kraft;

¹In the final rejection, claim 46 was also included in rejection (1), and claims 39 and 40 were also rejected as being unpatentable over Honma in view of Larsson. However, these rejection have been expressly withdrawn by the examiner. See page 2 of the answer.

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- (6) claims 29, 31, 33 and 41, rejected as being unpatentable over Kawai in view of Susnjara;
- (7) claims 34, 35 and 42, rejected as being unpatentable over Blatt '276 in view of Kraus and Dailey;
- (8) claims 43-45, rejected as being unpatentable over Blatt '276 in view of Vachtsevanos and Kraft;
- (9) claim 46, rejected as being unpatentable over Blatt '276 in view of Hurlimann, Vachtsevanos, Kraft, Blatt '566 and Giern.

Reference is made to appellants' main and reply briefs (Paper Nos. 26 and 29) and to the examiner's answer (Paper No. 27) for the respective positions of appellants and the examiner regarding the merits of these rejections. In support of their position that the appealed claims are patentable over the prior art, appellants also rely on the declaration by Mr. Steven E. Sawdon filed March 12, 2001 (Paper No. 15) as evidence of commercial success of the claimed invention.

Discussion

(1) The 35 U.S.C. § 112, second paragraph, rejection

We sustain the rejection of claims 39 and 40 under 35 U.S.C. § 112, second paragraph.

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In rejecting independent claim 39 and claim 40 that depends therefrom on this ground of rejection, the examiner correctly notes that the term "said member" in line 3 of claim 39 lacks a proper antecedent. According to the examiner, this claim deficiency renders the claims indefinite. Appellants have not specifically disputed the examiner's position, but have instead pointed to proposed changes to claim 39 contained in the amendment after final that was refused entry by the examiner.² Since appellants have not taken issue with the examiner's position regarding the indefiniteness of claims 39 and 40, we summarily sustain this rejection.

(2) The § 103 rejection of claims 1-16 and 18

We do not sustain the § 103 rejection of claim 1, or claims 2-16 and 18 that depend therefrom, as being unpatentable over Blatt '276 in view of Hurlimann, Vachtsevanos, Kraft and Blatt '566.

²Appellants request entry and favorable consideration of the proposed amendment after final. Under 35 U.S.C. § 134 and 37 CFR 1.191, appeals to the Board of Patent Appeals and Interferences are taken from the decision of the primary examiner to reject claims. We exercise no general supervisory power over the examining corps and decisions within the primary examiner's discretion, such as whether or not to enter an amendment after final rejection, are not subject to our review. See, for example, *In re Mindick*, 371 F.2d 892, 894, 152 USPQ 566, 568 (CCPA 1967). Thus, the relief sought by appellants would have properly been presented by a petition to the Commission under 37 CFR 181.

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Appellants argue, among other things, that none of the applied references discloses the requirement of claim 1 that "at least one of said arms hav[e] an elongated dimension greater than any unidirectional dimension of said base." The examiner takes the position that the claimed dimensional relationship between the arms and the base is "an obvious matter of design and/or choice with one arrangement providing no unobvious result over another" (answer, page 6). The examiner also contends (answer, page 10) that "[i]t is well known to eliminate structure and function. In this case it would have been . . . [obvious to eliminate] the base and arms and their function to the right of the first two arms in Blatt '276 figure 1."

In short, the cited references do not provide the factual basis necessary to support the examiner's conclusion of obviousness. The recited dimensional relationship of the arm to the base is disclosed in appellants' specification in the paragraph spanning pages 2 and 3 as solving asserted problems of rigidity, compactness and reduction in the volume of fluid consumed. Thus, this limitation may not be dismissed as an obvious matter of design choice without supporting evidence (*compare In re Kuhle*, 526 F.2d 553, 555, 188 USPQ 7, 9 (CCPA 1975)).

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The examiner's theory of obviousness based on omitting a part and its function to justify the proposed elimination of those portions of Blatt '276 to the right of the first two arms (as viewed in Figure 1) also is not well taken. While there is support in the case law for the rule that omitting an element and its function is an obvious expedient if the remaining elements perform the same function as before (*In re Karlson*, 311 F.2d 581, 584, 136 USPQ 184, 186 (CCPA 1963)), this is not a mechanical rule and the language in *Karlson* was not intended to short circuit the determination of obviousness mandated by 35 U.S.C. § 103. See *In re Wright*, 343 F.2d 761, 769-70, 145 USPQ 182, 190 (CCPA 1965). Our current court of review has made clear that the use of *per se* rules is improper in applying the test for obviousness under 35 U.S.C. § 103 since such rules are inconsistent with the fact-specific analysis of claims and prior art mandated by section 103. See *In re Ochiai*, 71 F.3d 1565, 1570, 37 USPQ2d 1127, 1132 (Fed. Cir. 1995). In the present case, the examiner has not advanced any factual basis to justify his conclusion that it would have been obvious to discard the large portion of the apparatus of Blatt '276 to the right of the first two arms (as viewed in Figure 1) in order to arrive at the combination set forth in appellants' claim 1.

(3) The § 103 rejection of claims 19-24 and 26

We do not sustain the § 103 rejection of claim 19, or claims 20-24 and 26 that depend therefrom, as being unpatentable over Dailey in view of Hayes, Vachtsevanos, Herbermann '309, Larsson and Blatt '276.

Appellants argue, first, that Dailey and Hayes constitute nonanalogous art. However, in the view we take in this case, even if we assume that Dailey and Hayes are analogous art, the obviousness rejection of claims 19-24 and 26 is not well founded.

Appellants further argue (main brief, pages 12-13) that the examiner's reference combination is based on the use of impermissible hindsight. We agree. Like appellants, we find no basis in the combined teachings of the applied references for, among other things, substituting the sophisticated powered gripper of Vachtsevanos for the fish hook clamping means 102, 103, 106 of Dailey, and for then further modifying Dailey by routing a flexible line through the ball joint 62 of Dailey to power the gripper in view of Herbermann '309 and/or Larsson. In that regard, we share appellants' view that the examiner is using hindsight benefit of appellants' own disclosure to pick and choose elements or concepts from the applied references, and then selectively combine the chosen disparate elements or concepts in an attempt to reconstruct

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appellants' claimed subject matter. However, as our court of review indicated in *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992), it is impermissible to use the claimed invention as an instruction manual or "template" in attempting to piece together isolated disclosures and teachings of the prior art so that the claimed invention is rendered obvious.

(4) The § 103 rejection of claims 25, 27 and 46

We do not sustain the § 103 rejection of claims 25, 27 and 46 as being unpatentable over Dailey in view of Hayes, Vachtsevanos, Herbermann '309, Larsson, Blatt '276 and Giern.

The discussion found in our treatment of rejection (3) applies. Further, Giern's teaching of a C-shaped clamp ring 19 for a lockable ball joint does not overcome the deficiencies of the other references applied in the rejection. Simply put, the rejection is based on the use of impermissible hindsight.

(5) The first § 103 rejection of claims 29, 31, 33 and 41

We sustain the § 103 rejection of claims 29, 31, 33 and 41 as being unpatentable over Herbermann '097 in view of Blatt '556 and Kraft.

Herbermann '097 pertains to a system for mounting suction tools 26 and 28 along a cross bar 22. The cross bar is of the type that can move vertically and horizontally to reposition a workpiece

34 relative to various work stations. The system includes rails 38 extending between brackets 40 and 42. The brackets are secured to respective locking portions 45 and 46 associated with the cross bar. Arms (not numbered) are mounted to the rails 38 by clamp members 36 that allow the arms to be mounted at any axial location along the rail. Suction tools 26, 28 are mounted to the ends of the arms. Although not shown, Herbermann '097 states (col. 3, lines 65-67) that fluid, electric or vacuum connections, presumably for the suction tools, can extend through the locking portions.

Although not expressly set forth in the answer, it appears that the examiner finds correspondence between the rails 38, the unnumbered arms (i.e., the members mounted to the rails 38 by clamp members 36), and the suction tools 26, 28 of Herbermann '097 and the base, the arms, and the interfacing workpiece members, respectively, of claim 29. The examiner implicitly concedes that Herbermann '097 does not disclose (1) a base having at least two parallel and elongated internal bores operable to carry fluid, and (2) fluid paths connected to said manifold and extending to the suction tools through the interiors of the arms. The examiner turns to Blatt '556 and Kraft, respectively, for teachings of these features.

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Blatt '556 discloses an end arm manipulator apparatus comprising an elongated boom 20 having support arms 22, 24 slidably mounted thereon, and vacuum cup gripper assemblies V1, V2 mounted to the ends of the respective support arms. The boom includes two parallel and elongated internal passages 34 that carry air under pressure (col. 1, lines 28-33; col. 3, lines 19-21). In order to supply air under pressure to the gripper assemblies, a drill bit is utilized to tap into one of the passages 34 and an air hose H is run from the tap location to the gripper assembly (col., 5, lines 10-14). The air hose is illustrated in Figure 1 as running along the side of the support arm.

Kraft is directed to an underwater manipulator system. The system includes a pair of manipulator arms 1, each having a powered gripper 14 at the distal end thereof. As may be discerned from a review of Figures 4, 18, 19, 21 and 30, hoses for supplying motive fluid to power the grippers are routed at least partially through the interiors of the arms.

Given the collective teachings of these references, we conclude, as did the examiner, that it would have been obvious to one of ordinary skill in the art at the time of appellants' invention to (1) provide a pair of parallel and elongated internal bores operable to carry fluid in the base members (i.e., rails 38)

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of Herbermann '097, and (2) route hoses for carrying fluid to the suction tools 26, 28 of Herbermann '097 through the interiors of the support arms. The reason for these modifications would be to conceal and protect the air lines and thus make them less susceptible to damage from the surroundings in which the apparatus operates, which benefit the ordinarily skilled artisan would have readily derived from the teachings of the applied references.

In that Blatt '556 discloses elongated internal passages 35 that carry air under pressure, appellants' argument (main brief, page 21) that the cited references do not teach the feature of a base having a fluid distributing manifold with at least two parallel and elongated internal bores is not well taken. We also do not accept appellants' argument (main brief, page 22) that the rejection is based on hindsight. On the contrary, in this instance it is clear to us that the examiner's rejection has taken into account only knowledge which was within the level of ordinary skill in the art at the time of appellants' invention, as evidenced by the applied patents themselves, and that such knowledge would have been suggestive to one of ordinary skill in the art of the presently claimed subject matter as defined in claim 29.

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In light of the above, we consider that the examiner has met the PTO's initial burden of establishing a *prima facie* case of obviousness of the subject matter of claim 29.

Although appellants state (main brief, page 6) that "all of the claims at issue stand or fall separately from each other," claims 31, 33 and 41 have not been separately argued with any reasonable degree of specificity apart from independent claim 29 from which they depend. Therefore, we consider that the reference evidence adduced by the examiner also is sufficient to establish a *prima facie* case of obviousness of these claims.

Having concluded that a *prima facie* case of obviousness has been established with respect to claims 29, 31, 33 and 41, we turn to the evidence of nonobviousness in the form of the above noted Sawdon declaration submitted by appellants, bearing in mind the necessity of reweighing the entire merits of the matter and hence of considering all the evidence of record anew. *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

The Sawdon declaration sets forth that declarant Stephen E. Sawdon is the president of BTM Corporation, which owns the present application. Mr. Sawdon states on page 1 of the declaration that BTM Corporation sold over 200 end arm effectors (EAEs) constructed in accordance with the disclosure of the present application to

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General Motors Corporation. Mr. Sawdon states on page 5 of the declaration that it is his understanding and belief that these EAEs were purchased by General Motors primarily based on their technical superiority. Thus, the Sawdon declaration is submitted as evidence of commercial success of the claimed invention.

With regard to evidence of commercial success, a nexus must be established between the merits of the invention and the evidence proffered if such evidence is to be accorded substantial weight in deciding the issue of obviousness. See *Simmons Fastener Corp. v. Illinois Tool Works, Inc.*, 739 F.2d 1573, 1575, 222 USPQ 744, 746 (Fed. Cir. 1984), *cert. denied*, 471 U.S. 1065 (1985). In the present case, it is not clear that the EAEs sold to General Motors by BTM embodied the claimed invention of claims 29, 31, 33 and 41. This is so because Mr. Sawdon's declaration does not indicate whether or not the EAEs sold to General Motors included a base "having a fluid distribution manifold with at least two parallel and elongated internal bores, said bores being operable to carry fluid" as required by claim 29. Moreover, the declarant's statements concerning the alleged sale³ of 200 EAEs to General Motors are ambiguous and have not been placed in any meaningful

³It is noted that these statements are not supported by any objective evidence tending to support the asserted sale.

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context. In this regard, bare sales figures such as those set forth in the declaration constitute minimal evidence of commercial success (see *In re Huang*, 100 F.3d 135, 137, 40 USPQ2d 1685, 1689 (Fed. Cir 1996); *Cable Elec. Prods. Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1026-27, 226 USPQ 881, 887-88 (Fed. Cir. 1985)) where, as here, there is no evidence of, for example, the size of the market, appellants' market share, or growth in appellants' market share. For all appellants' evidence shows, the sale of EAEs to General Motors could be attributed to economic and commercial factors (e.g., advertising, position as a market leader, recent changes in related technology or code requirement) that are unrelated to the unique characteristics of the claimed invention.

For the foregoing reasons, appellants' evidence of nonobviousness cannot be accorded substantial weight. Thus, as in *EWP Corp. v. Reliance Universal, Inc.*, 755 F.2d 898, 907, 225 USPQ 20, 25 (Fed. Cir.), *cert. denied*, 474 U.S. 843 (1985), when all of the evidence is considered anew, it is our opinion that, on balance, the evidence of nonobviousness fails to outweigh the evidence of obviousness with respect to the examiner's first rejection of claims 29, 31, 33 and 41.

(6) The second § 103 rejection of claims 29, 31, 33 and 41

We do not sustain the § 103 rejection of claims 29, 31 33 and 41 as being unpatentable over Kawai in view of Susnjara.

In this instance, appellants' argument on page 25 of the main brief that the applied prior art does not disclose or suggest a base having a fluid distributing manifold, fluid paths connected to said manifold and extending through an interior of the arms, and a robotic member moving the base, as required by claim 29, is persuasive.

Kawai is directed to a two-arm type manipulator wherein the arms are powered by electric motors such as motors 21-23 mounted intermediate the ends of the arms. The motive power of the motors is transmitted to the grippers 50 located at the ends of the arms by means of a series of drive shafts and gears, such as the shafts 202 and gears 204, 205 shown in Figure 3. Susnjara teaches an arm assembly powered by hydraulic and/or pneumatic fluids. We find no suggestion in the combined teachings of these references for the major overhauling and reworking of Kawai that would be required in order to arrive at the subject matter of claim 29, aside from the impermissible guidance from appellants' own disclosure. Since the evidence relied upon by the examiner in this rejection would not have been suggestive of the content of, in particular claim 29, the

examiner has not established a *prima facie* case of obviousness of appellants' claims 29, 31, 33 and 41.

(7) The § 103 rejection of claims 34, 35 and 42

We do not sustain the § 103 rejection of claims 34, 35 and 42 as being unpatentable over Blatt '276 in view of Kraus and Dailey.

In rejecting these claims, the examiner contends (answer, page 8) that it would have been obvious to make the arms of Blatt '276 extendable "since such structure is conventional in arm structure" and "could be provided by any conventional structure including . . . [telescoping tubes] and a set screw as used in Kraus (elements 9, 10 and 13)." The examiner further contends that it also would have been obvious "to use any conventional clamp to attach the gripper [of Blatt '276] to its base including a ball and socket as taught by Dailey."

We appreciate that Kraus discloses a work support having an extendable column 9, 10, and that Dailey discloses a ball joint 90 for attaching the clamp 98 to the shaft member 14. However, like appellants, we find no basis in these teachings for modifying Blatt '276 in the manner proposed by the examiner. Concerning the examiner's reliance on Kraus as a teaching for making the arms 16 of Blatt '276 extendable, we consider the nonextendable arm 40 of Kraus, rather than the extendable column 9, 10, as corresponding to

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arm 16 of Blatt '276. Thus, we do not view Kraus as teaching or suggesting the use of an extendable arm in Blatt '276. Moreover, given the disparate natures of the devices of Blatt '276 (a relatively heavy duty transfer beam) and Dailey (a support for holding a fish hook for fly tying), we do not see any basis for providing a ball joint in Blatt '276 for mounting the pneumatically operated gripper thereof to the arm 16 aside from the luxury of hindsight accorded one who first viewed the appellants' disclosure. This, of course, is not a proper basis for a rejection. See *In re Fritch*, 972 F.2d at 1266, 23 USPQ2d at 1784.

The mere fact that the prior art *could* be modified does not make such a modification obvious absent suggestion of the desirability of doing so. See, for example, *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). In the present case, we fail to perceive any suggestion of the desirability, and thus the obviousness, of modifying Blatt '276 in the manner proposed by the examiner. In this regard, the examiner's contention that extendable arm structures and ball joints are conventional in the art and could be provided in Blatt '276 does not suffice.

(8) The § 103 rejection of claims 43-45

We do not sustain the § 103 rejection of claims 43-45 as being unpatentable over Blatt '276 in view of Vachtsevanos and Kraft.

Claim 43 calls for, among other things, a base having a fluid distributing internal manifold and a ball joint, with fluid operably flowing from the manifold and internally through the ball of the ball joint.

The cited references do not teach a ball joint having a ball with fluid flowing through said ball. In particular, Vachtsevanos does not teach a ball joint having control lines of any sort passing through the ball of the joint. In Figures 1 and 2 of Vachtsevanos the conductors 42-48 bypass the spherical rotor R and are routed to the gripper 28 by means of breakout 32. Likewise, in Blatt '276 (see, for example, Figure 1) the fluid lines 50 bypass the ball joints that mount the booms 16 to the boom arm 14. As to Kraft, the manipulation system thereof does not utilize ball joints.

(9) The § 103 rejection of claim 46

We do not sustain the § 103 rejection of claim 46 as being unpatentable over Blatt '276 in view of Hurlimann, Vachtsevanos, Kraft, Blatt '566 and Giern.

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Claim 46 is directed to an apparatus that includes, among other things, an arm having a fluid powered workpiece gripping mechanism, the arm being mounted to a base by a ball and socket joint, and a flexible line passing from the base, through the ball and to the gripping mechanism.

The cited references do not disclose or collectively teach a ball joint having a ball with fluid flowing therethrough. For the reasons explained in our treatment of rejection (8), Vachtsevanos, Blatt '276 and Kraft do not teach or suggest this arrangement. Blatt '566 is similar to Blatt '276 in that the fluid lines H bypass the ball joints that mount the booms to the boom arm. Hurlimann, directed to a telescoping arm arrangement, and Giern, directed to a universal vise, also do not disclose a ball joint having fluid flowing therethrough.

Summary

The rejection of claims 39 and 40 under 35 U.S.C. § 112, second paragraph, is affirmed.

The rejection of claims 29, 31, 33 and 41 as being unpatentable over Herbermann '097 in view of Blatt '556 and Kraft is affirmed.

All other rejections are reversed.

The decision of the examiner is affirmed-in-part.

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

AFFIRMED-IN-PART

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| LAWRENCE J. STAAB |) | |
| Administrative Patent Judge |) | |
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| |) | BOARD OF PATENT |
| JOHN P. McQUADE |) | APPEALS |
| Administrative Patent Judge |) | AND |
| |) | INTERFERENCES |
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| JENNIFER D. BAHR |) | |
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