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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/177,809	07/08/2005	Edward S. Ellis	GJH-0542 (P2005J041)	7590
27810	7590	01/31/2013	EXAMINER	
ExxonMobil Research & Engineering Company P.O. Box 900 1545 Route 22 East Annandale, NJ 08801-0900			NGUYEN, TAM M	
			ART UNIT	PAPER NUMBER
			1772	
			NOTIFICATION DATE	DELIVERY MODE
			01/31/2013	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte EDWARD S. ELLIS, THOMAS R. HALBERT,
and GORDON F. STUNTZ

Appeal 2011-005020
Application 11/177,809
Technology Center 1700

Before CHARLES F. WARREN, PETER F. KRATZ, and
DEBORAH KATZ, *Administrative Patent Judges*.

KRATZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1-9, 23, and 25-34. We have jurisdiction pursuant to 35 U.S.C. § 6.

Appellants' claimed invention is directed to a method of desulfurizing a low sulfur naphtha feed using a first hydrodesulfurization reaction stage and a second stage wherein mercaptan sulfur is removed from the first stage product. In the claimed method, hydrogen sulfide is added to a hydrogen treat gas that is employed in the hydrodesulfurization stage. This is accomplished via hydrogen sulfide in the hydrogen treat gas or by a precursor spiking agent added in at least one of the low sulfur naphtha feedstock or the hydrogen treat gas.

Claim 1 is illustrative and reproduced below:

1. A process for hydrodesulfurizing a low sulfur naphtha feedstock, which process comprises:
 - a) providing a low sulfur naphtha feedstock containing less than about 500 wppm sulfur, based on feedstock, and greater than about 20 wt.% olefins, based on feedstock;
 - b) adding hydrogen sulfide to a hydrogen treat gas in the form of i) hydrogen sulfide in a hydrogen treat gas, or ii) a precursor spiking agent in at least one of the low sulfur naphtha feedstock or the hydrogen treat gas;
 - c) contacting the low sulfur naphtha feedstock in a first reaction stage under hydrodesulfurization conditions including a hydrogen treat gas, with the sulfide catalyst comprising at least one Group VIB metal and at least one Group VIII metal on an inorganic refractory support material to yield a first stage reaction product having less than about 50 wppm non-mercaptan sulfur, based on reaction product, and a mercaptan sulfur to non-mercaptan sulfur ratio of greater than 1 : 1, provided that the hydrogen treat gas, including the hydrogen sulfide added in step
 - b), contains at least about 50 vppm of hydrogen sulfide, based on hydrogen; and
 - d) passing the first stage product to a second stage wherein mercaptan sulfur is at least partially removed or converted from the first stage product to obtain a second stage product having a reduced amount of mercaptan sulfur.

The Examiner relies on the following prior art references as evidence in rejecting the appealed claims:

Verachtert

US 4,626,341

Dec. 2, 1986

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Jossens	US 6,228,254 B1	May 8, 1991
Brignac	US 6,589,418 B2	Jul. 8, 2003
Podrebarac	US 2004/0129606 A1	Jul. 8, 2004
Didillon	US 6,972,086 B2	Dec. 6, 2005

The Examiner maintains the following grounds of rejection:

Claims 1-5, 7, 8, 11, 15, and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jossens in view of Podrebarac. Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Jossens in view of Podrebarac and Brignac. Claims 9, 10, and 12-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jossens in view of Podrebarac and Verachtert. Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Jossens in view of Podrebarac and Didillon.

We affirm the stated rejections for substantially the factual findings and reasons as set forth by the Examiner in the Answer. We add the following for emphasis.

Concerning the first stated obviousness rejection, Appellants argue the rejected claims together as a group (Br. 10-15). Accordingly, we select claim 1 as the representative claim.

Appellants basically argue that:

(1) Jossens teaching with respect to the hydrogen sulfide content of the hydrogen treating gas used in hydrodesulfurization of the naphtha/gasoline feed of Jossens is to employ as low a content of hydrogen sulfide therein as is possible (Br. 11);

(2) the Examiner's reliance on Podrebarac for suggesting the addition of hydrogen sulfide to a hydrodesulfurization zone hydrogen treating gas is misplaced because (a) Podrebarac does not disclose a second stage

mercaptan desulfurization zone as employed by Jossens and (b) Podrebarac teaches adding hydrogen sulfide to the hydrogen treating gas in as low an amount as possible and below the claimed at least 50 vppm amount, the above indicating that Podrebarac teaches away from using hydrogen sulfide in the hydrogen treating gas in amounts as high as Appellants' representative claim 1 requires (Br. 11-14);

(3) Jossens does not teach or suggest that the hydrodesulfurization product has a mercaptan sulfur to non-mercaptan sulfur ratio of greater than 1:1 and the Examiner's rationale for asserting that Jossens would have suggested such lacks logical and/or scientific underpinnings (Br. 14); and,

(4) the Examiner's proposed combination of Jossens and Podrebarac is premised on selective picking and choosing from the disclosures of each of the applied references while improperly using, in hindsight, Appellants' teachings as a roadmap rather than the overall teachings of the applied references (Br. 10-15).

We are not persuaded of any substantive error in the Examiner's obviousness rejection of representative claim 1 by Appellants' arguments given the collective applied prior art teachings and for reasons presented by the Examiner in the Answer.

We first note that Appellants do not dispute the Examiner's findings set forth in the Final Office action¹ and, as reaffirmed in the Examiner's Answer, that Jossens discloses a naphtha sulfur removal process including both a hydrodesulfurization step and a mercaptan removal or extraction step, wherein the hydrogen treat gas employed in the hydrodesulfurization step

¹ FOA.

has been indicated by Jossens as including less than 1000 ppm hydrogen sulfide (H₂S) (Br. 10-11; FOA 3; Ans. 3).

In particular, Jossens discloses a preference for using hydrogen containing less than 1000 ppm H₂S, “with hydrogen containing less than 500 ppm H₂S being more preferred and hydrogen containing less than 250 ppm H₂S being still more preferred” (col. 4, ll. 45-48). Thus, Jossens discloses at least the option of using a hydrogen treat gas in the hydrodesulfurization step that includes an amount of H₂S that overlaps the claimed range of hydrogen sulfide in the hydrogen treat gas, as recited in representative claim 1.

We further observe that the additional disclosures in Jossens with respect to using hydrogen having a purity with respect to H₂S that is as low as the economics of the process permit, including the use of an H₂S scavenger in a hydrogen recycle loop that immediately follow the aforementioned teachings of Jossens, are not described by Jossens as a necessary constraint on Jossens’ described preferred amounts of H₂S in the hydrogen (col. 4, ll. 49-53).

In addition, Jossens discloses that the gasoline/naphtha feedstock employed in the hydrodesulfurization process can have a total sulfur content ranging from in excess of 50 or about 150 ppm up to about several thousand ppm, by weight, amounts which, as determined by the Examiner, overlap the claimed amount of less than about 500 wppm sulfur. (Ans. 3 and 8: Jossens, col. 4, ll. 11-18). Also, Jossens discloses that the feedstock to be desulfurized can include up to about 30 weight percent olefins, an amount which overlaps the claimed feedstock olefin content range (Ans. 3 and 8; Jossens, col. 4, ll. 25-28).

In light of the above noted teachings of Jossens, Appellants' arguments to the effect that Jossens teaches one of ordinary skill in the art that the hydrogen treat gas used by Jossens requires or is limited to an H₂S content that is less than the claimed hydrogen treat gas amount of at least 50 vppm H₂S lacks persuasive merit.

Similarly, Appellants' contentions about the Examiner's reliance on Podrebarac for additionally teaching the addition of H₂S to a hydrogen treat gas in amounts corresponding to the claimed amount for hydrodesulfurization of a naphtha feed are off the mark for several reasons. In this regard, Jossens discloses the use of a hydrogen treat gas that includes an amount of H₂S that overlaps that required by representative claim 1; thus, Podrebarac is not necessary for teaching such. In addition, Podrebarac is relied upon by the Examiner to establish that one of ordinary skill in the art would have known that the provision or addition of H₂S to the hydrogen treating gas of a hydrodesulfurization zone is advantageous as it contributes to the activation (prevention of the desulfurization) of a hydrodesulfurization catalyst (Ans. 4; Podrebarac, paras. 0041 and 0045). While Podrebarac teaches that the amount of hydrogen sulfide that is necessary for this purpose can be quite small, Podrebarac does not teach that the H₂S content of the hydrogen treating gas must be less than 50 ppmv., as Appellants imply by the arguments presented (Br. 11-14). Thus, Podrebarac does not teach away from the claimed process as determined by the Examiner (Ans. 6 and 7). *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004) (“[t]he prior art’s mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not

criticize, discredit, or otherwise discourage the solution claimed in the . . . application.”)

As for the ratio of the amounts of mercaptan and non-mercaptan sulfur present in the effluent from the hydrodesulfurization step of Jossens, the Examiner has furnished a reasonable explanation as to why the ratio of these constituents in the hydrodesulfurized naphtha of Jossens would be expected to substantially correspond to the claimed ratio (Ans. 4, 7, and 8). Appellants’ non-substantiated arguments to the contrary are unavailing.

In light of the above, Appellants’ contentions that the Examiner has engaged in improper hindsight reconstruction and improper picking and choosing lacks traction as the record makes it clear that the Examiner’s obvious position is bottomed on the combined teachings and suggestions found in the applied prior art as set forth in the Examiner’s Answer and indicated by the findings noted above. *See In re Corkill*, 771 F.2d 1496, 1500 (Fed.Cir.1985) (obviousness rejection affirmed in light of prior art teaching that “hydrated zeolites will work” in detergent formulations, even though “the inventors selected the zeolites of the claims from among ‘thousands’ of compounds”); *In re Susi*, 440 F.2d 442, 445 (CCPA 1971) (obviousness rejection affirmed where the disclosure of the prior art was “huge, but it undeniably include[d] at least some of the compounds recited in appellant's generic claims and it is of a class of chemicals to be used for the same purpose as appellant's additives”); *In re Arkley*, 455 F.2d 586, 587-88 (CCPA 1972) (“picking and choosing may be entirely proper in the making of a 103, obviousness rejection, where the applicant must be afforded an opportunity to rebut with objective evidence any inference of obviousness

which may arise from the similarity of the subject matter which he claims to the prior art”).

On this appeal record, we determine that a preponderance of the evidence of record weighs in favor of an obviousness determination as to representative claim 1. Accordingly, we shall sustain the Examiner’s first stated rejection.

As for the separate rejections of several dependent claims, the Examiner relies on additional references including Brignac for teaching or suggesting a hydrodesulfurization catalyst corresponding to the claim 6 requirements, Verachtert for further teaching or suggesting the use of an extractant corresponding to the caustic required by claim 9², and Didillon for teaching or suggesting a preceding diolefin reactor as required by separately rejected dependent claim 17 (Ans. 4-6).

For reasons set forth by the Examiner, Appellants further arguments with respect to the separate rejections of these dependent claims lack substantive merit (Br. 15-20; Ans. 8-10). It follows that we shall likewise sustain the Examiner’s separate rejections of these dependent claims.

CONCLUSION/ORDER

The Examiner’s decision to reject the appealed claims is affirmed.

² Appellants argue the commonly rejected claims 9, 10, and 12-14 together as a group; hence, we select claim 9 as the representative claim on which we decide this appeal as to the separate rejection of these dependent claims. Moreover, the Examiner correctly notes that Jossens discloses the use of caustic extractant (Ans. 9; Jossens, col. 5, ll. 31-44).

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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

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