UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KATSUHIKO SHINYAMA,
REIZO MAEDA,
YASUYUKI HARADA,
TADAYOSHI TANAKA,
YOSHINORI MATSUURA,
TOSHIYUKI NOHMA, and
IKUO YONEZU

Appeal 2006-3027
Application 10/369,706
Technology Center 1700

Decided: April 5, 2007

Before CHARLES F. WARREN, THOMAS A. WALTZ, and
PETER F. KRATZ, *Administrative Patent Judges*.

WALTZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Primary Examiner's final rejection of claims 1-12, which are the only claims pending in this application. We have jurisdiction pursuant to 35 U.S.C. § 6.

According to Appellants, the invention is directed to a nickel electrode for alkaline secondary batteries comprising a porous sintered nickel substrate loaded with a nickel hydroxide-based active material, where a first coating layer of a cobalt compound and a second coating layer of a specified compound are laid on a portion of the active material (Br. 5). Independent claim 1 is illustrative of the invention and is reproduced below:

> 1. A nickel electrode for alkaline secondary battery including a porous sintered nickel substrate loaded with a nickel hydroxide-based active material, the nickel electrode comprising
>
> a first coating layer of cobalt compound laid on a surface portion of the active material loaded into the sintered nickel substrate; and
>
> a second coating layer laid on the first coating layer and based on a compound of at least one element selected from the group consisting of nickel, magnesium, calcium, barium, strontium, scandium, yttrium, lanthanide and bismuth.

The Examiner has relied upon the following references as evidence of obviousness:

Maruta	US 6,245,459 B1	Jun. 12, 2001
Kimiya	US 6,261,720 B1	Jul. 17, 2001

ISSUES ON APPEAL

Claims 1-12 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Maruta in view of Kimiya (Answer 3).

Appellants contend that Maruta does not teach any second coating layer, and that the nickel oxyhydroxide layer of Maruta is a layer of active material (Br. 7-8; Reply Br. 3-4).

Appellants contend that Kimiya is directed to a paste type nickel electrode, which is substantially different from the porous sintered nickel substrate of Maruta, and thus there is no teaching or suggestion that the layers of Kimiya would work on the substrate of Maruta (Br. 8).

Appellants contend that Kimiya does not teach any second coating layer but requires a "complex layer" which is a layer on the discrete particles which make up the active material (Br. 9-10; Reply Br. 4).

The Examiner contends that Kimiya is directed to a nickel-based electrode, and teaches improved results for an alkaline storage battery when a surface layer on the electrode substrate has an average composition including one element selected from the group consisting of Ca, Sr, Ba, Y, Cd, Co, Bi, and lanthanoids (Answer 5 and 8).

Accordingly, the issues presented in this appeal are as follows: (1) would one of ordinary skill in the art have applied the teachings of Kimiya, directed to a foamed nickel type electrode for an alkaline storage battery, to modify the porous sintered electrode of Maruta?; and (2) in so modifying, would the teachings of Kimiya applied to the electrode substrate of Maruta produced the claimed two coating layer nickel electrode?

We determine that the Examiner has established a prima facie case of obviousness in view of the reference evidence, which prima facie case has not been adequately rebutted by Appellants' arguments. Therefore we AFFIRM the sole rejection on appeal essentially for the reasons stated in the Answer, as well as those reasons set forth below.

OPINION

We determine the following factual findings from the record in this appeal:

(1) Maruta discloses a sintered nickel porous plaque substrate for alkaline storage batteries including a layer of nickel oxyhydroxide active material that prevents the nickel skeleton from corroding and an outside layer of cobalt oxyhydroxide that improves the electric conductivity (Abstract; Figure 2; col. 3, ll. 33-59; col. 4, ll. 11-26; and col. 8, ll. 1-8; Answer 3-4);

(2) Kimiya discloses an active material used in a positive electrode for alkaline storage batteries which exhibits high energy density (col. 1, ll. 5-10 and 36-38);

(3) Kimiya teaches that the main active material of a positive electrode in industrial Ni-Cd storage batteries has been nickel oxide (NiOOH), while recently the conventional substrate of the electrode (sintered nickel plaque) has been replaced by a network substrate having a higher porosity, and thus a higher energy density when filled with active material (e.g., a foamed nickel substrate) (col. 1, ll. 41-57);

(4) Kimiya teaches that problems of low conductivity have occurred for foamed nickel substrates, which require the incorporation of various metallic elements (col. 1, l. 59-col. 2, l. 10); and the incorporation of metallic elements into the active material has been known "for a long time" when using a sintered substrate (col. 2, ll. 17-24);

(5) Kimiya teaches that a method of forming a surface layer of Co oxide on the active material powder has been suggested to improve conductivity (col. 2, ll. 41-47);

(6) Kimiya discloses a novel active material capable of attaining an energy density higher than a conventional active material, comprising a multi-metals oxide with an average composition of the surface layer different from an average composition of the interior layer (col. 5, ll. 1-5 and 35-46);

(7) Kimiya teaches that the "multi-metals oxide" has a defined surface layer and composition different from the interior, which improves battery performance at high temperature (col. 7, ll. 19-58; col. 8, l. 67-col. 9, l. 24);

(8) Kimiya exemplifies a foamed nickel substrate 1 filled with an active material 2 that is coated with a porous conductive layer 3 of CoOOH, a Y_2O_3 powder 4 and a resin binder 5 (col. 10, ll. 50-67; *see* Figure 3); and

(9) Kimiya exemplifies the composition of surface layers and the interior of the "multi-metals oxide" active material (col. 24, Table 6).

Where the claimed subject matter has been rejected as obvious over a combination of prior art references, a proper analysis under § 103 requires consideration of at least two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device; and (2) whether the prior art would also have revealed that in so making, those of ordinary skill would have a

reasonable expectation of success. *See In re Vaeck,* 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991). Obviousness does not require absolute predictability; all that is required is a reasonable expectation of success. *See In re O'Farrell,* 853 F.2d 894, 903-04, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988).

Applying the preceding legal principles to the factual findings in the record of this appeal, we determine that the Examiner has established a prima facie case of obviousness. We determine that Maruta discloses every limitation of claim 1 on appeal except the presence of a second coating layer on the active material loaded into a porous sintered nickel substrate (*see* factual finding (1) listed above). We determine that Kimiya teaches that both porous sintered nickel substrates and foamed nickel substrates have been known for use as the positive electrode in alkaline storage batteries, both substrates have problems with low conductivity, and these problems have been solved for both substrates by the incorporation of metallic elements (*see* factual findings (3) and (4) listed above). We also determine that Kimiya teaches that forming a layer of Co oxide on the active material has been suggested to improve conductivity, which is the same improvement suggested by Maruta for porous sintered nickel substrates (*see* factual findings (1) and (5) listed above). Accordingly, we determine that the reference evidence establishes that one of ordinary skill in this art would have reasonably expected achieving the beneficial results of Kimiya by applying the teachings of Kimiya to the porous sintered nickel substrate of Maruta (*see* factual findings (2) and (6) listed above).

We determine that the reference evidence establishes that one of ordinary skill in this art would have used the surface layer taught by Kimiya

to improve the high temperature charge characteristic over the first coating layer (of the cobalt compound) in the electrode disclosed by Maruta (*see* factual finding (8) listed above). We note that Kimiya teaches a nickel skeleton, the same nickel oxide active material as disclosed by Maruta, and the same Co oxyhydroxide layer to improve conductivity as taught by Maruta (*see* factual findings (1) and (8) listed above). Additionally, we determine that it would have been well within the ordinary skill in this art to substitute the entire active material of Kimiya for the active material of Maruta, with its attendant benefits (*see* factual finding (2) listed above). We determine that the complex "multi-metals oxide" active material taught by Kimiya has two compositions or layers on the active material, thus reading on the first and second coating layers of the claims on appeal (*see* factual findings (7), (8), and (9) listed above). As taught and exemplified by Kimiya, the foamed nickel substrate of the reference has nickel oxide (NiOOH) as the active material, with various compositions of metallic elements in the interior and the surface layer of the complex oxide (*see* factual findings (8) and (9) listed above). As shown by Figure 3 of Kimiya and the compositions listed in Table 6, the interior layer may be a cobalt compound and the surface layer may be a compound of yttrium (Figure 3), calcium or nickel (Table 6, Example 14). Although these layers are coated on discrete particles of the active material (Kimiya, col. 10, ll. 53-56), we determine that these coatings are "laid on a surface portion of the active material" within the scope of the claims on appeal.

For the foregoing reasons and those stated in the Answer, we determine that the Examiner has established a prima facie case of obviousness in view of the reference evidence. Based on the totality of the

record, including due consideration of Appellants' arguments, we determine that the preponderance of evidence weighs most heavily in favor of obviousness within the meaning of § 103(a). Therefore we affirm the rejection of claims 1-12 under § 103(a) over Maruta in view of Kimiya.

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) (2006).

AFFIRMED

tf/ls

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