

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 10

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte LOUIS E. SANSONE

Appeal No. 1997-4044
Application No. 08/504,233¹

ON BRIEF

Before URYNOWICZ, NASE, and HECKER, Administrative Patent Judges.

NASE, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1, 3 to 11 and 13 to 18, which are all of the claims pending in this application.

We AFFIRM-IN-PART.

¹ Application for patent filed July 19, 1995.

BACKGROUND

The appellant's invention relates to a removable air mandrel for use in positioning hydrophone groups in the construction of towed array sonar systems (claims 1 and 3 to 10) and a process for installing hydrophone mandrels into an array forming part of a sonar system (claims 11 and 13 to 18). An understanding of the invention can be derived from a reading of exemplary claims 1 and 11, which are reproduced in the opinion section below.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Boxmeyer 1985	4,514,447	Apr. 30,
Bledsoe et al. 28, 1989 (Bledsoe)	4,809,243	Feb.
Maas et al. 1993 (Maas)	5,256,237	Oct. 26,
Davis et al. 1993 (Davis)	5,259,901	Nov. 9,
Muto et al. 1994 (Muto)	5,324,558	June 28,

Claims 1, 3, 5, 7 to 11 and 13 to 18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Maas in view of either Boxmeyer or Davis.

Claim 6 stands rejected under 35 U.S.C. § 103 as being unpatentable over Maas in view of either Boxmeyer or Davis as applied to claim 1 above, and further in view of Muto.

Claim 4 stands rejected under 35 U.S.C. § 103 as being unpatentable over Maas in view of either Boxmeyer or Davis as applied to claim 1 above, and further in view of Bledsoe.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the final rejection (Paper No. 4, mailed October 4, 1996) and the answer (Paper No. 9, mailed April 25, 1997) for the examiner's complete reasoning in support of the rejections, and to the brief (Paper No. 8, filed March 17, 1997) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

In the brief (p. 3), the appellant stated that the claims under appeal

can be grouped into two groups:

Group 1: Claims 1, 3-10 which are directed to an apparatus and

Group 2: Claims 11 and 13 -18 which are directed to a process.

In accordance with the appellant's grouping of claims and arguments provided, we need to review only the rejections of independent claims 1 and 11 to decide the appeal on the rejections under 35 U.S.C. § 103 set forth above.

The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary

skill in the art. See In re Young, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991) and In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). Moreover, in evaluating such references it is proper to take into account not only the specific teachings of the references but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968).

Claim 1

We sustain the rejection of claim 1 under 35 U.S.C. §
103.

Claim 1 reads as follows:

A removable air mandrel for use in positioning hydrophone groups in the construction of towed array sonar systems, said mandrel comprising:
an inflatable tubular structure;
said tubular structure having a wall structure and means for preventing the tubular structure from expanding in a longitudinal direction during inflation while permitting radial expansion; and
said preventing means comprising a plurality of fibers embedded within said wall structure, said fibers extending solely in a direction substantially parallel to a longitudinal axis of said tubular structure; and
whereby said fibers substantially limit any elongation of said tubular structure so as not to displace said hydrophone groups along an axis substantially parallel to said longitudinal axis.

Maas discloses an inner surface fiber affixation for manufacturing a sensor mandrel. Maas teaches (column 1, lines 14-16) that the field of his invention relates "to an inner surface fiber affixation system and to a process for producing fiber optic hydrophone sensor mandrels." Maas also teaches in his abstract that

[t]he inner surface affixation system and process is a method for affixing wound optical fibers on the inner surface of a hollow cylinder. It is useful, for example, in the manufacture of rigid mandrel-based fiber optic sensors. The optical fibers of a sensor wound on the inner surface are less susceptible to damage than are optical fibers wound on the outside of the mandrel. The process requires that the fibers be supported on a cylinder, which is coated with an adhesive and placed within the sensor mandrel cylinder, at which time the circumference of the supporting cylinder is expanded, causing the fibers to engage the inner surface of the sensor mandrel cylinder. The adhesive is then cured, holding the fibers in place on the inner surface of the sensor mandrel cylinder while the supporting cylinder is contracted and removed from the sensor mandrel cylinder.

In Figure 3, Maas further discloses a preferred embodiment using a cylindrical bladder 9. Cylindrical bladder 9 serves as supporting means for optical fibers 3. The cylindrical bladder consists of thin-walled hose 10, pressure plugs at each end 11, and a pressure vent 12. After the cylinder/fiber assembly is placed in hollow member 4, the internal pressure is increased causing expansion of the circumference of cylindrical bladder 9. Fibers 3 engage the inner surface of hollow member 4. Once the adhesive has cured, decreasing the internal pressure will allow removal of cylindrical bladder 9.

Davis discloses a method for constructing an inflatable elastomer mandrel for use in fabricating composite articles.

Davis teaches (column 2, lines 48-57) that

[i]t is another object of the present invention to provide a method for fabricating a reusable, inflatable/collapsible mandrel which can be quickly and easily removed from composite parts which have at least one opening that may be considerably smaller than the overall width or diameter of the main body of the part.

A further object of the present invention is to provide a method for fabricating a seamless inflatable mandrel which will maintain a desired thickness and shape when subjected to varying internal pressures.

Davis further discloses (column 2, line 67, to column 3, line 23) that

[t]he methods of the present invention are designed to fabricate a hollow, reinforced, inflatable, elastomer mandrel with at least one opening or port through which a gas may be supplied or removed to respectively inflate or deflate the inflatable mandrel. The inflatable mandrel constructed comprises layers of an elastomer containing interspersed layers of fiber reinforcement. The inflatable mandrel may be inflated to its expanded condition by connection of a pressurized gas supply. The actual steps for preparation of the surface of the inflatable mandrel is dependent upon specific materials and manufacturing processes selected for the composite fabrication. Following the inflatable mandrel surface preparation, the composite shell can be completed by the desired manufacturing process such as filament winding, braiding, tape rolling, hand lay-up, and resin transfer molding. This composite shell is then consolidated, cured, or set in a rigid state dependent upon subsequent

process operations. The pressure is then released allowing the inflatable mandrel to deflate and collapse, facilitating removal of the mandrel from the interior of the composite shell. Upon removal from the composite shell, the inflatable mandrel may be immediately readied for another composite fabrication process.

Lastly, Davis teaches that the hollow inflatable, elastomer mandrel can be reinforced with only polar windings (column 8, lines 25-26) which are shown in Figure 8.

Boxmeyer discloses an inflatable structural column/member. As set forth in the abstract, the inflatable structural column/member has

a substantially tubular shape and sealed at both ends, includes an inner lining to maintain internal pressure upon inflation. The inner lining is covered with a filament reinforced matrix structure comprising resin impregnated filaments of high tensile strength. The uninflated structural member is stowable in a collapsed condition. Curing of the resin matrix is inhibited by storing the collapsed member at a low temperature. Prior to use, the member is inflated with a fluid and heated to enable curing of the resin matrix.

As shown in Figure 3, and enlarged in Figure 3A, the filament reinforced matrix structure includes a first layer of filaments 304 spirally wound in the first direction 204 (see Figure 2), a second layer of longitudinal filaments 306 which

are oriented in a direction substantially parallel to the longitudinal axis of the member 100, and a third layer of filaments 307 which are spirally wound in the second direction 206.

After the scope and content of the prior art are determined, the differences between the prior art and the claims at issue are to be ascertained. Graham v. John Deere Co., 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966).

The examiner determined (final rejection, p. 2) that Maas discloses substantially all claimed elements except that it fails to show the means for preventing longitudinal expansion of the mandrel as set forth in claim 1. With regard to this difference, the examiner then determined that providing Maas's air mandrel with longitudinal fibers would have been obvious to one of ordinary skill in the art from the teachings of either Boxmeyer or Davis.

In applying the above-noted test for obviousness, we conclude that it would have been obvious to one of ordinary

skill in the art at the time the invention was made to have modified Maas' hose 10 (i.e., the inflatable tubular structure) to have included polar windings of a reinforcement fiber as suggested and taught by Davis. The motivation to have modified Maas based upon Davis' teachings is to have made Maas' hose 10 a reusable, inflatable/collapsible mandrel which can be quickly and easily removed and to have provided an inflatable mandrel which will maintain a desired thickness and shape when subjected to varying internal pressures as taught by Davis.

The appellant argues (brief, pp. 5-6) that claim 1 requires that the fibers extend solely in a direction substantially parallel to the longitudinal axis so as to substantially limit any elongation of the tubular structure so as not to displace the hydrophone groups along an axis substantially parallel to the longitudinal axis. The appellant then goes on to argue that the applied prior art fails to teach this aspect of the invention. The appellant also argues (brief, pp. 6-8) that there is no motivation to

combine Maas and Davis absent the use of impermissible hindsight.

We agree with the appellant that claim 1, taken as a whole, requires all the fibers embedded in the wall structure of the inflatable tubular structure to extend solely in a direction substantially parallel to the longitudinal axis of the inflatable tubular structure. As such, the combined teachings of Maas and Boxmeyer are not suggestive of the subject matter of claim 1 since all the fibers embedded in the wall structure of the inflatable tubular structure of Boxmeyer do not extend solely in a direction substantially parallel to the longitudinal axis of the inflatable tubular structure due to the presence of the first layer of filaments 304 and the third layer of filaments 307. However, for the reasons set forth above, it is our view that the combined teachings of Maas and Davis are suggestive of the subject matter of claim 1 since all the fibers embedded in the wall structure of the inflatable tubular structure of Davis do extend solely in a direction substantially parallel to the longitudinal axis of the inflatable tubular structure due the use of only polar

windings of the filaments as shown in Figure 8 of Davis. Thus, we disagree with the appellant that the rejection utilizing the combined teaching of Maas and Davis lacks the requisite motivation and thus involved the use of impermissible hindsight.

Lastly, the appellant argues (brief, pp. 6-8) that there is clearly no need in Maas to prevent any longitudinal extension and that Davis fails to show the need to limit the longitudinal expansion of an inflatable mandrel to position hydrophones. We find this argument unpersuasive for the following reason. As long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor. See In re Dillon, 919 F.2d 688, 693, 16 USPQ2d 1897, 1901 (Fed. Cir. 1990)(en banc), cert. denied, 500 U.S. 904 (1991) and In re Beattie, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992). The Davis reference is not being relied upon to teach an inflatable mandrel to correctly position hydrophones, but is being relied upon to show that it is known to use fibers

extending solely in a direction substantially parallel to a longitudinal axis of the inflatable tubular structure. Davis provides a clear motivation to combine its teachings with that of Maas for the reasons previously stated.

For the reasons stated above, the decision of the examiner to reject claim 1 under 35 U.S.C. § 103 is affirmed.

Claims 3 to 10

As stated above, the appellant has grouped claims 1 and 3 to 10 as standing or falling together. Thereby, claims 3 to 10 fall with claim 1. Thus, it follows that the decision of the examiner to reject claims 3 to 10 under 35 U.S.C. § 103 is also affirmed.

Claim 11

We will not sustain the rejection of claim 11 under 35 U.S.C. § 103.

Claim 11 reads as follows:

A process for installing hydrophone mandrels into an array forming part of a sonar system, said process comprising the steps of:

 providing an inflatable hose having a radially expandable wall structure and means for preventing longitudinal expansion of said wall structure during inflation;

 positioning hydrophone mandrels at desired locations along said hose to obtain a desired frequency;

 said positioning step comprising sliding said hydrophone mandrels over said hose and partially inflating said hose so as to provide a slip fit between the mandrels and the hose without causing any longitudinal displacement of the mandrels; and

 fully inflating said hose so as to provide a tight connection between said hose and said hydrophone mandrels without causing substantially any longitudinal displacement of the mandrels.

The examiner determined (final rejection, p. 2) that Maas discloses substantially all claimed elements except that it fails to show the means for preventing longitudinal expansion of the wall structure of the inflatable air mandrel/hose as set forth in claim 11. With regard to this difference, the examiner then determined that providing Maas's air mandrel with longitudinal fibers would have been obvious to one of ordinary skill in the art from the teachings of either Boxmeyer or Davis.

The appellant contests the examiner's determinations of the differences between Maas and claim 11. Specifically, the appellant argues (brief, pp. 8-9) that none of the applied prior art (including Maas) teaches (1) positioning hydrophone mandrels at desired locations along a hose to obtain a desired frequency; and (2) positioning hydrophone mandrels over the inflatable hose and then partially inflating the hose so as to provide a slip fit between the mandrels and thereafter fully inflating the hose so as to provide a tight connection between the hose and the hydrophone mandrels without causing substantially any longitudinal displacement of the mandrels.

We agree with the appellant that the applied prior art (e.g., Maas) does not teach positioning hydrophone mandrels at desired locations along a hose to obtain a desired frequency. In that regard, Maas is directed to a process for producing hydrophone mandrels. We have reviewed the full disclosure of Maas and fail to find any teaching therein of positioning hydrophone mandrels at desired locations along a hose to obtain a desired frequency. We have also reviewed the disclosures of both Boxmeyer and Davis and fail to find any

teaching which would have suggested positioning hydrophone mandrels at desired locations along a hose to obtain a desired frequency.

Additionally, we agree with the appellant that the applied prior art (e.g., Maas) does not teach positioning hydrophone mandrels over the inflatable hose and then **partially** inflating the hose so as to provide a slip fit between the mandrels and thereafter **fully** inflating the hose so as to provide a tight connection between the hose and the hydrophone mandrels without causing substantially any longitudinal displacement of the mandrels. We have reviewed the disclosures of Maas, Boxmeyer and Davis and fail to find any teaching which would have suggested positioning hydrophone mandrels over the inflatable hose and then **partially** inflating the hose so as to provide a slip fit between the mandrels and thereafter **fully** inflating the hose so as to provide a tight connection between the hose and the hydrophone mandrels without causing substantially any longitudinal displacement of the mandrels.

Since all the limitations of claim 11 would not have been obvious from the applied prior art for the reasons stated above, the decision of the examiner to reject claim 11 under 35 U.S.C.

§ 103 is reversed.

Claims 13 to 18

We will not sustain the rejection of dependent claims 13 to 18 under 35 U.S.C. § 103 for the reasons set forth above with respect to their parent independent claim (i.e., claim 11).

CONCLUSION

To summarize, the decision of the examiner to reject claims 1 and 3 to 10 under 35 U.S.C. § 103 is affirmed and the decision of the examiner to reject claims 11 and 13 to 18 under 35 U.S.C. § 103 is reversed.

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

STANLEY M. URYNOWICZ, JR.)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
JEFFREY V. NASE)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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STUART N. HECKER)	
Administrative Patent Judge)	

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APPEAL NO. 1997-4044 - JUDGE NASE
APPLICATION NO. 08/504,233

APJ NASE

APJ HECKER

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DECISION: **AFFIRMED-IN-PART**

Prepared By: Gloria Henderson

DRAFT TYPED: 13 Sep 99

FINAL TYPED: