Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MARK MARKOVITZ,
JAMES J. GRANT, WILLIAM E. TOMAK,
and WILLIAM P. DOBBINS

Appeal No. 1999-1942
Application 08/770,037[1]

ON BRIEF

Before HAIRSTON, BARRETT, and LEVY, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

[1] Application for patent filed December 19, 1996, entitled (as amended in Paper No. 6) "Electrical Insulating Material and Stator Bar Formed Therewith."

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1-16, 19, and 20. Claims 17 and 18 have been objected to.

We reverse.

BACKGROUND

The invention relates to an insulation material suitable as groundwall insulation for a high voltage generator stator bar. The insulation material is formed of layers of resin-rich sheet material, wherein at least one of the layers is formed by a sheet material containing submicron oxide particles while at least one other is free of such oxide particles. The combination provides better voltage endurance performance than possible if the ground insulation is formed by only one of the material layers.

Claim 1 is reproduced below.

> 1. An electrical insulating material comprising at least first and second insulating layers, the first insulating layer comprising:
>
> a mica paper having first and second surfaces on opposite sides of the mica paper;
>
> a woven fabric on the first surface of the mica paper;
>
> a resin composition permeating the woven fabric and bonding the woven fabric to the mica paper; and

oxide particles dispersed in the woven fabric;

wherein the second insulating layer is free of oxide particles.

The Examiner relies on Appellants' admitted prior art (APA) in figures 1-3 and the following references:

Foster	4,013,987	March 22, 1977
Mitsui et al. (Mitsui)	4,335,367	June 15, 1982
Penneck	4,521,549	June 4, 1985

The content of the prior art is fairly described by Appellants (Brief, pp. 9-11).

Claims 1-16 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Foster, Penneck, and the APA.

Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Foster, Penneck, and the APA, as applied to claim 10, further in view of Mitsui.

We refer to the final rejection (Paper No. 9) (pages referred to as "FR__") and the examiner's answer (Paper No. 15) (pages[2] referred to as "EA__") for a statement of the Examiner's position, and to the brief (Paper No. 14) (pages

[2] The pages of the examiner's answer are not numbered and have been numbered beginning with the cover sheet as page 1.

referred to as "Br__") and the reply brief (Paper No. 16) (pages referred to as "RBr__") for a statement of Appellants' arguments thereagainst.

OPINION

The claims are grouped to stand or fall together (Br9). Claim 1 is analyzed as representative.

Foster discloses an oxide-free resin-impregnated mica paper tape 12 applied over an oxide-free resin-impregnated turn mica paper tape 11, but, as to claim 1, does not disclose the claimed: (1) woven fabric on one side of the mica paper; and (2) oxide particles dispersed in the woven fabric in just one of the two layers. The APA teaches resin-impregnated mica paper 17 having a woven fabric 18 on one side, woven fabrics 18a and 18b on both sides, or a woven fabric 18a on one side and a nonwoven fabric 18b on the other side. The Examiner concludes that it would have been obvious to make insulation layer 12 in Foster from a resin-impregnated mica paper with a woven fabric on one side in view of the APA (EA4). This conclusion is properly not challenged by Appellants. A number of layers of the groundwall insulation 15 in APA figure 1 could arbitrarily be designated as a first insulating layer

and the remaining layers could arbitrarily be designated as a second insulating layer, where both layers can be made of an oxide-free resin-impregnated mica paper with a woven fabric on one or both sides, so we agree that two layers of an oxide-free resin-impregnated mica paper with a woven fabric on one or both sides would have been obvious.

The issues are: (1) whether Penneck provides sufficient evidence to show a prima facie case of obviousness to disperse oxide particles in the woven fabric of Foster as modified in just one of the layers; and, if so (2) whether the test examples evidence unexpected results for two layers, only one of which contains oxide particles, and rebut the prima facie case.

(1)

The Examiner finds that Penneck teaches the use of oxides, such as titanium dioxide, as an anti-tracking additive for impregnated insulation (EA3-4). The Examiner concludes that it would have been obvious to disperse titanium dioxide particles in the outer layer 12 of Foster, as modified by the APA to have a fabric layer, for improved anti-tracking properties on the surface of the insulation (EA4). The

Examiner states that tracking is a surface phenomenon and, so, the oxide would be added to the outer insulation layer (FR8; EA7-8). The Examiner contends that "it is implied by Penneck, that his treatment is only for the outer insulation layer, because it would not make sense to apply it to an inner insulation layer where tracking would never occur" (EA8) and "that when, as in Foster's device, there are two separate insulating sections, an inner and an outer, then only the layers . . . of the outer section would be treated by the additive of Penneck, because it would make no sense to treat the layers of the inner section" (EA8).

Appellants argue that none of the references provides motivation for limiting the oxide filler to certain regions of Penneck's polymer insulating material, much less to one or more oxide-filled mica tape layers interleaved with one or more oxide-free mica tape layers (Br12). It is argued that Penneck requires the oxides to be used <u>in combination with</u> a hydrate of alumina and therefore cannot be said to suggest the use of oxides alone (Br 13-14). It is further argued that Penneck employs a polymeric (i.e., non-mica) insulating material and disperses the non-tracking additive (containing

an oxide) throughout the material and does not disclose adding anti-tracking additive only to an outer insulating layer (Br13-15; RBr4-5).

It is noted that, as disclosed with respect to the preferred embodiment of figure 8, the "mica tape 20 containing the submicron oxide particles 19 forms the inner groundwall layers 15b adjacent or near the tiers of conductor strands 12, while the unfilled tape 16 preferably forms the outer layers 15a of the groundwall insulation" (specification, p. 10, lines 7-11). This embodiment, if claimed, would clearly overcome the Examiner's reasons which are completely dependent on the oxide-containing tape being on the outside layer to prevent tracking. However, since at least the independent claims do not recite the order of layers, and since it is possible for the oxide layer to be on the outside (Appendix B, Example #11), the order of the layers is not considered.

Penneck discloses an electrically insulating material which comprises one or more polymers and an "anti-tracking filler system" comprising (a) a hydrate of alumina having a specific surface area, and (b) a compound from a group

including oxides (col. 1, lines 60-68). Penneck discloses that it was known in the prior art to incorporate hydrated alumina in substantial amounts to polymeric materials to protect against "tracking" (irreversible degradation of surface material from the formation of conductive carbonized paths due to electrical discharge or sparking) (col. 1, lines 15-57). Penneck discloses a synergistic anti-tracking effect due to component (b), such as allowing an increase in the amount of carbon black fillers to increase the U.V. (ultraviolet) resistance (col. 4, lines 8-35) and reducing the amount of filler material without loss of anti-tracking properties (col. 4, lines 36-54).

Penneck is not directed to Appellants' problem of increasing the voltage endurance performance of electrical insulating material, but is directed to a different problem of preventing tracking on molded and extruded polymers. The prior art need not suggest solving the same problem set forth by Appellants. See In re Dillon, 919 F.2d 688, 693, 16 USPQ2d 1897, 1901 (Fed. Cir. 1990) (in banc) (overruling in part In re Wright, 848 F.2d 1216, 6 USPQ2d 1959 (Fed. Cir. 1988)). However, when the references are directed to a

different unrelated problem, it always raises a question in our mind whether the Examiner properly worked forward from the teachings in the references to the claimed subject matter, or has started with knowledge of applicants' invention and worked backwards using whatever reasons are in the available prior art to justify the rejection, which is impermissible hindsight. "[T]he best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine the references." In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

In our opinion, the Examiner has failed to establish the requisite motivation to modify Foster, as modified by the APA, to arrive at the claimed subject matter for at least two reasons:

First, Penneck does not suggest using the anti-tracking filler system in other than a molded or extruded polymer where the filler is distributed uniformly throughout the material and, importantly, does not suggest using layers of oxide-filled and oxide-free materials. Penneck does not

suggest that dispersing oxide in a woven fabric bonded to a mica paper, as opposed to a solid molded or extruded polymer, will prevent tracking. While the Examiner has invented a plausible motivation for using an oxide-filled layer only on the outside layer, this reasoning finds no support in Penneck and appears to have been constructed using hindsight. The Examiner has found an oxide material used in an electrical insulation environment to solve a different problem than that addressed by Appellants, and worked backward by inventing reasons to modify Foster to arrive at the claimed invention rather than showing evidence in Penneck or in the knowledge of those of ordinary skill in the art that would have suggested the proposed modification. Because Appellants disclose an unexpected voltage endurance performance property using oxide-filled and oxide-free layers, as discussed in the next section, (which is inherent and need not be expressly claimed), which is not taught or suggested by Penneck, there must be more than an invented motivation for doing what Appellants have done.

Second, we find no teaching in Penneck that oxide component (b) is useful alone for preventing tracking; the

oxide component (b) is used in combination because it synergistically enhances the properties of the hydrated alumina of component (a). Thus, we agree with Appellants' argument (e.g., Br14) that there is no suggestion for using the oxide of component (b) alone to prevent tracking, which is the Examiner's motivation for the rejection. The motivation, if any, would be to use the anti-tracking filler system having both components (a) and (b) for its improved anti-tracking characteristics and such a material would contain an oxide. While it is true that claim 1 is open ended and does not preclude the addition of the hydrated alumina of component (a), the fact that the oxide component (b) is only an additive to the hydrated alumina for its synergistic effects indicates that hindsight was employed to find a material that happens to contain an oxide rather than a suggestion to use oxide itself. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84

(Fed. Cir. 1992), citing In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

The arguments about "hydrated oxides" at EA7-9, RBr4-6 are based on a misunderstanding of Appellants' arguments by the Examiner. Appellants contend that the alumina hydrate of component (a) is not an oxide, which the Examiner mistakenly interprets as an argument that Penneck does not teach an oxide. Appellants never dispute that component (b) can be an oxide. It does not appear that the Examiner contends that the alumina hydrate of component (a) is the oxide, even though it is a "hydrated oxide" because it is aluminum oxide bound to a water molecule; if so, the Examiner would be in error because the alumina hydrate is never referred to as an oxide. The Examiner relies on component (b) as the oxide, which is supported by the abstract and disclosure of Penneck. As we have discussed, there is no motivation for adding the oxide component (b) alone because it is not mainly responsible for preventing tracking.

For these reasons, we conclude that the Examiner has failed to establish a prima facie case of obviousness. The rejection of claims 1-16 and 20 is reversed. Mitsui does not

cure the deficiencies of Foster, Penneck, and the APA and, consequently, the rejection of claim 19 is reversed.

(2)

Although we have concluded that the Examiner did not establish a prima facie case of obviousness, and have reversed the rejections, we comment that the examples in the specification as summarized in Appendix B to the brief, establish unexpected or synergistic results for the reasons discussed by Appellants in the brief (Br16-22, particularly the comparisons at Br19-20). For example, as discussed by Appellants (Br19), Example #1 has 13 layers of "U" (unfilled resin binder) and a normalized life of 1.0. Example #2 has 10 layers of "A" (resin binder with a dispersion of 12% alumina) with a life of 3.21 times that of Example #1. One would expect that Example #3, having 5 layers of "A" and 5 layers of "U," would have a life intermediate that of Examples #1 and #2. However, in fact, it has over double the life, plainly establishing an unexpected result. The Examiner has failed to deal with these results.

The Examiner argues that Appellants have not discussed the "statistical significance" of the experimental results

(EA9-10), have not provided reasons why the results are unexpected (EA10; EA11) or shown that the experiments are repeatable (EA10-11), and that "[t]here is not enough data, and no statistical analysis, provided so that the Examiner can extrapolate what the results would look like if only one oxide-filled layer and one oxide-free layer [were provided]" (EA11). We generally agree with Appellants' response (RBr6-10). The tests results speak for themselves and cannot be ignored because reasons can be thought of why the results could be more complete.

Thus, even if the combination of references did establish a prima facie case of obviousness, it would be rebutted by this objective evidence of nonobviousness.

CONCLUSION

The rejections of claims 1-16, 19, and 20 are reversed.

REVERSED

KENNETH W. HAIRSTON)
Administrative Patent Judge)

LEE E. BARRETT Administrative Patent Judge	BOARD OF PATENT APPEALS AND INTERFERENCES
STUART S. LEVY Administrative Patent Judge	

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