UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte HSUEH SUNG TUNG, ROBERT C. JOHNSON, and DANIEL C. MERKEL

Appeal 2008-3644
Application 10/626,997
Technology Center 1600

Decided: July 2, 2008

Before ERIC GRIMES, LORA M. GREEN, and JEFFREY N. FREDMAN, *Administrative Patent Judges*.

FREDMAN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a process for the manufacture of 1,3,3,3-tetrafluoropropene which the Examiner has rejected as obvious. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

Background

"Traditionally, chlorofluorocarbons (CFCs) like trichlorofluoromethane and dichlorodifluoromethane have been used as refrigerants, blowing agents and diluents for gaseous sterilization." (Spec. 1.) The Specification notes that "[i]n recent years, there has been widespread concern that certain chlorofluorocarbons might be detrimental to the Earth's ozone layer. As a result, there is a worldwide effort to use halocarbons which contain fewer or no chlorine substituents" (Spec. 1).

"1,3,3,3- tetrafluoropropene (HFC-1234ze) is a compound that has the potential to be used as a zero Ozone Depletion Potential (ODP) and a low Global Warming Potential (GWP) refrigerant, blowing agent, aerosol propellant, solvent, etc, and also as a fluorinated monomer" (Spec. 1-2).

Appellants teach "an alternate process for forming HFC-1234ze which is more economical than prior art processes and at a higher yield as compared to known processes" (Spec. 2).

Statement of the Case

The Claims

Claims 1, 3, 5-9, 11-17, 19, 20, 22-31, and 33-37 are on appeal.[1] We will focus on claim 1, which is representative and reads as follows:

> 1. A process for the manufacture of 1,3,3,3-tetrafluoropropene comprising :
>
> a) reacting 1-chloro-3,3,3-trifluoropropene with hydrogen fluoride in a reactor in the vapor phase and in the

[1] Claims 2, 4, 10, 18, and 32 are objected by the Examiner and therefore not subject to our consideration. Claim 21 is not included in the statement of rejection.

> presence of a fluorination catalyst and under conditions sufficient to form an intermediate product which comprises 1-chloro-1,3,3,3-tetrafluoropropane and/or 1,1,1,3,3-pentafluoropropane; and
>
> b) reacting said intermediate product with a caustic solution and under conditions sufficient to dehydrochlorinate 1-chloro-1,3,3,3-tetrafluoropropane and/or to dehydrofluorinate 1,1,1,3,3-pentafluoropropane, forming a reaction product which comprises 1,3,3,3-tetrafluoropropene.

The prior art

The Examiner relies on the following prior art references to show unpatentability:

Elsheikh	US 5,895,825	Apr. 20, 1999
Elsheikh	US 6,124,510	Sep. 26, 2000

The issue

The rejection as presented by the Examiner is as follows:

Claim 1, 3, 5-9, 11-17, 19, 20, 22-31, and 33-37 stand rejected under 35 U.S.C. § 103(a), as being obvious over Elsheikh '825 and Elsheikh '510 (Ans. 3).

35 U.S.C. § 103(a) rejection over Elsheikh '825 and Elsheikh '510

Appellants argue that the "first cited reference E1 [Elsheikh '825] does not have the production of HFC- 1234ze as a goal. Rather, the process of E1[Elsheikh '825] serves solely to produce HFC-245fa" (App. Br. 6). Appellants contend that "the process of E1 [Elsheikh '825] directly teaches away from step (a) of the present invention" (App. Br. 6).

Appellants submit that "neither of the cited references teach or suggest step (a) of the present invention, much less the particular

combination of step (a) followed by step (b) to produce a final product of HFC-1234ze" (App. Br. 6). Appellants further contend that "[o]bviously the applicant's conditions, which produce HFC-245fa would inherently be different from E1's conditions which produce HFC- 1234ze" (App. Br. 7).

Appellants view the combination as resulting in an "illogical pathway from HCFC-1233zd to HFC-1234ze, since HFC-1234ze would be converted into HFC-245fa and then converted back to HFC-1234ze" (App. Br. 7).

The Examiner responds that it is "reasonably expected that one of ordinary skill in the art wishing to obtain 1234ze would practice the present invention by combining the teaching of the two references (that is, preparing 1,1,1,3,3-pentafluoropropane (245fa) from 1,1,1- trifluoro-3-chloro-2-propene (1233zd) followed by the preparation of 1234ze from intermediate products (245fa or 1-chloro-1,3,3,3-tetrafluoropropane)" (Ans. 7). The Examiner also contends that

> [t]he choice of the two-step synthesis depends on the availability and cost of raw materials, and convenience in preparing the intermediate compound. The combination of the steps process is not a patentable distinction as claimed by applicants because the references cited teach the elements of the claimed invention with sufficient guidance, particularity, and with a reasonable expectation of success.

(Ans. 7.)

In view of these apparently conflicting positions, we frame the obviousness issue before us as follows:

Would it have been obvious to an ordinary artisan to combine the teachings of Elsheikh '825 and Elsheikh '510 into a two step pathway for production of HFC-1234ze?

Findings of Fact

1. Elsheikh '825 teaches "preparation of 1,1,1,3,3-pentafluropropane ('245fa') from 1,1,1-trifluoro-3-chloro-2-propene ('1233zd'), particularly processes wherein said 1233zd is first converted to 1,1,1,3-tetrafluoro-2-propene ('1234ze'), followed by conversion of the 1234ze to 245fa" (Elsheikh '825, col. 1, ll. 5-10).

2. Elsheikh '825 teaches "contacting 1234zd with HF in a first reaction zone under conditions sufficient to produce 1234ze, such as by the gas phase, catalyzed fluorination to produce a mixture whose major components are 1234ze, 245fa, HF, HCl and 1233zd" (Elsheikh '825, col. 1, ll. 56-60).

3. Elsheikh '825 teaches that a "variety of fluorination catalysts can be used" (Elsheikh '825, col. 2, l. 1).

4. Elsheikh '825 teaches that 1234ze can be separated from 245fa, noting "[o]ne manner of carrying out the separation is to subject the reaction mixture from the first reaction zone to two distillations, the first distillation serving to separate the lower boiling 1234ze and HCL (taken off at the top of the column) from the 245fa, 1233zd, HF and any other heavies" (Elsheikh '825, col. 2, ll. 32-37).

5. Elsheikh '510 teaches "a process for the preparation of 1234ze which comprises (a) contacting 245fa with an alkaline solution or with a chromium based catalyst, and (b) recovering cis/trans 1,1,1,3-tetrafluoro-2-propene from the resulting reaction mixture" (Elsheikh '510, col. 1, ll. 18-22).

Discussion of 35 U.S.C. § 103(a) rejection over Elsheikh '825 and Elsheikh '510

The obviousness case rests on whether it would have been obvious to first convert 1233zd to 245fa using the method of Elsheikh '825 in order to then convert the resultant 245fa to 1234ze using the method of Elsheikh '510. In our opinion, the ordinary practitioner interested in the preparation of maximal amounts of 1234ze, such as Elsheikh '510, and possessing a feedstock of 1233zd, would have followed the instructions of Elsheikh '825 to convert 1233zd into a mixture of 1234ze and 245fa (FF 1-3). Since the ordinary practitioner is interested in obtaining 1234ze, the practitioner would have followed the instructions of Elsheikh '825 and separated the 1234ze and 245fa from one another (FF 4). The ordinary practitioner would have put the purified 1234ze aside as complete and treated the separated 245fa as taught by Elsheikh '510 in order to convert the remaining feedstock components into 1234ze (FF 5).

We therefore conclude that the Examiner has set forth a prima facie case that claim 1 would have been obvious to the ordinary artisan in view of Elsheikh '825 and Elsheikh '510. In *KSR*, the Supreme Court indicated that "[w]hen a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability." *KSR Int'l v. Teleflex Inc*., 127 S. Ct. 1727, 1740 (2007). In the instant case, application of the methods of Elsheikh '825 and Elsheikh '510 suggests a predictable variation in the method for production of 1234ze.

We are not persuaded by Appellants' argument that "the process of E1 directly teaches away from step(a) of the present invention" (App. Br. 6). Like our appellate reviewing court, we "will not read into a reference a teaching away from a process where no such language exists." *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1364 (Fed. Cir. 2006). There is no language in Elsheikh '825 which teaches away from obtaining 245fa from 1233zd as an intermediate. Elsheikh '825 is interested in producing 245fa, but expressly teaches separation of the 1234ze from the 245fa followed by further treatment of the 1234ze to convert it into 245fa (*see* Elsheikh '825, col. 2, ll. 29-31). This is not a teaching away, but rather a teaching that the ordinary practitioner recognizes that separation of an intermediate product from a final product during the reaction may be performed, followed by further reaction of the intermediate product to obtain additional final product (*see* Elsheikh '825, col. 2, ll. 29-31). Just as an ordinary practitioner can separate 1234ze and 245fa and react the 1234ze according to the method of Elsheikh '825 to form additional 245fa, so too, the ordinary practitioner can perform the same separation, but react the 245fa using the method of Elsheikh '510 to obtain additional 1234ze, if that is the desired final product (*See* FF 5).

We also do not find Appellants' "illogical pathway" argument to be correct (*see* App. Br. 7). In our opinion, Appellants fail to properly combine the references as would an ordinary practitioner, where when a first reaction produces both final and intermediate products, these would be separated and the intermediate product subjected to another reaction to

obtain the desired final product, as exemplified by Elsheikh '825 (*see* Elsheikh '825, col. 2, ll. 29-31).

We affirm the rejection of claim 1 as obvious over Elsheikh '825 and Elsheikh '510. Pursuant to 37 C.F.R. § 41.37(c)(1)(vii)(2006), we also affirm the rejections of claims 3, 5-9, 11-17, 19-20, 22-31, and 33-37 as these claims were not argued separately.

CONCLUSION

In summary, we affirm the rejection of claim 1 as obvious over Elsheikh '825 and Elsheikh '510. Pursuant to 37 C.F.R. § 41.37(c)(1)(vii)(2006), we also affirm the rejections of claims 3, 5-9, 11-17, 19-20, 22-31, and 33-37 as these claims were not argued separately.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv)(2006).

AFFIRMED

Ssc:

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