

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte DANIEL HAGE, DANIEL C. MERKEL and FELTON HULSEY

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Appeal No. 1998-2012  
Application 08/657,556

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ON BRIEF

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Before HANLON, OWENS and TIMM, Administrative Patent Judges.  
HANLON, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the final rejection of claims 1-13, all of the claims pending in the application. The claims on appeal are directed to a method for recovering anhydrous hydrogen fluoride and a uranium oxide

product from uranium hexafluoride. Claim 1 is illustrative and reads as follows:

1. A method for recovering anhydrous hydrogen fluoride and a uranium oxide product from uranium hexafluoride comprising the steps of:

a) reacting said uranium hexafluoride in a first reactor by contact with a liquid solution comprised of hydrogen fluoride and water to produce an uranyl fluoride hydrate intermediate;

b) reacting said uranyl fluoride hydrate intermediate with a gaseous water feed in a second reactor to produce said uranium oxide products and a mixture comprised of water, hydrogen fluoride and oxygen;

c) boiling said liquid solution comprised of hydrogen fluoride and water from said first reactor to form a vapor and combining said vapor with said mixture of comprised of water, hydrogen fluoride and oxygen from said second reactor to form a combination;

d) condensing said combination to form a mixed gas and liquid state, said gas state being comprised of essentially oxygen and said liquid state being comprised of hydrogen fluoride and water; and

e) distilling said mixed gas and liquid state in a separation unit to produce said anhydrous hydrogen fluoride as a distillate and a liquid stream of hydrogen fluoride and water azeotrope.

The references relied upon by the examiner are:

Grant

3,333,930

Aug. 1, 1967

Mestepey

5,346,684

Sept. 13, 1994

The sole issue in this appeal is whether claims 1-13 were properly rejected under 35 U.S.C. § 103 as being unpatentable over Mestepey in view of Grant.

Discussion

The claimed invention is directed to a method for recovering anhydrous hydrogen fluoride and a uranium oxide product from uranium hexafluoride comprising the steps of:

(a) reacting the uranium hexafluoride in a first reactor by contact with a liquid solution comprised of hydrogen fluoride and water to produce an uranyl fluoride hydrate intermediate;

(b) reacting the uranyl fluoride hydrate intermediate with a gaseous water feed in a second reactor to produce the uranium oxide product and a mixture comprised of water, hydrogen fluoride and oxygen;

(c) boiling the liquid solution of hydrogen fluoride and water from the first reactor to form a vapor and combining the vapor with the mixture of water, hydrogen fluoride and oxygen from the second reactor to form a combination;

(d) condensing the combination to form a mixed gas and

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liquid state, the gas state being comprised of essentially oxygen and the liquid state being comprised of hydrogen fluoride and water; and

(e) distilling the mixed gas and liquid state in a separation unit to produce the anhydrous hydrogen fluoride as a distillate and a liquid stream of hydrogen fluoride and water azeotrope.

According to the examiner (Answer, pp. 3-4):

Mestepey teaches the production of solid triuranium octoxide in a two-step process. The first step is the gas-phase reaction of depleted uranium hexafluoride with a recycle mixture of hydrogen fluoride (HF) and steam, which may further contain fresh steam if desired. This affords solid uranyl fluoride and a gaseous mixture of hydrogen fluoride and steam. The uranyl fluoride is fed into a second reactor and treated with fresh steam to make triuranium octoxide and a second gaseous mixture comprising oxygen, steam and hydrogen fluoride (col. 2, lines 16-51). The gaseous products of the two steps are combined, condensed and separated into two streams. One consists of oxygen and anhydrous hydrogen fluoride, and the second consists of azeotropic hydrogen fluoride and water. The azeotrope is vaporized and recycled to the first reactor.

The examiner points out that appellants' claimed method is very similar to the process disclosed in Mestepey with the exception that the first reaction in the claimed method is

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conducted in the liquid phase rather than the gas phase. See Answer, p. 3. The examiner relies on Grant to establish that producing uranyl fluoride hydrate by contacting uranium hexafluoride with a liquid-phase mixture of water and hydrogen fluoride is known. See Answer, p. 4. The examiner concludes that (Answer, p. 4):

It would have been obvious at the time the invention was made to modify the procedure of Mestepey by running the first reaction in the liquid phase, as taught by Grant et al. to realize the advantages of using lower temperatures and pressures.

Appellants not only disagree that the combined teachings of Mestepey and Grant would have suggested substituting the liquid phase reaction disclosed in Grant for the gas phase reaction disclosed in Mestepey, but additionally argue that the references, either alone or in combination, fail to suggest steps (c) through (e) of the claimed invention. See Brief, p. 8; Reply brief, p. 2.

Manifestly, the examiner's statement of the rejection fails to discuss how the references, either alone or in combination, suggest "boiling said liquid solution comprised of hydrogen fluoride and water from said first reactor to form a vapor" as recited in step (c). Therefore, even assuming

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that it would have been obvious to run the first reaction of the process disclosed in Mestepey by contacting the uranium hexafluoride with a liquid solution of hydrogen fluoride and water as suggested by Grant, the examiner has failed to explain why one of ordinary skill in the art would have subsequently boiled that liquid solution to form a vapor as claimed in step (c).

Furthermore, to the extent that Mestepey uses a condenser (18) in the disclosed process, it does not appear that "a mixed gas and liquid state" is formed as in step (d) of the claimed method. Compare step (d) of claim 1 ("condensing said combination to form a mixed gas and liquid state, said gas state being comprised of essentially oxygen and said liquid state being comprised of hydrogen fluoride and water") with col. 4, lines 13-18 (condenser 18 separates outlet stream 38 into (1) substantially pure commercial grade liquid anhydrous hydrogen fluoride and (2) oxygen gas).

For the reasons set forth above, we cannot sustain the rejection of claims 1-13 under 35 U.S.C. § 103. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992) (the examiner bears the initial burden of presenting a

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prima facie case of unpatentability).

REVERSED

	ADRIENE LEPIANE HANLON	)	
	Administrative Patent Judge	)	
		)	
		)	
		)	
	TERRY J. OWENS	)	BOARD OF
PATENT	Administrative Patent Judge	)	APPEALS AND
		)	INTERFERENCES
		)	
		)	
	CATHERINE TIMM	)	
	Administrative Patent Judge	)	

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