Paper No. 12

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte ROBERT S. BRIDGES, RICHARD B. HALSEY
and DONALD H. POWERS

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Appeal No. 2003-0172
Application 09/810,801

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ON BRIEF

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Before PAK, OWENS and JEFFREY T. SMITH, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal is from the final rejection of claims 1-20, which are all of the claims in the application.

THE INVENTION

The appellants' claimed invention is directed toward a thermal steam cracking process for producing olefins. Claim 1 is illustrative:

1. A process for producing olefins which consists of thermally team cracking a crude oil wherein;

(A) the crude oil has pentane insolubles, ASTM D893, less than or equal to 1.2; and

(B) the weight percent hydrogen of the crude oil is greater than 12.5.

THE REFERENCES

Wernicke et al. (Wernicke '520)	4,210,520	Jul. 1, 1980
Wernicke et al. (Wernicke '871)	4,257,871	Mar. 24, 1981

H.J. Wernicke and W. Kreuter, "Pretreat feed for more olefins", *Hydrocarbon Processing* 137-42 (Oct. 1979) (Wernicke article).

THE REJECTION

Claims 1-20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Wernicke '520 in view of Wernicke '871 and the Wernicke article.

OPINION

We affirm the aforementioned rejection.

The appellants state that the claims stand or fall together (brief, page 2). We therefore limit our discussion to one claim, i.e., claim 1. *See In re Ochiai*, 71 F.3d 1565, 1566 n.2, 37

USPQ2d 1127, 1129 n.2 (Fed. Cir. 1995); 37 CFR § 1.192(c)(7)(1997).

The terms in patent claims are to be given their broadest reasonable interpretation in view of the specification. *See In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989).

The appellants' specification states that the term "crude oil feedstock" "may include primary, secondary or tertiary recoveries of conventional or offshore oil fields as well as the myriad of feedstocks derived therefrom as well as 'syncrudes' such as those that can be derived from coal, shale oil, tar sands and bitumens" (page 2, line 22 - page 3, line 4). The specification also states that prior art steam cracking processes typically "require the feedstock to be deasphalted and hydrotreated prior to feeding the feedstock into the steam cracking unit" (page 1, line 17 - page 2, line 1), and that "[l]ess costly means [i.e., the appellants' process] for producing olefins is desired" (page 2, line 3). Also, the appellants do not argue that the gas oil in Wernicke '520 (col. 3, lines 44-55) is not a crude oil as that term is used by the appellants.

Consequently, when we give the term "crude oil" in the appellants' claim 1 its broadest reasonable interpretation in view of the specification, we interpret it as including oils that are derived by separation from oil taken from oil fields, but excluding oils that have been deasphalted or hydrotreated.

Wernicke '520 discloses a two stage process for producing olefins, wherein in the first stage heavy petroleum fractions are hydrogenated in the presence of hydrogen and a hydrogenation catalyst, and in the second stage the hydrogenated fractions are thermally cracked in the presence of steam (abstract).

Wernicke '871 discloses a vacuum residue thermal cracking process wherein vacuum residue is subjected to separation to remove asphalt components therefrom, the deasphalted vacuum residue is blended with a vacuum gas oil or substantial equivalent thereof, the blend is hydrogenated, and the resultant hydrogenate is at least partially thermally cracked (col. 2, lines 12-18).

The portion of the Wernicke article relied upon by the examiner (answer, page 4) discloses a thermal cracking process wherein vacuum distillate is deasphalted to an asphaltene level below 0.5 wt%, hydrotreated, and then steam cracked (page 140; figure 1).

The appellants state that "[a]lthough it may arguably be obvious to use low asphaltene feeds in the Wernicke two-step process, there is nothing to suggest to one of ordinary skill in the art to use low asphaltene feeds in a non-obvious one-step process" (appeal brief, page 6). Thus, the appellants do not argue that it would have been unobvious to one of ordinary skill in the art to use, in the Wernicke two step process, a crude oil feed having low asphaltenes, i.e., pentane insolubles less than or equal to 1.2. The appellants' argument is that it would not have been obvious to one of ordinary skill in the art to thermally steam crack this crude oil without first hydrotreating it.

The appellants argue that the statement in Wernicke '520 that "[p]etroleum fractions having such a boiling range [380°C to 700°C] are unsuitable for direct thermal cracking, since besides a small yield of olefins, additional products are pyrolysis oil, coke, and tar" indicates that hydrotreatment is necessary before petroleum fractions within the boiling range of the crude oil of the appellants' invention are thermally steam cracked (brief, page 5). In the Wernicke '520 examples, however, the feed gas oil has a boiling range of 208-354°C, which is below the range in the above excerpt. Wernicke '520 does not state that the lower

boiling feedstock must be hydrotreated before being thermally cracked. In fact, in comparative example 1, Wernicke '520 thermally cracks this feedstock without any preceding hydrotreatment.

The appellants argue that the feedstock used in all of the Wernicke '520 examples, including comparative example 1, contains 13.13 wt% hydrogen, which is within the range recited in the appellants' claim 1, yet Wernicke '520 hydrotreats this feedstock in the examples of his invention and shows that this hydrotreatment increases the olefin yield relative to that obtained in comparative example 1 (brief, page 5). Hence, the appellants' argue, Wernicke '520 teaches away from eliminating the hydrotreating step (brief, pages 5-6).

It would have been *prima facie* obvious to one of ordinary skill in the art to eliminate the hydrotreating step along with its disclosed function of increasing the olefin yield, in order to reduce the cost of the process. *See In re Thompson*, 545 F.2d 1290, 1294, 192 USPQ 275, 277 (CCPA 1976).

In the Wernicke '520 examples the ranges of the ethylene and propylene yields are, respectively, 26.2-30.0 wt% and 14.3-16.1 wt%, whereas in comparative example 1 the ethylene and propylene yields are, respectively, 21.0 wt% and 12.2 wt%. Thus,

at the expense of the Wernicke '520 hydrotreating step, the yields of ethylene and propylene are increased by, respectively, about 7 wt% and about 3 wt%.

The feedstock in the examples in the appellants' specification is different than that in the Wernicke '520 examples. The appellants' feedstock is an Alaskan crude oil having a hydrogen content of 13.2 wt% and a boiling range mostly in the below 200°C to 540°C range, whereas the feedstock in the Wernicke '520 examples is a gas oil having a hydrogen content of 13.13 wt% and a boiling range of 208°C to 354°C. Even though there is this difference in feedstocks, a comparison of the yields obtained by the appellants and Wernicke '520 is informative. The appellants' ranges of yields of ethylene and propylene are, respectively, 19.3-20.4 wt% and 12.1-12.2 wt%. These yields, obtained without a hydrotreating step, are comparable to the yields in the Wernicke '520 comparative example 1 which were obtained without a hydrotreating step, i.e., 21.0 wt% and 12.2 wt%. Thus, it reasonably appears that the appellants have merely eliminated the hydrotreating step along with its function of increasing olefin yield. As indicated above, doing so would have been *prima facie* obvious to one of ordinary skill in the art. The appellants have not shown that,

unlike in Wernicke '520, hydrotreating the feedstock in their examples would decrease the olefin yield.

For the above reasons we conclude that the appellants' claimed invention would have been obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103.

OTHER ISSUE

In the event of further prosecution the examiner and the appellants should address on the record whether the appellants' claimed invention is anticipated by the Wernicke '520 comparative example 1. In this example a gas oil having a hydrogen content of 13.13 wt% is thermally cracked without a preceding hydrotreating step. Wernicke '520 does not disclose the pentane insoluble content of the feedstock. This feedstock, however, boils in the 208-354°C range, which is at the lower end of the boiling range of the feedstock in the examples in the appellants' specification. Also, this boiling range is below the boiling range of feedstocks which, Wernicke '520 teaches, form pyrolysis oil, coke and tar (col. 2, lines 41-44). In addition, the Wernicke article (table 1) discloses a heavy vacuum gas oil which has a boiling range generally higher than that in Wernicke '520 (340-540°C versus 208-354°C), but contains only 0.07 wt% asphaltenes. Thus it reasonably appears that the gas oil in the

Wernicke '520 comparative example 1 contains little or no asphaltenes and, therefore, has pentane insolubles less than or equal to 1.2 as required by the appellants' independent claims.

DECISION

The rejection of claims 1-20 under 35 U.S.C. § 103 over Wernicke '520 in view of Wernicke '871 and the Wernicke article is affirmed.

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

AFFIRMED

CHUNG K. PAK Administrative Patent Judge	)
TERRY J. OWENS Administrative Patent Judge	) BOARD OF PATENT) APPEALS AND) INTERFERENCES
JEFFREY T. SMITH Administrative Patent Judge	)

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