

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RUDY VAN DEN BERGH

Appeal 2007-0835¹
Application 09/950,778
Technology Center 2800

Decided: May 23, 2007

Before CATHERINE Q. TIMM, JEFFREY T. SMITH, and LINDA M. GAUDETTE, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1, 2, and 4-12. We have jurisdiction under 35 U.S.C. § 6(b).

¹ An oral hearing was held on May 9, 2007.

We AFFIRM.

I. BACKGROUND

The invention relates to a luminescent intensifying screen (X-ray conversion screen). Such screens are used in radiography systems. In common medical radiography systems, the screens are fixed inside a cassette so that a double-side coated silver halide emulsion film (X-ray film) can be inserted in-between the two screens (Specification 2:31-36 and 15:12-19). In such systems phosphor within the intensifying screen converts X-rays into light of corresponding intensity so the light irradiates the light-sensitive silver halide photographic emulsion layer of the X-ray film (Specification 2:20-30). The image is later developed in the film (*id.*). Combinations of a single sided film with one screen are also known (Specification 3:1-8). Because the screens are reused, they are subject to scratching during loading and unloading of the X-ray film. To increase durability, the screens include a protective coating over the phosphor layer (Specification 3:15-21). The protective layer preferably has a relief structure that reduces friction and prevents sticking during loading and unloading of the X-ray film from the cassette (Specification 3:25-29). Forming such relief structures to an optimum surface roughness by embossing the protective layer was known in the art (Specification 3:34-4:4 referencing EP-A 0 510 754).

Appellant's screen, as claimed, includes a protective coating containing titanium dioxide in a binder of urethane acrylate, the protective coating having a particular surface roughness. Claim 1, the only independent claim, is illustrative of the subject matter on appeal:

1. Luminescent intensifying screen comprising a self-supporting or supported layer of phosphor particles dispersed in a binding medium and, adjacent thereto, a protective coating characterized in that said protective coating comprises a urethane acrylate binder and titanium dioxide as a white pigment and in that said protective coating has a surface roughness (Rz) between 2 and 10 μm .

The references relied upon by the Examiner are as follows:

Van Landeghem	US 4,386,431	May 31, 1983
Van Havenbergh	US 6,120,902	Sep. 19, 2000
Yamane	US 6,188,073	Feb. 13, 2001

The Examiner rejects claims 1, 2, and 4-12 under 35 U.S.C. § 103(a) as unpatentable over Yamane in view of Van Landeghem and Havenbergh.²

II. DISCUSSION

A. Issue

The Examiner's rejection is based on the teaching in Yamane of a luminescent intensifying screen including the claimed supported phosphor layer and a protective coating (Answer 4). The Examiner acknowledges that Yamane does not specifically disclose urethane acrylate as a binder in the protective layer or the level of roughening of the protective layer surface (*id.*). According to the Examiner, it would have been obvious to roughen the surface of Yamane's protective layer for the same reasons as Van

² The Examiner listed the rejection of claims 11 and 12 separately in the Final Office Action, however, the Examiner combines the two rejections as one in the Answer. Appellant lists two rejections under separate headings in the Brief but includes no sufficiently specific separate arguments to claims 11 and 12 for separate consideration. Therefore, we list the rejection as one rejection and select claim 1, the broadest independent claim to represent the issues on appeal.

Landeghem roughens the foil of that reference and it would have been obvious to optimize the roughness level through routine experimentation to obtain the benefits taught by Van Landeghem (*id.*, citing *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)). Further according to the Examiner, it would have been obvious to use a urethane acrylate composition as a binder for the protective coating of Yamane because as evidenced by Van Havenbergh, it was a known composition for use in protective coatings (Answer 5).

Appellant contends that the Examiner's reliance on Van Havenbergh for the teaching of a urethane acrylate binder for the protective layer of Yamane is misplaced because Van Havenbergh is directed to binders for the phosphor layer, not the protective layer (Br. 9-10). Appellant further contends that the Examiner's reliance on Van Landeghem for the teachings of roughness is misplaced because Van Landeghem is directed to a foil rather than a screen and does not teach or suggest the claimed roughness range of between 2 and 10 microns (Br. 10). Appellant also contends that no criticality is disclosed in the references as to these claimed features (Reply Br. 1-4).

The Examiner responds that the evidence supports the findings with regard to both the binder and the roughness (Answer 5-7).

The principle issue on appeal is: Does a preponderance of the evidence support the Examiner's determination that one of ordinary skill in the intensifying screen and radiography system manufacturing art would have found it obvious at the time of the invention to have provided the protective layer of Yamane's screen with a urethane acrylate binder and a surface roughness between 2 and 10 microns?

B. Facts

Yamane is directed to a radiographic intensifying screen including a support, a phosphor layer, and a protective layer (Yamane, col. 2, ll. 4-7). The protective layer contains light-scattering fine particles, preferably particles of titanium dioxide (Yamane, col. 4, ll. 27-44). The background of the invention section of Yamane discloses several prior art references that disclose roughened surfaces (Yamane, col. 1, ll. 29-41). The binder employable in the surface protective layer is not restricted, but is selected to provide surface durability (Yamane, col. 4, ll. 45-49). The object is to obtain a screen with good surface durability which gives a radiation image of high sharpness with high sensitivity (Yamane, col. 1, l. 66 to col. 2, l. 3). In preparation for use in a radiographic process, the radiographic X-ray film is placed in contact with a screen or in-between two screens (Yamane, col. 1, ll. 7-9; col. 5, ll. 38-42; col. 6, ll. 50-56; col. 8, ll. 47-51).

Van Havenbergh is also directed to a screen including a phosphor element with a protective coating used in radiography systems (Van Havenbergh, col. 1, ll. 7-18). Van Havenbergh suggests the use of urethane acrylates in the abrasion-resistant protective coating overlaying the phosphor layer (Van Havenbergh, col. 5, l. 45 to col. 6, l. 22).

Van Landeghem is directed to an X-ray film cassette in which air pockets are eliminated between a reinforcing foil and an X-ray film within the cassette (Van Landeghem, col. 1, ll. 36-39). The surface of the reinforcing foil facing the film has a roughness of between 10 and 60 microns (Van Landeghem, col. 1, ll. 45-47). The roughness allows air to flow out during loading and unloading of the X-ray film from the cassette so that air pockets are eliminated on loading and sticking reduced on unloading

(Van Landeghem, col. 1, ll. 36-58; col. 3, ll. 28-40). Roughening can be accomplished by embedding particles or by embossing the surface (Van Landeghem, col. 3, ll. 17-20). As shown in Figure 4, the foil 9 includes a light-active layer 13 and particles 12, the particles 12 holding the film 11 at a distance from the foil 9 (Van Landeghem, Fig. 4; col. 3, ll. 21-35).³ The “foil” is in the same contacting position with the X-ray film as the “screen” of Yamane (Figs. 1 and 2 showing foil 9, Fig. 4 showing the loading of the X-ray film 11).

C. Analysis

With regard to the issue of whether one of ordinary skill in the art would have found it obvious to select a urethane acrylate for the protective layer binder in the screen of Yamane, a preponderance of the evidence supports the determination of the Examiner. As found by the Examiner, and contrary to the argument by Appellant, Yamane describes the inclusion of a binder in the protective layer to provide durability (Yamane, col. 4, ll. 45-49). Van Havenbergh describes compositions containing urethane acrylates that provide durability to a protective layer (Van Havenbergh, col. 5, ll. 45-49 and 65-67). This is not disputed by Appellant (Br. 9-10). The use of the known urethane acrylate composition for its established use in a protective coating is no more than the predictable use of a prior art element according to its established function and, therefore there is an adequate suggestion in the art to support the rejection. *See KSR Int'l. Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1739, 82 USPQ2d 1385, 1395 (2007) (“The combination of

³ Van Landeghem contains an obvious typographical error at column 3, line 27. As shown, for instance, at column 3, line 7, reinforcing foil is properly labeled “9” not “11.”

familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.); *see also In re Omeprazole Patent Litigation*, ___ F.3d ___, 2007 WL 1175673, at 9 (Fed. Cir. 2007)(holding it obvious to substitute one known alkaline reacting compound (ARC) for another where each was known to stabilize omeprazole).

With regard to the issue of whether one of ordinary skill in the art would have found it obvious to roughen the surface of Yamane's protective layer to a level between 2 and 10 microns, we also find that the preponderance of the evidence supports the determination of the Examiner. The contacting surface of Yamane's screen is intended to contact the X-ray film in the same manner as the "foil" of Van Landeghem and is subject to the same problem, i.e, air pockets upon loading of the X-ray film and stickiness upon unloading. Therefore, the use of the roughened surface suggested by Van Landeghem in the screen of Yamane would have been obvious to one of ordinary skill in art because it would have been expected to solve the air pocket and stickiness problem known in the art. *See KSR*, 127 S. Ct. at 1742, 82 USPQ2d at 1397 ("One of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims."); *see also In re Kahn*, 441 F.3d 977, 987-88, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006)(“consider what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.”).

Moreover, Van Landeghem suggests roughening to a level of between 10 and 60 microns, a range touching Appellant's claimed range of 2-10 microns for the same purpose of preventing stickiness. One of ordinary skill in the art would have expected to obtain the desired air pocket elimination and anti-stickiness at a roughness of 10 microns, a roughness encompassed by Appellant's claim 1. A claimed invention can be rendered *prima facie* obvious by a prior art reference that discloses a range that touches the range recited in the claim. *In re Geisler*, 116 F.3d 1465, 1469, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997) (*citing In re Malagari*, 499 F.2d 1297, 1303, 182 USPQ 549, 553 (CCPA 1974)). In fact, Appellant's own discussion of the prior art, particularly the discussion of EP-A 0 510 754 (Specification 3:25 to 4:4), indicates that it was known in the art to roughen the surface.

Furthermore, where as here the prior art acknowledges that the variable has effects, e.g., the effect of air flow by roughening, there is motivation to conduct routine experimentation to optimize those effects to get the expected benefits, i.e., elimination of air pockets and stickiness. It is true that a routine variable change sometimes causes an unexpected effect. In such a situation, the claimed subject matter will be unobvious under the law if Appellant presents a showing of criticality of the range for unexpected beneficial results. See *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980). Note also *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936-37 (Fed. Cir. 1990), and *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Appellant presents no convincing evidence of unexpected results on this record.

D. Conclusion

We conclude that the Examiner has established by a preponderance of the evidence that one of ordinary skill in the intensifying screen art would have found it obvious at the time of the invention to have provided the protective layer of Yamane's screen with a urethane acrylate binder and a surface roughness between 2 and 10 microns. Appellant has not convinced us of a reversible error by the Examiner nor overcome the Examiner's reasonable conclusion of obviousness by a showing of secondary considerations.

III. OTHER ISSUES

In the event of further prosecution, the Examiner should consider the relevance of EP-A 0 510 754 to the issue of patentability. This document, cited in the Specification at page 3, line 36, describes a screen with an embossed protective coating with a roughness optimized to prevent sticking, friction, and electrostatic attraction (EP '754, p. 3, ll. 35-49) and suggests that a roughness of 3 microns for a protective coating 8 microns thick provides favorable image sharpness (EP '754, p. 4, ll. 13-14) and includes examples of screens with a roughness range of 1-8 microns (EP '754, p. 8, ll. 48-49; fig. 1). This document also suggests the use of urethane acrylates in the radiation curable composition for forming the protective coating (EP '754, p. 5, ll. 9-46; p. 8, ll. 24-30).

IV. DECISION

With regard to the decision of the Examiner to reject claims 1, 2, and 4-12 as obvious under 35 U.S.C. § 103(a), we AFFIRM.

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V. TIME PERIOD FOR RESPONSE

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

AFFIRMED

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BREINER & BREINER, L.L.C.
P.O. BOX 19290
ALEXANDRIA, VA 22320-0290