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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/806,894	08/24/2010	Harilaos Mavridis	88-2239A	9479

24114 7590 12/27/2019

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EXAMINER
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ART UNIT	PAPER NUMBER
1762	

NOTIFICATION DATE	DELIVERY MODE
12/27/2019	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HARILAOS MAVRIDIS, DEBRA L. BERAN, JEFFREY R. GOLDEN, JOACHIM T. M. PATER, and GIAMPIERO MORINI

Appeal 2018-008916
Application 12/806,894
Technology Center 1700

Before KAREN M. HASTINGS, MICHAEL P. COLAIANNI, and JANE E. INGLESE, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1, 7, 9–12, 26, 27, and 31. We have jurisdiction under 35 U.S.C. § 6(b). Appellant waives oral argument in this appeal in the Notice of Hearing Response filed on December 16, 2019. We AFFIRM.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Equistar Chemicals, LP. Br. 2.

Appellant's invention is directed to a method for producing linear low density polyethylene grades having controlled xylene solubles and hexane solubles (Spec. 1:5-7; Claim 1).

Claim 1[2] is representative of the subject matter on appeal:

1. A method for making linear low density polyethylene (LLDPE) grades comprising:

(a) producing a first linear low density polyethylene by copolymerizing ethylene with butene or hexene in the presence of a Ziegler-Natta catalyst consisting of $TiCl_4$ supported on $MgCl_2$, an alkylaluminum consisting of trialkylaluminum, and an electron donor consisting of tetrahydrofuran, wherein the alkylaluminum/electron donor molar ratio is 4.3-7.1;
(b) determining the dependency of xylene solubles or hexane extractables on the first alkylaluminum/electron donor molar ratio;
(c) producing a second linear low density polyethylene wherein the step of producing the second linear low density polyethylene comprises the steps of:
(i) copolymerizing ethylene with said butene or hexene in the presence of said Ziegler-Natta catalyst, said alkylaluminum, and said electron donor, and
(ii) producing a second alkylaluminum/electron donor molar ratio by either:

(1) keeping constant the first alkylaluminum amount and varying the first electron donor amount to produce a second electron donor amount; or,

[2] Claim 1 recites producing a first linear low density polyethylene and producing a second linear low density polyethylene. The claim is not clear whether the product of the first linear low density polyethylene is fed and used during the step of producing a second linear low density polyethylene. It is also unclear if the result is a blended linear low density polyethylene. We note that the Specification discloses that in the two reactor embodiment the linear low density polyethylene produced in the first reactor is sent, in part, to a second reactor for further reaction in forming the second linear low density polyethylene where a blend of LLDPE is made (Spec. 5:28-32; 6:1-7; 9:17-19). In the event of further prosecution, these observations should be addressed.

(2) keeping constant the first electron donor amount and varying the first alkylaluminum amount to produce a second alkylaluminum amount; wherein the LLDPE grades consist of a base resin density of 0.9184-0.9205 g/cm³.
Br. 12. (Claims App.).

Appellant appeals the following rejections:

1. Claims 1, 9–12, and 31 are rejected under 35 U.S.C. § 103 as unpatentable over Jorgensen (US 6,187,866 B1, issued Feb. 13, 2001).
2. Claim 7 is rejected under 35 U.S.C. § 103 as unpatentable over Jorgensen in view of Brita (US 2006/0089251 A1, published Apr. 27, 2006).
3. Claims 26 and 27 are rejected under 35 U.S.C. § 103 as unpatentable over Jorgensen in view of Mitsuno (US 6,667,675 B1, issued Dec. 23, 2003).

Appellant argues the claims under rejections (1) to (3) as a group (Br. 4–10). Therefore, we select claim 1 as representative of the group. 37 CFR §41.37(c)(iv).

FINDINGS OF FACT & ANALYSIS

The Examiner's findings and conclusions regarding the rejection of claim 1 over Jorgensen are located on pages 3 to 5 of the Final Action.

We have fully considered Appellant's arguments and we find that the preponderance of the evidence favors the Examiner's obviousness conclusion for the reasons discussed in the Final Action and Answer. We add the following analysis for emphasis.

Appellant argues that Jorgensen does not teach a method of making linear low density polyethylene (LLDPE) compositions by using the required alkylaluminum/electron donor (activator) molar ratio (Br. 6). Appellant contends that the Examiner is picking and choosing from Jorgensen in an attempt to reconstruct the claimed subject matter (Br. 6). Appellant argues that Jorgensen provides that the molar ratio of activator to electron donors is from 0.1:1 to 1:1, which is significantly less than the 4.3:7.1 activator to electron donor ratio in the claims (Br. 6). Appellant argues that the activator ratios required by claim 1 as well as the $MgCl_2$ catalyst support, have not been shown to be result effective variables that would have been optimized (Br. 8).

The Examiner finds correctly that Jorgensen teaches that the activator to electron donor ratio affects the level of hexane extractables in the resulting polymer (Final Act. 4; col. 17, lines 41–44). Jorgensen further discloses that varying the activator 1 or activator 2 molar ratios to the electron donor compound allows manipulation of the melt flow ratio (MFR) and polymer bulk density, while allowing control of catalyst productivity (col. 17, ll. 31–34). We agree with the Examiner that Jorgensen teaches that the activator to electron donor ratio is a result effective variable for affecting various properties of the resulting LLDPE. As a result effective variable it would have been obvious to optimize the activator to electron donor ratio to achieve a polymer having the desired properties. In this case, claim 1 includes an activator to electron donor ratio from 4.3 to 7.1. This ratio may be normalized to a 1 to 1.65 ratio of activator to electron donor. Jorgensen's proviso in column 3 at lines 18 to 20 states "the mole ratio of the precursor activator compound to the electron donor is in the range of *about* 0.1:1 to

about 1:1" (emphasis added). Jorgensen's disclosure includes ratios greater than 1. In our view, the claimed activator to electron donor range from 1:1.65 (or 4.3:7.1 un-normalized to 1) would have been obvious in view of Jorgensen's disclosure that includes values of "about 1:1." Appellant proffers no evidence of unexpected results or criticality in the claimed activator to electron donor ratio (Br. *generally*).

Appellant contends that Jorgensen teaches a methodology entirely different for controlling extractables versus the instant invention such that the relationship of alkylaluminum/THF to extractables levels for the claimed method is neither obvious nor derivable from Jorgensen (Br. 7). Appellant contends that Jorgensen changes the sum of the ratio of first activator (tri-n-hexylaluminum (TnHAL) to tetrahydrofuran (THF) and the ratio of second activator (diethylaluminum chloride (DEAC)) to THF to change the hexane extractable levels (Br. 7–8). Appellant contends that the claims require that the sum of the first activator to THF and second activator to THF remains constant where only the triethylaluminum (TEAL) in the reactor is changed, which is a significant improvement and inventive distinction over Jorgensen (Br. 8). Appellant contends that the claimed method is faster than the prior art method (Br. 9).

Contrary to Appellant's arguments, claim 1 requires, in relevant part, a step of producing a first linear low density polyethylene using an alkylaluminum/electron donor ratio from 4.3 to 7.1 and a step of producing a second linear low density polyethylene that includes a step of producing a second alkylaluminum/electron donor molar ratio by either: (1) keeping constant the first alkylaluminum amount and varying the electron donor amount to produce as second electron donor amount or (2) keeping constant

the first electron donor amount and varying the first alkylaluminum amount to produce a second alkylaluminum amount (claim 1). Appellant's argument about the sum of the ratios of the first activator to THF and second activator to THF and only varying the triethylaluminum amount is not persuasive because those limitations argued do not appear in the claim. *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) ("Many of appellant's arguments fail from the outset because . . . they are not based on limitations appearing in the claims."). Moreover, Appellant's argument about the faster response by using the claimed method lacks any evidence to substantiate the argument. No evidence has been proffered and we note that the claims do not recite any particular time limitation.

The Examiner provides an analysis of this argument on page 8 of the Answer. Specifically, the Examiner finds that Jorgensen shows in Examples 3 and 4 of Table III that first alkylaluminum amount (i.e., A1/ED of 0.39) is changed to a second alkylaluminum amount (i.e., A1/ED of 0.51), while the ratio of activator 2 to electron donor (i.e., A2/ED) is held relatively constant (0.22 to 0.23). We adopt the Examiner's response, which Appellant does not challenge or otherwise respond to (no Reply Brief).

Appellant contends that Jorgensen prefers to use no catalyst support but prefers silica as catalyst support if one is used (Br. 8). Appellant argues that $MgCl_2$ is chemically and structurally different from silica (Br. 8).

Although Jorgensen prefers not to use a catalyst support and patentee prefers silica if one is used, the Examiner finds that Jorgensen does teach that $MgCl_2$ is used as part of the catalyst structure (Final Act. 3; Ans. 8). Appellant does not respond or otherwise show reversible error with the Examiner's finding regarding the $MgCl_2$. Accordingly, Appellant has not

shown error in the Examiner's finding that $MgCl_2$ is part of Jorgensen's catalyst support structure.

Therefore, we affirm the Examiner's § 103 rejections of all the claims on appeal.

CONCLUSION

In summary:

Claims Rejected	Basis	Affirmed	Reversed
1, 9–12, 31	§ 103	1, 9–12, 31	
7	§103 Jorgensen and Brita	7	
26, 27	§ 103 Jorgensen and Mitsuno	26, 27	
Overall Outcome		1, 7, 9–12, 26, 27, 31	

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

AFFIRMED