

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SIEMENS WATER TECHNOLOGIES HOLDING CORP.,
Patent Owner and Appellant

Appeal 2007-3919
Reexamination Control 90/007,022¹
Patent 6,174,498
Technology Center 1700

Decided: March 25, 2008

Before TEDDY S. GRON, ADRIENE LEPIANE HANLON, and
MARK NAGUMO, *Administrative Patent Judges*.

NAGUMO, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ Reexamination of U.S. Patent 6,174,498, issued 16 January 2001, based on application 08/827,848, which was filed 11 April 1997, titled *Odor Control System*.

A. Introduction

Ex parte reexamination of U.S. Patent 6,174,498 (“498 patent”) was requested on 30 April 2004 by the then-patent owner, United States Filter Corporation, based on two references, which are described *post*. (Reexamination Control 90/007,022, Patent Owner’s Detailed Statement Pursuant to 37 CFR § 1.510(b), filed 30 April 2004 (“Detailed Statement”). During the course of prosecution, claims 27–30 were amended and new claims 31–116 were added. (App. Br. Claims App’x at 18–47.)

The current patent owner, identified as Siemens Water Technologies Holding Corporation (“Siemens”), (App. Br.² at 3), seeks review under 35 U.S.C. § 134(b) of the final rejection of claims 1–116, all of the pending claims. We have jurisdiction under 35 U.S.C. § 6(b).

The subject matter on appeal relates to methods and apparatuses (“systems”) for removing unwanted constituents from a gas stream.

The Examiner has maintained the following rejection³:

Claims 1–116 have been rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Triplex⁴ and Foidl⁵.

² Amended Appeal Brief under 37 C.F.R. § 41.37, filed 15 December 2006.

³ Examiner’s Answer mailed 26 January 2007 (“Ans.”) at 3.

⁴ *Triplex Model Operation and Maintenance Manual for Eleventh Street Pump Station, Houston, Texas*.

⁵ Leonhard Foidl, *Installation for the Treatment of Combustion Gases*, U.S. Patent 4,588,535 (1986).

Independent claims 1 and 49 are representative of the issues necessary to resolve this appeal. Due to the length of the claims and the nature of the arguments presented by Siemens, the texts of these claims are set out in full in Appendix A, attached to this Decision. A brief summary of the claimed subject matter follows.

Claim 1 covers a system for removing unwanted constituents from a gas stream, the system comprising a unitary housing with an inlet and an outlet, interior partial walls defining first and second chambers that are in “series fluid communication” with each other and that have first and second sumps, respectively, that hold aqueous solutions for treating the gas stream, and means for delivering the aqueous solutions to the gas streams, wherein reacted and unreacted aqueous solutions are returned to the sumps.

Claim 49 covers a system which is similar to the one covered by claim 1, except that the housing need not be unitary⁶; there are three connected chambers rather than two; the chambers each include a packed bed through which the gas is passed and a sump; the second and third chambers share the same sump; distinct first and second aqueous reagent solutions selected from a four-member Markush group are used to wet the packed beds to treat the gas stream; the reaction products and unreacted aqueous solutions are collected in the sumps; and the reaction products and the cleaned gas streams are discharged.

⁶ We infer the nonunitary housing limitation of independent claims 49 and 94 from the presence of claims 69 and 114, which depend from claims 49 and 94, respectively, and which recite a unitary housing; and from Appellant’s argument that independent claims 1, 10, 19, 27, and 72 require unitary housings (App. Br. at 12).

The major disputed limitations of the independent claims are:

- claims 1, 10, 19, 27, and 72 require a unitary housing; claims 49 and 94 do not;
- claims 27, 49, 72, and 94 require that the gas stream flows through packed beds; claims 1 and 10 do not;
- claims 10, 49, and 94 require that at least two treatment chambers share a sump; claims 1, 19, 27, and 72 do not.

B. Findings of Fact (FF)

Findings of fact throughout this Decision are supported by a preponderance of the evidence of record.

The 498 Patent

1. The 498 patent claims the benefit under 35 U.S.C. § 120 via a continuation parent-application and via two continuation-in-part applications, back to October 1991.
2. Among the stated objects of the invention are: an odor control system having multiple stages and multiple chemistries in a single housing (498 patent at 4:41–46); and a compact arrangement of components to conserve the area required for installation (*id.* at 4:38–41).
3. A conventional 15,000 cfm packed tower system for a municipal wastewater treatment plant is said to require more than 20 feet of height clearance and about 400 square feet of floor space (allowing for ancillary equipment). (498 patent at 3:8–11.)

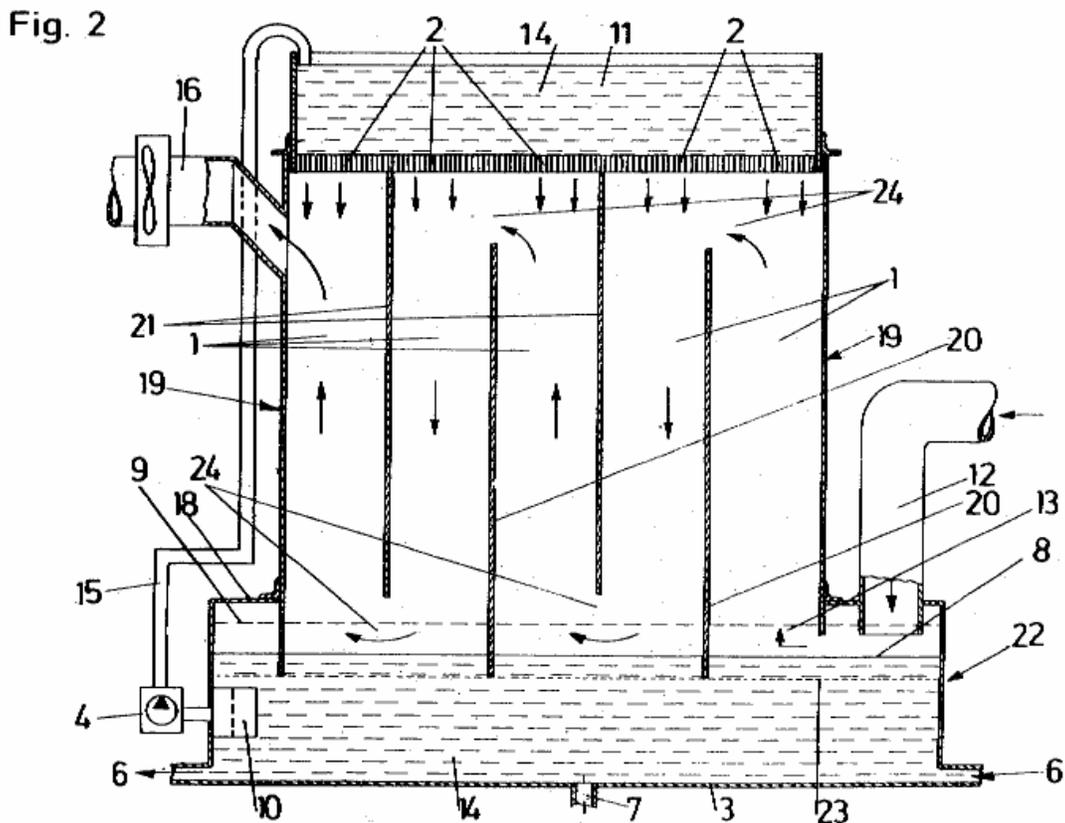
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4. The 498 patent does not appear to report the height and space requirements of a typical system within the scope of the claimed systems.

5. The term “unitary” is not separately defined in the specification, but the term appears in the phrase “unitary construction” (*e.g.*, 498 patent at 5:67 and at 6:17); the term “single housing” is also used (*id.* at 4:45-46 and at 5:11).

Foidl

6. Foidl describes a device said to be useful for treating combustion gases. (Foidl at 1:7-8.)
7. A particular embodiment is depicted in Foidl Figure 2, which is reproduced below:



{Foidl Figure 2 is said to show a gas-treatment device.}⁷

⁷ The text in curly braces following the Figures is provided to ensure compliance with section 508 of the U.S. Rehabilitation Act for publication of this Decision on the USPTO website pursuant to the Freedom of Information Act. It is not part of the Decision.

8. The device is formed by a middle part **19** which is fitted to a lower part **22** through an aperture in cover **18**. (Foidl at 4:57–59.)
9. Gas to be treated enters through duct **12** and exits through duct **16**.
10. Ducts in the middle are formed by partitions **20, 21**, which are mounted in vertically staggered positions. (Foidl at 4:61–63.)
11. As can be seen from Figure 2, washing liquid **14** in lower vessel **22** is raised by pump **4** and duct **15** to an upper storage space **11**, whence it passes through spray nozzles **2** down through the gas which flows alternately against and with the spray.

12. Foidl explains the advantages of the device in the following words:

due to the repeated deflection of the stream of combustion gases which on their way are exposed, alternately in parallel and countercurrently, to the washing liquid discharged through the spray nozzles, not only the combustion gases are stripped of solid particles, but also, even if only water is used, gaseous pollutants, especially SO₂, are dissolved to a large extent.

(Foidl at 3:10–17.)

13. Foidl explains further that:

[a]nother possibility is to subdivide both vessel **3** and storage space **11** into a plurality of compartments having each a connecting line and circulating pump of their own, so that the combustion gases can be treated sequentially with different washing liquids, each serving the purpose of dissolving another gaseous pollutant.

(Foidl at 5:26–31.)

Triplex

14. Triplex does not appear to bear a clear date of publication.
15. The patent owner presented, without reservation, Triplex as prior art against the 498 patent. (Detailed Statement at 1.)
16. Triplex describes “the Triplex Scrubber,” as being a device “designed to control atmospheric hydrogen sulfide and other noxious odors. It consists of three, counter-current, absorption towers capable of removing 300 ppm of hydrogen sulfide continuously at rates from 150 to 300 cubic feet per minute.” (Triplex at 4-1, lead paragraph.)
17. A typical Triplex scrubber is said to have a pH of 9.0 to 9.2 in the first tower, a pH of 9.5 to 9.7 in the second tower, and a pH of 10.0 to 10.2 in the last tower. (Triplex at 4-3, § 4.1.6.)
18. Triplex instructs that “[i]f any of the scrubbers are removed to other sites and operated at lower air flows (500 cfm or less), the typical pH ranges listed above should be used. (Triplex at 4-3, § 4.1.6; italics omitted.)
19. The general operation of the Triplex scrubber system can be seen from Triplex Figures 4-1 and 4-2, which are reproduced on the following pages.

20. Triplex Figure 4-1 is shown below:

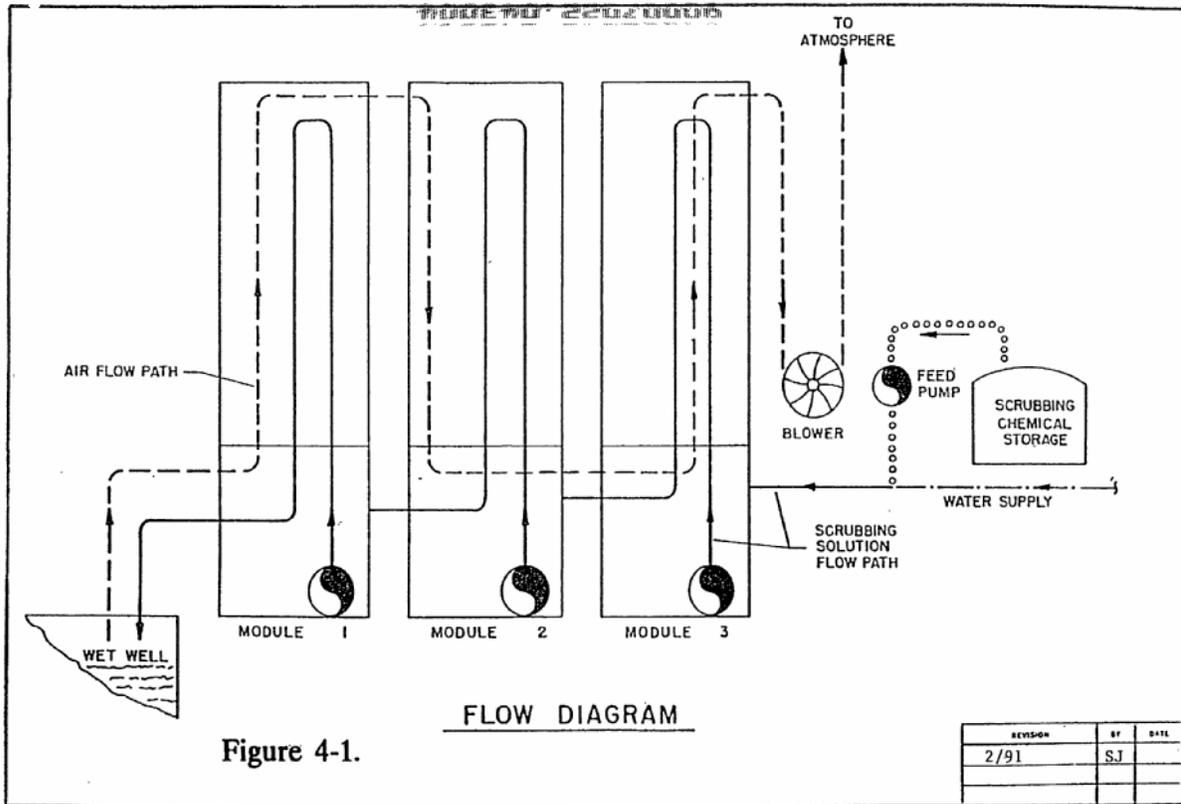


Figure 4-1.

{Triplex Figure 4-1 is said to show a flow diagram of the Triplex Scrubber.}

21. As shown in Figure 4-1, *supra*, air enters module 1 near the bottom and exits near the top into module 2, whence the air exits near the bottom, into the bottom of module 3, thus executing a series of reversals of direction of flow.

22. As shown in Figure 4-1, *supra*, and in Figure 4-2, *infra*, the scrubbing solution(s) are pumped from the bottom of each module to the top, where they are sprayed on a packed bed through which the air is passed.

23. Triplex Figure 4-2 is shown below:

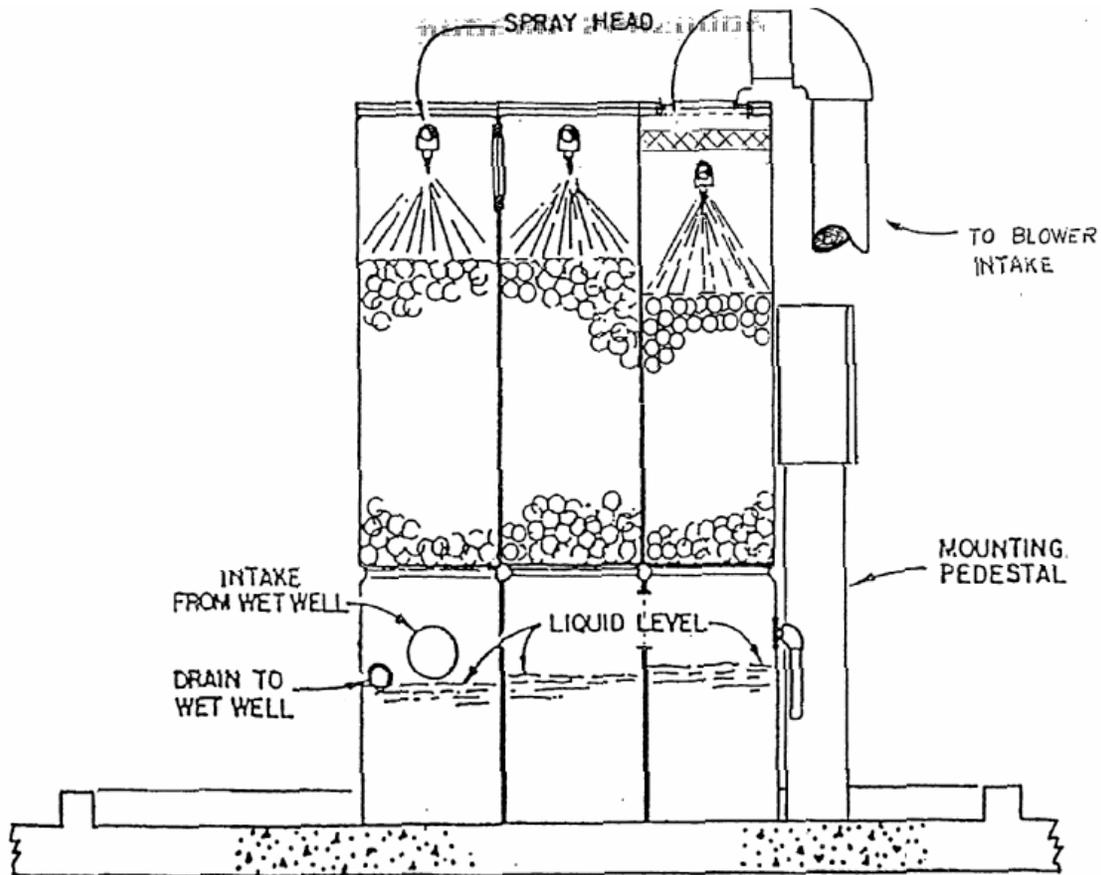


Figure 4-2. CO-CURRENT TRI-PLEX INTERNAL VIEW (2/91)

{Triplex Figure 4-2 is said to show an internal view of the Triplex Scrubber.}

C. Discussion

Claimed subject matter is unpatentable if the differences between the claimed subject matter and the prior art are such that one of ordinary skill in the art, at the time the invention was made, would have deemed the claimed subject matter obvious. 35 U.S.C. § 103(a). “Obviousness is a legal conclusion based on factual inquiries including the scope and content of the

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prior art, the differences between the prior art and the claimed subject matter, and the level of ordinary skill in the pertinent art.” *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). The inquiry is broad, and any secondary considerations that prove instructive should be considered. *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1739 (2007). “One of the ways in which a patent’s subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent’s claims.” *KSR*, 127 S.Ct. at 1742.

On appeal, the burden is on the Appellant to demonstrate reversible error by the Examiner. Arguments not timely raised are waived absent a showing of good cause. 37 C.F.R. § 41.37(c)(vii).

The Examiner finds that Triplex describes “substantially the invention as claimed” (Ans. at 3, making specific findings), except that “the [Triplex] system is configured as a modular system” (*id.* at 4). The Examiner finds that Foidl describes “an installation” for the treatment of gases formed with a unitary housing, plural chambers, and clearly showing alternating flow from one chamber to the next. (*Id.* at 4.) Although the figures show a single sump, the Examiner finds that Foidl describes embodiments in which each chamber may have its own sump, spraying system, and washing liquid. (*Id.*; FF 13.) The Examiner concludes that it would have been obvious to one of ordinary skill in the art to configure the Triplex scrubbing system as a unitarily housed system as taught by Foidl in order to provide a more compact structure. (*Id.*) The Examiner concludes further that, given Foidl’s teaching of different chemicals and sumps for different chambers, claimed

embodiments requiring shared or separate sumps and chemical solutions would have been obvious modifications. (*Id.*)

In rebuttal, Siemens does not dispute the Examiner's findings as to the teachings of Triplex or Foidl, taken separately. Nor does Siemens challenge the status of Triplex as prior art against the 498 patent. Rather, Siemens argues, with respect to the subject matter of independent claims 1, 10, 19, 27, and 72, and the subject matter of the corresponding dependent claims, that there is no motivation to modify the modular system described by Triplex to the unitary housing system described by Foidl. (App. Br. at 12.) Such a combination, Siemens urges, would be contrary to the teachings of modularity found in Triplex. (*Id.* at 13.) Moreover, according to Siemens, the operation of the Foidl device is so different than the operation of an odor control system "that one skilled in the art would not even consider it applicable to the field." (*Id.* at 14.) More specifically, the chemistry for treating combustion gases is said to be different from that for an odor control system. (*Id.*) Siemens also objects that Foidl uses a storage space at the top of the device so the washing liquid rains down through the gas ducts, rather than being passed through controlled spray nozzles onto packed beds, which, according to Siemens, Foidl does not disclose. (*Id.*) Siemens then charges the Examiner with having used impermissible hindsight, as shown by the allegedly impermissible substantial change in the method of the Triplex operation, namely, the loss of modularity. (*Id.*)

Finally, Siemens argues that claims 10, 49, and 94 require a shared sump, and points out that Triplex requires different treatment chemicals in each section. Shared sumps are therefore, according to Siemens,

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incompatible with the Triplex system, and the Examiner's rejection of these claims must be reversed for this additional reason. (App. Br. at 15.)

Initially, we note that Siemens has, by presenting Triplex as prior art, without reservation, waived any argument that Triplex is not prior art against the 568 patent. *Cf. In re Nomiya*, 509 F.2d 566, 570–71 (CCPA 1975) (accepting Nomiya's representations that figures labeled "Prior Art" as admissions that they were available as prior art for any purpose). We observe further that Siemens has not, with the exceptions noted *infra*, argued for the separate patentability of the claims. In particular, Siemens has not argued the separate patentability of any dependent claims. Accordingly, all claims stand or fall with the representative claims.

Siemens' arguments that the Examiner's rejection fails for lack of motivation to make unitary the modular system described by Triplex apply to all the claims except for claims 49 and 94, which, as discussed *supra*, do not require a unitary housing. Although modularity is a feature of the Triplex scrubber, Siemens has not directed our attention to any credible evidence that the ordinary worker would have regarded modularity as critical to the Triplex scrubber function or operation. Put another way, Siemens has failed to establish that those skilled in the art believed that modularity was mandatory for the operation of the Triplex scrubber. Nor has Siemens directed our attention to any teaching in Triplex that indicates that the proposed modification to a "unitary" housing cannot or must not be done on a scrubber of practical size (FF 3-4). Thus, Siemens has failed to establish the factual predicates necessary to conclude that Triplex teaches away from using a unitary housing. *Para-Ordnance Manufacturing, Inc. v.*

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SGS Importers International, Inc., 73 F.3d 1085, 1090 (Fed. Cir. 1995) (to teach away, a reference must state that it “should not” or “cannot” be used in combinations with the other reference.)

As the Supreme Court observed recently:

If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* and *Anderson's-Black Rock* are illustrative—a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

KSR Int'l Co. v. Teleflex Inc., 127 S.Ct. 1727, 1731 (2007). Here, Siemens has failed to show that there is more than the predictable use of prior art elements according to their established functions.

Siemens's objections to Foidl are similarly without merit. Siemens has not directed our attention to any credible evidence of record that persons having ordinary skill in the art would have regarded the methods of treating gas streams with the aqueous reagents taught by Triplex and by Foidl as non-analogous art, i.e., as not in the same field of endeavor—still less not reasonably pertinent to the problem of removing malodorous substances from a gas stream. Neither of the tests established by the Federal Circuit for determining whether art is “non-analogous” has been met. *In re Clay*, 966 F.2d 656, 658-59 (Fed. Cir. 1992). Nor has Siemens directed our attention to any credible evidence of record that adapting the unitary housing taught

by Foidl to accommodate the plumbing, spray nozzles, and packed beds⁸, taught by Triplex would have been beyond the ordinary skill in the art. Considering the absence of special instruction in Siemens' own specification (which need not describe what is well known in the art), the preponderance of the evidence of record is that the artisan would have needed no more than the suggestion to know how to make and use the appropriate modifications. As the Examiner has shown, Foidl provides the suggestion that a gas scrubber can be advantageously placed in a unitary housing.

Finally, Siemens' argument that the different chemical treatments in the three stages taught by Triplex negate the Examiner's holding that a shared sump, as recited in independent claims 10, 49, and 94, would have been obvious over the combined teachings of Triplex and Foidl is without merit. Siemens ignores teachings in Triplex that different configurations of the Triplex scrubber, with different numbers of scrubbers, can be accommodated. (Triplex at 4-3, § 4.1.6; FF 18.) Siemens also ignores the express teachings of Foidl that different chemistries can be accommodated with a plurality of separate compartments, each having a connecting line, circulating pump, and washing liquid of its own. (Foidl at 5:26–31; FF 13.) Thus, it appears that the ordinary worker would have understood that both Triplex and Foidl teach that gas scrubbers can be configured that have plural treatment chemistries with correspondingly modified structures. In particular, providing a shared sump, plumbing, and washing fluid for chambers having the same washing liquid, and a distinct sump, plumbing,

⁸ The packed beds limitation argument applies only to the traverse of the rejections of independent claims 27, 49, and 94.

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and washing liquid for chambers having different chemistries would have been an obvious variation based on the teachings of Foidl. Moreover, the record indicates that it would have been within the skill of and obvious to the ordinary worker to adapt the flexible system described by Triplex to share sumps for chambers sharing the same washing fluids.

Siemens has, in essence, attacked the teachings of Triplex and Froidl separately. It is improper to attack references individually where, as here, the obviousness rejection is based on their combined teachings. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

On the present record, we have no difficulty determining that Siemens has failed to demonstrate reversible error in the Examiner's holding of obviousness.

D. Summary

In view of the record and the foregoing considerations, it is:

ORDERED that the rejection of claims 1–116 under 35 U.S.C. § 103(a) in view of the combined teachings of Triplex and Foidl is AFFIRMED;

AFFIRMED

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APPENDIX A

claims 1 and 49
(paragraphing and indentation added)

Claim 1:

A system for removing unwanted constituents from a gas stream, comprising:

an unitary housing,

said housing having,

at an upstream end thereof, an inlet
for receiving a gas stream carrying unwanted constituents,
and having,

at a downstream end thereof, an outlet
for the exhaustion to atmosphere of a gas stream which has
been cleaned while passing through said housing,

said housing further having

a wall disposed inside thereof between said upstream end and said
downstream end,

said wall forming first and second chambers, between said
upstream end and said downstream end respectively,

said wall having a height less than the height of said formed
chambers,

said chambers being in series fluid communication

for confining a gas stream for pretreatment in said first
chamber and subsequent treatment in said second chamber

and for passing the gas stream from the inlet of said
upstream end toward said downstream end and out the outlet
thereof,

wherein said gas stream flows over said wall, and directly
into said second chamber,

thereby changing direction of gas flow whereby said
direction of flow in one of said chambers is opposite to the
direction of flow in the other one of said chambers,

said housing further having

first and second sumps forming a bottom of said housing and being in fluid communication with said first and second chambers, respectively,

each of said first and second sumps containing

an aqueous reagent solution for the treatment of the gas stream flowing through said system;

means for delivering, from said first and second sumps, respectively, an aqueous reagent solution, to said first and second chambers, to thereby treat the gas stream flowing therethrough,

wherein one portion of said aqueous reagent solution reacts chemically with unwanted constituents in the gas stream to produce reaction products removing unwanted constituents from the gas stream and

another portion of said aqueous reagent solution remains unreacted, and

wherein the reaction products and the unreacted aqueous reagent solution are collected in said first and second sumps by being returned thereto from said first and second chambers, respectively.

Claim 49:

A method of cleaning a gas stream by removing therefrom unwanted odorous substances, in a single pass through a treatment system utilizing highly reactive reagents and less reactive reagents simultaneously, the method comprising the steps of:

providing a housing having a first treatment chamber for confining the gas stream for pretreatment,

said chamber including a first packed bed and a first sump;

providing a second treatment chamber within said housing in direct fluid communication with said first treatment chamber,

for confining the gas stream for further treatment,

said second treatment chamber also including a second packed bed and a second sump;

providing a third treatment chamber within said housing in direct fluid communication with said second treatment chamber,

for confining the gas stream for further treatment,

said third treatment chamber including a third packed bed and sharing the second sump with the second treatment chamber;

selecting a first aqueous reagent solution,

said solution containing a reagent selected from the class consisting of sodium hydroxide, sodium hypochlorite, sulfuric acid and hydrogen peroxide;

wetting the first packed bed in the first chamber with a surplusage of the selected first aqueous solution,

said solution containing a chemical reagent reactive to the gas stream odorous substances for chemical reaction therewith for formation of reaction products;

providing a wall between said sumps to prevent fluid flow therebetween;

selecting a second aqueous reagent solution, said second solution being other than the first selected solution,

said solution containing a reagent selected from the class consisting of sodium hydroxide, sodium hypochlorite, sulfuric acid and hydrogen peroxide;

wetting the second and third packed beds in the second chamber with a surplusage of the selected second aqueous solution,

said solution containing a chemical reagent reactive to the gas stream odorous substances for chemical reaction therewith for formation of reaction products;

passing sequentially the gas stream through the first, second, and third chambers including passing the gas stream through the respective packed beds;

collecting in the first and second sumps, respectively, the reaction products formed in the respective packed beds and the portion of the aqueous solution unreacted with odorous substances;

discharging reaction products from said first and second sumps;

and discharging a cleaned gas stream from said housing.