

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* JEFFREY D. CARNEVALI

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Appeal 2008-1322  
Application 10/698,158  
Technology Center 3600

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Decided: July 11, 2008

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Before WILLIAM F. PATE, III, MURRIEL E. CRAWFORD, and  
LINDA E. HORNER, *Administrative Patent Judges*.

HORNER, *Administrative Patent Judge*.

DECISION ON APPEAL  
STATEMENT OF THE CASE

Jeffrey D. Carnevali (Appellant) seeks our review under 35 U.S.C. § 134 of the final rejection of claims 1-3 and 5-21. Claim 4 has been canceled. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

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## SUMMARY OF DECISION

We AFFIRM-IN-PART.

### THE INVENTION

The Appellant's claimed invention relates to supporting heavy objects relative to a fixed surface using a flexible support apparatus (Spec. 1:11-13). Claim 1, reproduced below, is representative of the subject matter on appeal.

1. A flexible support apparatus comprising:
  - a support base having an opening in one surface;
  - a mounting bracket having an opening in one surface; and
  - a permanently bendable continuously solid metal rod having a first end installed in the opening of the support base and fused directly thereto with a weld joint formed directly between the first end of the metal rod and the support base, and having a second end installed in the opening of the mounting bracket and fused directly thereto with a weld joint formed directly between the second end of the metal rod and the mounting bracket.

### THE REJECTIONS

The Examiner relies upon the following as evidence of unpatentability:

Kruger	US 4,020,575	May 3, 1977
Lingnau	US 6,637,642 B1	Oct. 28, 2003
Richter	US 6,749,160 B1	Jun. 15, 2004
Giralt	US 6,811,146 B1	Nov. 2, 2004

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The following rejections are before us for review:

1. Claims 1-3, 5, 6, 8-10, and 14-19 are rejected under 35 U.S.C. § 103(a) as unpatentable over Richter and Kruger.
2. Claims 13, 20, and 21 are rejected under 35 U.S.C. § 103(a) as unpatentable over Richter, Kruger, and Giralt.
3. Claims 7, 11, and 12 are rejected under 35 U.S.C. § 103(a) as unpatentable over Richter, Kruger, and Lingnau.

### ISSUES

The issues before us are whether the Appellant has shown that the Examiner erred in rejecting claims 1-3, 5, 6, 8-10, and 14-19 under 35 U.S.C. § 103(a) as unpatentable over Richter and Kruger, claims 13, 20, and 21 as unpatentable over Richter, Kruger, and Giralt, and claims 7, 11, and 12 as unpatentable over Richter, Kruger, and Lingnau. These issues turn, in part, on whether it would have been obvious to fuse, either directly or indirectly, the ends of Richter's metal rod to sleeves 5 and 14.

### FINDINGS OF FACT

We find that the following enumerated findings are supported by at least a preponderance of the evidence. *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Office).

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1. The ordinary meaning of fused is to become mixed or united by or as if by melting together. *The American Heritage Dictionary of the English Language* (4th ed. 2000), found at [www.bartelby.com](http://www.bartelby.com).
2. The ordinary meaning of directly is without anyone or anything intervening. *The American Heritage Dictionary of the English Language* (4th ed. 2000), found at [www.bartelby.com](http://www.bartelby.com).
3. Richter discloses a suction disc mounting arrangement devised to provide a large suction force so that “relatively heavy articles” can be supported thereby (Richter, col. 2, ll. 35-37).
4. Richter’s suction disc mounting arrangement includes a support arm 10 having one end mounted on sleeve 5 of suction element 2 and the other end received and firmly connected to a sleeve 14 of support plate 13 (Richter, col. 4, ll. 20-36; Fig. 2).
5. Support arm 10 is comprised of a flexible plastic tube 11, through which an aluminum rod 12 extends (Richter, col. 4, ll. 24-25).
6. Annular plug members 12a and 12b are disposed on opposite ends of rod 12 and fix rod 12 and corrugated plastic tube 11 relative to each other (Richter, col. 4, ll. 27-32; Fig. 2).
7. As shown in Figure 2, rod 12 is mounted to sleeves 5 and 14 via plug members 12a and 12b (Richter, Fig. 2).
8. Richter does not disclose that its metal rod 12 is “fused directly” to a support base or a mounting bracket and does not disclose a “weld joint” directly between the ends of metal rod 12 and a support base and mounting bracket.

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9. Richter does not disclose how the support arm 10 is “mounted” to sleeves 5 and 14.
10. The sleeves 5 and 14 of Richter disclose a single aperture or bore sized to admit the flexible plastic sheath and the plugs 12a and 12b (Richter, Fig. 2).
11. Welding was known in the art as a way to securely connect metal parts to other metal parts or to weldable plastic parts (Kruger, col. 2, ll. 31-33).
12. Neither Richter nor Kruger teaches upsetting metal on the ends of a metal rod.
13. Lingnau relates to an improved method of solid state welding metal parts (Lingnau, col. 1, ll. 8-9).
14. Lingnau teaches that during solid state welding, a certain volume of metal is ejected by virtue of the direct energy input of induction heating the surfaces to be welded, and that such ejected metal is known as “flash” or “upset” (Lingnau, col. 4, ll. 60-66).

#### PRINCIPLES OF LAW

“Section 103 forbids issuance of a patent when ‘the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.’” *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007). The question of obviousness is resolved on the basis of

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underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 127 S. Ct. at 1734 (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”)

In *KSR*, the Supreme Court emphasized “the need for caution in granting a patent based on the combination of elements found in the prior art,” *id.* at 1739, and discussed circumstances in which a patent might be determined to be obvious. In particular, the Supreme Court emphasized that “the principles laid down in *Graham* reaffirmed the ‘functional approach’ of *Hotchkiss*, 11 How. 248.” *KSR*, 127 S. Ct. at 1739 (citing *Graham*, 383 U.S. at 12), and reaffirmed principles based on its precedent that “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* The Court explained:

When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious

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unless its actual application is beyond his or her skill.

*Id.* at 1740. The operative question in this “functional approach” is thus “whether the improvement is more than the predictable use of prior art elements according to their established functions.” *Id.*

The Supreme Court stated that there are “[t]hree cases decided after *Graham* [that] illustrate the application of this doctrine.” *Id.* at 1739. “In *United States v. Adams*, ... [t]he Court recognized that when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *Id.* at 1739-40. “*Sakraida and Anderson’s-Black Rock* are illustrative – a court must ask whether the improvement is more than the predictable use of prior art elements according to their established function.” *Id.* at 1740.

The Supreme Court stated that “[f]ollowing these principles may be more difficult in other cases than it is here because the claimed subject matter may involve more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement.” *Id.* The Court explained:

Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion

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claimed by the patent at issue.

*Id.* at 1740-41. The Court noted that “[t]o facilitate review, this analysis should be made explicit.” *Id.* (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”). However, “the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.*

#### ANALYSIS

*Rejection of claims 1-3, 5, 6, 8-10, and 14-19 under 35 U.S.C. § 103(a) as unpatentable over Richter and Kruger*

Claim 1 recites that a first end of the metal rod is fused directly to the support base with a weld joint formed directly therebetween, and the second end is fused directly to the mounting bracket with a weld joint formed directly therebetween.

The Appellant argues that the Examiner erred in rejecting claim 1 because Richter does not teach “fusing” the support arm to the suction disc mounting arrangement or the support plate (Br. 9). The Appellant contends that Richter discloses only mounting or firmly connecting the support arm ends, and that “‘mounted’ and ‘firmly connected’ are not synonymous with the term ‘fused’” (*id.*) (emphasis original). The Appellant further argues that

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the Examiner erred in rejecting claim 1 because Richter fails to disclose or suggest a weld joint between the first and second ends of the metal rod and the respective support base and mounting bracket (Br. 9). The Appellant further argues that Richter teaches that plug members 12a and 12b are “disposed” on the rod 12 “in an unknown manner” and that the aluminum rod 12 is “not attached in any way to the respective sleeves 5 and 14” (Br. 10) (emphasis original).

The Appellant’s Specification does not provide a definition of “fused directly.” The ordinary meaning of fused is to become mixed or united by or as if by melting together (Fact 1). This definition is consistent with the Appellant’s Specification, which describes fusing as occurring by ultrasonic welding (Spec. 7:17-18), metal-to-metal welding (Spec. 8:7-8), conventional soldering techniques (Spec. 10:6-7), and adhesive bonding (Spec. 10:16). The ordinary meaning of directly is without anyone or anything intervening. (Fact 2). This definition is also consistent with the Appellant’s Specification, which shows nothing intervening between the ends of rod 12 and the inner surfaces of apertures 36, 38 (Figs. 2 & 3).

We agree with the Appellant that Richter does not disclose that its metal rod 12 is “fused directly” to a support base or a mounting bracket and does not disclose a “weld joint” directly between the ends of metal rod 12 and a support base and mounting bracket (Fact 8). In particular, Richter shows metal rod 12 mounted indirectly, i.e., via plug members 12a and 12b and tube 11, to sleeves 5 and 14 (Facts 4-7), and Richter does not disclose how the support arm 10 is “mounted” to sleeves 5 and 14 (Fact 9). These

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findings, however, do not end our inquiry, because we are reviewing an obviousness rejection. As such, we must determine whether it would have been obvious, in view of the teaching in Richter to mount support arm 10 to sleeves 5 and 14, to do so by directly fusing metal rod 12 to sleeves 5 and 14 using weld joints.

We see no reason, absent hindsight, why one having ordinary skill in the art would have been led by the prior art to modify Richter to result in the subject matter of claim 1. In particular, we see no reason, and the Examiner has failed to provide one, why one skilled in the art would have been led to attach the metal rod 12 directly to the sleeves 5 and 14. The Examiner relies on Kruger to teach a device with ultrasonically weldable plastic and the method of using ultrasonically weldable plastic for securely bonding two elements together (Ans. 4-5). Even if it was well known in the art at the time the invention was made to use welding to fuse parts together, the use of welding in the mounting system of Richter would simply result in the interior surfaces of the plugs 12a and 12b being fused by welding onto the ends of metal rod 12, and the outer surfaces of the plugs 12a and 12b being fused by welding to the sleeves 5 and 14. Thus, even with the use of welding to attach the various components of Richter, the metal rod 12 would still not be fused “directly” to the sleeves 5 and 14. As such, the Appellants have persuaded us that the Examiner erred in rejecting claim 1, and claims 2, 3, 5, 6, and 8, which depend from claim 1, under 35 U.S.C. § 103(a) as unpatentable over Richter and Kruger.

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Independent claim 9 is of different scope than claim 1, because it does not recite that the metal rod is “fused directly” to the support base and mounting bracket, and although it recites weld joints, claim 9 does not require that the weld joints are “directly” between the metal rod and the support base and mounting bracket. Rather, claim 9 recites that the first end of the metal rod is inserted into a tubular aperture of the support base and has a weld joint formed therebetween and the second end of the metal rod is inserted into a tubular aperture of the mounting bracket and has a weld joint formed therebetween. Thus, the question presented for claim 9 is whether it would have been obvious to one having ordinary skill in the art to modify Richter to add a weld joint between metal rod 12 and sleeves 5 and 14.

As we found *supra*, Richter teaches that the support arm 10 is “mounted” to the sleeve 5 and “received and firmly connected” to sleeve 14 (Fact 4). Metal rod 12 is part of support arm 10 (Fact 5). This disclosure in Richter implies that metal rod 12 is connected in some fashion, albeit indirectly via plug members 12a and 12b, to sleeves 5 and 14 (Fact 7). Richter’s suction disc mounting arrangement is devised to provide a large suction force so that “relatively heavy articles” can be supported thereby (Fact 3). As such, it would stand to reason that one skilled in the art would want to use a strong connection mechanism to join the ends of support arm 10 to sleeves 5 and 14. Welding was known in the art as a way to securely connect metal parts to other metal parts or to weldable plastic parts (Fact 11). Under the “functional approach” to obviousness recently discussed by the Supreme Court in *KSR*, the weld joints of Kruger operate to

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connect parts of an apparatus together and were known in the art to function as a secure connection mechanism. As such, it would have been obvious to one having ordinary skill in the art to use weld joints as the connection mechanism to connect the support arm 10 of Richter to sleeves 5 and 14. We thus sustain the rejection of claim 9 as unpatentable over Richter and Kruger. The Appellant does not present any separate arguments for patentability of claim 14. As such, this claim falls with claim 9. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2007).

The Appellant presents separate arguments for dependent claims 10 and 15. In particular, the Appellant argues the Examiner erred in rejecting claim 10 because Richter does not disclose or suggest weld joints formed between the metal rod and each of the support base and the mounting bracket, and Kruger fails to cure the deficiencies of Richter as to the weld joints formed between the metal rod and each of the support base and the mounting bracket (Br. 23). The Appellant appears to be attacking each reference individually. The Examiner's rejection of claim 10 is based on the combined teachings of Richter and Kruger. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *See In re Keller*, 642 F.2d 413 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091 (Fed. Cir. 1986). For the reasons set forth above for claim 9, we find that the combination of Richter and Kruger renders obvious the claimed weld joints formed between the metal rod and each of the support base and the mounting bracket.

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The Appellant argues that the Examiner erred in rejecting claim 15 because neither Richter nor Kruger teaches a counterbore substantially concentric with the respective tubular apertures and sized to admit the flexible plastic sheath (Br. 23-24). We agree. The sleeves 5 and 14 of Richter disclose a single aperture or bore sized to admit the flexible plastic sheath and the plugs 12a and 12b (Fact 10). As such, the Appellant has persuaded us that the Examiner erred in rejecting claim 15 under 35 U.S.C. § 103(a) as unpatentable over Richter and Kruger.

Independent claim 16 is also of different scope than claim 1. Claim 16 is directed to a method for forming a flexible support apparatus including the steps of fusing a first end of the metal rod in the tubular aperture of the support base and fusing a second end of the metal rod in the tubular aperture of the mounting bracket. The language of claim 16 does not require that the metal rod is fused “directly” to the support base and mounting bracket. We see no practical difference between the step of “fusing” and that of providing a weld joint. Thus, for the same reasons provided above for claim 9, we sustain the rejection of claim 16 as unpatentable over Richter and Kruger.

The Appellant presents separate arguments for patentability of claims 17-19. In particular, the Appellant contends that the Examiner erred in rejecting claim 17 because Richter fails to disclose or suggest ultrasonically welding the ends of the metal rod to the respective tubular apertures of the support base and mounting bracket, and Kruger fails to cure the deficiencies of Richter (Br. 25). The Examiner did not rely on Kruger to

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teach welding first and second ends of a metal rod to a support base and a mounting bracket. Rather, the Examiner relied on Kruger to teach that it was well known in the art to use ultrasonic welding to join plastic parts together. The Appellant appears to be arguing the references individually. We do not find this persuasive. As such, we sustain the Examiner's rejection of claim 17.

The Appellant contends that the Examiner erred in rejecting claim 18 because neither Richter nor Kruger teaches upsetting the metal around the first and second ends of the metal rod (Br. 25). We agree. The Examiner has failed to point to where the cited prior art teaches upsetting the metal around the ends of the metal rod, and we do not see where either reference teaches or suggests such a condition on the ends of a rod (Fact 12). Further, the Examiner has failed to set forth a reason why one having ordinary skill in the art would have been led to make such a modification to the metal rod of Richter. As such, we do not sustain the rejection of claim 18, or claim 19 which depends therefrom.

*Rejection of claims 13, 20, and 21 under 35 U.S.C. § 103(a) as unpatentable over Richter, Kruger, and Giralt*

The Appellant argues claims 13, 20, and 21 as a group (Br. 26-27). As such, we review claim 13 as a representative claim. The Appellant argues that Giralt fails to cure the deficiencies of Richter and Kruger as they relate to the subject matter of claim 9, from which claim 13 depends. We find no deficiencies in the combination of Richter and Kruger as set forth

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above in our analysis of claim 9. As such, the Appellant has failed to persuade us of error in the Examiner's rejection of claims 13, 20, and 21 as unpatentable over Richter, Kruger, and Giralt.

*Rejection of claims 7, 11, and 12 under 35 U.S.C. § 103(a) as unpatentable over Richter, Kruger, and Lingnau*

The Appellant contends that the Examiner erred in rejecting claim 7 because Lingnau fails to cure the deficiency of the combination of Richter and Kruger as it relates to the subject matter of claim 1, from which claim 7 depends (Br. 28). We agree. The Examiner did not rely on Lingnau for the teaching of directly fusing the metal rod to the support base and mounting bracket, as required by claim 1. As such, we reverse the rejection of claim 7.

The Appellant contends that the Examiner erred in rejecting claims 11 and 12 because Lingnau does not teach or suggest the "upset metal finish" of the first and second ends of the metal rod (Br. 28-30). Claim 11 recites "wherein the first and second ends of the metal rod further comprise upset surface material." The Appellant's Specification describes that "the otherwise smooth metal of rod 12 is knurled or otherwise upset at both ends 12a while remaining substantially unchanged along most of its length 12b between the ends 12a" (Spec. 6: 26-28).

Lingnau relates to an improved method of solid state welding metal parts (Fact 13). Lingnau teaches that during solid state welding, a certain volume of metal is ejected by virtue of the direct energy input of induction heating the surfaces to be welded, and that such ejected metal is known as

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“flash” or “upset” (Fact 14). It is clear that the upset caused by induction heating during welding is not the upset metal finish recited in claim 11. As such, the teaching in Lingnau that upset occurs during solid state welding would not have led one having ordinary skill in the art to modify the first and second ends of the metal rod of Richter to have an upset surface material, as claimed. As such, the Appellant has persuaded us that the Examiner erred in rejecting claims 11 and 12 as unpatentable over Richter, Kruger, and Lingnau.

#### CONCLUSIONS

We conclude the Appellant has shown that the Examiner erred in rejecting under 35 U.S.C. § 103(a) claims 1-3, 5, 6, 8, 15, 18, and 19 as unpatentable over Richter and Kruger and claims 7, 11, and 12 as unpatentable over Richter, Kruger, and Lingnau. The Appellant has failed to show that the Examiner erred in rejecting under 35 U.S.C. § 103(a) claims 9, 10, 14, 16, and 17 as unpatentable over Richter and Kruger and claims 13, 20, and 21 as unpatentable over Richter, Kruger, and Giralt.

#### DECISION

The decision of the Examiner to reject claims 1-3, 5-8, 11, 12, 15, 18, and 19 is reversed. The decision of the Examiner to reject claims 9, 10, 13, 14, 16, 17, 20, and 21 is affirmed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED-IN-PART

JRG

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