



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/597,523 08/29/2012 Hyung Suk Woo 2012EM251 9372

27810 7590 02/01/2019
ExxonMobil Research & Engineering Company
P.O. Box 900
1545 Route 22 East
Annandale, NJ 08801-0900

EXAMINER

DOYLE, BRANDI M

ART UNIT PAPER NUMBER

1771

NOTIFICATION DATE DELIVERY MODE

02/01/2019

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ipg@exxonmobil.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HYUNG SUK WOO, JANE CHI-YA CHENG,
TEH C. HO, and STEPHEN HAROLD BROWN,

Appeal 2017-003340
Application 13/597,523¹
Technology Center 1700

Before JEFFREY T. SMITH, CHRISTOPHER C. KENNEDY, and
MONTÉ T. SQUIRE, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134(a) from the final rejection of claims 1–5, 7–14, and 16–26. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

The appealed invention relates to a process for producing a hydroprocessed product comprising exposing a combined feedstock comprising a heavy oil feed component and a solvent component to a

¹ According to Appellants, the real party in interest is ExxonMobil Research and Engineering Co. *See* App. Br. 3.

hydroprocessing catalyst. (Spec. ¶ 12). Independent claim 1 is representative of the appealed subject matter and reproduced below:

1. A process for producing a hydroprocessed product, comprising:

exposing a combined feedstock comprising a heavy oil feed component and a solvent component to a bulk metal hydroprocessing catalyst comprising a Group VIII non-noble metal and a Group VI metal and having a median pore size of about 85 Å to about 120 Å, under effective fixed bed hydroprocessing conditions to form a hydroprocessed effluent, the effective hydroprocessing conditions including a total pressure of about 1500 psig (10.3 MPag) or less, a temperature of at least about 360°C, and a liquid hourly space velocity of the fraction of the combined feedstock boiling above 1050°F (566°C) of at least about 0.10 hr⁻¹, the heavy oil feed component having an n-pentane asphaltene content of at least about 5 wt%;

separating the hydroprocessing effluent to form at least a liquid effluent; and

fractionating a first portion of the liquid effluent to form at least a distillate product and a bottoms product, the bottoms product having an ASTM D6352 distillation point of at least about 600°F (316°C).

Claims Appendix to App. Br. 17.

Appellants (*see App. Br., generally*) request review of the following rejections:

I. Claims 1–3, 5, 7–12, and 17–26 are rejected under 35 U.S.C. 103(a) as unpatentable over the combined teachings of Eijsbouts-Spickova (US 2010/0248945 A1; Sept. 30, 2010), Shih (US 4,421,633; Dec. 20, 1983), Peck (US 4,808,298; Feb. 28, 1989), Baldassari (US 2010/0320122 A1; Dec. 23, 2010), and Gauthier (US 2008/0149534 A1; June 26, 2008).

II. Claims 4, 13, and 14 are rejected under 35 U.S.C. 103(a) as unpatentable over the combined teachings of Eijsbouts-Spickova, Shih, Peck, Baldassari, Gauthier, and Bowes (US 4,548,709; Oct. 22, 1985).

III. Claim 16 is rejected under 35 U.S.C. 103(a) as unpatentable over the combined teachings of Eijsbouts-Spickova, Shih, Peck, Baldassari, Gauthier, and Tan (US 2007/0295640 A1; Dec. 27, 2007).

The complete statement of the rejections on appeal appear in the Final Office Action. (Final Act. 4–14).

OPINION

Upon consideration of the evidence in this appeal record in light of the respective positions advanced by the Examiner and Appellants, we determine that Appellants have identified reversible error in the Examiner's rejection of independent claims 1, 25, and 26. We add the following:

The dispositive issue for this appeal is:

Did the Examiner err in determining that the combined teachings of Eijsbouts-Spickova, Shih, and Peck teach or suggest a process for producing a hydroprocessed product, comprising exposing a combined feedstock comprising a heavy oil feed component and a solvent component to a bulk metal hydroprocessing catalyst at a liquid hourly space velocity of the fraction of the combined feedstock boiling above 1050°F (566°C) of at least about 0.10hr⁻¹ as required by independent claims 1, 25, and 26?²

The Examiner finds Eijsbouts-Spickova discloses hydroprocessing feed mixtures, which include residual and distillate fractions under

² The Examiner cited Baldassari and Gauthier to address other limitations of the claim not related to the dispositive issue. Consequently, a discussion of these references is unnecessary.

hydroprocessing conditions including a hydroprocessing catalyst in a fixed bed. (Final Act. 4–5). According to the Examiner:

The effective hydroprocessing conditions for residue include a total pressure of 65-1100 bar for resids but generally about 5 to 250 bar (0166), which overlaps the claimed range of about 1500 psig (i.e. about 104 bar) or less, a temperature between 340 and 450, which overlaps the claimed range of at least about 360 °C and an LHSV of the feed between 0.1 and 1 h⁻¹ (0166 table). When treating in a combined process with a solvent, as discussed below, it is expected that the LHSV of the portion of the combined feed boiling above 1050°F (566°C) would overlap the claimed range of at least about 0.1 h⁻¹. It is noted that Eijbouts-Spickova teaches non-feed specific effective hydroprocessing conditions (0162; 0166) that all overlap the claimed ranges and Eijbouts-Spickova teach treating heavy feeds such as e.g. vacuum resid, and light fractions (see list in 0164), and mixtures thereof (0164).

(Final Act. 4–5).

The Examiner recognizes Eijbouts-Spickova is silent regarding exposing the heavy oil feed to the hydroprocessing catalyst in a combined feedstock comprising the heavy oil component and a solvent component. The Examiner relies on the teachings of Shih and Peck for suggesting the inclusion of a solvent in the feedstock. (Final Act. 5). The Examiner determined the combined teachings of Eijsbouts-Spickova, Shih, and Peck suggest hydroprocessing of a heavy oil component and a solvent component under effective conditions would overlap the claimed LHSV of the 1050°F+ fraction. (Final Act. 4–5).

Appellants argue Eijsbouts-Spickova does not teach hydroprocessing in the presence of a solvent. Appellants argue that it would not have been obvious to use the solvent of either Shih or Peck because the described solvent processing requires utilizing specialized catalyst systems. (App. Br. 11–14). Appellants specifically argue:

Based on the description of the relationship between pore size and solvent processing in Shih, one of skill in the art would understand that modifying Eijsbouts-Spickova to include the solvent processing of Shih would also require incorporating the catalyst pore size teachings of Shih. Since Eijsbouts-Spickova teaches a large range of catalyst pore sizes, one of skill in the art could make a bulk catalyst according to Eijsbouts-Spickova with the pore sizes from Shih. However, in order to arrive at the claimed invention, any proposed combination of Eijsbouts-Spickova and Shih would need to result in a catalyst with a median pore size of about 85 Å to about 120 Å. This poses a difficulty when attempting to modify Eijsbouts-Spickova in view of Shih.

(App. Br. 12).

Appellants also argue the Examiner's determination to incorporate a solvent as described by Shih or Peck is premised on hindsight. (App. Br. 13–14; Reply Br. 7).

We agree with Appellants that the Examiner has not properly explained why the teachings of Shih and Peck would have suggested the incorporation of a solvent absent the described catalyst system. Shih specifically states:

This invention relates to an improved process for catalytically hydrocracking residuums in a solvent and further relates to demetalation, desulfurization, and decarbonization thereof. It especially relates to using a dual-bed catalyst system having a large-pore catalyst as the first bed and a small-pore catalyst as the second bed. It specifically relates to recycling a process-generated distal and (boiling at about 400°–700° F.) as the solvents.

(Shih, col 1, ll. 8–15).

The Examiner in the Answer states: “Shih and Peck teach the reasons for or benefits of adding a solvent to heavy feed during hydroprocessing and Eijsbouts-Spickova teaches processing heavy feed, thus, one would be

motivated to add solvent to the process taught in Eijsbouts-Spickova to minimize processing problems taught in the art.” (Ans. 20). The claimed invention requires a catalyst comprising a Group VIII non-noble metal and a Group VI metal and having a median pore size of about 85 Å to about 120 Å. The Examiner has failed to address Appellants’ argument that the solvent of Shih and Peck required the described catalyst systems having the described pore size. Moreover, the Examiner has not explained how the process of Eijsbouts-Spickova would have been modified to incorporate a process generated solvent such as described in Shih. The Examiner has also failed to explain why the improvements provided by Peck, which utilizes a catalyst having a pore size of 20 Å would have been expected to also occur in the hydroprocessing system of Eijsbouts-Spickova, which employs catalyst having a larger pore size.

Appellants argue the Examiner has failed to properly consider the claimed limitation “the liquid hourly space velocity [LHSV] of the fraction of the combined feedstock boiling above 1050°F (566°C) of at least about 0.10 hr⁻¹” claim limitation. (App. Br. 10–11). In support of this position, Appellants argue the Examiner has not presented a proper basis for establishing that the LHSV of Eijsbouts-Spickova overlaps the claimed invention. (App. Br. 10–11).

As explained by the present Specification, the LHSV is a characterization of the “flow rate of a portion of the feed relative to the amount of catalyst being used for processing the feed.” (Spec. ¶ 38). The Examiner has not directed us to evidence that supports the position that the hydroprocessing conditions of Eijsbouts-Spickova are the same as the claimed invention such that when combined with a solvent the result would have been the claimed LHSV of the 1050°F+ fraction. The Examiner has

Appeal 2017-003340
Application 13/597,523

not explained how the LHSV ranges reported in Eijsbouts-Spickova at ¶ 166 are suitable for determining the LHSV of the 1050°F+ fraction. The Examiner has also failed to explain of how the addition of a solvent to feed would have affected the hydroprocessing conditions including the LHSV of the 1050°F+ fraction.

Since we reverse because the Examiner has not established that the relied-upon disclosures are sufficient to support obviousness, we need not reach the issue of the sufficiency of the evidence of unexpected results presented by Appellants. *Cf. In re Geiger*, 815 F.2d 686, 688 (Fed. Cir. 1987).

For the foregoing reasons and those stated in the Brief, we determine that the Examiner's conclusion of obviousness is not supported by facts. "Where the legal conclusion [of obviousness] is not supported by facts it cannot stand." *In re Warner*, 379 F.2d 1011, 1017 (CCPA 1967). Accordingly, we cannot sustain the Examiner's decision to reject claims 1–5, 7–14, and 16–26.

DECISION

The rejections under 35 U.S.C. §103(a) of claims 1–5, 7–14, and 16–26 are reversed.

REVERSED