

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte BARRY E. KINSMAN
and
RICHARD HANNEY

Appeal No. 1998-1405
Application No. 08/379,600

HEARD: MARCH 8, 2001

Before PAK, OWENS, and PAWLIKOWSKI, ***Administrative Patent Judges.***

PAK, ***Administrative Patent Judge.***

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 7 through 21, which are all of the pending claims in the above-identified application.

Claim 7 is representative of the subject matter on appeal

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and reads as follows:

7. A process for the preparation of a metal sulphide which comprises reacting an elementary carbon source and gaseous H_2S at a temperature of 900 to 1500EC to produce gaseous CS_2 in a first reaction zone, passing the gaseous product from the first reaction zone, containing CS_2 prepared *in situ* and unreacted H_2S , directly to a second reaction zone, which is separate from the first reaction zone, containing a metal oxide corresponding to the metal sulphide and reacting the metal oxide with the gaseous CS_2 at a temperature of from 500 to 1500EC to prepare the metal sulphide.

In support of his rejection, the examiner relies on the following prior art:

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|--------------------------------------|-----------|----------|
| Johnson et al. (Johnson) 1961 | 3,009,781 | Nov. 21, |
| Henderson et al. (Henderson) 1973 | 3,748,095 | Jul. 24, |

Claims 7 through 21 stand rejected under 35 U.S.C. § 103 as unpatentable over the combined disclosures of Henderson and Johnson.

We have carefully reviewed the claims, specification and applied prior art, including all of the arguments advanced by both the examiner and appellants in support of their

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respective positions. This review leads us to conclude that the examiner's § 103 rejection is not well founded.

Accordingly, we reverse the examiner's § 103 rejection for essentially those reasons set forth in the Brief (Paper No. 11) and Reply Brief (Paper No. 13). We add the following primarily for emphasis and completeness.

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Both the examiner and appellants agree that Henderson teaches reacting a metal oxide with a gas mixture containing carbon disulfide and hydrogen sulfide at the claimed temperature to form the corresponding metal sulfide. See Answer, page 4, and Brief, pages 7 and 8. The examiner and appellants agree that Johnson teaches reacting hydrogen sulfide with electrically conductive carbon particles, such as petroleum coke, to produce a mixture containing, *inter alia*, carbon disulfide and hydrogen sulfide. See Answer, page 7, and Brief, page 7. The dispositive question is therefore whether it would have been obvious to pass the carbon disulfide and hydrogen sulfide gases produced *in situ* in the process of Johnson **directly** (without any intervening steps) to the process of Henderson. We answer this question in the negative.

As is recognized by appellants (Brief, pages 7 and 8), Henderson is directed to forming high purity single crystal metal sulfides, which are useful as semiconductors, transistors, etc. See also Henderson, abstract and column 2, lines 19-27. To form the high purity metal sulfides,

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Henderson carries out its sulfiding reaction between a metal oxide and a carbon disulfide and hydrogen sulfide gas mixture in the substantial absence of water vapor and oxygen. See Abstract and column 6, lines 23-28. Although Henderson recognizes that absolute purity of the components (carbon disulfide and hydrogen sulfide) of the gas mixture is not necessary, it suggests using carbon disulfide and hydrogen sulfide which are substantially pure. See column 5, lines 25-36, column 9, lines 1-8, and column 10, lines 45-61. Nowhere does Henderson teach the formation of this substantially pure carbon disulfide and hydrogen sulfide gas mixture through reacting elemental carbon with hydrogen sulfide as required by the claims on appeal.

In order to remedy such a deficiency, the examiner relies on Johnson. However, Johnson does not teach forming a substantially pure gas mixture of carbon disulfide and hydrogen sulfide that can be **directly** used in the process of Henderson. Rather, Johnson teaches employing a cheap carbon source, petroleum coke, with hydrogen sulfide to produce carbon disulfide which is separated from other impurities,

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including hydrogen sulfide. On this record, we find no evidence that Johnson teaches forming a substantially pure gas mixture which can be **directly** used in the process of Henderson, without any intervening purification steps. There simply is no evidence that the gas mixture containing carbon disulfide and hydrogen sulfide produced in Johnson's fluidized bed is substantially free of impurities, especially water vapor and oxygen. Nor is there any evidence establishing conventionality of forming a substantially pure carbon disulfide and hydrogen sulfide mixture *in situ* through reacting elemental carbon with hydrogen sulfide.

On this record, for the reasons indicated **supra**, we determine that the examiner has not supplied sufficient evidence suggesting the desirability of using the gas mixture produced by Johnson **directly** in the process of Henderson without any intervening purification steps. Therefore, we are constrained to reverse the examiner's decision rejecting all of the appealed claims under 35 U.S.C. § 103 over the applied prior art.

As a final point, we note that the specification refers

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to Eastman et al. (Eastman), *J. Amer. Chem. Soc.*, 72, 2248 (1950). See specification, page 2. According to appellants (specification, page 2), Eastman describes *in situ* generation of carbon disulfide from sulfur (inclusive of hydrogen sulfide) and carbon (inclusive of elemental carbon). Upon return of this application, the examiner is to review the content of Eastman to

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determine whether the combined teachings of Henderson and Eastman affect the patentability of the claimed subject matter.

In view of the foregoing, the decision of the examiner is reversed and the application is returned to the examiner for appropriate action consistent with the above instruction.

REVERSED and REMANDED

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| CHUNG K. PAK |) | |
| Administrative Patent Judge |) | |
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| |) | BOARD OF PATENT |
| TERRY J. OWENS |) | APPEALS AND |
| Administrative Patent Judge |) | INTERFERENCES |
| |) | |
| |) | |
| BEVERLY A. PAWLIKOWSKI |) | |
| Administrative Patent Judge |) | |

CKP:hh

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