

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. 33

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JUN FUJIKAMI, KENICHI SATO, TSUKUSHI HARA and
HIDEO ISHII

Appeal No. 1998-1917
Application No. 08/766,984

HEARD: Jan. 25, 2001

Before HAIRSTON, RUGGIERO and GROSS, Administrative Patent Judges.

RUGGIERO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal from the final rejection of claims 1, 3-7, and 9-15, which are the only claims remaining in the application. Claims 2 and 8 have been canceled.

The claimed invention relates to an insulated oxide superconducting cable in which a plurality of tape-shaped multifilamentary superconducting wires are spirally wound in superposed layers on a support structure former. A tape-

shaped insulating material consisting of a material having a thermal contraction rate of at least three times that of the superconductor wires is in turn spirally wound on the superconducting wires. Appellants assert at page 4 of the specification that the higher thermal contraction rate of the insulating material enables pressure to be exerted on the wires toward the former support structure during cooling thereby improving electrical contact between the superposed superconducting wires.

Claim 1 is illustrative of the invention and reads as follows:

1. An insulated superconducting cable conductor having a plurality of tape-shaped multifilamentary oxide superconducting wires, said insulated superconducting cable conductor comprising:

an elongated former having flexibility;

said plurality of tape-shaped multifilamentary oxide superconducting wires being spirally wound on said former at a bending strain factor in a prescribed range; and

a tape-shaped insulating material being spirally wound on said multifilamentary superconducting wires,

said multifilamentary superconducting wires being superposed in layers on said former, whereby stabilizing materials of superposed said superconducting wires are in contact with each other,

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said tape-shaped insulating material consisting essentially of a material being contracted at a thermal contraction rate of at least three times that of said multifilamentary superconducting wires by cooling from room temperature to liquid nitrogen temperature, whereby said tape-shaped insulating material can apply a pressure to superposed said multifilamentary superconducting wires from said tape-shaped insulating material toward said former by cooling in employment so that electrical contact between superposed said multifilamentary superconducting wires can be improved by cooling in employment, wherein said insulated superconducting cable conductor is for dc use.

The Examiner relies on the following prior art:

Sato et al. (Sato) 1994	5,276,281	Jan. 04,
	(filed August 24, 1992)	
Kikuchi et al. (Kikuchi) ¹ 1992	4-277,410	Oct. 02,
(Published Japanese Patent Application)		

Claims 1, 3-7, and 9-15 stand finally rejected under 35 U.S.C. § 103 as being unpatentable over Kikuchi in view of Sato.

¹ A copy is enclosed of an English translation relied upon in this decision, provided by the U.S. Patent & Trademark Office, June 1998.

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Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the Briefs² and Answer for the respective details.

² The Appeal Brief was filed March 16, 1998. In response to the Examiner's Answer dated April 27, 1998, a Reply Brief was filed June 26, 1998, which was acknowledged and entered by the Examiner without further comment as indicated in the communication dated October 19, 2000.

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OPINION

We have carefully considered the subject matter on appeal, the rejection advanced by the Examiner and the evidence of obviousness relied upon by the Examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, Appellants' arguments set forth in the Briefs along with the Examiner's rationale in support of the rejection and arguments in rebuttal set forth in the Examiner's Answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 1, 3, 4, and 6. We reach the opposite conclusion with respect to claims 5, 7 and 9-15. Accordingly, we affirm-in-part.

Appellant indicates (Brief, page 3) that, for purposes of this appeal, claims 1 and 3-6 stand or fall separately from claims 7 and 9-15, and separate arguments for patentability have been provided for independent claims 1 and 7 and

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dependent claims 4, 5, 13, and 15.³ We will consider the claims separately only to the extent that separate arguments are of record in this appeal. Dependent claims 3, 6, 9-12, and 14 have not been argued separately in the Briefs and, accordingly, will stand or fall with their base claims. Note In re King, 801 F.2d 1324, 1325, 231 USPQ 136, 137 (Fed. Cir. 1986); In re Sernaker, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed. Cir. 1983).

As a general proposition in an appeal involving a rejection under 35 U.S.C. § 103, an Examiner is under a burden to make out a prima facie case of obviousness. If that burden is met, the burden of going forward then shifts to Appellants to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir.

³ The separate patentability of the limitations of dependent claims 4, 5, 13, and 15 is argued at page 4 of the Reply Brief.

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1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976).

With respect to independent claim 1, the Examiner, as the basis for the obviousness rejection, proposes to modify the superconducting cable structure disclosure of Kikuchi which describes a plurality of tape-shaped superconducting wires spirally wound on a former. As recognized by the Examiner, Kikuchi lacks a teaching of providing a plurality of superposed layers of wires, as well as a layer of tape-shaped insulating material, having a thermal contraction rate "at least three times" that of the superconducting wires, surrounding the superconducting wires. To address these deficiencies, the Examiner turns to Sato which, in the illustrated Figure 2 embodiment, binds a plurality of superconducting wires 6 to a former 5 with insulating Teflon tape. In the Examiner's view, the skilled artisan would have been motivated and found it obvious to provide a Teflon insulating tape as taught by Sato around the superconducting wires of Kikuchi "to enhance the binding of the superconducting wires to the former." (Answer, page 4).

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After reviewing the Examiner's analysis, it is our view that such analysis carefully points out the teachings of the Kikuchi and Sato references, reasonably indicates the perceived differences between this prior art and the claimed invention, and provides reasons as to how and why the prior art teachings would have been modified and/or combined to arrive at the claimed invention. In our opinion, the Examiner's analysis is sufficiently reasonable that we find that the Examiner has at least satisfied the burden of presenting a prima facie case of obviousness. The burden is, therefore, upon Appellants to come forward with evidence or arguments which persuasively rebut the Examiner's prima facie case of obviousness. Only those arguments actually made by Appellants have been considered in this decision. Arguments which Appellant could have made but chose not to make in the Briefs have not been considered [see 37 CFR § 1.192(a)].

In response, Appellants assert the Examiner's failure to establish a prima facie case of obviousness since proper motivation for the proposed combination of Kikuchi and Sato has not been established. In Appellants' view (Brief, page

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7), neither Kikuchi nor Sato discloses that "contact between superconducting layers is improved by insulating tapes having the prescribed contraction rate." Further, Appellants contend (Reply Brief, page 3) that, since Sato is concerned with insuring that the superconducting wires and the former are structurally integrated so as to expand and shrink at the same rate, there is no motivation to use an insulating material layer with a higher contraction rate than the superconducting wires.

After careful review of the applied Kikuchi and Sato references, we find Appellants' arguments to be unpersuasive, and we agree with the Examiner's position as stated in the Answer. In our opinion, the skilled artisan, although Kikuchi's disclosure is silent on the subject, would be generally motivated by the need to bond the superconducting wires of Kikuchi to the former structure and, in our view, would have been logically led to employ the binding techniques disclosed by Sato including the Figure 2 Teflon tape embodiment. Since the evidence of record (e.g. Reply Brief, page 3) indicates that Teflon material has a thermal contraction rate of approximately six times that of the silver

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sheathed superconducting wires of Kikuchi, the resulting combination of Kikuchi and Sato would, therefore, meet all the requirements of independent claim 1. The fact that Sato has no disclosure which indicates a recognition of differing thermal contraction rates of the Teflon insulating tape and the superconducting wires, or any indication of a desire to take advantage of such differing thermal contraction rates to achieve wire to former binding, does not mitigate against Sato's clear suggestion to the skilled artisan to use Teflon tape to provide a necessary bond between wires and former. The fact that Appellant has recognized another advantage which would flow naturally from the suggestions of the prior art, i.e. that the higher thermal contraction rate of the Teflon insulating tape would exert pressure on the superconducting wires toward the former, cannot be the basis for patentability when the differences would otherwise be obvious. Ex parte Obiaya, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

In view of the above discussion, the Examiner's 35 U.S.C. § 103 rejection of independent claim 1, as well as dependent claims 3 and 6 which fall with claim 1, is sustained. The obviousness rejection of dependent claim 4 is sustained as

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well since the Teflon insulator layer used by Sato is a polyethylene compound material as claimed.

We do not, however, sustain the 35 U.S.C. § 103 rejection of dependent claim 5 which includes a requirement that the material used for the insulating layer have a thermal contraction rate "at least 10 times" that of the superconducting wires. While we remain convinced of the obviousness of the Examiner's proposed combination of Kikuchi and Sato, we find no basis for any suggestion to further modify this existing combination so as to use an insulating material of ten times thermal contraction rate as opposed to the six times inherent thermal contraction rate of Teflon. We find no evidence in the record that the skilled artisan would be led to enhance the binding pressure on the superconducting wires and former by substituting an insulating material with a higher thermal contracting rate than the Teflon of the combined structure since neither of the Kikuchi or Sato references has recognized or taken advantage of the effect of thermal contraction rates on binding pressure in the first instance.

Turning to a consideration of the Examiner's obviousness rejection of independent claim 7, we note that, while we found

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Appellants' arguments to be unpersuasive with respect to independent claim 1 discussed supra, we reach the opposite conclusion with respect to claim 7. Independent claim 7, while similar in many respects to independent claim 1, includes further recitations of specific characteristics of the superconducting cable structure such as binding strain factor, cooling temperature, and, in particular, the winding tension, i.e. in a range from 0.5 to 2kgf, with which the insulating material is wound on the superconducting wires.

The Examiner has taken the position (Answer, page 4), citing In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1969), that, where general conditions of a claim are disclosed by the prior art, discovering the optimum or workable ranges involves only routine skill in the art. It is our opinion, however, that the present factual situation and evidence presented to us do not support the Examiner's position. Appellants indicate at pages 11 and 12 of their specification that insulating tapes are to be wound with a tension within the prescribed range of 0.5 to 2kgf as claimed in order to effectively take advantage of the increased pressure provided

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during cooling by the higher thermal contraction rate insulating material.

In our view, since Sato provides no recognition of the advantages of thermal contraction rates in applying binding pressure to the superconducting wires, any winding tension optimization performed by the skilled artisan on Sato's insulating tape would be directed solely to that tension necessary to accomplish Sato's disclosed function of holding the superconducting wires on the former support. As alluded to by Appellants (Reply Brief, page 4), however, a loosely wound tape might perform Sato's disclosed purpose of fixing the superconductor wires on the former, but would not necessarily have the requisite winding tension to achieve the desired binding pressure from thermal contraction during cooling.

For the above reason, since all of the limitations of independent claim 7 are not taught or suggested by the prior art, the Examiner has not established a prima facie case of obviousness. Accordingly, the Examiner's 35 U.S.C. § 103 rejection of independent claim 7, as well as claims 9-15 dependent thereon, is not sustained.

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In summary, with respect to the Examiner's 35 U.S.C. § 103 rejection of the appealed claims, we have sustained the rejection of claims 1, 3, 4, and 6 but have not sustained the rejection of claims 5, 7, and 9-15. Therefore, the Examiner's decision rejecting claims 1, 3-7, and 9-15 is affirmed-in-part.

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

KENNETH W. HAIRSTON)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
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Administrative Patent Judge)	AND
)	INTERFERENCES
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