

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TEH-KUEI CHEN

Appeal No. 1996-3017
Application No. 07/851,810

HEARD: March 23, 2000

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

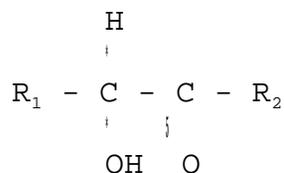
KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 2-10, 12, 13 and 17-20. Appellant has withdrawn the appeal of claims 1, 11, 15 and 16, the other claims remaining in the present application. Claim 2 is reproduced below:

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2. A process for preparation of alkyl-pyrazine compounds comprising heating and refluxing an aqueous medium containing ammonium ions and at least one acyloin compound having the general formula:



wherein R₁ and R₂ are methyl groups, to obtain a reacted mixture, adding a base to the reacted mixture to adjust the pH of liquid of the reacted mixture to an alkaline pH, separating reacted mixture solid material from the pH-adjusted liquid, adding water to the separated solid material to dissolve the solid material to form a solution, allowing a product to crystallize [sic] from the solution, thereby forming a solid crystalline product and a liquid phase, and then separating the crystalline product from the liquid phase.

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

Langdon	3,067,199	Dec. 4, 1962
Bonzom et al. (Bonzom)	3,676,442	Jul. 11, 1972
Kosuge et al. (Kosuge) (Japanese Kokai patent application)	Sho 52-97983	Aug. 17, 1977

4 Technique of Organic Chemistry 613-28, 627-28 (Arnold Weissberger, ed., Interscience Publishers, Inc., New York 1951)

R.F. Evans et al. (Evans), "Diazabenzene. I. Synthesis of Some t-Butylpyrazines and Their N-Oxides," 25 Australian Journal of Chemistry 2671-85 (1972)

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Takuya Akiyama et al. (Takuya), "A New Method of Pyrazine Synthesis for Flavor Use," 26 Journal of Agricultural and Food Chemistry no. 5, 1176-79 (1978)

Dennis J. Bell et al. (Bell), "Diazabenzenes. II. Synthesis, Photolysis and Mass Spectra of Some Tetraalkylpyrazines," 32 Australian Journal of Chemistry 1281-300 (1979)

George P. Rizzi, "Formation of Pyrazines from Acyloin Precursors under Mild Conditions," 36 Journal of Agricultural and Food Chemistry no. 2 (1988)

Appellant's claimed invention is directed to a process for preparing and isolating alkyl-pyrazines, e.g., tetra-alkyl-pyrazines. The process entails heating and refluxing an aqueous solution comprising ammonium ions and an acyloin compound of the recited formula, adding a base to the reacted mixture to adjust the mixture to an alkaline pH, adding water to dissolve a solid material that is separated from the reacted mixture, and allowing the product to crystallize from the solution. The process defined by the embodiment of claim 6 involves heating, refluxing and subliming an aqueous medium containing ammonium ions and the acyloin compound, and collecting the sublimed product on a cooled collection surface.

Appellant submits at page 7 of the principal brief that separate arguments are presented for claims 2, 5 and 6.

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Accordingly, appealed claims 3, 4, 7-10, 12, 13 and 17-20 stand or fall together with the independent claim upon which they depend.

Appealed claims 2-5, 12, 17 and 18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kosuge, Rizzi, Bell and Langdon in view of Bonzom and Akiyama. Claims 6-10, 13, 19 and 20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kosuge, Rizzi, Bell and Langdon in view of Evans, Weissberger and Akiyama.

We have thoroughly reviewed each of appellant's arguments for patentability. However, inasmuch as we find that the examiner's legal conclusion of obviousness is supported by the factual findings made by the examiner, we will sustain the examiner's rejections for essentially those reasons expressed in the Answer. We add the following primarily for emphasis.

We consider first the examiner's rejection of claims 2-5, 12, 17 and 18. There is no dispute that Kosuge, Rizzi, Bell and Langdon, the primary references, disclose processes for preparing appellant's product, an alkyl-pyrazine, by reacting appellant's reactants in an aqueous medium. The primary references do not disclose isolating the product from the

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reaction mixture by the presently claimed crystallization technique. However, as explained by the examiner, Bonzom discloses that it was known in the art to separate appellant's alkyl-pyrazines from an aqueous reaction medium by the claimed steps of separation and recrystallization from water.

Accordingly, based on the collective teachings of the primary references and Bonzom, we agree with the examiner that one of ordinary skill in the art would have understood that the claimed alkyl-pyrazines can be isolated by either the extraction and distillation techniques disclosed by the primary references or the recrystallization method disclosed by Bonzom.

The principal argument advanced by appellant is that Bonzom utilizes different reactants in preparing alkyl-pyrazines, namely, acetylene compounds and ammonium derivatives, and, therefore, "does not disclose, much less suggest, that his isolation procedure would be viable in any other reaction system" (page 18 of principal brief). However, insofar as the reaction schemes of the primary references and Bonzom result in the same product, an alkyl-pyrazine, in an aqueous medium, we agree with the examiner that one of

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ordinary skill in the art would have had a reasonable expectation of successfully isolating the product alkyl-pyrazine from the aqueous medium utilizing the recrystallization method disclosed by Bonzom. Appellant has not apprised us of any reason, and we are not aware of one, why one of ordinary skill in the art would have been dissuaded from applying Bonzom's recrystallization technique to an aqueous medium comprising an alkyl-pyrazine simply because the reactant mixture may contain amounts of an acetylene starting reactant rather than an acyloin starting reactant. Also, since distillation, extraction and recrystallization are all conventional techniques used in the art to isolate compounds from aqueous medium, we are satisfied that one of ordinary skill in the art would have found it obvious to simply determine which of the known techniques produce the optimum yield without the need to resort to undue experimentation.

Compare In re Boesch,

617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980). We find no flaw in the following reasoning of the examiner:

The different modes of purification would be considered alternately and even sequentially usable since isolation is a separate consideration for the synthetic chemist once a product mixture is obtained

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since in most cases the mixture will be contaminated with a variety of unidentified inorganic, organic components and one skilled in the art of organic synthesis would be capable of picking one over another well-known technique to achieve their goals - whether it be highest possible yield at the expense of some purity or very high purity at the expense of yield or combination of techniques for achieving highest possible yield and purity. [Sentence bridging pages 6 and 7 of Answer).

Regarding appellant's argument at page 19 of the principal brief that "Bonzom refers only to neutralization which, it is submitted, is distinct from adjusting the pH to an alkaline condition, as claimed in claim 2, and clearly, Bonzom is not suggestive of adjusting the pH to a pH of at least about 8, as affirmatively recited in claim 5," it is well settled that where patentability is predicated upon a change in a condition of a prior art process, such as a change in pH, temperature, and pressure or the like, the burden is on the applicant to establish with objective evidence that the change is critical, i.e., it leads to a new and unexpected result. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990); In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In the present case, appellant has

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presented no objective evidence that adjusting the reaction mixture to an alkaline pH produces an unexpected result.

We now turn to the examiner's rejection of claims 6-10, 13, 19 and 20 under 35 U.S.C. § 103. Independent claim 6 calls for preparing alkyl-pyrazines by "heating, refluxing and subliming" an aqueous medium containing ammonium ions and an acyloin compound as reactants. While the primary references do not disclose sublimation, appellant does not dispute the examiner's factual determination that Evans discloses the isolation of alkyl-pyrazines by a sublimation technique. Since Weissberger evidences that sublimation was a well-known technique for isolating volatile compounds, in general, and Evans evidences that it was known in the art to employ sublimation to isolate alkyl-pyrazines, we find no error in the examiner's conclusion that it would have been obvious for one of ordinary skill in the art to employ such a well-known separation technique to isolate the alkyl-pyrazines produced by the methods of the primary references. In effect, our analysis is much the same as that discussed above with respect to the rejection of claim 2.

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Appellant maintains that "the sublimation operation in Evans is far, far removed from the reaction step," i.e., "[a] plurality of processing steps intervene" (page 20 of principal brief). Furthermore, appellant submits that "[i]n contrast to Evans, claims 6-10, 13, 19 and 20 recite a one-step, simultaneous reaction and isolation" (page 20 of principal brief). However, like the examiner, we do not find that this argument is germane to the presently claimed subject matter. As noted by the examiner, none of claims 6-10, 13, 19 and 20 recite the asserted one-step, simultaneous reaction and isolation. Independent claim 6 simply specifies a process "comprising heating, refluxing and subliming an aqueous medium . . ." (emphasis added). It is elementary that by virtue of the claim language "comprising," the claim is "open" to additional steps, including any intervening steps disclosed by Evans. Moreover, we find no error in the examiner's reasoning that even if the appealed claims recited a simultaneous operation, performing the reaction transformation in one step rather than sequential steps would have been obvious to one of ordinary skill in the art, i.e., it would have been obvious for one of ordinary skill in the art to eliminate intervening

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steps in a sublimation sequence along with their attendant advantages. In re Thompson, 545 F.2d 1290, 1294, 192 USPQ 275, 277 (CCPA 1976); In re Marzocchi, 456 F.2d 790, 793, 173 USPQ 228, 229-30 (CCPA 1972).

As a final point, we note that appellant bases no argument upon objective evidence of nonobviousness, such as unexpected results which attach to the use of the claimed crystallization and sublimation techniques for isolating alkyl-pyrazines viz-à-viz the distillation and extraction techniques disclosed by the primary references.

In conclusion, based on the foregoing and the reasons well-stated by the examiner, the examiner's decision rejecting the appealed claims is affirmed.

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

AFFIRMED

EDWARD C. KIMLIN)	
Administrative Patent Judge)	
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JOHN D. SMITH)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
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