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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GUIDO STEFFAN

Appeal No. 94-3474
Application 07/956,126¹

HEARD: June 10, 1997

Before GARRIS, WEIFFENBACH and WALTZ, Administrative Patent Judges.

WEIFFENBACH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final decision rejecting claims 1 and 4-16, which are all of the claims remaining in the application. We reverse.

The Claimed Subject Matter

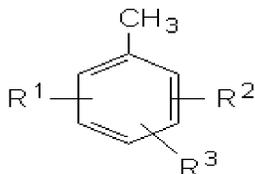
¹Application for patent filed October 2, 1992.

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The claims on appeal are directed to a process for the free-radical chlorination or bromination of a methylaromatic compound.

Claim 1 is illustrative of the claimed subject matter:

1. A process for the free-radical chlorination or bromination of a methylaromatic compound of the formula

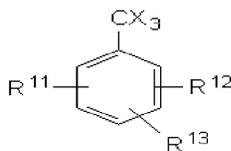


in which

R¹ and R² independently of each other denote hydrogen, halogen, COHal or SO₂Hal and

R³ denotes hydrogen or halogen, where R² and R³ together, if they are adjacent, can form the radical of a 5- or 6-membered isocyclic or heterocyclic ring, which can itself be monosubstituted or disubstituted by halogen, COHal or SO₂Hal, where such heterocyclic rings contain 1 or 2 hetero atoms selected from the group comprising N, O and S,

to give a trichloromethyl aromatic compound or a tribromomethyl aromatic compound of the formula



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in which

R^{11} and R^{12} independently of each other denote hydrogen, halogen or COHal,

R^{13} is hydrogen, halogen or COHal, where R^2 and R^{13} , if they are adjacent, can form the radical of a 5- or 6-membered isocyclic or heterocyclic ring, which itself can be monosubstituted or disubstituted by halogen or COHal, where such heterocyclic rings contain 1 or 2 hetero atoms selected from the group comprising N, O and S, and

X is chlorine or bromine,

and where, in the case of the occurrence of SQHal groups, these are converted to halogen with elimination of SO_2 , without ultraviolet irradiation and without the addition of free-radical generators, wherein the halogenation is carried out at a temperature of 120 - 240EC and in the presence of one or more alkali metal halides selected from the group comprising KCl, KBr, RbCl, RbBr, CsCl and CsBr in an amount of 0.1-30 mmol of alkali metal halide per mol of the methylaromatic compound, provided that when X is chlorine, only the alkali metal chlorides are used, and when X is bromine, only the alkali metal bromides are used.

The Rejection

Claims 1 and 4-16 stand rejected under 35 U.S.C. § 112, first paragraph, on the ground that the expressions "without ultraviolet irradiation" and "without the addition of free-radical generators" recited in claim 1 do not have support in the specification as originally filed.

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The examiner determined that the expression "without ultraviolet radiation" is not "supported by the specification simply by the absence of a requirement to include UV radiation in that even the presence of daylight would include UV radiation" (Answer, page 4). As for the expression "without the addition of free-radical generators," the examiner determined that the specification does not support the expression because if appellant's claimed process is a free-radical reaction, the process "must include a free-radical generator of some kind in order to function" (Answer, page 4). The examiner concluded that both expressions "introduce new concepts and violate the description requirement of the first paragraph of 35 U.S.C. 112" (Answer, page 4).

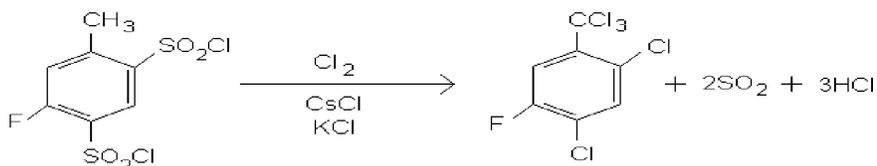
Appellant admits that his "specification makes absolutely no reference whatsoever to the use of ultraviolet irradiation or free-radical generators" in his free-radical process (Brief, page 4). Appellant argues, however, that if one skilled in the art at the time the application was filed intended to use ultraviolet irradiation or a free-radical generator, such a person would have said so. Appellant considers the concept of conducting his free-radical chlorination or bromination process in the absence of ultraviolet irradiation and without the addition of free-radical

generators would have been understood by those skilled in the art in the context of his disclosure at the time the application was filed.

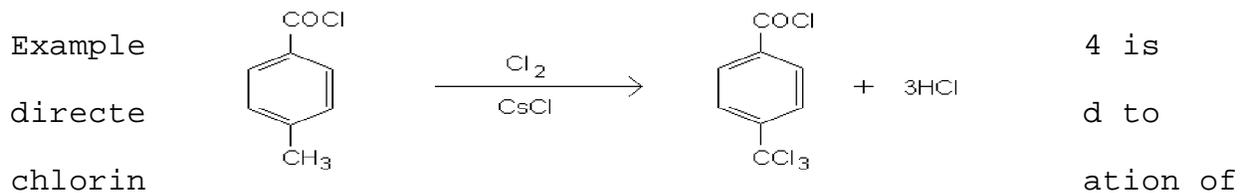
Background

Appellant's invention "relates to a free-radical process for side chain chlorination or side chain bromination of methyl aromatic compounds..." [specification, page 1, lines 7-9]. Appellant's specification includes three embodiments (chlorinating 5-fluorotoluene-2,4-disulphonyl chloride, 4-methylbenzoyl chloride, and 2,3-dichloro-6-methylquinoxaline) which are set forth in four examples.

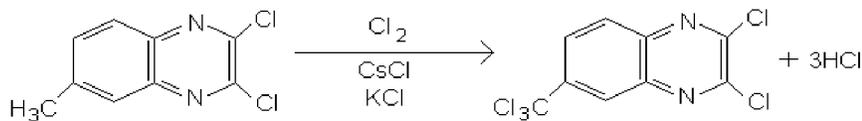
Examples 1 and 2 are directed to chlorinating 5-fluorotoluene-2,4-disulphonyl chloride by treating it with chlorine gas at temperatures ranging from 160°C to 197°C. for 5 to 12 hours in the presence of CsCl and KCl according to the following reaction scheme:



Example 3 is directed to the chlorination of 4-methylbenzoyl chloride to give 4-trichloromethylbenzoyl chloride in the presence of CsCl and chlorine gas at temperatures from 195 to 215EC. for 5 to 14 hours according to the following reaction scheme:



2,3-dichloro-6-methyl quinoxaline with chlorine gas in the presence of CsCl and KCl at temperatures between 135 and 200EC. for 2.5 to 9 hours according to the following reaction scheme:



None of the examples mention the use of UV irradiation or free-radical generators. Nor, as already mentioned, does appellant explicitly

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state in the specification that his process does not require the use of UV radiation or the addition of free-radical generators.

In order for us to properly evaluate the examiner's rejection, it is necessary to determine the level of ordinary skill in the art as it pertains to appellant's claimed subject matter.

Appellant admits that the side chain chlorination of methyl aromatic compounds by a free radical mechanism to give the corresponding trichloromethyl aromatic compounds and the decomposition of aromatic sulphonyl chlorides by a free radical mechanism to give the corresponding aryl halides are well known in the art (specification, page 1, lines 15-22). Appellant then states that these processes "are carried out in industrial chemistry under illumination, with addition of free-radical generators or purely thermally" (specification, page 1, lines 15-25). Appellant does not define the term "illumination" in his specification. As for the term "free radical generators," appellant gives examples of organic and inorganic compounds which function as "generators," namely, "phosphorous pentachloride, sulphuryl chloride, sulphur chlorides, iodine, peroxides and azo compounds" (specification, page 1, lines 26-28).

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In addition to appellant's statement of the level of ordinary skill in the art, we considered the following references of record in this application:

Kobayashi et al (Kobayashi)	3,230,268	Jan. 18, 1966
Davis et al. (Davis)	4,046,656	Sep. 6, 1977
Klauke et al. (Klauke)	4,439,620	Mar. 27, 1984
Döscher et al. (Döscher)	4,950,813	Aug. 21, 1990

Kobayashi discloses free radical chlorination of methyl-aromatic compounds such as ortho- or para-toluenesulfonyl chloride by reacting a methylaromatic compound with chlorine gas under UV irradiation or in the presence of a "free-radical generator-type catalyst" such as a peroxide or azo compound at a temperature between 60 and 90°C. (col. 2, lines 8-49 and col. 2, line 66 to col. 3, line 3). Each of the examples in the patent describing the chlorination process explicitly recite that the chlorination reaction occurs in the presence of either UV radiation or a "free-radical generator-type catalyst" (see Examples 1-9 of the patent). Moreover, in describing the prior art, the Kobayashi discloses that

... it has been conventional to prepare, for example, chloro-substituted trichloromethylbenzenes by reacting toluenes substituted with chlorine atom at a desired position with chlorine gas at a temperature of 80-165°C. in the presence of a catalyst such as phosphorus trichloride [col. 1, lines 40-45.]

Davis discloses photochlorination of methylaromatic compounds such as toluene or toluenesulfonyl chloride by a free-radical mechanism in which the methylaromatic compound is reacted with chlorine and an accelerating amount of bromine in the presence of UV radiation at a temperature between 60°C and 200°C. (col. 1, lines 30-35; col. 6, lines 18-24). Again, in describing the chlorination process, Davis, like Kobayashi, specifically recites that the process is conducted in the presence of UV radiation (col. 5, lines 8-63). Each of Davis' examples also explicitly requires a source for UV radiation, e.g a sunlamp or a UV bulb (see Examples I-VII). According to Davis, the source of the UV radiation can be natural sunlight or an artificial UV radiation source (col. 5, lines 56 and 57).

Klauke discloses chlorinating 2,4-dichloro-5-fluorobenzoyl chloride to produce 2,4-dichloro-5-fluoro-1-trichloromethylbenzene by reacting the benzoyl chloride compound at 110°C to 160°C. under UV irradiation (col. 3, lines 5-10 and claim 8). In each of the examples describing the chlorination process, Klauke explicitly recites using UV irradiation (see Examples 3 and 4).

Döscher discloses chlorinating methylaromatic compounds such as 2,4-dibromo-5-fluorotoluene or 4-methylbenzoyl chloride to give 2,4-dichloro-5-fluoro-benzotrichloride or 4-trichloro-

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methylbenzoyl chloride by a free-radical mechanism by reacting the methylaromatic compound with chlorine in the presence of a peroxide catalyst at a temperature between 30°C and 60°C (Examples 1, 2 and 5 and claim 1). In all of the examples, Döscher explicitly recites that a peroxide catalyst is present in the chlorination process (see Examples 1-7). In addition, in discussing the prior art, Döscher discloses that

[a]s is generally known, chlorination of the methyl group follows a free-radical mechanism. For this, it is necessary to employ free-radical generators, for example organic peroxides, UV light or high temperatures (> 180°C). [Col. 1, lines 32-36.; emphasis ours.]

Opinion

We have carefully considered the respective positions advanced by appellant and the examiner. However, for the reasons set forth below, we will not sustain the examiner's rejection.

The written description requirement under the first paragraph of 35 U.S.C. § 112 requires that the disclosure of the invention in the originally filed application reasonably convey to one having ordinary skill in the art that the inventor had in his possession the later claimed subject matter as of the filing date of the application. In re Wertheim, 541 F.2d 257, 262, 191 USPQ 90, 96 (CCPA 1976). The later claimed subject matter need

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not be described in haec verba to satisfy the description requirement. In re Herschler, 591 F.2d 693, 700-701, 200 USPQ 711, 717 (CCPA 1979). All that is required to satisfy the description requirement is that the originally filed disclosure would have conveyed to one having ordinary skill in the art that the appellant had possession of the concept of what is later claimed. In re Anderson, 471 F.2d 1237, 1244, 176 USPQ 331, 336 (CCPA 1973).

The later claimed subject matter at issue in this case consists of two expressions, each of which is a negative limitation. It is well settled that negative limitations are not impermissible per se, but may be permitted if indefiniteness and undue breadth are avoided. Chisum on Patents, Vol. 3, Chapter 8.06[3], page 8-144 (1997). See Ex parte Hradcovsky, 214 USPQ 554, 555-56 (Bd. App. 1982); In re Duva, 387 F.2d 402, 408, 156 USPQ 90, 95 (CCPA 1967); In re Bankowski, 318 F.2d 778, 782-783, 138 USPQ 75, 79 (CCPA 1963). The examiner has not found the expressions to be indefinite or impermissible per se, but not supported by the specification as originally filed.

Appellant contends his process is a free-radical reaction that is not conducted in the presence of UV radiation or "free-radical generators" because a fair reading of his specification

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shows that no free-radical generators are added to his process and no UV radiation is used. According to appellant, the free-radicals in his process are produced because of the high temperature of the reaction. Appellant's sole independent claim recites a temperature of 120°C to 240°C. for the claimed process. Appellant points to page 1, lines 23-28 of the specification which states that

... [the prior-art processes] proceed by a free-radical mechanism and are carried out in industrial chemistry under illumination, with addition of free-radical generators or purely thermally. Free-radical generators are for example phosphorous pentachloride, sulphuryl chloride, sulphur chlorides, iodine, peroxides and azo compounds.

Appellant is asserting that his claimed free-radical chlorination or bromination reactions are thermal only.

The issue before us is whether one having ordinary skill in the art, at the time the application was filed, would have known from appellant's original disclosure that his claimed free-radical reaction process was conducted "without UV irradiation" and "without the addition of free-radical generators" and that the objected-to expressions do not introduce a new concept.

At the outset, we must determine what one of ordinary skill in the art would attribute to the meaning of the terms "illumination" and "free-radical generators" since appellant has

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not explicitly defined "illumination" in his specification as meaning UV irradiation and since it appears that the examiner has interpreted the expression "without the addition of free-radical generators" as excluding any and all means for generating free-radicals in the claimed reaction.

In the absence of a definition by appellant for the term "illumination," we interpret the term in accordance with its common and ordinary meaning. The American Heritage Dictionary defines the term as meaning an act of illuminating, i.e. to provide light or to expose to radiation.² The only source of "illumination" or light the prior art teaches for use in the chlorination of methylaromatic compounds by a free-radical mechanism is UV radiation as evidenced by the teachings of Kobayashi, Davis and Klauke. From these teachings, we find one having ordinary skill in the art would have understood "illumination" to mean UV irradiation or light containing UV radiation. According to Davis, sunlight would be a sufficient source of UV radiation for generating free-radicals. The examiner has not presented any evidence or scientific reasoning that "illumination" would have a broader meaning beyond using UV

²The American Heritage Dictionary, Second College Edition, Houghton Mifflin Company, Boston, MA, 1982, page 641.

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radiation to persons skilled in the art of free-radical processes for halogenating methylaromatic compounds. The level of skill in the art of record further indicates that if UV radiation is used as the source for producing free-radicals, it would be explicitly disclosed as evidenced by the examples set forth in the disclosures of Kobayashi, Davis and Klauke. Accordingly, we find that at the time this application was filed, one of ordinary skill in the art would have understood "illumination" to mean UV irradiation within the context of the free-radical process for chlorination and bromination of methylaromatic compounds as disclosed and claimed by appellant.

As for the expression "without the addition of free radical generators," the examiner correctly points out that the claimed reaction must include some sort of a free-radical generator. The term "free radical generators" as defined by Döscher would encompass any and all means for generating free radicals, i.e. UV light, catalysts or high temperatures. However, in the context in which appellant has described his "free-radical generators," one having ordinary skill in the art would consider appellant's "free-radical generators" to be inorganic or organic compounds which function as catalysts for generating free radicals. Applicant includes, as examples of "free-radical generators", azo

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compounds and peroxides. It is evident from the disclosures of Kobayashi and Döscher that peroxides and azo compounds are known catalysts for free-radical reactions. Also, Kobayashi discloses using phosphorous trichloride as a catalyst which is analogous to appellant's disclosed example of phosphorous pentachloride. Moreover, we do not find any evidence of record from which to conclude that appellant's "free-radical generators" are inclusive of all means for generating free-radicals, i.e., catalysts, UV radiation and thermal. Appellant's "free-radical generators" are limited to compounds that generate free-radicals. Thus, we find that one of ordinary skill in the art would have understood the expression "without the addition of free-radical generators" to mean without the addition of free-radical catalyst compounds such as phosphorous pentachloride, sulphuryl chloride, sulphur chlorides, iodine, peroxides and azo compounds, to the reaction. It is also evident from these disclosures that if free-radical generator catalysts are employed, the catalysts are explicitly set forth in the examples.

For the reasons given above, we find that the expressions "without ultraviolet radiation" and "without the addition of free-radical generators" do not introduce new concepts and violate the written description requirement of the first

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paragraph of 35 U.S.C. § 112. We agree with appellant that, in view of the prior art, if UV radiation and free-radical catalysts are used, they would have been explicitly set forth in the disclosure, most notably, the examples. The prior art (e.g., Döscher) as well as appellant's disclosure sets forth three means by which free-radicals are generated: catalysts, UV radiation and heat. We find that within the context of appellant's disclosure that one having ordinary skill in the art would have recognized and understood that the free-radicals of the claimed process are being generated by a thermal means without ultraviolet radiation and without the addition of a free-radical generator-type catalyst compound. Appellant recites the temperature of his claimed process as being between 120°C and 240°C. Döscher teaches that thermal generation of free-radicals occurs at temperatures greater than 180°C. This teaching is sufficient to establish that the temperature of appellant's claimed process will be sufficient to generate free-radicals. There is no evidence of record to establish that temperatures between 120°C and 180°C would not also produce free-radicals in accordance with the claimed process.

For the reasons given above, the decision of the examiner is reversed.

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REVERSED

BRADLEY R. GARRIS)	
Administrative Patent Judge))	
)	
)	
CAMERON WEIFFENBACH)	BOARD OF PATENT
Administrative Patent Judge))	APPEALS AND
)	INTERFERENCES
)	
THOMAS A. WALTZ)	
Administrative Patent Judge))	

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