

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. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MANFRED KAUFHOLD
and
MARCEL FELD

Appeal No. 2001-2028
Application No. 09/141,163

HEARD: DECEMBER 10, 2002

Before KIMLIN, PAK, and LIEBERMAN, Administrative Patent Judges.

LIEBERMAN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner refusing to allow claims 1 through 5 and 7 through 17, as amended subsequent to the final rejection, which are all the claims pending in this application.

THE INVENTION

The invention is directed to a process for preparing a cyclopropane carboxylate of a lower alcohol by esterifying cyclopropane carboxylic acid with a lower alcohol. Specific process conditions are directed to the stoichiometry and temperature of the reaction. The process provides for the distillation of the unreacted components. Additional limitations are described in the following illustrative claims.

THE CLAIMS

Claims 1, 2, and 4 are illustrative of appellants' invention and are reproduced below:

1. A process for preparing a cyclopropanecarboxylate of a lower alcohol which comprises:

(1) esterifying a cyclopropanecarboxylic acid with a lower alcohol in the presence of an acid catalyst, wherein the cyclopropanecarboxylic acid is present in a stoichiometric excess with respect to the lower alcohol, wherein said stoichiometric excess is 2 to 1000 times while maintaining the temperature in the range of from 100 to 200°C; and

(2) distilling off the cyclopropanecarboxylate together with the water of reaction and small amounts of the lower alcohol.

2. The process as claimed in Claim 1, wherein the temperature is maintained in the range of from 120 to 200°C.

4. The process as claimed in Claim 1, wherein the acid catalyst is selected from the group consisting of sulfuric acid, an ion exchange resin containing sulfonic acid groups and a sulfonic acid.

The Rejection under Section 103(a)

It is appellants' position that the claimed subject matter is directed to a process, "for preparing cyclopropanecarboxylates of lower alcohols by esterification of the carboxylic acid with the lower alcohol in the presence of an acid catalyst, where the cyclopropane carboxylic acid is maintained in stoichiometric excess of 2 to 1000 times with respect to the lower alcohol." See Brief, page 4. In contrast, it is submitted that, "Liang et al[.] conducts the reaction with a ratio of alcohol to acid from 5:1 to 11:1." See Brief, page 5. We disagree with appellants' analysis.

Claim 1 requires that, "the cyclopropanecarboxylic acid is present in a stoichiometric excess with respect to the lower alcohol, wherein said stoichiometric excess is 2 to 1000 times." The specification utilizes the same terminology, page 5, but fails to further explain what is meant by requirement of a stoichiometric excess of 2 to 1000. As the term is not further explained, we are required to give the term its ordinary and customary meaning unless stated otherwise by appellants in their specification. The term, "stoichiometric" is customarily defined as, "the determination of the proportions in which the elements combine (formulas) and the weight relations of reactions."¹ Accordingly, a stoichiometric excess of 2 to 1000 times requires that at least 2 times the amount of cyclopropane carboxylic acid required to react with an alcohol is present in the reaction.

¹Julius Grant, Ed., Hackh's Chemical Dictionary, p. 639 (4th Ed., McGraw-Hill Book Co., New York, 1972). Copy enclosed.

Reference to the specification including the examples however, fails to support the apparent stoichiometric excess required by the claimed subject matter. The appellants submitted at oral argument that the stoichiometric excess may refer to the weight of the components present. In this respect, we note however, that inasmuch as the molecular weight of cyclopropane carboxylic acid is approximately 86 as compared with 32 for methanol and 46 for ethanol, the claimed subject matter may be interpreted as providing for a substantial weight excess of cyclopropane carboxylic acid including more than a two-fold excess with respect to methanol and still be present within the preferred limitations of Liang. Stated otherwise a stoichiometric excess of cyclopropane carboxylic acid may nonetheless fall within the teaching of Liang. See infra.

Notwithstanding claim 1, dependent claims 10 and 11, which are necessarily directed to claims narrower than the scope of claim 1, specifically provide for mole ratios wherein the alcohol is present in an amount in excess of the cyclopropane carboxylic acid. Indeed claim 10 provides for "a mole ratio of cyclopropane carboxylic acid and lower alcohol, in the range of 1:1.20 to 1:1.02" which provides up to a 20% excess of alcohol, which is not necessarily even inconsistent with our interpretation of "stoichiometric excess" supra. We accordingly, interpret appellants' invention in accordance with claims 10 and 11.

Liang is directed to a process for the preparation of cyclopropane carboxylic acid and esters thereof. See column 1, lines 5-9. We find that Liang discloses the preparation

of cyclopropane carboxylic acid esters. See column 3, line 64 to column 4, lines 11. We find that the temperature of the esterification reaction is “about 20° to 200° C.” Id. We conclude that the teachings of Liang are sufficient to meet the requirements of the temperature range of claim 2. We find that, “[t]he alcohol is generally employed in a quantity of 1 to 200 equivalents per equivalent of cyclopropanecarboxylic acid to be converted.” See column 4, lines 32-34. We conclude therefrom that alcohol may be present in excess, in an equivalent quantity and even a deficient quantity, inasmuch as the term “generally” provides for an amount of alcohol other than those specifically set forth in the disclosure of Liang. We conclude therefrom that the range of components disclosed by Liang is sufficient to meet the stoichiometric requirements of claims 10 and 11 and accordingly meet the requirements of claim 1.

We find that recovery and isolation of excess alcohol and the ester product may be accomplished by distillation. See column 4, lines 50-51. We conclude therefrom that each of the other components likewise present at the end of the reaction may also be recovered by distillation including any water of condensation and any unreacted cyclopropane carboxylic acid. Accordingly, the distillation requirements of the claimed subject matter are satisfied by Liang.

As to the presence of an acid catalyst of a selected group as required by claim 4, Liang discloses the presence and utilization of acid catalysts including sulfuric acid, p-toluene sulfonic acid, methyl sulfonic acid and ion exchange resins containing sulfonic acid

groups. See column 4, lines 34-45. We accordingly conclude that each of the acid

catalysts required by the Markush group present in claim 4 are specifically disclosed by Liang. Accordingly, the requirements of the second subgroup of claims are satisfied by Liang.

Based upon the above findings and interpretation and analysis, we conclude that Liang is sufficient in and of itself or in conjunction with Kirk-Othmer to establish a prima facie case of obviousness with respect to the claimed subject matter.

DECISION

The rejection of claims 1 through 5 and 7 through 13 under 35 U.S.C. §103(a) as being unpatentable over Liang in view of Kirk-Othmer is affirmed.

The decision of the examiner 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

EDWARD C. KIMLIN
Administrative Patent Judge

CHUNG K. PAK
Administrative Patent Judge

PAUL LIEBERMAN
Administrative Patent Judge

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Appeal No. 2001-2028
Application No. 09/141,163

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