

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte WEI-KAO LU, CHARLES Q. JIA,  
VISHWAPRAKASH S. HEGDE and STEVEN HOI-CHIU NG

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Appeal No. 96-1188  
Application No. 08/240,800<sup>1</sup>

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ON BRIEF

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Before KIMLIN, JOHN D. SMITH and OWENS, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

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<sup>1</sup> Application for patent filed May 10, 1994. According to appellants, this application is a continuation of Application No. 08/059,243, filed May 7, 1993, now abandoned.

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This is an appeal from the final rejection of claims 23-44, all the claims remaining in the present application.

Claim 23 is illustrative:

23. A process for desulfurizing sulfur dioxide-containing gas comprising the steps of:

- a) absorbing sulfur dioxide gas into an aqueous sulfide solution to remove said sulfur dioxide from a stream of gas, said aqueous sulfide solution being contained in a reactor,
- b) absorbing additional sulfur dioxide gas into said reactor to form hydrogen sulfide gas,
- c) removing hydrogen sulfide gas from said reactor,
- d) absorbing additional sulfur dioxide gas in said reactor, after said removal of hydrogen sulfide gas, to form bisulfite in said reactor, and
- e) removing aqueous bisulfite-containing solution from said reactor, with said hydrogen sulfide and bisulfite being the principal products of steps b) and d).

The examiner relies upon the following references as evidence of obviousness:

Strong et al. (Strong)	3,784,630	Jan. 8, 1974
Miller	4,837,001	Jun. 6, 1989
Talonen et al. (Talonen)	4,937,057	Jun. 26, 1990
Brannland et al. (Canada '378) (Canadian patent)	948,378	Jun. 4, 1974

Appellants' claimed invention is directed to a process for desulfurizing sulfur dioxide-containing gas which entails

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passing the gas into an aqueous sulfide solution which ultimately forms hydrogen sulfide gas, removing the hydrogen sulfide from the reactor, absorbing additional sulfur dioxide gas in the solution to form bisulfite, and removing the bisulfite-containing solution from the reactor.

Appealed claims 23-31 and 33-44 stand rejected under 35 U.S.C. § 103 as being unpatentable over Canada '378 in view of Talonen and Strong. In addition, claims 23-44 stand rejected under 35 U.S.C. § 103 as being unpatentable over Canada '378 in view of Talonen and Strong in further view of Miller.

Upon careful consideration of the opposing arguments presented on appeal, we concur with appellants that the prior art relied upon by the examiner fails to establish a prima facie case of obviousness for the claimed subject matter. Accordingly, we will not sustain the examiner's rejections.

In our view, the examiner has not established that the collective teachings of Canada '378, Talonen, Strong and Miller teach or suggest the manipulative steps of the claimed process, namely, (1) forming hydrogen sulfide gas by absorbing sulfur dioxide into an aqueous sulfide solution, (2) removing

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hydrogen sulfide from the reactor, (3) forming bisulfite in the solution by absorbing additional sulfur dioxide after removal of the hydrogen sulfide gas, and (4) removing the aqueous bisulfite-containing solution from the reactor.

Although Talonen discloses at column 4 that bisulfite and hydrogen sulfide are products of some of the reactions that occur during the introduction of sulfur dioxide into a sulfide solution, neither Talonen nor any of the other cited references provides a teaching of the sequence of steps defined by the process presently on appeal. Canada '378 discloses a process for inhibiting the emission of hydrogen sulfide during the absorption of sulfur dioxide in a sulfide solution and fails to teach the generation of bisulfite. Talonen, in the paragraph bridging columns 4 and 5, teaches that bisulfite is first produced when sulphur dioxide is introduced into a sulphide solution and, then, after a certain amount of sulphur dioxide is absorbed by the sodium sulphide, plenty of hydrogen sulphide is released from the solution. Also, Talonen does not disclose removing bisulfite as a product but, rather, elemental sulfur is the product of the Talonen process.

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Strong does not alleviate the deficiencies of Canada '378 and Talonen. Strong discloses the absorption of sulfur dioxide gas in an aqueous sulfide solution to form a precipitate that is predominantly metal sulfite and elemental sulfur. Strong does not disclose the production of hydrogen sulfide and, although the reference teaches that it is possible to form some metal bisulfite, it is disclosed that "the bisulfite forms only when the pH of the solution is relatively low, and at such pH, there is an insufficient absorption of sulfur dioxide in the slurry, and excessive sulfur dioxide may pass through the slurry to atmosphere" (column 4, lines 3-7). Since the primary goal of Strong is to obtain the maximum removal of sulfur dioxide (column 4, lines 7 et seq.), it is clear that Strong provides a teaching away from the claimed process of forming bisulfite in the reactor.

The examiner states at page 3 of the Answer that "[i]t would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the scrubbing system of '378 as suggested by Talonen and Strong because doing so assures complete removal of SO<sub>x</sub>." However, the examiner has failed to sufficiently explain how the

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process of Canada '378 would be modified in accordance with the teachings of Talonen and Strong such that appellants' claimed process would result. It appears to us that the examiner has found that various sulfur dioxide scrubbing processes in the prior art which utilize aqueous sulfide solutions generate hydrogen sulfide gas and bisulfite and, therefore, concludes that one of ordinary skill in the art would be able to somehow modify all the prior art processes to arrive at the claimed process. However, it is well settled that the prior art must provide some teaching or suggestion of the claimed process or some motivation why one of ordinary skill in the art would perform the claimed steps. Inasmuch as the examiner has not established on this record the requisite teaching, suggestion or motivation, we must conclude that the examiner has not established a prima facie case of obviousness for the claimed subject matter.

In conclusion, based on the foregoing, we are constrained to reverse the examiner's rejections.

REVERSED

EDWARD C. KIMLIN )

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Administrative Patent Judge	)	
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JOHN D. SMITH	)	BOARD OF PATENT
Administrative Patent Judge	)	APPEALS AND
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TERRY J. OWENS	)	
Administrative Patent Judge	)	

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