

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ANDREW NORMAN, F. RUSSELL WILLIAMS,
CHRISTOPHER W. SMITH, WILLETT COFFMAN,
and KEITH S. MIZEN

Appeal 2007-4012
Application 10/277,421
Technology Center 1700

Decided: February 26, 2008

Before THOMAS A. WALTZ, CATHERINE Q. TIMM, and
JEFFREY T. SMITH, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL
Statement of the Case

This is an appeal under 35 U.S.C. § 134 from a final rejection of claims 1-4, 6-8, 10, 16, and 18-26. Claims 5, 9, 11-15, 17, and 27-31 have been canceled. We have jurisdiction under 35 U.S.C. § 6.

Appellants' invention relates to a tubular structure for use as a fuel transport tube in an automobile. The tubular structure has a corrugated or convoluted configuration and comprises an inner conductive acrylonitrile-butadiene rubber or polyvinyl chloride layer; an outer tetrafluoroethylene-hexafluoropropylene-vinylidene fluoride terpolymer barrier layer; an elastomeric backing layer; and a synthetic elastomer cover layer.

Representative claim 1 is reproduced below:

1. A corrugated or convoluted tubular structure for use as a fuel transport tube in an automobile, comprising:
 - an inner conductive acrylonitrile-butadiene rubber or polyvinyl chloride layer;
 - an outer fluorothermoplastic tetrafluoroethylene-hexafluoropropylene-vinylidene fluoride terpolymer barrier layer around said inner conductive layer;
 - an elastomeric backing layer selected from the group consisting of butadiene-acrylonitrile rubber, epichlorohydrin rubber and ethylene-acrylic rubber; and
 - a synthetic elastomer cover layer selected from the group consisting of styrene-butadiene rubber, butadiene-acrylonitrile rubber, chlorinated polyethylene, vinylidene-acrylic rubber, acrylic rubber, epichlorohydrin rubber, a copolymer of epichlorohydrin and ethylene oxide, polychloroprene rubber, polyvinyl chloride, ethylene-propylene copolymers, ethylene-propylene-diene terpolymer, ultra high molecular weight polyethylene, and blends thereof, wherein said tubular structure is corrugated or convoluted on at least a portion of the outer surface of the tubular structure.

The Examiner relies on the following references in rejecting the appealed subject matter:

Schacerfl	US 6,142,188	Nov. 7, 2000
Shifman	US 6,365,250 B2	Apr. 2, 2002

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Iio US 6,446,673 B1 Sep. 10, 2002

Claims 1-4, 6-8, 10, 16, and 18-26 stand rejected under 35 U.S.C. § 103(a) as follows:

I. Claims 1, 3, 6-8, 10, 16, and 18-23 stand rejected over Iio in view of Shifman.

II. Claims 2 and 4 stand rejected over Iio in view of Shifman, further in view of Schaeerfl.¹

III. Claims 24-26 stand rejected over Iio in view of Shifman and Schaerfl.

We have thoroughly reviewed each of Appellants' arguments and evidence. However, we are in full agreement with the Examiner that the claimed subject matter is unpatentable over the cited prior art. Accordingly, we will sustain the Examiner's rejection for the reasons set forth in the present record. We add the following:

Based on the contentions of the Examiner and the Appellants, the issues before us are:

(1) Has the Examiner made accurate and sufficient factual findings such that it is reasonable to conclude that one of ordinary skill in the art would have been motivated to form a tubular structure for use as a fuel transport tube comprising an inner conductive acrylonitrile-butadiene rubber or polyvinyl chloride layer and an outer tetrafluoroethylene-

¹ The statement of rejection as presented in the Answer appears to have inadvertently excluded the Shifman reference. The subject matter of claims 2 and 4 depends upon claim 1. Appellants in rebuttal to the stated rejection have included a discussion of Shifman (Br. 20-21).

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hexafluoropropylene-vinylidene fluoride terpolymer (THV) within the meaning of 35 U.S.C. § 103?

(2) Have Appellants presented evidence sufficient to overcome the rejection under § 103?

We answer the first question in the affirmative and the second question in the negative.

Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966). “[A]nalysis [of whether the subject matter of a claim would have been obvious] 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.” *KSR Int’l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1741 (2007) quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); see also *DyStar Textilfarben GmbH & Co.*

Deutschland KG v. C.H. Patrick Co., 464 F.3d 1356, 1361 (Fed. Cir. 2006) (“The motivation need not be found in the references sought to be combined, but may be found in any number of sources, including common knowledge, the prior art as a whole, or the nature of the problem itself.”); *In re Bozek*, 416 F.2d 1385, 1390 (CCPA 1969) (“Having established that this knowledge was in the art, the examiner could then properly rely, as put forth by the solicitor, on a conclusion of obviousness ‘from common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference.’”); *In re Hoeschele*, 406 F.2d

1403, 1406-07 (CCPA 1969) (“[I]t is proper to take into account not only specific teachings of the references but also the inferences which one skilled in the art would reasonably be expected to draw therefrom . . .”). The analysis supporting obviousness, however, should be made explicit and should “identify a reason that would have prompted a person of ordinary skill in the art to combine the elements” in the manner claimed. *KSR*, 127 S. Ct. at 1740.

The Examiner has found that Iio teaches a fuel hose having the characteristic of providing and maintaining fuel impermeability in a bent state. The fuel hose of Iio has an inner conductive barrier layer. The inner wall layer may be surrounded by a single or multiple outer wall layer formed from any adequate resinous material of high flexibility, impact resistance and cold resistance. Suitable materials are selected from among the materials of the inner wall layer, or other resinous materials (Iio, col. 6, ll. 10-15). Iio discloses the outermost layer can be formed from a blend of acrylonitrile-butadiene rubber and polyvinyl chloride (NBR-PVC). (Iio, col. 6, ll. 27-34). Iio fails to disclose that the inner layer and backing layer comprises acrylonitrile and butadiene rubber.

Shifman teaches that in fuel hose technology tetrafluoroethylene - hexafluoropropylene vinylidene fluoride terpolymer (THV) and acrylonitrile butadiene rubber (NBR) are recognized as equivalent materials utilized in fuel hose layers for the purpose of obtaining an inner layer having good conductive properties and fuel resistance (Shifman, col. 6, ll. 39-47). Shifman discloses the barrier layer (10) can comprise THV and the elastomeric layer (12) can comprise NBR or THV (Shifman, col. 4, ll. 43-47; col. 5, ll. 30-34). Shifman’s Figure 4 exhibits the use of the elastomeric

layer (12) as the innermost layer. Shifman's Figure 3 exhibits the use of the elastomeric layer (12) as surrounding the innermost layer (10). Therefore, one of ordinary skill in the art would have recognized that conductive NBR was suitable for use as the innermost layer in a fuel hose and as a layer surrounding the elastomeric layer. A person of ordinary skill would have selected layers comprising NBR and/or THV depending on the conductive properties and fuel resistance desired in the end product.²

Appellants argue that NBR is not disclosed by Iio to be suitable for the interior layer of a fuel hose because NBR has a high permeability to fuel and/or vapor and, therefore, is unsatisfactory as a barrier layer in a fuel hose. Appellants also argue that Shifman does not describe conductive NBR as a fuel vapor impermeable material (Br. 11-12).

The Shifman reference establishes that a person of ordinary skill in the art would have recognized the suitability of utilizing conductive NBR in the formation of various layers of fuel hoses including the innermost layer as well as a backing layer for an elastomeric layer. "The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.... Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). See also *In re Sneed*, 710 F.2d 1544, 1550 (Fed. Cir. 1983) ("[I]t is

² Moreover, a review of the present record reveals that it was conventional to use NBR as the inner layer of fuel hoses. These fuel hoses had a high permeability to fuel. However, environmental regulations imposed on the automotive industry have limited the amount of fuel vapor that can permeate from the fuel systems of motor vehicles. (Shifman, col. 1, ll. 19-31). Thus, there was a need to develop fuel hoses that would satisfy the environmental regulations.

not necessary that the inventions of the references be physically combinable to render obvious the invention under review."); and *In re Nievelt*, 482 F.2d 965, 968 (CCPA 1973) ("Combining the *teachings* of references does not involve an ability to combine their specific structures."). In the present case, a person of ordinary skill would have selected layers comprising NBR and/or THV depending on the conductive properties and fuel resistance desired in the end product

Appellants' arguments regarding the corrugations or convolutions of the tubular surface are not persuasive. As acknowledged by Appellants, Iio teaches corrugations of at least a portion of the tubular structure (Br. 13-14).

Appellants' arguments regarding the utilization of conductive materials in the various layers are not persuasive. Shifman discloses the suitability of using conductive materials in the various layers of fuel hoses.

Appellants' arguments regarding the fluorine content of the THV material is not persuasive. Shifman describes the use of THV in fuel hoses. The Appellants have not directed us to evidence that establishes the fluorine content of 70-75% by weight is different from and/or not obvious over the materials cited in the references of record.

Claims 2 and 4 stand rejected over Iio in view of Shifman, further in view of Schaerfl. Schaerfl is cited as teaching corrugated surface having alternating crest and valleys interconnected by shallow angle sidewalls and extending outward leave from the outer surface of the tube. The Examiner asserts that this construction exhibits a high degree of resistance to collapse and distortion. The Examiner, therefore, determined that one of ordinary skill in the art would have recognized the advantage of providing for the alternating crests and valleys interconnected by shallow angled side walls of

Schaerfl in the corrugations of Iio (Ans. 7-8). Appellants have not disputed the Examiner's factual determinations regarding the Schaerfl reference.

Rather, Appellants contend that the mere disclosure in Schaerfl of the alternating crests and valleys interconnected by shallow angled corrugated side walls does not obviate claims 2 and 4 which simply further limits independent claim 1 from which they depend (Br. 21). This argument is not persuasive for the reasons set forth in the present record and above.

Claims 24-26 stand rejected over Iio in view of Shifman and Schaertl. Appellants' arguments in traverse of this stated rejection are substantially the same as those presented for the rejection as discussed above. (*See* Br. 21-32). As such, these arguments are not persuasive for the reasons set forth in the discussion of the previous rejections.

Appellants also contend that the subject matter of claim 24 is directed to a fuel transport tube comprising: an inner conductive acrylonitrile-butadiene rubber layer containing carbon black; and an outer tetrafluoroethylene-hexafluoropropylene-vinylidenefluoride terpolymer barrier layer having a fluorine content of about 70 to 75% by weight. (Br. 24-25). The Examiner found that Shifman suggests utilizing a THV layer having a fluorine content of about 70 to 75% by weight. (*See* Ans. 10). Appellants have not disputed the Examiner's factual determination.

Conclusion

The rejection of claims 1, 3, 6-8, 10, 16, and 18-23 over Iio and Shifman is AFFIRMED. The rejections of claims 2, 4, and 24-26 over Iio, Shifman and, Schaerfl are AFFIRMED.

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ORDER

The Examiner's decision rejecting claims 1, 3, 6-8, 10, 16, and 18-26 under 35 U.S.C. § 103(a) is affirmed.

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)(iv).

AFFIRMED

PL Initials
sld

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