

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT2860418

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
ESTATE OF STEFFEN W THOMAS JR	11/26/2013
KENNETH M PONDER	11/26/2013
RECEIVING PARTY DATA	
Name:	STEFKO PROPERTIES LLC
Street Address:	610 MCFARLAND 400 DR.
City:	ALPHARETTA
State/Country:	GEORGIA
Postal Code:	30004
PROPERTY NUMBERS Total: 1	
Property Type	Number
Patent Number:	8197706
CORRESPONDENCE DATA	
Fax Number:	(770)781-9191
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>	
Phone:	770-781-4100
Email:	wkraby@mphtlaw.com
Correspondent Name:	WENDY W KRABY
Address Line 1:	202 TRIBBLE GAP ROAD
Address Line 2:	SUITE 200
Address Line 4:	CUMMING, GEORGIA 30040
NAME OF SUBMITTER:	WENDY W. KRABY
SIGNATURE:	/Wendy W. Kraby/
DATE SIGNED:	05/19/2014
This document serves as an Oath/Declaration (37 CFR 1.63).	
Total Attachments: 2	
source=Patent 8,197,706 - Assignment of Rights - Patent Issued#page1.tif	
source=Patent 8,197,706 - Assignment of Rights - Patent Issued#page2.tif	

ASSIGNMENT OF RIGHTS - PATENT ISSUED

This Assignment of Rights – Patent Issued Agreement (the “Agreement”) is made and entered into this 26 day of November 26, 2013 with an effective date of January 1, 2013 (the “Effective Date”) by and among the **Estate of Steffen W. Thomas, Jr.** (“Assignor Thomas”), **Kenneth M. Ponder** (“Assignor Ponder”) and **STEFKO Properties, LLC** (“Assignee”).

WITNESSETH:

WHEREAS, Steffen W. Thomas, Jr. and Assignor Ponder were the only two inventors and owners of the following U.S. Patent:

- **U.S. Patent Number: 8,197,706, filed December 6, 2010, and published June 12, 2012, titled R-421A, Refrigerant with lubricating oil for replacement of R22 refrigerant (the "Patent").**

WHEREAS, Steffen W. Thomas, Jr. died on January 8, 2013 and his interest and rights to the Patent is now held by his estate, Assignor Thomas.

WHEREAS, Assignee Thomas and Assignee Ponder desire to assign their entire interests in the Patent to Assignee.

WHEREAS, Assignee desires to acquire all the rights in and to the Patent.

Therefore, for valuable consideration, the receipt of which is acknowledged, Assignor Thomas and Assignor Ponder assign to Assignee 100% of their right, title and interest in the invention and Patent to Assignee for the entire term of the Patent and any reissues or extensions and for the entire terms of any patents, reissues or extensions that may issue from foreign applications, divisions, continuations in whole or part or substitute applications filed claiming the benefit of the Patent. The right, title and interest conveyed in this Assignment is to be held and enjoyed by Assignee and Assignee's successors as fully and exclusively as it would have been held and enjoyed by Assignor Thomas and Assignor Ponder had this assignment not been made.

Assignor Thomas and Assignor Ponder further agree to: (a) cooperate with Assignee in the protection of the patents rights and prosecution and protection of foreign counterparts; (b) execute, verify, acknowledge and deliver all such further papers, including patent applications and instruments of transfer; and (c) perform such other acts as Assignee lawfully may request to obtain or maintain the Patent and any and all applications and registrations for the invention in any and all countries.

[SIGNATURES ON FOLLOWING PAGE]

ASSIGNOR THOMAS:

Estate of Steffen W. Thomas, Jr.

Date: 11-26-13

Betty Rives Thomas

Name: Betty Rives Thomas, Executor of the
Estate of Steffen W. Thomas, Jr.

Address: 4250 Bethany Road
Buckhead, GA 30625

ASSIGNOR PONDER:

Kenneth M. Ponder

Date: 11/26/13

Kenneth M. Ponder

Name: Kenneth M. Ponder
Address: 105 Laurel Lane
Cumming, GA 30040

ASSIGNEE:

STEFKO Properties, LLC

Date: 11/26/13

Kenneth M. Ponder

Name: Kenneth M. Ponder, Manager
STEFKO Properties, LLC
Address: 610 McFarland 400 Dr,
Alpharetta, GA 30004



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/961,045	06/12/2012	8197706	821920-1031	8450

24504 7590 05/23/2012

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
400 INTERSTATE NORTH PARKWAY SE
SUITE 1500
ATLANTA, GA 30339

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Kenneth M. Ponder, Cumming, GA;
Steffan Thomas JR., Buckhead, GA;

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax **(571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

24504 7590 02/15/2012
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
400 INTERSTATE NORTH PARKWAY SE
SUITE 1500
ATLANTA, GA 30339

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/961,045

12/06/2010

Kenneth M. Ponder

821920-1031

8450

TITLE OF INVENTION: REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$870	\$300	\$0	\$1170	05/15/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
HARDEE, JOHN R	1761	252-067000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Thomas, Kayden, Horstemeyer
 & Risley, LLP
 2 _____
 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☒ Payment by credit card. ~~XXXXXXXXXXXXXXXXXXXX~~
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 20-0778 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Todd Deveau/

Date May 14, 2012

Typed or printed name Todd Deveau

Registration No. 29,526

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal

Application Number:	12961045			
Filing Date:	06-Dec-2010			
Title of Invention:	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT			
First Named Inventor/Applicant Name:	Kenneth M. Ponder			
Filer:	Todd Deveau./Amy Kwon			
Attorney Docket Number:	821920-1031			
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	2501	1	870	870
Publ. Fee- early, voluntary, or normal	1504	1	300	300

EXHIBIT 1004

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1170

Electronic Acknowledgement Receipt

EFS ID:	12768784
Application Number:	12961045
International Application Number:	
Confirmation Number:	8450
Title of Invention:	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT
First Named Inventor/Applicant Name:	Kenneth M. Ponder
Customer Number:	24504
Filer:	Todd Deveau./Amy Kwon
Filer Authorized By:	Todd Deveau.
Attorney Docket Number:	821920-1031
Receipt Date:	14-MAY-2012
Filing Date:	06-DEC-2010
Time Stamp:	14:16:34
Application Type:	Utility under 35 USC 111(a)


Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1170
RAM confirmation Number	724
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part / (if appl.)	Pages (if appl.)
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1	Issue Fee Payment (PTO-85B)	01615915.PDF	340369 fa5e5eab740e8d25172ab745ec4a82cd4f63f9e5	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32069 4dccc769f2b2864bd26b47d003f7d08e75c3cc47	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			372438		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

Issue Classification 	Application/Control No. 12961045	Applicant(s)/Patent Under Reexamination PONDER ET AL.
	Examiner JOHN HARDEE	Art Unit 1761

ORIGINAL						INTERNATIONAL CLASSIFICATION												
CLASS			SUBCLASS			CLAIMED					NON-CLAIMED							
252			68			C	0	9	K	5 / 04 (2006.01.01)								
CROSS REFERENCE(S)																		
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																	

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant								<input type="checkbox"/> CPA								<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original				
-	1	-	17	19	33	16	49												
-	2	-	18	21	34	23	50												
-	3	-	19	-	35														
-	4	-	20	5	36														
-	5	-	21	6	37														
-	6	-	22	-	38														
-	7	4	23	13	39														
-	8	1	24	14	40														
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-	14	-	30	10	46														
-	15	20	31	18	47														
-	16	17	32	8	48														

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 23	
/JOHN HARDEE/ Primary Examiner.Art Unit 1761 (Primary Examiner) _____ (Date) _____		O.G. Print Claim(s) 1	O.G. Print Figure 2

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

24504 7590 02/15/2012
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
400 INTERSTATE NORTH PARKWAY SE
SUITE 1500
ATLANTA, GA 30339

EXAMINER

HARDEE, JOHN R

ART UNIT

PAPER NUMBER

1761

DATE MAILED: 02/15/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/961,045

12/06/2010

Kenneth M. Ponder

821920-1031

8450

TITLE OF INVENTION: REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional

YES

\$870

\$300

\$0

\$1170

05/15/2012

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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24504 7590 02/15/2012
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
400 INTERSTATE NORTH PARKWAY SE
SUITE 1500
ATLANTA, GA 30339

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

12/961,045 12/06/2010 Kenneth M. Ponder 821920-1031 8450

TITLE OF INVENTION: REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT

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nonprovisional	YES	\$870	\$300	\$0	\$1170	05/15/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
HARDEE, JOHN R	1761	252-067000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/961,045	12/06/2010	Kenneth M. Ponder	821920-1031	8450

24504 7590 02/15/2012
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
400 INTERSTATE NORTH PARKWAY SE
SUITE 1500
ATLANTA, GA 30339

EXAMINER

HARDEE, JOHN R

ART UNIT	PAPER NUMBER
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1761

DATE MAILED: 02/15/2012

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No.	Applicant(s)	
	12/961,045	PONDER ET AL.	
	Examiner	Art Unit	
	JOHN HARDEE	1761	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the attached examiner's amendment.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 23-25,27-29,31-34,36,37,39,40 and 42-50.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. <input type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date ____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date ____. 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other ____. |
|--|--|

/John R. Hardee/
Primary Examiner, Art Unit 1761

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Todd Deveau on February 9, 2012.

The application has been amended as follows:

1-22. (Cancelled)

23. (Currently amended) In the apparatus of claim ~~[[22]]~~ 25, wherein the blend exhibits a dew point at about -32°F and a bubble point at about -41.5°F.

24. (Currently amended) In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition designed to achieve a phase change, the refrigerant composition comprising a combination of refrigerant gases, said refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits a dew point at about -32°F or a bubble point at about -41.5°F~~In the apparatus of claim 22, wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including a lubricating~~

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oil, wherein the lubricating oil is present up to about 20% by weight of the refrigerant gases ~~a lubricating oil that~~ and is soluble in chlorodifluoromethane, tetrafluoroethane and pentafluoroethane wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, ~~paraffinic based lubricants, and mixtures thereof, mineral oil,~~ and polyol ester.

25. (Currently amended) In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition, the refrigerant composition comprising a combination of refrigerant gases, said refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane,

the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits one or more of a dew point at about -32°F ~~[[,]]~~ or a bubble point at about -41.5°F ~~or a glide at -9.5°F~~ wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in the lubricating oil having the following components:

65-88% hydrotreated light napthenic distillate, and

10-20% solvent refined light napthenic distillate petroleum.

26. (Cancelled)

27. (Currently amended) The method of claim ~~[[26]]~~ 29, wherein the blend exhibits a dew point at about -32°F and a bubble point at about -41.5°F.

28. (Currently amended) A method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant, the method comprising:

(1) selecting a substitute refrigerant composition designed to achieve a phase change and comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits a dew point at about -32°F or a bubble point at about -41.5°F,

(2) supplying a the substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

(3) adding to said apparatus via the manifold the substitute refrigerant composition for chlorodifluoromethane ~~The method of claim 26~~, wherein the refrigerant

composition further comprises non-refrigerant gas components, said non-refrigerant gas components including a lubricating oil, wherein the lubricating oil is present up to about 20% by weight of the refrigerant gases ~~a lubricating oil that~~

and is soluble in chlorodifluoromethane, tetrafluoroethane and pentafluoroethane,

wherein the lubricating oil is selected from the group consisting of naphthenic based lubricants, ~~paraffinic based lubricants, and mixtures thereof, mineral oil,~~ and polyol ester.

29. (Currently amended) A method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant, the method comprising:

(1) selecting a substitute refrigerant composition designed to achieve a phase change and comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits a dew point at about -32°F or a bubble point at about -41.5°F,

(2) supplying a the substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

(3) adding to said apparatus via the manifold the substitute refrigerant composition for chlorodifluoromethane ~~The method of claim 28,~~ the lubricating oil having the following components:

65-85% hydrotreated light naphthenic distillate, and

10-20% solvent refined light naphthenic distillate petroleum.

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30. (Cancelled)

31. (Currently amended) The refrigerant composition of claim ~~[[30]]~~ 33, wherein the blend exhibits a dew point at about -32°F and a bubble point at about -41.5°F.

32. (Currently amended) A refrigerant composition comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits a dew point at about -32°F or a bubble point at about -41.5°F ~~The refrigerant composition of claim 30~~, wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including a lubricating oil, wherein the lubricating oil is present up to about 20% by weight of the refrigerant gases ~~a lubricating oil that~~ and is soluble in chlorodifluoromethane, tetrafluoroethane and pentafluoroethane, wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, ~~paraffinic based lubricants, and mixtures thereof, mineral oil, and polyol ester.~~

33. (Currently amended) A refrigerant composition comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits one or more of a dew point at about -32°F~~[[.]]~~or a bubble point at about -41.5°F ~~or a glide at -9.5°F~~, wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas

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components including up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in the lubricating oil having the following components:

65-88% hydrotreated light naphthenic distillate, and

10-20% solvent refined light naphthenic distillate petroleum.

34. (Currently amended) The refrigerant composition according to claim ~~[[32]]~~ 33, wherein the lubricating oil further includes an acrylic polymer, a corrosion inhibitor, a surfactant or a foaming agent.

35. (Cancelled)

36. (Currently amended) In the apparatus of claim ~~[[22]]~~ 25, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

37. (Currently amended) In the apparatus of claim ~~[[24]]~~ 25, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor, a surfactant, a foaming agent, and mixtures thereof.

38. (Cancelled)

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39. (Currently amended) The method according to claim ~~[[26]]~~ 29, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

40. (Currently amended) The method according to claim ~~[[28]]~~ 29, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibit, a surfactant, a foaming agent, and mixtures thereof.

41. (Cancelled)

42. (Currently amended) In the apparatus of claim ~~[[22]]~~ 25, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

43. (Currently amended) The method of claim ~~[[26]]~~ 29, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

44. (Currently amended) The refrigerant composition of claim ~~[[30]]~~ 33, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

45. (New) In the apparatus of claim 24, wherein the blend exhibits a dew point at about -32°F and a bubble point at about -41.5°F.

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46. (New) The method of claim 28, wherein the blend exhibits a dew point at about -32°F and a bubble point at about -41.5°F.

47. (New) The refrigerant composition of claim 32, wherein the blend exhibits a dew point at -32°F and a bubble point at -41.5°F.

48. (New) In the apparatus of claim 42, wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.

49. (New) The method according to claim 43, wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.

50. (New) The refrigerant composition according to claim 44, wherein said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight with a napthenic lubricant.

Allowable Subject Matter

2. Claims 23-25, 27-29, 31-34, 36, 37, 39, 40 and 42-50 are allowed.

3. The following is an examiner's statement of reasons for allowance: The closest prior art of record is Takigawa, US 6,207,071. The reference discloses the utility of compositions comprising pentafluoroethane and tetrafluoroethane in amounts which make obvious those presently recited. However, the reference further discloses that naphthenic based lubricants and polyol esters were not satisfactory lubricants. As the present claims require those lubricants, they are not obvious over the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, Dr. John R. Hardee, whose telephone number is (571) 272-1318. The examiner can normally be reached on Monday through Friday from 8:00 until 4:30. In the event that the examiner is not available, his supervisor, Mr. Harold Pyon, may be reached at (571) 272-1498.


The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

Art Unit: 1761

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/John R. Hardee/
Primary Examiner
February 9, 2012


Search Notes 	Application/Control No. 12961045	Applicant(s)/Patent Under Reexamination PONDER ET AL.
	Examiner JOHN HARDEE	Art Unit 1761

SEARCHED			
Class	Subclass	Date	Examiner
252	68	2/09/12	JRH

SEARCH NOTES		
Search Notes	Date	Examiner
EAST text and image. PALM inventor search. Reviewed prosecution of parent.	6/01/11	JRH

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
252	68	2/09/12	JRH

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<i>Issue Classification</i> 	Application/Control No. 12961045	Applicant(s)/Patent Under Reexamination PONDER ET AL.
	Examiner JOHN HARDEE	Art Unit 1761

[illegible][illegible]

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	22	
/JOHN HARDEE/ Primary Examiner.Art Unit 1761	2/09/12	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2



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BIB DATA SHEET

CONFIRMATION NO. 8450

SERIAL NUMBER 12/961,045	FILING or 371(c) DATE 12/06/2010 RULE	CLASS 252	GROUP ART UNIT 1761	ATTORNEY DOCKET NO. 821920-1031		
APPLICANTS Kenneth M. Ponder, Cumming, GA; Steffan Thomas JR., Buckhead, GA; ** CONTINUING DATA ***** This application is a CON of 10/937,736 09/08/2004 ABN which claims benefit of 60/501,049 09/08/2003 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 12/17/2010						
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and Acknowledged <u>/JOHN R HARDEE/</u> Examiner's Signature		<input type="checkbox"/> Met after Allowance Initials	STATE OR COUNTRY GA	SHEETS DRAWINGS 1	TOTAL CLAIMS 23	INDEPENDENT CLAIMS 3
ADDRESS THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 400 INTERSTATE NORTH PARKWAY SE SUITE 1500 ATLANTA, GA 30339 UNITED STATES						
TITLE REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT						
FILING FEE RECEIVED 855	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit			



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/961,045	12/06/2010	Kenneth M. Ponder	821920-1031	8450
24504 7590 02/09/2012 THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 400 INTERSTATE NORTH PARKWAY SE SUITE 1500 ATLANTA, GA 30339			EXAMINER HARDEE, JOHN R	
			ART UNIT 1761	PAPER NUMBER
			NOTIFICATION DATE 02/09/2012	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspatents@tkhr.com
kristen.layton@tkhr.com
ozzie.liggins@tkhr.com

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:	Confirmation No.: 8450
Ponder et al.	Group Art Unit: 1761
Serial No.: 12/961,045	Examiner: Hardee, John R.
Filed: December 6, 2010	Docket No. 821920-1031
For:	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT

RESPONSE TO NON-FINAL OFFICE ACTION

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

The Office Action from Examiner John R. Hardee mailed on July 11, 2011 (Paper No./Mail Date 20110630), has been received and reviewed. Applicant provides the following amendments and remarks in response.

AUTHORIZATION TO DEBIT ACCOUNT

A petition for a 3-months extension of time is herein submitted. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefore (including fees for net addition of claims) are hereby authorized to be charged to deposit account no. 20-0778.

CLAIMS

Please amend the claims as indicated hereafter wherein the changes are shown by strikethrough or double brackets for deleted matter and underlining for added matter.

1-21. (Cancelled)

22. (Currently amended) In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition designed to achieve a phase change, the refrigerant composition comprising a combination of refrigerant gases, said refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits ~~one or more of~~ a dew point at about -32°F, ~~or~~ a bubble point at about -41.5°F ~~or a glide at 9.5°F.~~

23. (Currently amended) In the apparatus of claim 22, wherein the blend exhibits a ~~all three of the~~ dew point at about -32°F, ~~the~~ and a bubble point at about -41.5°F ~~and a glide at 9.5°F.~~

24. (Currently amended) In the apparatus of claim 22, wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in chlorodifluoromethane, tetrafluoroethane and pentafluoroethane wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, and polyol ester,

~~synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.~~

25. (Currently amended) In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition, the refrigerant composition comprising a combination of refrigerant gases, said refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits one or more of a dew point at -32°F, a bubble point at -41.5°F or a glide at 9.5°F wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in ~~In the apparatus of claim 24,~~ the lubricating oil having the following components:

65-88% hydrotreated light naphthenic distillate, and
10-20% solvent refined light naphthenic distillate petroleum.

26. (Currently amended) A method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant, the method comprising:

(1) selecting a substitute refrigerant composition designed to achieve a phase change and comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits a dew point at about -32°F or a bubble point at about -41.5°F,

(4) (2) supplying a the substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

~~(2) (3) adding to said apparatus via the manifold the substitute refrigerant composition for chlorodifluoromethane, said substitute refrigerant composition comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits one or more of a dew point at -32°F, a bubble point at -41.5°F or a glide at 9.5°F.~~

27. (Currently amended) The method of claim 26, wherein the blend exhibits ~~all three of the~~ a dew point at about -32°F, ~~the~~ and a bubble point at about -41.5°F ~~and the glide at 9.5°F.~~

28. (Currently amended) The method of claim 26, wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in chlorodifluoromethane, tetrafluoroethane and pentafluoroethane, wherein the lubricating oil is selected from the group consisting of naphthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, and polyol ester, ~~synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.~~

29. (Previously Presented) The method of claim 28, the lubricating oil having the following components:

65-85% hydrotreated light naphthenic distillate, and
10-20% solvent refined light naphthenic distillate petroleum.

30. (Currently amended) A refrigerant composition comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits ~~one or more of~~ a dew point at about -32°F, ~~or~~ a bubble point at about -41.5°F ~~or a glide at 9.5°F~~.

31. (Currently amended) The refrigerant composition of claim 30, wherein the blend exhibits ~~all three of the~~ a dew point at -32°F, ~~the~~ and a bubble point at -41.5°F ~~and a glide at 9.5°F~~.

32. (Currently amended) The refrigerant composition of claim 30, wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in chlorodifluoromethane, tetrafluoroethane and pentafluoroethane, wherein the lubricating oil is selected from the group consisting of naphthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, and polyol ester, ~~synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.~~

33. (Currently amended) ~~The refrigerant composition of claim 32,~~ A refrigerant composition comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits one or more of a dew point at -32°F, a bubble point at -41.5°F or a glide at 9.5°F, wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in the lubricating oil having the following components:

65-88% hydrotreated light napthenic distillate, and
10-20% solvent refined light napthenic distillate petroleum.

34. (Previously Presented) The refrigerant composition according to claim 32, wherein the lubricating oil further includes an acrylic polymer, a corrosion inhibitor, a surfactant or a foaming agent.

35. (Cancelled)

36. (Previously Presented) In the apparatus of claim 22, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

37. (Previously Presented) In the apparatus of claim 24, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor, a surfactant, a foaming agent, and mixtures thereof.

38. (Cancelled)

39. (Previously Presented) The method according to claim 26, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

40. (Previously Presented) The method according to claim 28, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibit, a surfactant, a foaming agent, and mixtures thereof.

41. (Cancelled)

42. (Previously Presented) In the apparatus of claim 22, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

43. (Previously Presented) The method of claim 26, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

44. (Previously Presented) The refrigerant composition of claim 30, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

REMARKS

The Office Action presents following points: 1) claims 22-44 stand rejected under 35 USC 112, second paragraph, as being indefinite; and 2) claims 22-44 stand rejected under 35 USC 103(a) as obvious in view of US 6,207,071 (*Takigawa et al.*).

In response to the Office Action, Applicant hereby amends claims 22-24, 26-28, and 30-32. Claims 25 and 33 are placed in independent form, original to the application. Additionally, claims 35, 38 and 41 are canceled, without prejudice. Applicant respectfully requests reconsideration and withdrawal of the rejections based upon the amendment and remarks presented herein.

1. Claim Rejections – 35 USC § 112

Claims 22-44 are tentatively rejected under 35 USC 112, second paragraph, as being indefinite, in particular for “merely setting forth physical characteristics desired in an article, and not setting forth specific compositions which would meet such a characteristics”, citing *Ex Parte Slob*, 157 USPQ 172 (Bd. Pat. App. & Int. 1967).
(copy attached)

A reading of *Ex Parte Slob* shows that it does not support the rejection. In fact a reading *Ex Parte Slob* shows that this rejection is improper and should be withdrawn. In *Ex Parte Slob*, the Board of Patent Appeals and Interferences held that claim 16 which merely recited: “A process...which comprises thoroughly mixing together a powdered detergent composition and from about 2% to about 40% by weight of the powdered detergent composition of a liquefiable substance having a liquefaction (sic) temperature from about 40°C...” was properly rejected as being indefinite and too broad, and in particular for not setting forth specific compositions which would meet the characteristics recited in the claim. In contrast, however, the Board specifically held that the rejection of claim 26 would not be sustained where claim 26 recited a hydrated inorganic salt,

specifically “hydrated sodium perborate”. The Board held that claim 26 “is clearly not too broad and indefinite”. Accordingly, the rejection of claim 26 was reversed.

The claims presented herein are analogous to claim 26 in *In re Slob* in that all the claims originally filed with this application and now presently pending specifically identify the refrigerant gas components as “consisting of a blend of tetrafluoroethane and pentafluoroethane”. Accordingly, under the holding by the Board in *Ex Parte Slob*, the rejection of the present claims is not sustainable and should be withdrawn.

2. Claim Rejection – 35 USC § 103(a)

Claims 22-44 are tentatively rejected as being obvious under 35 USC §103(a) in view of *Takigawa et al.*, (US Patent No. 6,207,071).

Takigawa et al. disclose: “A refrigerator oil for use with an HFC refrigerant containing HFC – 134a and/or HFC – 125”, which comprises a specific alkylbenzene oil. See abstract. In particular: “The object of the present invention [Takigawa et al.] is to provide a refrigerator oil to be used within HFC refrigerant containing HFC -134a and/or HFC – 125, which enables a refrigerating compressor to be prevented from its seizure, is excellent in lubricity and retains high reliability for a long period of time”. (emphasis added) See column 2, lines 14-18.

Furthermore, according to *Takigawa et al.* not any alkylbenzene oil is suitable as refrigerator oil. In the background, *Takigawa et al.* cite to a Japanese Patent Unexamined Publication that according to *Takigawa et al.*: “describes a refrigerating system for an HFC – 134a refrigerant wherein there is used a refrigerator oil which is incompatible with a refrigerant. As an example of such an oil, an alkylbenzene is disclosed therein”. See column 1, lines 49-53. *Takigawa et al.* go on to state they have “found that if an ordinary alkylbenzene is to be used as a refrigerator oil for HFC- 134a and/or HFC – 125, some specific means is required to be taken on the side of the

system, and that if ordinary alkylbenzene is used as refrigerator oil HFC – 134a and/or HFC – 125 without taking such specific means, the seizure of a refrigerating compressor used may possibly be caused after a long period of its operation.” (emphasis added) See column 1, lines 54-61.

Further, Applicant notes the statement in the Office Action at page 4 that: “Lubricant compositions comprising naphthenic mineral oil and polyol polyesters are disclosed in Table 1. The Examiner takes the position that “hydrotreated light naphthenic distillate” and “solvent refined light naphthenic distillate petroleum” have a species-genus relationship with the disclosed naphthenic mineral oil, so their use is obvious over the disclosed lubricant”.

Applicant respectfully disputes this statement and this position. Applicant respectfully disagrees that polyol polyesters are disclosed in Table 1. Table 1 does disclose a base oil “K” that is a “naphthenic mineral oil (commercially available)”. Review of Tables 4 and 6, however, shows that *Takigawa et al.* specifically teach that such a naphthenic mineral oil is unsuitable. Tables 4 and 6 specifically states that use of such a lubricant oil resulted in seizure of the equipment (Table 4, Comparative Example 5) and further that it seized and was unstable in Comparative Example 14, Table 6. Since *Takigawa et al.* specifically state the objective of their disclosure here’s to prevent equipment “from its seizure”, *Takigawa et al.* expressly teach against the use and inclusion of naphthenic mineral oil in any of its compositions.

Further, it is unquestionable that the objective of *Takigawa et al.* is to provide a refrigerator oil used with an HFC refrigerant containing HFC – 134a and/or HFC -125 in just about any composition, further stating that there is no restriction as to the kind of HFC to be mixed therewith. Thus, *Takigawa et al.* is focused on what type of refrigerator oil may be used with such a wide range of refrigerants and refrigerant compositions. *Takigawa et al.* provide no teaching whatsoever as to what of those

compositions may be suitable as a substitute or replacement for refrigerant R-22 (chlorodifluoromethane), or how to determine what of those compositions may be suitable as a substitute or replacement for R-22. In fact, there can be no doubt, that *Takigawa et al.* disclose HFC refrigerant compound or compositions that are unsuitable as a substitute or a replacement for R-22 (see, Declaration of Kenneth M. Ponder, enclosed herewith), *Takigawa et al.* making no distinction as to what if any of its compositions would be suitable as an R-22 replacement or substitute.

In contrast, the presently pending claims, in particular independent claims 22, 26 and 30, are directed to a refrigerant composition comprising a combination of refrigerant gases “consisting of blend of tetrafluoroethane and pentafluoroethane” that is suitable as a substitute for chlorodifluoromethane (R-22). More particularly, the pending claims recite that the ratio of the tetrafluoroethane to the pentafluoroethane is selected such that the blend exhibits a dew point of about -32°F or a bubble point at about -41.5°F. This is a specific recitation that is not met by just any combination of tetrafluoroethane and pentafluoroethane.

Takigawa et al. provide no teaching or suggestion, whatsoever, to a blend of refrigerant gases “consisting of” tetrafluoroethane and pentafluoroethane that exhibits such a dew point or bubble point. This is so because *Takigawa et al.* has no interest in identifying a specific blend or ratio of tetrafluoroethane and pentafluoroethane to be used as a substitute or a replacement for R-22 to the exclusion of other blends or ratios of tetrafluoroethane and pentafluoroethane. (see again, Declaration of Kenneth M. Ponder).

With respect to dependent claims 23, 27 and 31, there is no teaching or suggestion in *Takigawa et al.* to a combination “consisting of a blend of tetrafluoroethane and pentafluoroethane” that exhibits both a dew point at about -32°F and a bubble point at about -41.5°F.

With respect to dependent claims 24, 28, and 32, these claims have been amended to delete reference to a compound that could include alkylbenzene. *Takigawa et al.* fail to teach or disclose a lubricating oil as recited in these claims, particularly considering that even in regards to alkylbenzene as a refrigerating oil, *Takigawa et al.* expressly teach that not any alkylbenzene is suitable.

With respect to claims 25, 29, and 33, these claims recite a lubricating oil comprising a mixture of napthenic distillates. As noted above, *Takigawa et al.* expressly teach that a lubricating oil including such compounds is unsuitable for use with a refrigerant composition including HFC – 125 and/or HFC – 134a. *Takigawa et al.* expressly teach that use of such lubricating oil causes damage to the equipment causing seizure in the equipment.

Applicant notes in particular that claims 25 and 33 are amended herewith to place them in independent form, in a manner that is original to the application as filed, these claims being directed to the lubricating oil including napthenic distillate compounds that are expressly taught by *Takigawa et al.* to be unsuitable for use with an HFC refrigerant containing HFC – 134a and/or HFC – 125.

With respect to independent claim 26 which is a method claim and its dependent claims, Applicant respectfully submits *Takigawa et al.* fails to render these claims obvious. There is no teaching or suggestion in *Takigawa et al.* to a method for refilling an apparatus designed for use with chlorodifluoromethane refrigerant (R-122) that involves selecting a substitute refrigerant composition for R-22, the refrigerant gases “consisting of” a blend of tetrafluoroethane and pentafluoroethane, the ratio of tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits a dew point at about -32°F or a bubble point at about -41.5°F, further supplying the selected substitute refrigerant composition under pressure in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold for the apparatus

and adding to the apparatus via the manifold the selected substitute the refrigerant composition recited therein as a substitute for R-22.

CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicant respectfully submits that all objections and/or rejections have been traversed and that all pending claims are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephone conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

Respectfully submitted,

**THOMAS, KAYDEN, HORSTEMEYER
& RISLEY, LLP**

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Ex parte SLOB

No Number in Original

U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences

157 U.S.P.Q. (BNA) 172

Patent issued Jan. 30, 1968 Opinion dated Apr. 13, 1967

CASE HISTORY and DISPOSITION: Appeal from Group 150.

Application for patent of Arie Willem Slob, Serial No. 194,658, filed May 14, 1962. From decision rejecting claims 16 to 28, applicant appeals (Appeal No. 625-73). Affirmed as to claims 16 to 25, 27, and 28; reversed as to claim 26.

HEADNOTES:
PATENTS

[**1H] 1. Claims -- Indefinite -- In general (20.551)

Claims merely setting forth physical characteristics desired in article, and not setting forth specific compositions which would meet such characteristics, are invalid as vague, indefinite, and functional since they cover any conceivable combination of ingredients either presently existing or which might be discovered in future and which would impart desired characteristics; thus, expression "a liquefiable substance having a liquefaction temperature from about 40 degreesC. to about 300 degreesC. and being compatible with the ingredients in the powdered detergent composition" is too broad and indefinite since it purports to cover everything which will perform the desired functions regardless of its composition, and, in effect, recites compounds by what it is desired that they do rather than what they are; expression also is too broad since it appears to read upon materials that could not possibly be used to accomplish purposes intended.--*Ex parte Slob (PO BdApp) 157 USPQ 172.*

Particular patents--Detergent Tablets

3,366,570, Slob, Process of Preparing Detergent Tablets, claim 26 of application allowed; claims 16 to 25, 27, and 28 refused.--*Ex parte Slob (PO BdApp) 157 USPQ 172.*

CLASS-NO: 20.551

COUNSEL: BRUMBAUGH, FREE, GRAVES & DONOHUE, New York, N.Y., for applicant.

JUDGES: Before LIDOFF, Examiner in Chief, and STONE and REBOLD, Acting Examiners in Chief.

OPINIONBY: STONE, Acting Examiner in Chief.

OPINION:

This is an appeal from the final rejection of claims 16 through 28, which are all the claims remaining in the application.

Claim 16 is illustrative:

16. A process for the preparation of a strong, hard surface, rapidly disintegrating and dissolving detergent tablet which comprises thoroughly mixing together a powdered detergent composition and from about 2% to about 40% by weight of the powdered detergent composition of a liquefiable substance having a liquefaction (sic) temperature from about 40 degreesC. to about 300 degreesC. and being compatible with the ingredients in the powdered detergent composition, forming the resulting mixture having the compatible liquefiable substance uniformly distributed therethrough into the shape of a tablet, heating the tablet-shaped mixture at a temperature from about 40 degreesC. to about 300 degreesC. for from about 90 seconds to about 6 minutes to liquefy thereby at least the portion of the liquefiable substance at the surface of the tablet-shaped mixture without completely melting the powdered detergent composition, and cooling the tablet-shaped mixture to [*173] convert the liquefied liquefiable substance to solid state and thereby bind together at least the portion of the powdered detergent composition at the surface of the tablet-shaped mixture, whereby there is formed a strong detergent tablet which disintegrates and dissolves in water in about 15 to 75 seconds and which has a hard agglomerated surface portion and a center portion having a consistency in the range from hard agglomerates to loose powder.

No references are relied on.

The claims stand rejected as being indefinite and too broad, under 35 U.S.C. 112. The examiner has set forth a number of different expressions which he considers as being too broad and indefinite.

Go to Headnotes [*1R] [1] We are in accord with the examiner's position with respect to the expression "a liquefiable substance having a liquefaction temperature from about 40 degreesC. to about 300 degreesC. and being compatible with the ingredients in the powdered detergent composition." In our opinion, this language purports to cover everything which will perform the desired functions regardless of its composition, and, in effect, recites the compounds by what it is desired that they do rather than what they are. We consider the holding in *Austen Laboratories, Inc. v. Nobilium Processing Company*, 115 USPQ 44, is especially pertinent here, that claims merely setting forth physical characteristics desired in an article, and not setting forth specific compositions which would meet such characteristics, are invalid as vague, indefinite, and functional since they cover any conceivable combination of ingredients either presently existing or which might be discovered in the future and which would impart the desired characteristics. The decision relied upon the Supreme Court decision of *Holland Furniture Co. v. Perkins Glue Co.*, 1928 C.D. 266, 372 O.G. 517, 275 U.S. 512. See also *General Electric Co. v. Wabash Appliance Corp.*, 1938 C.D. 813, 491 O.G. 463, 304 U.S. 364, 37 USPQ 466; and *In re Fullam et al.*, 34 CCPA 1018, 1947 C.D. 352, 603 O.G. 189, 161 F.2d 247, 73 USPQ 399.

We also find the expression too broad as it appears to read upon materials that could not possibly be used with a powdered detergent composition to accomplish the purposes intended. For example, the language is broad enough to read upon Wood's metal and Wood's alloy which have a melting point of approximately 71 degreesC. Such materials melt within the temperature range recited and are compatible with the detergent composition but clearly will not give rise to a suitable preparation for detergent or laundry purposes.

The examiner has also set forth a number of examples of different compounds which decompose when heated within the range claimed and which could not be used for the purposes intended. On the basis of the limited disclosure of approximately ten ingredients, most of which are hydrated inorganic salts, we see no reason for the allowance of claims drawn to all substances which are totally unrelated to those ingredients shown as suitable by appellant and which are merely claimed by the designation of desired properties.

We are also in accord with the examiner's position with respect to the expression "a hydrated inorganic salt," as recited in claim 25, as this reads on such a salt as strontium dichromate .3H₂O which the examiner has indicated decomposes within the temperature range recited and which would be unsuitable for the purpose in view. This expression also reads

upon sodium dichromate .2H₂O which melts at 100 degreesC. and which would clearly be unsuitable for washing purposes in view of its color.

We do not agree with the examiner's position with regard to the expression "a powdered detergent composition," per se, or his objections to "forming the product into the shape of a tablet."

We will not sustain the rejection as to claim 26 wherein the hydrated inorganic salt is the specific compound, hydrated sodium perborate. There is no reference to show the combination recited in this claim and the claim is clearly not too broad and indefinite.

The decision of the examiner is affirmed as to claims 16 through 25, 27, and 28 but is reversed as to claim 26.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Docket No.: 821920-1031

PONDER, K., et al.,

Confirmation No.: 8450

Serial No.: 12/961,045

Group Art Unit: 1761

Filing Date: December 6, 2010

Examiner: John R. Hardee

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

DECLARATION OF KENNETH M. PONDER

I, Kenneth M. Ponder, hereby declare as follows:

1. I am the President of RMS of Georgia, LLC and am a co-inventor named on the above application.
2. RMS of Georgia, LLC sells and distributes refrigerants and reclaims most refrigerants.
3. Among the refrigerants that RMS of Georgia, LLC sells and distributes are refrigerants known under ASHRAE designations R-421A and R-421B and SNAP approved by the EPA for different uses. The refrigerant having the ASHRAE designation R-421A is a refrigerant composition that is a mixture of R-125(pentafluoroethane) and R-134a (1,1,1,2-tetrafluoroethane) blended with a lubricant in which R-125 is present in an amount of about 58% by weight and R-134a is present in an amount of about 42% by weight of the refrigerant gases. R-421B, on the other hand, is also a mixture of R-125 (pentafluoroethane) and R-134a (1,1,1,2-tetrafluoroethane). R-421B, however, includes pentafluoroethane in the amount of about 85% by weight and 1,1,1, 2-tetrafluoroethane in the amount of about 15% by weight of the refrigerant gases.

4. Our R-421B refrigerant comprised of about 85% by weight pentafluoroethane and about 15% tetrafluoroethane by weight of the refrigerant gases is covered by U.S. Patent No. 7,320,763 on which I am named as a co-inventor.

5. Our R-421A refrigerant was developed as a replacement for R-22 refrigerant that consists of chlorodifluoromethane. R-22 refrigerant could cover a wide array of temperatures. The industry has not yet found a single refrigerant composition that could replace R-22 for use over the entire array of temperatures over which R-22 was used. As a result, the industry has had to come up with multiple refrigerant compositions covering different arrays of temperatures.

6. Our R-421A and our R-421B refrigerants were developed to address different uses in the marketplace. In particular, R-421A was developed to address a higher temperature or (medium temp) application in the industry. By high or medium temperature applications I mean approximately -5°F to +45 °F. In contrast, R-421B was developed as a long term option for low temperature applications in the industry. By low temperature applications, I mean applications below about 0°F and generally in the range of below about -5°F to about -40°F. Accordingly, R-421A and R-421B are marketed by us and used by our customers for different applications to meet different needs, depending upon whether a high R-22 and medium R-22 temperature application or a low R-22 temperature application is the specified use by our customer.

7. Our refrigerant R-421A that includes 58% pentafluoroethane and 42% tetrafluoroethane, which would be covered by the presently pending claims in this application, is superior to R-421B that consists of 85% pentafluoroethane and 15% tetrafluoroethane in high and medium temperature applications because it has a different temperature-pressure profile than R-421B and because the temperature-pressure profile of R-421A is superior to that of R-421B for high and medium temperature applications.

8. I have read U.S. Patent No. 6,207,071 (Takigawa et al.) and do not find any mention or suggestion in Takigawa of combining pentafluoroethane with tetrafluoroethane to create a composition including refrigerant gases consisting of pentafluoroethane and tetrafluoroethane to the exclusion of other refrigerant gases except for impurities ordinarily associated with those two gases having a temperature-pressure profile that provides superior properties for use in high and medium temperature applications as described above.

9. I also do not find any mention or suggestion in Takigawa for how to determine what HFC refrigerant or combination of HFC refrigerants would be suitable as a substitute or a replacement for R-22 (chlorodifluoromethane). Not all HFC refrigerants are suitable as a substitute or a replacement for R-22. Not all combinations of HFC-125 (pentafluoroethane) and HFC-134a (1,1,1,2-tetrafluoroethane) are suitable as a substitute or a replacement for R-22. In fact the only combination of HFC-125 and HFC-134a to the exclusion of other refrigerant gases that are SNAP approved by EPA to be a suitable substitute or replacement for R-22 are our R-421A and R-421B refrigerants.


10. I understand the Office Action mailed July 11, 2011 takes the position that Takigawa teaches to one skilled in the refrigerant art a refrigerant composition consisting of 40-60% R134a and 60-40% R125 to the exclusion of any other refrigerant gas. I respectfully disagree. Even assuming this position is correct, this covers a wide range of combinations of R134a and R125 that are not suitable as a substitute or a replacement for R-22. As examples, refrigerant compositions of 1) 40% R134a and 60% R125, 2) 60% R134a and 40% R125, and 3) 50% R134a and 50% R125 are considered unsuitable as substitutes or replacements for R-22 and do not have approval by EPA for use as substitutes or replacements for R-22..

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and

further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this patent.

Respectfully submitted,

Date: January 11, 2012


Kenneth M. Ponder

Under the paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) 821920-1031
Application Number 12/961,045	Filed December 6, 2010
For REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT	
Art Unit 1761	Examiner Hardee, John R.

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	<u>Fee</u>	<u>Small Entity Fee</u>	
<input type="checkbox"/> One month (37 CFR 1.17(a)(1))	\$150	\$75	\$ _____
<input type="checkbox"/> Two months (37 CFR 1.17(a)(2))	\$560	\$280	\$ _____
<input checked="" type="checkbox"/> Three months (37 CFR 1.17(a)(3))	\$1270	\$635	\$ <u>635</u>
<input type="checkbox"/> Four months (37 CFR 1.17(a)(4))	\$1980	\$990	\$ _____
<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$2690	\$1345	\$ _____

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☒ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 20-0778.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the ☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☒ attorney or agent of record. Registration Number 29,526

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

/Todd Deveau/

Signature

Todd Deveau

Typed or printed name

January 11, 2012

Date

770-933-9500

Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☐ Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	12961045			
Filing Date:	06-Dec-2010			
Title of Invention:	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT			
First Named Inventor/Applicant Name:	Kenneth M. Ponder			
Filer:	Todd Deveau./Amy Kwon			
Attorney Docket Number:	821920-1031			
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Independent claims in excess of 3	2201	2	125	250
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 3 months with \$0 paid	2253	1	635	635
Miscellaneous:				
Total in USD (\$)				885

Electronic Acknowledgement Receipt

EFS ID:	11813758
Application Number:	12961045
International Application Number:	
Confirmation Number:	8450
Title of Invention:	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT
First Named Inventor/Applicant Name:	Kenneth M. Ponder
Customer Number:	24504
Filer:	Todd Deveau./Amy Kwon
Filer Authorized By:	Todd Deveau.
Attorney Docket Number:	821920-1031
Receipt Date:	11-JAN-2012
Filing Date:	06-DEC-2010
Time Stamp:	16:38:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$885
RAM confirmation Number	3769
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part / (if appl.)	Pages (if appl.)
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1	Amendment/Req. Reconsideration-After Non-Final Reject	01526227.PDF	258784 bb8db2dccea9f8d4ac9ffef63c439ac426055 fa9	no	17
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	01526205.PDF	131980 cbaa5d68a7f15018fff5e64220193d33a3e1 073a	no	4
Warnings:					
Information:					
3	Extension of Time	01525326.PDF	286970 d8ec80c6e02e7cd1976bbeba716903b1fdb bbeff	no	2
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	32349 391e233d8491485d84c63db9f7cca8f6ca9d f1a5	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			710083		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/961,045		Filing Date 12/06/2010		<input type="checkbox"/> To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY <input checked="" type="checkbox"/> OR		OTHER THAN SMALL ENTITY		
FOR		NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A		N/A			N/A		
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A	N/A		N/A			N/A		
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A		N/A			N/A		
TOTAL CLAIMS (37 CFR 1.16(j))		minus 20 =	*		X \$ =			X \$ =		
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =	*		X \$ =			X \$ =		
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	01/11/2012	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X \$30 =	0	OR	X \$ =	
	Independent (37 CFR 1.16(h))	* 5	Minus	*** 3	= 2	X \$125 =	250	OR	X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))									
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE	250	OR	TOTAL ADD'L FEE	
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		OR	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR	X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))									
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>										

Legal Instrument Examiner:
/JACQUELYN WILLIAMS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/961,045	12/06/2010	Kenneth M. Ponder	821920-1031	8450
24504 7590 07/11/2011 THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 400 INTERSTATE NORTH PARKWAY SE SUITE 1500 ATLANTA, GA 30339			EXAMINER HARDEE, JOHN R	
			ART UNIT 1761	PAPER NUMBER
			NOTIFICATION DATE 07/11/2011	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspatents@tkhr.com
kristen.layton@tkhr.com
ozzie.liggins@tkhr.com

Office Action Summary	Application No. 12/961,045	Applicant(s) PONDER ET AL.	
	Examiner JOHN HARDEE	Art Unit 1761	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-44 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 22-44 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 December 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. The office action of June 6, 2011 is VACATED.
2. Applicant's response period is restarted.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 22-44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims merely setting forth physical characteristics desired in an article, and not setting forth specific compositions which would meet such characteristics, are vague and indefinite. *Ex part Slob*, 157 USPQ 172 (Bd. Pat. App. & Int. 1967).

Claim Scope and Interpretation

5. At p. 13 of the specification, applicant states that the compositions of interest possess the characteristics recited in claim 1. Figure 1 shows characteristics for compositions containing 40/60, 45/55 and 42/58 blends of tetrafluoroethane and pentafluoroethane, respectively. Compositions comprising these percentages of these refrigerants were searched and examined, in the absence of any percentage limitations in the claims.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 22-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takigawa et al., US 6,207,071. The reference discloses lubricating oil compositions and their use in compositions comprising R134a and R125 (col. 1, lines 13+). The reference

Art Unit: 1761

further discloses the use of hydrofluorocarbons as replacements for chlorofluorocarbons (col. 1, lines 20+). Suitable lubricants include the alkylbenzene oils described at col. 2, lines 30+. Refrigerants include alkane fluorides containing 40% or more of R134a in admixture with alkyl fluorides containing, most preferably, 40% or more of R125 (col. 8, lines 20+). The reference further discloses that there is “no restriction as to the kind of HFC to be mixed with” the disclosed refrigerants. The examiner takes the position that this can reasonably be construed to mean that no additional HFC need be added, and that the disclosure reads on refrigerant compositions *consisting of* 40-60% R134a and 60-40% of R125. Conventional additives may be added, including those disclosed at the top of col. 8. The examiner takes the position that anticorrosion additives are conventional, and that their use would be obvious over this disclosure. Lubricant compositions comprising naphthenic mineral oil and polyol polyesters are disclosed in Table 1. The examiner takes the position that “hydrotreated light naphthenic distillate” and “solvent refined light naphthenic distillate petroleum” have a species-genus relationship with the disclosed naphthenic mineral oil, so their use is obvious over the disclosed lubricant. Note the disclosure in Evaluation Tests 2 and 3 of refrigerant being premixed with lubricant prior to charging a compressor. The disclosed lubricating refrigerant compositions are useful in a variety of refrigeration apparatus, as disclosed at the top of col. 9. Determination of the lubrication-effective amount of a disclosed lubricant amounts to routine optimization. This reference differs from the claimed subject matter in that it does not disclose a composition which reads on appellant’s claims with sufficient specificity to constitute anticipation.

It would have been obvious at the time the invention was made to make such a composition, because this reference teaches that all of the ingredients recited by appellants are suitable for inclusion in a refrigerant composition. The person of ordinary skill in the refrigeration art would expect the recited compositions to have properties similar to those compositions which are exemplified, absent a showing to the contrary.

In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed Cir. 1990).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, Dr. John R. Hardee, whose telephone number is (571) 272-1318. The examiner can normally be reached on Monday through Friday from 8:00 until 4:30. In the event that the examiner is not available, his supervisor, Mr. Harold Pyon, may be reached at (571) 272-1498.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

Art Unit: 1761

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/John R. Hardee/
Primary Examiner
July 5, 2011

Notice of References Cited	Application/Control No. 12/961,045	Applicant(s)/Patent Under Reexamination PONDER ET AL.	
	Examiner JOHN HARDEE	Art Unit 1761	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,207,071	03-2001	Takigawa et al.	252/68
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			


FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes 	Application/Control No. 12961045	Applicant(s)/Patent Under Reexamination PONDER ET AL.
	Examiner JOHN HARDEE	Art Unit 1761

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
EAST text and image. PALM inventor search. Reviewed prosecution of parent.	6/01/11	JRH

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/961,045	12/06/2010	Kenneth M. Ponder	821920-1031

CONFIRMATION NO. 8450

PUBLICATION NOTICE



OC000000048625487

24504
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
400 INTERSTATE NORTH PARKWAY SE
SUITE 1500
ATLANTA, GA 30339

Title:REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT

Publication No.US-2011-0163117-A1

Publication Date:07/07/2011

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/961,045	12/06/2010	Kenneth M. Ponder	821920-1031	8450
24504 7590 06/06/2011 THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 600 GALLERIA PARKWAY, S.E. STE 1500 ATLANTA, GA 30339-5994			EXAMINER HARDEE, JOHN R	
			ART UNIT 1761	PAPER NUMBER
			NOTIFICATION DATE 06/06/2011	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspatents@tkhr.com
kristen.layton@tkhr.com
ozzie.liggins@tkhr.com

Office Action Summary	Application No. 12/961,045	Applicant(s) PONDER ET AL.	
	Examiner JOHN HARDEE	Art Unit 1761	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-50 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 30-50 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 December 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Numbering

1. Cancelled claims may not be replaced with claims having the same numbers. Currently pending claims 1-21 have been renumbered under Rule 1.26 as claims 30-50, respectively. Applicant is requested to use this numbering when amending the claims.

Claim Rejections - 35 USC § 112

2. Claims 48-50 are rejected under USC 112, 4th Paragraph for failure to modify the claims from which they depend. These claims recite percentages found in claims 30, 34 and 38, respectively.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 30-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takigawa et al., US 6,207,071. The reference discloses lubricating oil compositions and their use in compositions comprising R134a and R125 (col. 1, lines 13+). The reference further discloses the use of hydrofluorocarbons as replacements for chlorofluorocarbons (col. 1, lines 20+). Suitable lubricants include the alkylbenzene oils described at col. 2, lines 30+. Refrigerants include alkane fluorides containing 40% or more of R134a in admixture with alkyl fluorides containing, most preferably, 40% or more of R125 (col. 8, lines 20+). The reference further discloses that there is "no restriction as to the kind of HFC to be mixed with" the disclosed refrigerants. The examiner takes the position that this can reasonably be construed to mean that no additional HFC need be added, and that the disclosure reads on refrigerant compositions *consisting of* 40-60% R134a and 60-40% of R125. Conventional additives may be added, including those disclosed at the top of col. 8. The examiner takes the position that anticorrosion additives are conventional, and that their use would be obvious over this disclosure. Lubricant

Art Unit: 1761

compositions comprising naphthenic mineral oil and polyol polyesters are disclosed in Table 1. The examiner takes the position that “naphthenic mineral oil” has a species-genus relationship with the lubricant recited in claims 40 and 41, so it meets the recitation of a naphthenic lubricant. Note the disclosure in Evaluation Tests 2 and 3 of refrigerant being premixed with lubricant prior to charging a compressor. The disclosed lubricating refrigerant compositions are useful in a variety of refrigeration apparatus, as disclosed at the top of col. 9. This reference differs from the claimed subject matter in that it does not disclose a composition which reads on appellant’s claims with sufficient specificity to constitute anticipation.

It would have been obvious at the time the invention was made to make such a composition, because this reference teaches that all of the ingredients recited by appellants are suitable for inclusion in a refrigerant composition. The person of ordinary skill in the refrigeration art would expect the recited compositions to have properties similar to those compositions which are exemplified, absent a showing to the contrary.

In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed Cir. 1990).

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Art Unit: 1761

supervisor, Mr. Harold Pyon, may be reached at (571) 272-1498.

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/John R. Hardee/
Primary Examiner
June 1, 2011

Notice of References Cited	Application/Control No. 12/961,045	Applicant(s)/Patent Under Reexamination PONDER ET AL.	
	Examiner JOHN HARDEE	Art Unit 1761	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,207,071	03-2001	Takigawa et al.	252/68
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			


FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes 	Application/Control No. 12961045	Applicant(s)/Patent Under Reexamination PONDER ET AL.
	Examiner JOHN HARDEE	Art Unit 1761

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
EAST text and image. PALM inventor search. Reviewed prosecution of parent.	6/01/11	JRH

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 12/961,045		
APPLICATION AS FILED - PART I								
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)	
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	82		N/A		
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	270		N/A		
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	110		N/A		
TOTAL CLAIMS (37 CFR 1.16(j))	23	minus 20 = *	3	x 26 =	78			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *		x 110 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$270 (\$135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					0.00			
			TOTAL	540		TOTAL		
* If the difference in column 1 is less than zero, enter "0" in column 2.								
APPLICATION AS AMENDED - PART II								
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		x =	
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		x =	
	Application Size Fee (37 CFR 1.16(s))							
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
				TOTAL ADD'L FEE			TOTAL ADD'L FEE	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		x =	
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		x =	
	Application Size Fee (37 CFR 1.16(s))							
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
				TOTAL ADD'L FEE			TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.								



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/961,045	12/06/2010	1761	605	821920-1031	23	3

CONFIRMATION NO. 8450

UPDATED FILING RECEIPT



24504
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
600 GALLERIA PARKWAY, S.E.
STE 1500
ATLANTA, GA 30339-5994

Date Mailed: 03/28/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Kenneth M. Ponder, Cumming, GA;
Steffan Thomas JR., Buckhead, GA;

Power of Attorney: The patent practitioners associated with Customer Number 24504

Domestic Priority data as claimed by applicant

This application is a CON of 10/937,736 09/08/2004 ABN
which claims benefit of 60/501,049 09/08/2003

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)

If Required, Foreign Filing License Granted: 12/17/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/961,045**

Projected Publication Date: 07/07/2011

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT

Preliminary Class

252

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER**Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

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Electronic Patent Application Fee Transmittal

Application Number:	12961045			
Filing Date:	06-Dec-2010			
Title of Invention:	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT			
First Named Inventor/Applicant Name:	Kenneth M. Ponder			
Filer:	Todd Deveau./Virginia Keenan			
Attorney Docket Number:	821920-1031			
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with \$0 paid	2251	1	65	65

EXHIBIT 1004

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				65

Electronic Acknowledgement Receipt

EFS ID:	9708049
Application Number:	12961045
International Application Number:	
Confirmation Number:	8450
Title of Invention:	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT
First Named Inventor/Applicant Name:	Kenneth M. Ponder
Customer Number:	24504
Filer:	Todd Deveau./Virginia Keenan
Filer Authorized By:	Todd Deveau.
Attorney Docket Number:	821920-1031
Receipt Date:	22-MAR-2011
Filing Date:	06-DEC-2010
Time Stamp:	11:34:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$65
RAM confirmation Number	9770
Deposit Account	200778
Authorized User	DEVEAU,TODD

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

EXHIBIT 1004

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Fee Worksheet (PTO-875)	fee-info.pdf	30773	no	2
			9ddb148558e56dfe3664143bdd8bd3a497e91947		

Warnings:

Information:

Total Files Size (in bytes):

30773

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Ponder et al.

Confirmation No.: 8450

Group Art Unit: 1761

Serial No.: 12/961,045

Examiner: Unknown

Filed: December 6, 2010

Docket No. 821920-1031

For: **REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22
REFRIGERANT**

PRELIMINARY AMENDMENT

Mail Stop Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

In regard to the above-referenced application, the Applicant submits the following preliminary amendment and remarks to be respectively entered and considered prior to examination.

Applicant submits herewith a Petition and corresponding fee for a one (1) month extension of time to respond to the Notice to File Missing Parts. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to deposit account no. 20-0778.

IN THE CLAIMS

Please amend the claims to read as follows wherein changes are shown by strikethrough for deleted matter and underlining for added matter.

1-21. (Cancelled)

22. (New) In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition, the refrigerant composition comprising a combination of refrigerant gases, said refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits one or more of a dew point at -32°F, a bubble point at -41.5°F or a glide at 9.5°F.

23. (New) In the apparatus of claim 22, wherein the blend exhibits all three of the dew point at -32°F, the bubble point at -41.5°F and a glide at 9.5°F.

24. (New) In the apparatus of claim 22, wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

25. (New) In the apparatus of claim 24, the lubricating oil having the following components:

65-88% hydrotreated light napthenic distillate, and

10-20% solvent refined light naphthenic distillate petroleum.

26. (New) A method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant, the method comprising:

(1) supplying a substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

(2) adding to said apparatus via the manifold the substitute refrigerant composition for chlorodifluoromethane, said substitute refrigerant composition comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits one or more of a dew point at -32°F, a bubble point at -41.5°F or a glide at 9.5°F.

27. (New) The method of claim 26, wherein the blend exhibits all three of the dew point at -32°F, the bubble point at -41.5°F and the glide at 9.5°F.

28. (New) The method of claim 26, wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in wherein the lubricating oil is selected from the group consisting of naphthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

29. (New) The method of claim 28, the lubricating oil having the following components:
- 65-85% hydrotreated light napthenic distillate, and
- 10-20% solvent refined light napthenic distillate petroleum.
30. (New) A refrigerant composition comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits one or more of a dew point at -32°F, a bubble point at -41.5°F or a glide at 9.5°F.
31. (New) The refrigerant composition of claim 30, wherein the blend exhibits all three of the dew point at -32°F, the bubble point at -41.5°F and a glide at 9.5°F.
32. (New) The refrigerant composition of claim 30, wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.
33. (New) The refrigerant composition of claim 32, the lubricating oil having the following components:
- 65-88% hydrotreated light napthenic distillate, and
- 10-20% solvent refined light napthenic distillate petroleum.

34. (New) The refrigerant composition according to claim 32, wherein the lubricating oil further includes an acrylic polymer, a corrosion inhibitor, a surfactant or a foaming agent.
35. (New) The refrigerant composition of claim 32, wherein the lubricating oil is an alkylbenzene-based lubricating oil.
36. (New) In the apparatus of claim 22, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.
37. (New) In the apparatus of claim 24, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor, a surfactant, a foaming agent, and mixtures thereof.
38. (New) In the apparatus of claim 24, wherein the lubricating oil is an alkylbenzene-based lubricating oil.
39. (New) The method according to claim 26, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.
40. (New) The method according to claim 28, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor, a surfactant, a foaming agent, and mixtures thereof.
41. (New) The method according to claim 28, wherein the lubricating oil is an alkylbenzene-based lubricating oil.

42. (New) In the apparatus of claim 22, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

43. (New) The method of claim 26, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

44. (New) The refrigerant composition of claim 30, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

REMARKS

Applicant has cancelled claims 1-21 and has added claims 22-44. It is believed that the foregoing amendment adds no new matter to the present application.

Applicant respectfully requests that this application and all presently pending claims be allowed. If the Examiner has any questions or comments regarding Applicants' response, the Examiner is encouraged to telephone Applicants' undersigned counsel.

Respectfully submitted ,

**THOMAS, KAYDEN, HORSTEMEYER
& RISLEY, L.L.P.**

By:



Todd Deveau, Reg. No. 29,526

600 Galleria Parkway
Suite 1500
Atlanta, Georgia 30339-5948
(770) 933-9500

Docket No. 821920-1031

Electronic Patent Application Fee Transmittal

Application Number:	12961045			
Filing Date:	06-Dec-2010			
Title of Invention:	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT			
First Named Inventor/Applicant Name:	Kenneth M. Ponder			
Filer:	Todd Deveau./Virginia Keenan			
Attorney Docket Number:	821920-1031			
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	82	82
Utility Search Fee	2111	1	270	270
Utility Examination Fee	2311	1	110	110
Pages:				
Claims:				
Claims in excess of 20	2202	3	26	78
Miscellaneous-Filing:				
Late filing fee for oath or declaration	2051	1	65	65

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				605

Electronic Acknowledgement Receipt

EFS ID:	9707673
Application Number:	12961045
International Application Number:	
Confirmation Number:	8450
Title of Invention:	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT
First Named Inventor/Applicant Name:	Kenneth M. Ponder
Customer Number:	24504
Filer:	Todd Deveau./Virginia Keenan
Filer Authorized By:	Todd Deveau.
Attorney Docket Number:	821920-1031
Receipt Date:	22-MAR-2011
Filing Date:	06-DEC-2010
Time Stamp:	11:06:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$605
RAM confirmation Number	9477
Deposit Account	200778
Authorized User	DEVEAU,TODD

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

EXHIBIT 1004

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Extension of Time	EOT.pdf	52197	no	1
			c5df5ce97c62fb9ea573146adb2a067d3552d606		

Warnings:

Information:

2	Preliminary Amendment	PrelimAmend.pdf	198826	no	7
			9b453c57e95633302d540d9ccd0bea99376deb94		

Warnings:

Information:

3	Fee Worksheet (PTO-875)	fee-info.pdf	38549	no	2
			9e3410c0f5673de9715a2742b12054046046bd63		

Warnings:

Information:

Total Files Size (in bytes):			289572
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

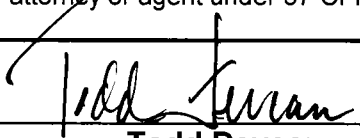
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) FY 2006 <i>(Fees pursuant to the Consolidated Appropriations act, 2005 (H.R. 4818).)</i>		Docket No. 821920-1031
Application Number: 12/961,045	Filed: December 6, 2010	
For: Refrigerant with Lubricating Oil for Replacement off R22 Refrigerant		
Art Unit: 1761	Examiner: TBD	
This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.		
The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):		
	<u>Fees</u>	<u>Small Entity Fees</u>
<input checked="" type="checkbox"/> One month (37 CFR 1.17(a)(1))	\$130	\$65 \$65
<input type="checkbox"/> Two months (37 CFR 1.17(a)(2))	\$490	\$245 \$_____
<input type="checkbox"/> Three months (37 CFR 1.17(a)(3))	\$1110	\$555 \$_____
<input type="checkbox"/> Four months (37 CFR 1.17(a)(4))	\$1730	\$865 \$_____
<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$2350	\$1175 \$_____
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27		
<input type="checkbox"/> A check in the amount of the fee is enclosed.		
<input checked="" type="checkbox"/> Payment by credit card.		
<input type="checkbox"/> The Director has already been authorized to charge fees in this application to a Deposit Account.		
<input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any deficiencies in fees which may be required, or credit any overpayment to Deposit Account No. 20-0778.		
WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.		
I am the		
<input type="checkbox"/> applicant/inventor.		
<input type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).		
<input checked="" type="checkbox"/> attorney or agent of record. Registration Number: 29,526		
<input type="checkbox"/> attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34:		
 Todd Deveau	22 March 2011 Date 770-933-9500 Telephone Number	

The collection of information is required by CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, US Patent and Trademark Office, US Department of Commerce, PO Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, PO Box 1450 Alexandria, VA 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/961,045		Filing Date 12/06/2010		<input type="checkbox"/> To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY <input checked="" type="checkbox"/> OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$	=		X \$	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
			TOTAL			TOTAL				
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	12/06/2010	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 21	Minus	** 20	= 1	X \$26 =	26	OR	X \$	=
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0	X \$110 =	0	OR	X \$	=
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))								OR		
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								OR		
						TOTAL ADD'L FEE	26	OR	TOTAL ADD'L FEE	
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	03/22/2011	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 23	Minus	** 21	= 2	X \$26 =	52	OR	X \$	=
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0	X \$110 =	0	OR	X \$	=
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))								OR		
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								OR		
						TOTAL ADD'L FEE	52	OR	TOTAL ADD'L FEE	
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>										

Legal Instrument Examiner:
/FELICIA R. FARMER/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/961,045	12/06/2010	Kenneth M. Ponder	821920-1031

CONFIRMATION NO. 8450

FORMALITIES LETTER



OC000000045034998

24504
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
600 GALLERIA PARKWAY, S.E.
STE 1500
ATLANTA, GA 30339-5994

Date Mailed: 12/22/2010

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$82 to complete the basic filing fee for a small entity.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of \$26 as a small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.
- A surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of \$65 for a small entity in compliance with 37 CFR 1.27, must be submitted.

SUMMARY OF FEES DUE:

Total fee(s) required within **TWO MONTHS** from the date of this Notice is \$553 for a small entity

- \$82 Statutory basic filing fee.
- \$65 Surcharge.
- The application search fee has not been paid. Applicant must submit \$270 to complete the search fee.
- The application examination fee has not been paid. Applicant must submit \$110 to complete the examination fee for a small entity in compliance with 37 CFR 1.27.
- Total additional claim fee(s) for this application is \$26
 - \$26 for 1 total claims over 20.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/sareebuddin/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/961,045	12/06/2010	1761	0.00	821920-1031	21	3

CONFIRMATION NO. 8450

24504

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
600 GALLERIA PARKWAY, S.E.
STE 1500
ATLANTA, GA 30339-5994

FILING RECEIPT



Date Mailed: 12/22/2010

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Kenneth M. Ponder, Cumming, GA;
Steffan Thomas JR., Buckhead, GA;

Power of Attorney: The patent practitioners associated with Customer Number 24504

Domestic Priority data as claimed by applicant

This application is a CON of 10/937,736 09/08/2004 ABN
which claims benefit of 60/501,049 09/08/2003

Foreign Applications

If Required, Foreign Filing License Granted: 12/17/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/961,045**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT

Preliminary Class

252

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 12/961,045			
APPLICATION AS FILED - PART I									
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)		
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	82		N/A			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	270		N/A			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	110		N/A			
TOTAL CLAIMS (37 CFR 1.16(j))	21	minus 20 = *	1	x 26 =	26				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *		x 110 =	0.00				
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$270 (\$135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				0.00				
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					0.00				
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL	488		
APPLICATION AS AMENDED - PART II									
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
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	Independent (37 CFR 1.16(h))	*	Minus	***	=		x	=	
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
TOTAL ADD'L FEE									
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=		x	=	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x	=	
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
TOTAL ADD'L FEE									
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.									

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET Substitute for Form PTO-1360 (For use with Form PTO/SB/06)							Application Number 12961045		Filing Date	
							Applicant(s) Kenneth Ponder			
							* May be used for additional claims or amendments			
CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT			*	*	*
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Ponder et al.

Confirmation No.: TBD

Group Art Unit: TBD

Serial No.: TBD

Examiner: TBD

Filed: TBD

Docket No.: 821920-1031

For: **REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22
REFRIGERANT**

PRELIMINARY AMENDMENT

Mail Stop Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

In regard to the above-referenced application, the Applicant submits the following preliminary amendment and remarks to be respectively entered and considered prior to examination.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to Deposit Account No. 20-0778.

IN THE SPECIFICATION

Amend the title as follows:

~~ENVIRONMENTALLY SAFER REPLACEMENT REFRIGERANT WITH NAPHTHENIC~~
LUBRICATING OIL FOR REFRIGERANT REPLACEMENT OF R22-BASED REFRIGERATION
SYSTEMS REFRIGERANT

Amend the specification as follows:

Page 1, line 6, delete the paragraph beginning with "This application..." and ending on line 7 with "September 8, 2003." and replace it with the following paragraph:

--This application is a continuation of U.S. Patent Application serial number 10/937,736 filed September 8, 2004, which claims priority to and the benefit of provisional application, Serial No. 60/501,049 filed September 8, 2003. --

Page 13, line 12, delete the paragraphs beginning with "Fig. 1 shows..." and ending on line 15 with "...pentafluoroethane to R-22." and replace them with the following paragraphs:

--Fig. 1 shows Pressure (liquid) vs. Temperature profiles for R-22 and blends of ~~60/40, 55/45 and 58/42~~ 40/60, 45/55 and 42/58 of tetrafluoroethane and pentafluoroethane, respectively.

Fig. 2 shows Temperature vs. Enthalpy profiles comparing a blend of ~~60/40~~ 40/60 tetrafluoroethane and pentafluoroethane to R-22.--

IN THE CLAIMS

Please amend the claims to read as follows wherein changes are shown by strikethrough for deleted matter and underlining for added matter.

1. - 29.(Cancelled)

1. (New) In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition containing a lubricant, the refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components, said refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane.

2. (New) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

3. (New) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.

4. (New) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight.

5. (New) A method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant, the method comprising:

(1) supplying a substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

(2) adding to said apparatus via the manifold the substitute refrigerant composition for chlorodifluoromethane, said substitute refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components, the refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane.

6. (New) The method according to claim 5 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

7. (New) The method according to claim 5 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.

8. (New) The method according to claim 5 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight.

9. (New) A refrigerant composition comprising a combination of refrigerant gases and non refrigerant gas components, the refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and
about 55% to about 60% by weight pentafluoroethane.

10. (New) A refrigerant composition according to claim 9 wherein said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

11. (New) A refrigerant composition according to claim 9 wherein said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight with a napthenic lubricant.

12. (New) A refrigerant composition according to claim 9 wherein said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight with a napthenic lubricant.

13. (New) The invention according to claim 1, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

14. (New) The method according to claim 5, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

15. (New) The refrigerant composition of claim 9, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

16. (New) The invention according to claim 1, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.
17. (New) The method of claim 5, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.
18. (New) The refrigerant composition of claim 9, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.
19. (New) The invention according to claim 1, wherein the refrigerant composition consists of:
about 40% to about 45% by weight tetrafluoroethane; and
about 55% to about 60% by weight pentafluoroethane.
20. (New) The method of claim 6, wherein the refrigerant composition consists of:
about 40% to about 45% by weight tetrafluoroethane; and
about 55% to about 60% by weight pentafluoroethane.
21. (New) The refrigerant composition of claim 9, wherein the refrigerant composition consists of:
about 40% to about 45% by weight tetrafluoroethane; and
about 55% to about 60% by weight pentafluoroethane.

REMARKS

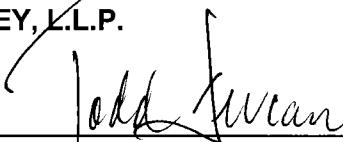
Applicant has amended the specification, relating to the priority claim and Figs. 1 and 2, and encloses a Substitute Specification. It is believed that the foregoing amendment adds no new matter to the present application.

Applicant respectfully requests that this application and all presently pending claims be allowed to issue. If the Examiner has any questions or comments regarding Applicant's response, the Examiner is encouraged to telephone Applicant's undersigned counsel.

Respectfully submitted ,

**THOMAS, KAYDEN, HORSTEMEYER
& RISLEY, L.L.P.**

By:



Todd Deveau, Reg. No. 29,526

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Docket No. 821920-1031

REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT

RELATED APPLICATION

5

This application is a continuation of U.S. Patent Application serial number 10/937,736 filed September 8, 2004, which claims priority to and the benefit of provisional application, Serial No. 60/501,049 filed September 8, 2003

BACKGROUND OF THE INVENTION

10 1. Field Of The Invention

The present invention relates to the replacement of Refrigerant R-22 (chlorodifluoromethane) refrigerant with a blend refrigerant that is less damaging to the ozone layer in systems designed to use Refrigerant R-22 (chlorodifluoromethane). More particularly the present invention relates to an improved refrigerant composition, method
15 and apparatus for refrigeration wherein two non-Refrigerant R-22 refrigerants are mixed in a defined ratio such that the temperature-pressure relationship of the mix approximates that of Refrigerant R-22 (chlorodifluoromethane). The mixture is compatible with Refrigerant R-22 (chlorodifluoromethane) so that it can be added to supplement and replace Refrigerant R-22 (chlorodifluoromethane). A further particularity of the instant
20 invention relates to an improved method and apparatus for refrigeration wherein refrigerant mixture is mixed with a soluble lubricating oil to provide lubrication to the apparatus. The lubricant is soluble in both the mixture of the invention and Refrigerant R-22 (chlorodifluoromethane) refrigerant.

2. General Background

25 Until recently, R-22 refrigerant chlorodifluoromethane (hereinafter sometimes called "Refrigerant R-22 (chlorodifluoromethane)") was the major, if not sole refrigerant, used in residential air-conditioners, refrigerators, freezers and window air-conditioning

units. Refrigerant R-22 (chlorodifluoromethane) is a trademark of E. I. du Pont de Nemours & Co. Inc. for chlorodifluoromethane. Hereinafter, "Refrigerant R-22 (chlorodifluoromethane)" is used in this specification to denote chlorodifluoromethane, regardless of the source.

5 Recently, however, Refrigerant R-22 (chlorodifluoromethane) has come under attack both nationally and internationally as an ozone layer-damaging chemical. In recent years, both the national and international scientific communities have linked Refrigerant R-22 (chlorodifluoromethane) with damage to the earth's protective ozone layer. Air-conditioners, refrigerator/freezers and window air-conditioning units
10 containing R-22 are believed to be a global source of ozone-damaging material.

 In response to scientific concern and a national and global outcry over the use of Refrigerant R-22 (chlorodifluoromethane) in air-conditioning, the United States Congress has acted to first reduce and then ban the use of Refrigerant R-22 (chlorodifluoromethane) in air-conditioning units.

15 As a first step toward phasing out the use of Refrigerant R-22 (chlorodifluoromethane) in air-conditioning units, Congress is phasing out the use of Refrigerant R-22 (chlorodifluoromethane) in new equipment effective 01/01/2015 and has banned the sale of Refrigerant R-22 (chlorodifluoromethane) in any size container as of 01/01/2020. One of the first areas in which the use of Refrigerant R-22
20 (chlorodifluoromethane) is to be phased out is in the Bakery industry under the Bakery Partnership Program. Another step in phasing out the use of R-22 is the import restrictions that begin in 2003, limiting the amount of R-22 that can be imported into the United States.

 At the time of this application, the vast majority of residential, window units and
25 freezers in use in the United States contain Refrigerant R-22 (chlorodifluoromethane).

 Prior to banning the sale of quantities of Refrigerant R-22 (chlorodifluoromethane), owners of equipment with Refrigerant R-22

(chlorodifluoromethane)-based air-conditioning units are able to purchase the level of refrigerant in their equipment with only the need of a refrigerants license as required by the Clean Air Act. Millions of units containing refrigerant R-22 (chlorodifluoromethane) were sold in the United States prior to the start of mandatory phase out set forth by
5 Congress and the international community.

Refrigerant R-22 (chlorodifluoromethane) recharging typically involves 30 lb. cans or cylinders typically used in the HVAC/R industry. The cylinders are fitted with a dispensing outlet compatible with a commercially available refrigeration manifold. In order to recharge an air-conditioning system, a customer need to only fit the can or
10 cylinder to the manifold and discharge, or “add to” the refrigerant charge directly into the air conditioning system.

Following Congress’s ban on the sale of Refrigerant R-22 (chlorodifluoromethane) millions of equipment owners with Refrigerant R-22 (chlorodifluoromethane)-based air-conditioning units will be left with no choice other
15 than to seek replacement refrigerants to service these units. Intentionally mixing of refrigerants is currently illegal by standards set forth by the Clean Air Act. An example would be for this application is that current R-22 units could not be mixed with this invention intentionally.

In response to Congress’s ban on the use of Refrigerant R-22
20 (chlorodifluoromethane) in air-conditioning, service dealers have began to retrofit existing Refrigerant R-22 (chlorodifluoromethane)-based air-conditioning units with new, non-R-22 refrigerants, such as R410A (a 50/50 mixture of difluoromethane and pentafluoroethane), R417 (a 46/50/4 mixture of pentafluoroethane, 1,1,1,2-tetrafluoroethane, and butane) or R407C (a 23/25/52 mixture of difluoromethane,
25 pentafluoroethane, and 1,1,1,2-tetrafluoroethane). None of these replacements contain a lubricant when produced.

The refrigerants that will be authorized by the Environmental Protection Agency (EPA) to replace Refrigerant R-22 (chlorodifluoromethane) in air conditioners is currently under review and will evolve to require an environmentally safe refrigerant, with a 0 odp factor like the one of the present invention described herein. Unfortunately, most
5 replacements for R-22 have a markedly different temperature-pressure relationship at most operating temperatures than Refrigerant R-22 (chlorodifluoromethane).

Because of this difference in the temperature-pressure relationship of Refrigerant R-22 (chlorodifluoromethane) and current replacement refrigerants, existing Refrigerant R-22 (chlorodifluoromethane)-based systems cannot typically be interchanged. Hence,
10 non-retrofitted, Refrigerant R-22 (chlorodifluoromethane)-based units have a need for a refrigerant that will fulfill the requirements of the system design while also meeting the requirements of the EPA and the international community.

Simply mixing refrigerants with existing Refrigerant R-22 (chlorodifluoromethane) in order to replenish, or “topping off” the level is against the law
15 and not feasible. When other refrigerants are mixed with Refrigerant R-22 (chlorodifluoromethane), the mixture can take on the pressure characteristics of a substance that could be harmful to either the equipment or the operator. The temperature-pressure relationship becomes markedly different from that of Refrigerant R-22 (chlorodifluoromethane) at temperatures within the normal refrigerant operating
20 temperature range and typical use of R-22.

Hence, in the absence of Refrigerant R-22 (chlorodifluoromethane) owners of equipment with Refrigerant R-22 (chlorodifluoromethane)-based air conditioners face but one choice when the level of their air-conditioning coolant is low: professional service—
at a significant cost—to remove the existing Refrigerant R-22 (chlorodifluoromethane),
25 and retrofit the system compatible with some kind of refrigerant gas.

R-22 refrigerants were developed to replace the prior, now banned R-12 refrigerant, or dichlorodifluoromethane. R-12 is sometimes referred to as FREON 12®, which is a trademark of E.I. du Pont de Nemours & Co. for dichlorodifluoromethane.

Thomas et al. (U.S. Pat. No. 5,254,280) discloses a lubricant developed for use
5 with a refrigerant known as R134a (1,1,1,2 – tetrafluoroethane) and the combination of that lubricant with a refrigerant, which is a replacement for R-12. The lubricant contains polyoxyalkylene glycol, which is hydrophilic and could damage the system as discussed below.

Wilczek (U.S. Pat. No. 5,384,057), Gorski (U.S. Pat. No. 4,971,712), and Anton
10 of DuPont (U.S. Pat. No. 5,145,594) disclose other R-12 replacements in the form of a blend of certain synthetic lubricants in various R134a and R134a/R125 refrigerant systems. The DuPont patents discuss a gas known as R125 (pentafluoroethane). R125 is five fluorine atoms bonded to an ethane molecule. This is a very large molecule for a refrigerant. It is currently being produced for refrigeration only. Anton discloses the use
15 of a lubricant comprising at least one cyanocarbon compound. Wilczek discloses a fluorosiloxane as a lubricant. Gorski discloses a polyalkylene glycol as a lubricant.

Systems that contain R-22, or R-12 replacements, are still being produced today. These older systems have common components: R-22, R-22 mineral oil lubricant, and water that is sequestered into the dryer. If R134a (1,1,1,2-tetrafluoroethane) were added to
20 the system, it would damage the system as follows: (1) if no lubricant is added to the R134a (as in U.S. Pat. No. 4,953,312 to Tamura et al.), then the R-22 system would be starved for lubricant, since the R134a gas is not miscible with the mineral oil lubricant; (2) if a synthetic lubricant is added to the R134a (as in Thomas et al.), then there is a different problem—that of moisture. Older systems can have water trapped in their
25 dryers. The synthetic lubricants (such as polyglycol- or polysiloxane-based lubricants) are hydrophilic. Thus, they are not only miscible with R-22 and R134a; they are also partially or completely miscible with water. Thus, if they are introduced into an R-22 system, they will pull this water out of the dryer into the refrigerant flow, initiating

corrosion and damage to pressure switches and the TX valve and possible other system components. This is why Elf Atochem and DuPont, to name a few publish elaborate flushing procedures and high efficiency dryer change-outs to prevent damage to the cooling system.

- 5 Weber (U.S. Patent No. 5,942,149) discloses yet another R-12 replacement consisting of a blend of chlorodifluoroethane, tetrafluoroethane and a naphthenic lubricating oil.

SUMMARY OF THE PRESENT DISCLOSURE

- 10 The present disclosure is of a method and apparatus that are environmentally sound alternatives to the use of Refrigerant R-22 (chlorodifluoromethane) as a refrigerant. More particularly, the invention provides a mixture of at least two refrigerants that are miscible with each other, and compatible with Refrigerant R-22 (chlorodifluoromethane) while at the same time possessing a temperature-pressure profile that approximates that of Refrigerant R-22 (chlorodifluoromethane) over the operating
- 15 range of ambient temperatures usually encountered by air conditioning units or other apparatus utilizing Refrigerant R-22 (chlorodifluoromethane) as a refrigerant. The invention also provides a lubricant, that is compatible with both the environmentally sound refrigerant of the invention and with Refrigerant R-22 (chlorodifluoromethane), so that mixtures of the refrigerant according to the invention and Refrigerant R-22
- 20 (chlorodifluoromethane) may be utilized with this lubricant in the refrigeration systems without deleterious effect upon moving parts of the refrigerating apparatus that require lubrication from the refrigerant.

- 25 More particularly, the refrigerant and method disclosed herein involves a mixture of pentafluoroethane and tetrafluoroethane in specific proportions that provide a temperature-pressure relationship that approximates that of Refrigerant R-22 (chlorodifluoromethane) over the range of ambient temperature operating conditions in which Refrigerant R-22 (chlorodifluoromethane) is a useful refrigerant. The

pentafluoroethane/tetrafluoroethane refrigerant blend disclosed herein is compatible with both synthetic and mineral oils. The tetrafluoroethane can be either 1,1,1,2-tetrafluoroethane or 1,1,2,2-tetrafluoroethane. In an exemplary embodiment, the refrigerant according to the invention comprises a ratio of from about 40 to about 45
5 weight percent pentafluoroethane to about 55 to about 60 percent 1,1,1,2-tetrafluoroethane, based upon the total weight of pentafluoroethane and 1,1,1,2-tetrafluoroethane. In a further exemplary embodiment, the refrigerant includes the ratio of about 42 weight percent pentafluoroethane to about 58 weight percent 1,1,1,2-tetrafluoroethane.

10 In addition, the refrigerant according to the invention also includes from about 0 to about 20 weight percent (based on the combined weight of pentafluoroethane and 1,1,1,2-tetrafluoroethane) of a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane. In a preferred embodiment the
15 lubricating oil is present in the range of from about 0.5 to about 2% by weight of the refrigerant mixture.

In an exemplary embodiment, the lubricating oil is a napthenic or paraffinic based lubricating oil. In a further exemplary embodiment, the lubricant is selected from those lubricants sold by Anderol, Inc., East Hanover, N.J., an affiliate of Royal Lubricants Company, under the trademark ROYCO® 2302. ROYCO® 2302 is a napthenic oil
20 lubricant having the following composition:

65-85% hydrotreated light napthenic distillate,
10-20% solvent refined light napthenic distillate petroleum,
<0.5% butylated triphenyl phosphate, and
<2% minor additive.

25 In another exemplary embodiment, the lubricating oil can be a synthetic lubricating oil, or a mixture of oils, that is soluble in the mixture of the chlorodifluoroethane and tetrafluoroethane. A suitable synthetic lubricant is a man-made,

--SUBSTITUTE SPECIFICATION--

synthetic alkyl aromatic lubricant. Suitable synthetic lubricants include alkylated benzene lubricants.

5 The lubricant can be either a synthetic alkyl aromatic lubricant, such as alkylbenzene, alone, or a mixture of a synthetic alkyl aromatic lubricant and mineral oil or a mixture of a synthetic alkyl aromatic lubricant and polyol ester (POE). When so mixed, it is preferred, but not required, that a minor portion of the mixture be mineral oil or POE. By minor portion, we mean less than 50% by weight of the blended refrigerants. Alternatively, either mineral oil or polyol ester (POE) can be used alone.

10 While it is intended that the substitute refrigerant according to the invention may be utilized to replace Refrigerant R-22 (chlorodifluoromethane) that has escaped from apparatus, the substitute refrigerant of the invention may also be utilized to completely refill apparatus that have been designed for use with Refrigerant R-22 (chlorodifluoromethane), since the refrigerant has a temperature-pressure profile that closely approximates that of Refrigerant R-22 (chlorodifluoromethane). Thus, when the
15 refrigerant is used as a complete replacement for Refrigerant R-22 (chlorodifluoromethane), it is no longer necessary that the lubricant be compatible with chlorodifluoromethane but only that it should be compatible with 1,1,1,2-tetrafluoroethane and pentafluoroethane.

20 Further, whereas the substitute refrigerant of the invention is less damaging to the ozone layer than Refrigerant R-22 (chlorodifluoromethane) and is useful in air conditioning units, and in particular residential type air-conditioning units, it is not so limited in its use. Indeed, the refrigerant may be utilized as a substitute or replacement for Refrigerant R-22 (chlorodifluoromethane) in virtually any application, thereby eliminating the use of ozone layer-damaging Refrigerant R-22 (chlorodifluoromethane).

25 In further specifics, the invention provides a canister containing a mixture of tetrafluoroethane and pentafluoroethane with a napthenic oil that may be fitted with an outlet manifold that is compatible with a Refrigerant R-22 (chlorodifluoromethane)

recharging manifold that is typically used to recharge an apparatus with the latter refrigerant. Refrigerant may then be allowed to flow from the container through the manifold and into the apparatus to replace Refrigerant R-22 (chlorodifluoromethane) refrigerant that has been lost from the refrigeration system.

5 When mixing the components of the refrigerant blend of the present invention, one should first mix the lubricant with the tetrafluoroethane, then mix that mixture with the pentafluoroethane in the proportions afore mentioned. Otherwise, the product does not mix properly.

10 In an exemplary form, the lubricant has a viscosity of 5 to 500 centistokes, more preferably 5 to 100 centistokes, even more preferably 5 to 50 centistokes, and most preferably 5 to 10 centistokes. The lubricant having a viscosity of 5 to 10 centistokes is preferred.

15 In an exemplary embodiment, the percentage by weight of lubricant in the refrigerant blend is 0-20%, preferably 0.5-2%, more preferably 1-2%, even more preferably 1.25-2%, and most preferably 1.5-1.75%. The percentage by weight of lubricant in the refrigerant blend is, for example, 1.75. \pm 0.05%.

20 A suitable lubricant is severely hydro treated naphthenic/paraffinic lubricant, such as the aforementioned ROYCO® 2302. Other suitable lubricants include Sunpar R2280 (a paraffinic based lubricant), Lubrizol 403, Sunthene 200 (a naphthenic based lubricant) and L30 or L35 from Shrieve Chemical Company, The Woodlands, Texas, or Zerol 150 from Nu-Calgon Wholesale, Inc., St. Louis, Missouri, or AB150 from Virginia KMP Corporation, Dallas, Texas (alkylbenzene synthetic lubricants). Mobil One 5-weight synthetic oil (it is hydrophobic) could also work as a lubricant, but it is relatively expensive.

25 In order for the parts of the refrigerant system to function best, 0.5-20% of total weight of refrigerant should be lubricant. When adding the refrigerant blend to a

--SUBSTITUTE SPECIFICATION--

refrigerant system, one should leave the lubricant in the system if one for some reason takes out the Refrigerant R-22.

5 The lubricating of the present system is miscible with the pentafluoroethane and tetrafluoroethane blend and with R-22 refrigerant. This allows for mixing of residual R-22 refrigerant and the refrigerant of the present invention, without the release of significant amounts of residual water in the dryer and subsequent system damage (as will happen if the synthetic lubricants disclosed in Thomas et al. and the DuPont patents are used). While alkylbenzene alone is considered not miscible with tetrafluoroethane (in particular R134a), it is sufficiently soluble in the present tetrafluoroethane/chlorodifluoroethane
10 mixture. This solubility allows the replacement refrigerant blend to lubricate the system, preventing damage to the compressor and component parts of the system.

Various optional additives can be included in the lubricant. A corrosion inhibitor can be included. (otherwise corrosion will probably occur within 6 months). An exemplary corrosion inhibitor is one for anhydrous systems (such corrosion inhibitors
15 comprise calcium, or phosphate salts). The corrosion inhibitor can be bonded to the lubricant. Additionally, a surfactant and/or a foaming agent can be included.

The present refrigerant blend is designed to be utilized as a R-22 replacement in refrigeration systems. It is designed as a replacement, in which little or no modifications including parts are used to adapt the system for the refrigerant of the present invention.

20 The present refrigerant blend can be used as a replacement for R-22 refrigerant, typically deminimus without retrofitting the air conditioning system or flushing it out. It is recommended that a full vacuum be obtained before adding the refrigerant to the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

25 Many aspects of the disclosure can be better understood with reference to the following drawings.

FIG. 1 illustrates pressure versus temperature profiles for various blends of the present disclosure in comparison to R-22.

FIG. 2 compares the temperature versus enthalpy profile of an exemplary embodiment of the present disclosure to R-22.

5 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

 The present disclosure provides a mixture of non-Refrigerant 22 refrigerants that are less damaging to the Earth's ozone layer and that are approved by the U.S. Environmental Protection Agency for use in air-conditioners. The invention mixture is compatible with Refrigerant R-22 (chlorodifluoromethane) and can be used to replace
10 existing Refrigerant R-22 (chlorodifluoromethane)-in R-22 based refrigeration systems. It is expected that the present invention will gradually replace Refrigerant R-22 (chlorodifluoromethane) in Refrigerant R-22 (chlorodifluoromethane)-based air-cooling systems, without the need to retrofit existing Refrigerant R-22 (chlorodifluoromethane)-based systems for non-Refrigerant 22 replacement refrigerants.

15 Specifically, the present refrigerant blend includes a mixture of pentafluoroethane and tetrafluoroethane packaged with a compatible lubricating oil, provided under pressure in a can or cylinder equipped with an outlet compatible with existing Refrigerant R-22 (chlorodifluoromethane) recharging kit manifolds, so that the refrigerant and lubricant mixture can be added to existing Refrigerant R-22 (chlorodifluoromethane) based coolant
20 systems. Also, the invention provides the possibility of using new refrigerant systems, originally designed for "Refrigerant R-22 (chlorodifluoromethane)," by supplying an EPA-approved refrigerant so that retrofitting to new equipment use is not required.

 In an exemplary embodiment, the invention provides an cylinder can like the standard 25 or 30 lb. can formerly used for containing "Refrigerant R-22
25 (chlorodifluoromethane)," but containing about 58% by weight 1,1,1,2-tetrafluoroethane and about 42% by weight pentafluoroethane. The can also contains the preferred

lubricant, ROYCO® 2302 in solution with the coolant mixture at a percent by weight of between 0.5% and 2%.

Existing Refrigerant R-22 (chlorodifluoromethane)-based air-conditioning systems use an amount of a vegetable or hydrocarbon mineral oil to lubricate the compressor. This oil has a very low vapor pressure, and is not soluble with pure tetrafluoroethane, particularly 1,1,1,2-tetrafluoroethane. Hence, adding tetrafluoroethane to replace Refrigerant R-22 (chlorodifluoromethane) in existing Refrigerant R-22 (chlorodifluoromethane)-based air-conditioning systems leads to compressor breakdown from lack of sufficient lubrication. The invention provides lubricants that are compatible with the invention mixture of tetrafluoroethane and pentafluoroethane, and with “Refrigerant R-22 (chlorodifluoromethane),” and that are suitable for lubricating refrigerant compressors and other air-conditioner component parts. The lubricants disclosed herein, on the other hand, are soluble in a tetrafluoroethane/ pentafluoroethane mixture. This solubility allows the replacement refrigerant blend to lubricate the air-conditioning system, preventing damage to the compressor and component parts of the system.

EXAMPLE 1

Table 1 summarizes the results of solubility tests of a 2% by weight solution of ROYCO® 2302 oil lubricant in an 58/42% by weight mixture of 1,1,1,2-tetrafluoroethane and pentafluoroethane refrigerants. ROYCO® 2302 oil (available from ANDEROL®, Inc., an affiliate of Royal Lubricants Co.), was added to a clear Fisher-Porter pressure burette and a mixture of 1,1,1,2-tetrafluoroethane/pentafluoroethane in an 58/42 ratio by weight was introduced under pressure to maintain the liquid state.

TABLE 1

Full Burette	clear no separation
2/3 Full Burette	clear no separation
1/2 Full Burette	clear no separation

--SUBSTITUTE SPECIFICATION--

1/3 Full Burette clear no separation

Almost Empty Burette clear no separation

Note: The color of the fluid remained the same as the burette was emptied. The expelled
5 gas deposited the oil onto a test panel.

EXAMPLE 2

1,1,1,2-tetrafluoroethane and pentafluoroethane are mixed with the napthenic oil
lubricant at set ratios such that the temperature-pressure profile of the mixture is similar
to that of Refrigerant R-22 (chlorodifluoromethane), over the normal operating range of
10 air-conditioners. Table 2 summarizes the results of tests of the temperature-pressure
profiles of various mixes of 1,1,1,2-tetrafluoroethane and pentafluoroethane over the
range of normal air-conditioner working temperatures, from -60 degree. F. to 160.
degree. F.

For Table 2, different percentages of 1,1,1,2-tetrafluoroethane and
15 pentafluoroethane --by weight--were mixed with the lubricant to show the pressure
temperature relationships of the various invention combinations.

Fig. 1 shows Pressure (liquid) vs. Temperature profiles for R-22 and blends of
40/60, 45/55 and 42/58 of tetrafluoroethane and pentafluoroethane, respectively.

Fig. 2 shows Temperature vs. Enthalpy profiles comparing a blend of 40/60
20 tetrafluoroethane and pentafluoroethane to R-22.

The blend of refrigerants tetrafluoroethane and pentafluoroethane of the present
disclosure shows the following properties of interest:

Dew Point @ -32F

Bubble Point @ -41.5F

25 Glide @ 9.5 F

An exemplary blend of refrigerants is about 42% by weight pentafluoroethane and about 58% by weight 1,1,1,2-tetrafluoroethane. This is the ratio of pentafluoroethane to 1,1,1,2-tetrafluoroethane with the lubricant where the mixture of the invention shows the greatest similarity to "Refrigerant R-22 (chlorodifluoromethane)", over most operating
5 temperatures.

The apparatus and method of the preferred embodiment encompass the use of a mixture of 1,1,1,2-tetrafluoroethane and pentafluoroethane at the ranges, as discussed above, with a lubricating oil at ranges, as discussed above of about 0.5% to about 2% by weight in the operation of an air-conditioning system, wherein the coolant-oil mixture
10 replaces Refrigerant R-22 (chlorodifluoromethane) in a Refrigerant R-22 (chlorodifluoromethane)-based refrigeration system.

The method and apparatus in the preferred embodiment further details providing the above described mix of pentafluoroethane/1,1,1,2-tetrafluoroethane and lubricating oil in 30 lb. cylinders, where the cylinders are pressure sealed and fitted with an outlet
15 compatible for existing Refrigerant 22-type refrigeration manifolds typically ¼ inch male flare.

Further, it was noted that the systems tested ran more smoothly and the compressor showed less vibration during the test period, as the mixture of the invention was added. It is theorized that the lubricating oil, being soluble in the refrigerant gasses,
20 was better able to lubricate the compressor and reciprocating parts than the existing Refrigerant R-22 (chlorodifluoromethane) lubricant used by itself. In some applications a reduction in power consumption maybe also noted.

The refrigerant of the present invention can also be used as a replacement refrigerant for the new R-22 air-conditioning systems, such as the systems used in today's
25 HFC-free units

The ROYCO® 2302 napthenic oil lubricant of the present disclosure has a flash point of more than 150 degrees F. Pure refrigerant 1,1,1,2-tetrafluoroethane is not

miscible with a napthenic lubricant like mineral oil or mineral seal oil (both of which could be used as the lubricants of the present invention). Pentafluoroethane is miscible with most napthenic lubricants, including mineral oils. The presence of the pentafluoroethane allows the use of mineral oils in the refrigerant blend and system of the present invention (a translucent, partially miscible blend is formed). The lubricant can advantageously be partially polymerized into longer chain molecules to allow it to function at very low percentage levels. The lubricant can be hydrotreated or polymerized for stability and wear resistance.

Phosphated additives add corrosion resistance in the presence of acids and salts and increase wear resistance. Calcium additives help the lubricant resist rust and the effects of corrosion; calcium salts reduce the corrosive effects of hydrochloric acid that is formed in the presence of water and the chlorinated gases present in the refrigerant systems of the present invention.

The ROYCO® lubricants mentioned above contain the corrosion inhibitors mentioned above and can also contain acrylic polymer. It is believed that the function of the acrylic polymer is to increase wear resistance under severe conditions. Acrylics can help film formation, and the ability of the lubricant to coat metal and soft parts and stay in place.

The lubricant of the present invention is miscible with R-22, the R-22 lubricant, and the blend of the refrigerant gases of the present invention.

It should be understood that variations and modifications may be made of the invention herein taught, and that those are within the scope and spirit of the invention as taught above and claimed here below.

--SUBSTITUTE SPECIFICATION--

Table 2

Temp (F)	P (60-40)	P (58-42)	P (55-45)	P (R-22)
-60	8.982	8.81	8.552	8.836
-55	10.36	10.16	9.87	10.19
-50	11.9	11.68	11.35	11.7
-45	13.62	13.37	12.99	13.39
-40	15.52	15.24	14.82	15.26
-35	17.63	17.32	16.84	17.34
-30	19.96	19.61	19.08	19.62
-25	22.52	22.13	21.54	22.14
-20	25.33	24.9	24.25	24.91
-15	28.41	27.93	27.21	27.93
-10	31.76	31.23	30.44	31.23
-5	35.42	34.83	33.96	34.82
0	39.39	38.74	37.79	38.73
5	43.69	42.98	41.94	42.96
10	48.34	47.57	46.43	47.54
15	53.36	52.52	51.27	52.48
20	58.76	57.85	56.5	57.79
25	64.57	63.58	62.11	63.51
30	70.8	69.73	68.14	69.65
35	77.48	76.33	74.61	76.22
40	84.62	83.38	81.52	83.26
45	92.25	90.9	88.91	90.76
50	100.4	98.93	96.79	98.76
55	109	107.5	105.2	107.3
60	118.2	116.6	114.1	116.3
65	128	126.2	123.6	125.9
70	138.4	136.5	133.6	136.1
75	149.3	147.3	144.3	146.9
80	160.9	158.8	155.6	158.3
85	173.2	170.9	167.5	170.4
90	186.1	183.7	180.1	183.1
95	199.8	197.2	193.3	196.5
100	214.2	211.4	207.3	210.6
105	229.3	226.4	222.1	225.5
110	245.3	242.2	237.6	241.1
115	262	258.7	253.9	257.5
120	279.6	276.1	271	274.7
125	298.1	294.4	289	292.7
130	317.5	313.6	307.8	311.6
135	337.8	333.7	327.6	331.4
140	359.1	354.8	348.3	352.1
145	381.4	376.8	370.1	373.7
150	404.8	400	392.8	396.4
155	429.3	424.2	416.7	420
160	454.9	449.5	441.6	444.7

Claims

What is claimed as the invention is:

1. In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition containing a lubricant, the refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components, said refrigerant gases consisting of:
 - about 40% to about 45% by weight tetrafluoroethane; and
 - about 55% to about 60% by weight pentafluoroethane.
2. The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.
3. The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.
4. The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight.
5. A method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant, the method comprising:
 - (1) supplying a substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

(2) adding to said apparatus via the manifold the substitute refrigerant composition for chlorodifluoromethane, said substitute refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components, the refrigerant gases consisting of:

- 5 about 40% to about 45% by weight tetrafluoroethane; and
 about 55% to about 60% by weight pentafluoroethane.

6. The method according to claim 5 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane
10 present in an amount of about 40% by weight.

7. The method according to claim 5 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane
present in an amount of about 42% by weight.

15

8. (The method according to claim 5 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane
present in an amount of about 45% by weight.

20 9. A refrigerant composition comprising a combination of refrigerant gases and non refrigerant gas components, the refrigerant gases consisting of:

 about 40% to about 45% by weight tetrafluoroethane; and
 about 55% to about 60% by weight pentafluoroethane.

25 10. A refrigerant composition according to claim 9 wherein said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

--SUBSTITUTE SPECIFICATION--

11. A refrigerant composition according to claim 9 wherein said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight with a napthenic lubricant.
- 5 12. A refrigerant composition according to claim 9 wherein said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight with a napthenic lubricant.
- 10 13. The invention according to claim 1, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.
- 15 14. The method according to claim 5, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.
- 20 15. The refrigerant composition of claim 9, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.
16. The invention according to claim 1, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.
- 25 17. The method of claim 5, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.
18. The refrigerant composition of claim 9, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.
19. The invention according to claim 1, wherein the refrigerant composition consists

--SUBSTITUTE SPECIFICATION--

of:

about 40% to about 45% by weight tetrafluoroethane; and
about 55% to about 60% by weight pentafluoroethane.

- 5 20. The method of claim 6, wherein the refrigerant composition consists of:
about 40% to about 45% by weight tetrafluoroethane; and
about 55% to about 60% by weight pentafluoroethane.

21. The refrigerant composition of claim 9, wherein the refrigerant composition
10 consists of:
about 40% to about 45% by weight tetrafluoroethane; and
about 55% to about 60% by weight pentafluoroethane.

ABSTRACT

An apparatus and method wherein potential ozone layer-damaging chlorodifluoromethane (Refrigerant R-22) is substituted with a mix of less environmentally damaging refrigerants pentafluoroethane and tetrafluoroethane in chlorodifluoromethane-based air-cooling systems mainly in residential cooling. While less environmentally damaging than chlorodifluoromethane, the substitute refrigerant has a temperature-pressure relationship similar to that of chlorodifluoromethane, making the substitute refrigerant suitable for use with chlorodifluoromethane-based air-cooling systems. In this event, it is mixed with a relatively small percentage of a lubricating oil which is compatible with both the unit refrigerant and typical R-22 system design.

Electronic Acknowledgement Receipt

EFS ID:	8974338
Application Number:	12961045
International Application Number:	
Confirmation Number:	8450
Title of Invention:	Refrigerant with Lubricating Oil for Replacement of R22 Refrigerant
First Named Inventor/Applicant Name:	Kenneth M. Ponder
Customer Number:	24504
Filer:	Todd Deveau./Virginia Keenan
Filer Authorized By:	Todd Deveau.
Attorney Docket Number:	821920-1031
Receipt Date:	06-DEC-2010
Filing Date:	
Time Stamp:	16:52:15
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Drawings-only black and white line drawings	01267602.PDF	137086 fe914f65ce94644d0ef0b5b9d3f29386921772d9	no	1

Warnings:

Information:

2		01267594.PDF	156014	yes	23
			25474c9152eb09375c6bf0a9809d8baf2e70f28		
	Multipart Description/PDF files in .zip description				
	Document Description	Start	End		
	Specification	1	16		
	Claims	17	22		
	Abstract	23	23		
Warnings:					
Information:					
3	Application Data Sheet	01267429.PDF	1360818	no	5
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Warnings:					
Information:					
4	Oath or Declaration filed	01267358.PDF	103524	no	3
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Warnings:					
Information:					
5	Preliminary Amendment	01267609.PDF	174502	no	7
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	Multipart Description/PDF files in .zip description				
	Document Description	Start	End		
	Specification	1	16		
	Claims	17	20		
	Abstract	21	21		
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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

FIG. 1

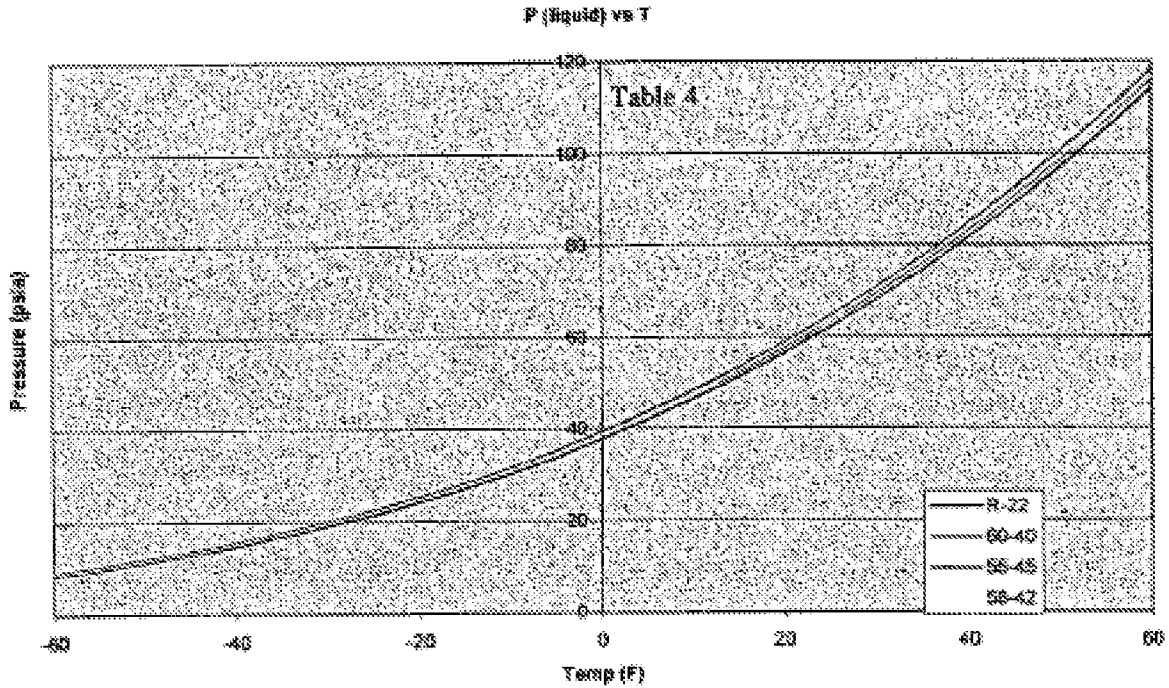
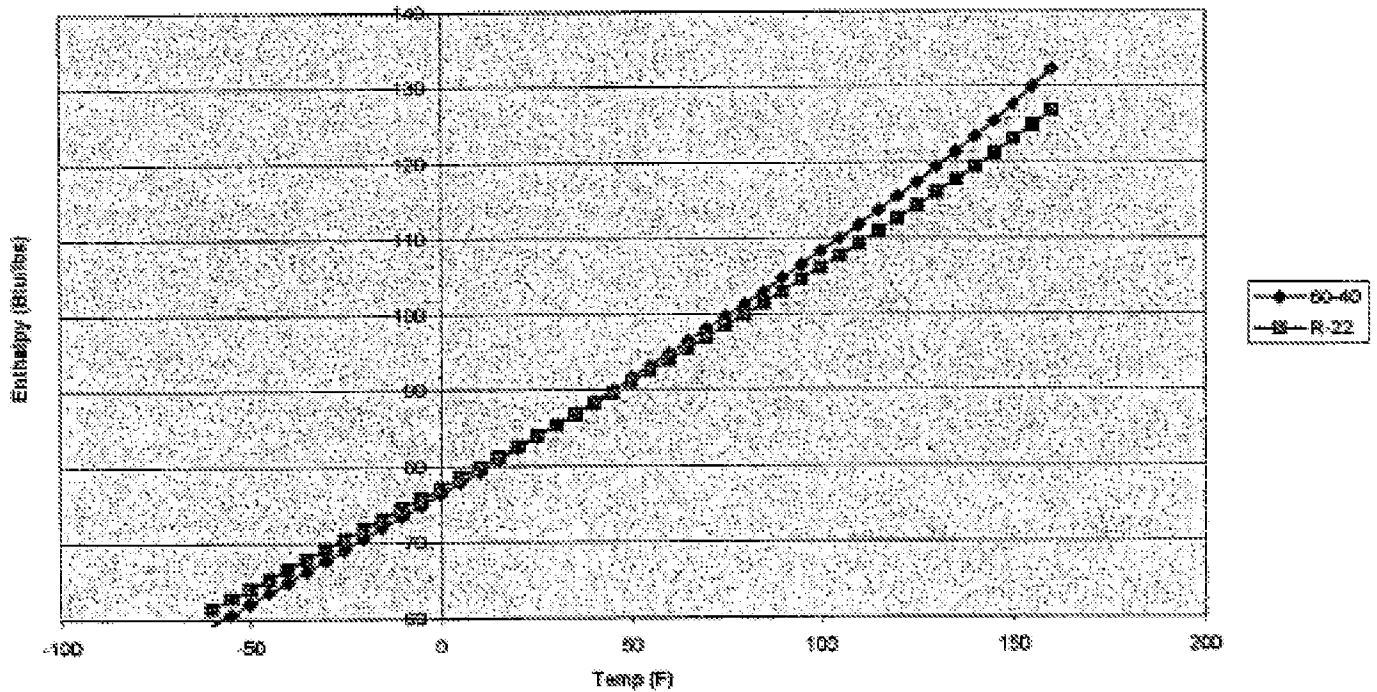


FIG. 2
 Temp vs Enthalpy



ENVIRONMENTALLY SAFER REPLACEMENT REFRIGERANT WITH NAPHTHENIC OIL FOR REFRIGERANT R22-BASED REFRIGERATION SYSTEMS

RELATED APPLICATION

5

This application claims priority to and the benefit of provisional application, Serial No. 60/501,049 filed September 8, 2003.

BACKGROUND OF THE INVENTION

1. Field Of The Invention

10 The present invention relates to the replacement of Refrigerant R-22 (chlorodifluoromethane) refrigerant with a blend refrigerant that is less damaging to the ozone layer in systems designed to use Refrigerant R-22 (chlorodifluoromethane). More particularly the present invention relates to an improved refrigerant composition, method and apparatus for refrigeration wherein two non-Refrigerant R-22 refrigerants are mixed
15 in a defined ratio such that the temperature-pressure relationship of the mix approximates that of Refrigerant R-22 (chlorodifluoromethane). The mixture is compatible with Refrigerant R-22 (chlorodifluoromethane) so that it can be added to supplement and replace Refrigerant R-22 (chlorodifluoromethane). A further particularity of the instant invention relates to an improved method and apparatus for refrigeration wherein
20 refrigerant mixture is mixed with a soluble lubricating oil to provide lubrication to the apparatus. The lubricant is soluble in both the mixture of the invention and Refrigerant R-22 (chlorodifluoromethane) refrigerant.

2. General Background

25 Until recently, R-22 refrigerant chlorodifluoromethane (hereinafter sometimes called "Refrigerant R-22 (chlorodifluoromethane)") was the major, if not sole refrigerant, used in residential air-conditioners, refrigerators, freezers and window air-conditioning units. Refrigerant R-22 (chlorodifluoromethane) is a trademark of E. I. du Pont de Nemours & Co. Inc. for chlorodifluoromethane. Hereinafter, "Refrigerant R-22

(chlorodifluoromethane)” is used in this specification to denote chlorodifluoromethane, regardless of the source.

Recently, however, Refrigerant R-22 (chlorodifluoromethane) has come under attack both nationally and internationally as an ozone layer-damaging chemical. In recent years, both the national and international scientific communities have linked Refrigerant R-22 (chlorodifluoromethane) with damage to the earth’s protective ozone layer. Air-conditioners, refrigerator/freezers and window air-conditioning units containing R-22 are believed to be a global source of ozone-damaging material.

In response to scientific concern and a national and global outcry over the use of Refrigerant R-22 (chlorodifluoromethane) in air-conditioning, the United States Congress has acted to first reduce and then ban the use of Refrigerant R-22 (chlorodifluoromethane) in air-conditioning units.

As a first step toward phasing out the use of Refrigerant R-22 (chlorodifluoromethane) in air-conditioning units, Congress is phasing out the use of Refrigerant R-22 (chlorodifluoromethane) in new equipment effective 01/01/2015 and has banned the sale of Refrigerant R-22 (chlorodifluoromethane) in any size container as of 01/01/2020. One of the first areas in which the use of Refrigerant R-22 (chlorodifluoromethane) is to be phased out is in the Bakery industry under the Bakery Partnership Program. Another step in phasing out the use of R-22 is the import restrictions that begin in 2003, limiting the amount of R-22 that can be imported into the United States.

At the time of this application, the vast majority of residential, window units and freezers in use in the United States contain Refrigerant R-22 (chlorodifluoromethane).

Prior to banning the sale of quantities of Refrigerant R-22 (chlorodifluoromethane), owners of equipment with Refrigerant R-22 (chlorodifluoromethane)-based air-conditioning units are able to purchase the level of refrigerant in their equipment with only the need of a refrigerants license as required by

the Clean Air Act. Millions of units containing refrigerant R-22 (chlorodifluoromethane) were sold in the United States prior to the start of mandatory phase out set forth by Congress and the international community.

5 Refrigerant R-22 (chlorodifluoromethane) recharging typically involves 30 lb. cans or cylinders typically used in the HVAC/R industry. The cylinders are fitted with a dispensing outlet compatible with a commercially available refrigeration manifold. In order to recharge an air-conditioning system, a customer need to only fit the can or cylinder to the manifold and discharge, or “add to” the refrigerant charge directly into the air conditioning system.

10 Following Congress’s ban on the sale of Refrigerant R-22 (chlorodifluoromethane) millions of equipment owners with Refrigerant R-22 (chlorodifluoromethane)-based air-conditioning units will be left with no choice other than to seek replacement refrigerants to service these units. Intentionally mixing of refrigerants is currently illegal by standards set forth by the Clean Air Act. An example
15 would be for this application is that current R-22 units could not be mixed with this invention intentionally.

In response to Congress’s ban on the use of Refrigerant R-22 (chlorodifluoromethane) in air-conditioning, service dealers have begun to retrofit existing Refrigerant R-22 (chlorodifluoromethane)-based air-conditioning units with new,
20 non-R-22 refrigerants, such as R410A (a 50/50 mixture of difluoromethane and pentafluoroethane), R417 (a 46/50/4 mixture of pentafluoroethane, 1,1,1,2-tetrafluoroethane, and butane) or R407C (a 23/25/52 mixture of difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane). None of these replacements contain a lubricant when produced.

25 The refrigerants that will be authorized by the Environmental Protection Agency (EPA) to replace Refrigerant R-22 (chlorodifluoromethane) in air conditioners is currently under review and will evolve to require a environmentally safe refrigerant, with

a 0 odp factor like the one of the present invention described herein. Unfortunately, most replacements for R-22 have a markedly different temperature-pressure relationship at most operating temperatures than Refrigerant R-22 (chlorodifluoromethane).

Because of this difference in the temperature-pressure relationship of Refrigerant
5 R-22 (chlorodifluoromethane) and current replacement refrigerants, existing Refrigerant R-22 (chlorodifluoromethane)-based systems cannot typically be interchanged. Hence, non-retrofitted, Refrigerant R-22 (chlorodifluoromethane)-based units have a need for a refrigerant that will fulfill the requirements of the system design while also meeting the requirements of the EPA and the international community.

10 Simply mixing refrigerants with existing Refrigerant R-22 (chlorodifluoromethane) in order to replenish, or “toping off” the level is against the law and not feasible. When other refrigerants are mixed with Refrigerant R-22 (chlorodifluoromethane), the mixture can take on the pressure characteristics of a substance that could be harmful to either the equipment or the operator. The
15 temperature-pressure relationship becomes markedly different from that of Refrigerant R-22 (chlorodifluoromethane) at temperatures within the normal refrigerant operating temperature range and typical use of R-22.

Hence, in the absence of Refrigerant R-22 (chlorodifluoromethane) owners of equipment with Refrigerant R-22 (chlorodifluoromethane)-based air conditioners face but
20 one choice when the level of their air-conditioning coolant is low: professional service—at a significant cost—to remove the existing Refrigerant R-22 (chlorodifluoromethane), and retrofit the system compatible with some kind of refrigerant gas.

R-22 refrigerants were developed to replace the prior, now banned R-12 refrigerant, or dichlorodifluoromethane. R-12 is sometimes referred to as FREON 12®,
25 which is a trademark of E.I. du Pont de Nemours & Co. for dichlorodifluoromethane.

Thomas et al. (U.S. Pat. No. 5,254,280) discloses a lubricant developed for use with a refrigerant known as R134a (1,1,1,2 – tetrafluoroethane) and the combination of

that lubricant with a refrigerant, which is a replacement for R-12. The lubricant contains polyoxyalkylene glycol, which is hydrophilic and could damage the system as discussed below.

5 Wilczek (U.S. Pat. No. 5,384,057), Gorski (U.S. Pat. No. 4,971,712), and Anton of DuPont (U.S. Pat. No. 5,145,594) disclose other R-12 replacements in the form of a blend of certain synthetic lubricants in various R134a and R134a/R125 refrigerant systems. The DuPont patents discuss a gas known as R125 (pentafluoroethane). R125 is five fluorine atoms bonded to an ethane molecule. This is a very large molecule for a refrigerant. It is currently being produced for refrigeration only. Anton discloses the use
10 of a lubricant comprising at least one cyanocarbon compound. Wilczek discloses a fluorosiloxane as a lubricant. Gorski discloses a polyakylene glycol as a lubricant.

Systems that contain R-22, or R-12 replacements, are still being produced today. These older systems have common components: R-22, R-22 mineral oil lubricant, and water that is sequestered into the dryer. If R134a (1,1,1,2-tetrafluoroethane) were added to
15 the system, it would damage the system as follows: (1) if no lubricant is added to the R134a (as in U.S. Pat. No. 4,953,312 to Tamura et al.), then the R-22 system would be starved for lubricant, since the R134a gas is not miscible with the mineral oil lubricant; (2) if a synthetic lubricant is added to the R134a (as in Thomas et al.), then there is a different problem—that of moisture. Older systems can have water trapped in their
20 dryers. The synthetic lubricants (such as polyglycol- or polysiloxane-based lubricants) are hydrophilic. Thus, they are not only miscible with R-22 and R134a; they are also partially or completely miscible with water. Thus, if they are introduced into an R-22 system, they will pull this water out of the dryer into the refrigerant flow, initiating corrosion and damage to pressure switches and the TX valve and possible other system
25 components. This is why Elf Atochem and DuPont, to name a few publish elaborate flushing procedures and high efficiency dryer change-outs to prevent damage to the cooling system.

Weber (U.S. Patent No. 5,942,149) discloses yet another R-12 replacement consisting of a blend of chlorodifluoroethane, tetrafluoroethane and a naphthenic lubricating oil.

SUMMARY OF THE PRESENT DISCLOSURE

5 The present disclosure is of a method and apparatus that are environmentally sound alternatives to the use of Refrigerant R-22 (chlorodifluoromethane) as a refrigerant. More particularly, the invention provides a mixture of at least two refrigerants that are miscible with each other, and compatible with Refrigerant R-22 (chlorodifluoromethane) while at the same time possessing a temperature-pressure profile
10 that approximates that of Refrigerant R-22 (chlorodifluoromethane) over the operating range of ambient temperatures usually encountered by air conditioning units or other apparatus utilizing Refrigerant R-22 (chlorodifluoromethane) as a refrigerant. The invention also provides a lubricant, that is compatible with both the environmentally sound refrigerant of the invention and with Refrigerant R-22 (chlorodifluoromethane), so
15 that mixtures of the refrigerant according to the invention and Refrigerant R-22 (chlorodifluoromethane) may be utilized with this lubricant in the refrigeration systems without deleterious effect upon moving parts of the refrigerating apparatus that require lubrication from the refrigerant.

 More particularly, the refrigerant and method disclosed herein involves a mixture
20 of pentafluoroethane and tetrafluoroethane in specific proportions that provide a temperature-pressure relationship that approximates that of Refrigerant R-22 (chlorodifluoromethane) over the range of ambient temperature operating conditions in which Refrigerant R-22 (chlorodifluoromethane) is a useful refrigerant. The pentafluoroethane/tetrafluoroethane refrigerant blend disclosed herein is compatible with
25 both synthetic and mineral oils. The tetrafluoroethane can be either 1,1,1,2-tetrafluoroethane or 1,1,2,2-tetrafluoroethane. In an exemplary embodiment, the refrigerant according to the invention comprises a ratio of from about 40 to about 45 weight percent pentafluoroethane to about 55 to about 60 percent 1,1,1,2-

tetrafluoroethane, based upon the total weight of pentafluoroethane and 1,1,1,2-tetrafluoroethane. In a further exemplary embodiment, the refrigerant includes the ratio of about 42 weight percent pentafluoroethane to about 58 weight percent 1,1,1,2-tetrafluoroethane.

5 In addition, the refrigerant according to the invention also includes from about 0 to about 20 weight percent (based on the combined weight of pentafluoroethane and 1,1,1,2-tetrafluoroethane) of a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane. In a preferred embodiment the lubricating oil is present in the range of from about 0.5 to about 2% by weight of the
10 refrigerant mixture.

 In an exemplary embodiment, the lubricating oil is a napthenic or paraffinic based lubricating oil. In a further exemplary embodiment, the lubricant is selected from those lubricants sold by Anderol, Inc., East Hanover, N.J., an affiliate of Royal Lubricants Company, under the trademark ROYCO® 2302. ROYCO® 2302 is a napthenic oil
15 lubricant having the following composition:

65-85% hydrotreated light napthenic distillate,
10-20% solvent refined light napthenic distillate petroleum,
<0.5% butylated triphenyl phosphate, and
<2% minor additive.

20 In another exemplary embodiment, the lubricating oil can be a synthetic lubricating oil, or a mixture of oils, that is soluble in the mixture of the chlorodifluoroethane and tetrafluoroethane. A suitable synthetic lubricant is a man-made, synthetic alkyl aromatic lubricant. Suitable synthetic lubricants include alkylated benzene lubricants.

25 The lubricant can be either a synthetic alkyl aromatic lubricant, such as alkylbenzene, alone, or a mixture of a synthetic alkyl aromatic lubricant and mineral oil

or a mixture of a synthetic alkyl aromatic lubricant and polyol ester (POE). When so mixed, it is preferred, but not required, that a minor portion of the mixture be mineral oil or POE. By minor portion, we mean less than 50% by weight of the blended refrigerants. Alternatively, either mineral oil or polyol ester (POE) can be used alone.

5 While it is intended that the substitute refrigerant according to the invention may be utilized to replace Refrigerant R-22 (chlorodifluoromethane) that has escaped from apparatus, the substitute refrigerant of the invention may also be utilized to completely refill apparatus that have been designed for use with Refrigerant R-22 (chlorodifluoromethane), since the refrigerant has a temperature-pressure profile that
10 closely approximates that of Refrigerant R-22 (chlorodifluoromethane). Thus, when the refrigerant is used as a complete replacement for Refrigerant R-22 (chlorodifluoromethane), it is no longer necessary that the lubricant be compatible with chlorodifluoromethane but only that it should be compatible with 1,1,1,2-tetrafluoroethane and pentafluoroethane.

15 Further, whereas the substitute refrigerant of the invention is less damaging to the ozone layer than Refrigerant R-22 (chlorodifluoromethane) and is useful in air conditioning units, and in particular residential type air-conditioning units, it is not so limited in its use. Indeed, the refrigerant may be utilized as a substitute or replacement for Refrigerant R-22 (chlorodifluoromethane) in virtually any application, thereby
20 eliminating the use of ozone layer-damaging Refrigerant R-22 (chlorodifluoromethane).

 In further specifics, the invention provides a canister containing a mixture of tetrafluoroethane and pentafluoroethane with a napthenic oil that may be fitted with an outlet manifold that is compatible with a Refrigerant R-22 (chlorodifluoromethane) recharging manifold that is typically used to recharge an apparatus with the latter
25 refrigerant. Refrigerant may then be allowed to flow from the container through the manifold and into the apparatus to replace Refrigerant R-22 (chlorodifluoromethane) refrigerant that has been lost from the refrigeration system.

When mixing the components of the refrigerant blend of the present invention, one should first mix the lubricant with the tetrafluoroethane, then mix that mixture with the pentafluoroethane in the proportions afore mentioned. Otherwise, the product does not mix properly.

5 In an exemplary form, the lubricant has a viscosity of 5 to 500 centistokes, more preferably 5 to 100 centistokes, even more preferably 5 to 50 centistokes, and most preferably 5 to 10 centistokes. The lubricant having a viscosity of 5 to 10 centistokes is preferred.

10 In an exemplary embodiment, the percentage by weight of lubricant in the refrigerant blend is 0-20%, preferably 0.5-2%, more preferably 1-2%, even more preferably 1.25-2%, and most preferably 1.5-1.75%. The percentage by weight of lubricant in the refrigerant blend is, for example, 1.75. \pm 0.05%.

15 A suitable lubricant is severely hydro treated naphthenic/paraffinic lubricant, such as the aforementioned ROYCO® 2302. Other suitable lubricants include Sunpar R2280 (a paraffinic based lubricant), Lubrizol 403, Sunthene 200 (a naphthenic based lubricant) and L30 or L35 from Shrieve Chemical Company, The Woodlands, Texas, or Zerol 150 from Nu-Calgon Wholesale, Inc., St. Louis, Missouri, or AB150 from Virginia KMP Corporation, Dallas, Texas (alkylbenzene synthetic lubricants). Mobil One 5-weight synthetic oil (it is hydrophobic) could also work as a lubricant, but it is relatively
20 expensive.

 In order for the parts of the refrigerant system to function best, 0.5-20% of total weight of refrigerant should be lubricant. When adding the refrigerant blend to a refrigerant system, one should leave the lubricant in the system if one for some reason takes out the Refrigerant R-22.

25 The lubricating of the present system is miscible with the pentafluoroethane and tetrafluorethane blend and with R-22 refrigerant. This allows for mixing of residual R-22 refrigerant and the refrigerant of the present invention, without the release of significant

amounts of residual water in the dryer and subsequent system damage (as will happen if the synthetic lubricants disclosed in Thomas et al. and the DuPont patents are used). While alkylbenzene alone is considered not miscible with tetrafluoroethane (in particular R134a), it is sufficiently soluble in the present tetrafluoroethane/chlorodifluoroethane mixture. This solubility allows the replacement refrigerant blend to lubricate the system, preventing damage to the compressor and component parts of the system.

Various optional additives can be included in the lubricant. A corrosion inhibitor can be included. (otherwise corrosion will probably occur within 6 months). An exemplary corrosion inhibitor is one for anhydrous systems (such corrosion inhibitors comprise calcium, or phosphate salts). The corrosion inhibitor can be bonded to the lubricant. Additionally, a surfactant and/or a foaming agent can be included.

The present refrigerant blend is designed to be utilized as a R-22 replacement in refrigeration systems. It is designed as a replacement, in which little or no modifications including parts are used to adapt the system for the refrigerant of the present invention.

The present refrigerant blend can be used as a replacement for R-22 refrigerant, typically deminimus without retrofitting the air conditioning system or flushing it out. It is recommended that a full vacuum be obtained before adding the refrigerant to the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Many aspects of the disclosure can be better understood with reference to the following drawings.

FIG. 1 illustrates pressure versus temperature profiles for various blends of the present disclosure in comparison to R-22.

FIG. 2 compares the temperature versus enthalpy profile of an exemplary embodiment of the present disclosure to R-22.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present disclosure provides a mixture of non-Refrigerant 22 refrigerants that are less damaging to the Earth's ozone layer and that are approved by the U.S. Environmental Protection Agency for use in air-conditioners. The invention mixture is compatible with Refrigerant R-22 (chlorodifluoromethane) and can be used to replace existing Refrigerant R-22 (chlorodifluoromethane)-in R-22 based refrigeration systems. It is expected that the present invention will gradually replace Refrigerant R-22 (chlorodifluoromethane) in Refrigerant R-22 (chlorodifluoromethane)-based air-cooling systems, without the need to retrofit existing Refrigerant R-22 (chlorodifluoromethane)-based systems for non-Refrigerant 22 replacement refrigerants.

Specifically, the present refrigerant blend includes a mixture of pentafluoroethane and tetrafluoroethane packaged with a compatible lubricating oil, provided under pressure in a can or cylinder equipped with an outlet compatible with existing Refrigerant R-22 (chlorodifluoromethane) recharging kit manifolds, so that the refrigerant and lubricant mixture can be added to existing Refrigerant R-22 (chlorodifluoromethane) based coolant systems. Also, the invention provides the possibility of using new refrigerant systems, originally designed for "Refrigerant R-22 (chlorodifluoromethane)," by supplying an EPA-approved refrigerant so that retrofitting to new equipment use is not required.

In an exemplary embodiment, the invention provides an cylinder can like the standard 25 or 30 lb. can formerly used for containing "Refrigerant R-22 (chlorodifluoromethane)," but containing about 58% by weight 1,1,1,2-tetrafluoroethane and about 42% by weight pentafluoroethane. The can also contains the preferred lubricant, ROYCO® 2302 in solution with the coolant mixture at a percent by weight of between 0.5% and 2%.

Existing Refrigerant R-22 (chlorodifluoromethane)-based air-conditioning systems use an amount of a vegetable or hydrocarbon mineral oil to lubricate the compressor. This oil has a very low vapor pressure, and is not soluble with pure

tetrafluoroethane, particularly 1,1,1,2-tetrafluoroethane. Hence, adding tetrafluoroethane to replace Refrigerant R-22 (chlorodifluoromethane) in existing Refrigerant R-22 (chlorodifluoromethane)-based air-conditioning systems leads to compressor breakdown from lack of sufficient lubrication. The invention provides lubricants that are compatible
 5 with the invention mixture of tetrafluoroethane and pentafluoroethane, and with “Refrigerant R-22 (chlorodifluoromethane),” and that are suitable for lubricating refrigerant compressors and other air-conditioner component parts. The lubricants disclosed herein, on the other hand, are soluble in a tetrafluoroethane/ pentafluoroethane mixture. This solubility allows the replacement refrigerant blend to lubricate the air-
 10 conditioning system, preventing damage to the compressor and component parts of the system.

EXAMPLE 1

Table 1 summarizes the results of solubility tests of a 2% by weight solution of ROYCO® 2302 oil lubricant in an 58/42% by weight mixture of 1,1,1,2-
 15 tetrafluoroethane and pentafluoroethane refrigerants. ROYCO® 2302 oil (available from ANDEROL®, Inc., an affiliate of Royal Lubricants Co.), was added to a clear Fisher-Porter pressure burette and a mixture of 1,1,1,2-tetrafluoroethane/pentafluoroethane in an 58/42 ratio by weight was introduced under pressure to maintain the liquid state.

TABLE 1

20	Full Burette	clear no separation
	2/3 Full Burette	clear no separation
	1/2 Full Burette	clear no separation
	1/3 Full Burette	clear no separation
25	Almost Empty Burette	clear no separation

Note: The color of the fluid remained the same as the burette was emptied. The expelled gas deposited the oil onto a test panel.

EXAMPLE 2

1,1,1,2-tetrafluoroethane and pentafluoroethane are mixed with the napthenic oil lubricant at set ratios such that the temperature-pressure profile of the mixture is similar to that of Refrigerant R-22 (chlorodifluoromethane), over the normal operating range of air-conditioners. Table 2 summarizes the results of tests of the temperature-pressure profiles of various mixes of 1,1,1,2-tetrafluoroethane and pentafluoroethane over the range of normal air-conditioner working temperatures, from -60 degree. F. to 160. degree. F.

For Table 2, different percentages of 1,1,1,2-tetrafluoroethane and pentafluoroethane --by weight--were mixed with the lubricant to show the pressure temperature relationships of the various invention combinations.

Fig. 1 shows Pressure (liquid) vs. Temperature profiles for R-22 and blends of 60/40, 55/45 and 58/42 of tetrafluoroethane and pentafluoroethane, respectively.

Fig. 2 shows Temperature vs. Enthalpy profiles comparing a blend of 60/40 tetrafluoroethane and pentafluoroethane to R-22.

The blend of refrigerants tetrafluoroethane and pentafluoroethane of the present disclosure shows the following properties of interest:

Dew Point @ -32F

Bubble Point @ -41.5F

Glide @ 9.5 F

An exemplary blend of refrigerants is about 42% by weight pentafluoroethane and about 58% by weight 1,1,1,2-tetrafluoroethane. This is the ratio of pentafluoroethane to 1,1,1,2-tetrafluoroethane with the lubricant where the mixture of the invention shows the greatest similarity to "Refrigerant R-22 (chlorodifluoromethane)", over most operating temperatures.

The apparatus and method of the preferred embodiment encompass the use of a mixture of 1,1,1,2-tetrafluoroethane and pentafluoroethane at the ranges, as discussed above, with a lubricating oil at ranges, as discussed above of about 0.5% to about 2% by weight in the operation of an air-conditioning system, wherein the coolant-oil mixture
5 replaces Refrigerant R-22 (chlorodifluoromethane) in a Refrigerant R-22 (chlorodifluoromethane)-based refrigeration system.

The method and apparatus in the preferred embodiment further details providing the above described mix of pentafluoroethane/1,1,1,2-tetrafluoroethane and lubricating oil in 30 lb. cylinders, where the cylinders are pressure sealed and fitted with an outlet
10 compatible for existing Refrigerant 22-type refrigeration manifolds typically ¼ inch male flare.

Further, it was noted that the systems tested ran more smoothly and the compressor showed less vibration during the test period, as the mixture of the invention was added. It is theorized that the lubricating oil, being soluble in the refrigerant gasses,
15 was better able to lubricate the compressor and reciprocating parts than the existing Refrigerant R-22 (chlorodifluoromethane) lubricant used by itself. In some applications a reduction in power consumption maybe also noted.

The refrigerant of the present invention can also be used as a replacement refrigerant for the new R-22 air-conditioning systems, such as the systems used in today's
20 HFC-free units

The ROYCO® 2302 napthenic oil lubricant of the present disclosure has a flash point of more than 150 degrees F. Pure refrigerant 1,1,1,2-tetrafluoroethane is not miscible with a napthenic lubricant like mineral oil or mineral seal oil (both of which could be used as the lubricants of the present invention). Pentafluoroethane is miscible
25 with most napthenic lubricants, including mineral oils. The presence of the pentafluoroethane allows the use of mineral oils in the refrigerant blend and system of the present invention (a translucent, partially miscible blend is formed). The lubricant can

advantageously be partially polymerized into longer chain molecules to allow it to function at very low percentage levels. The lubricant can be hydrotreated or polymerized for stability and wear resistance.

5 Phosphated additives add corrosion resistance in the presence of acids and salts and increase wear resistance. Calcium additives help the lubricant resist rust and the effects of corrosion; calcium salts reduce the corrosive effects of hydrochloric acid that is formed in the presence of water and the chlorinated gases present in the refrigerant systems of the present invention.

10 The ROYCO® lubricants mentioned above contain the corrosion inhibitors mentioned above and can also contain acrylic polymer. It is believed that the function of the acrylic polymer is to increase wear resistance under severe conditions. Acrylics can help film formation, and the ability of the lubricant to coat metal and soft parts and stay in place.

15 The lubricant of the present invention is miscible with R-22, the R-22 lubricant, and the blend of the refrigerant gases of the present invention.

It should be understood that variations and modifications may be made of the invention herein taught, and that those are within the scope and spirit of the invention as taught above and claimed here below.

Table 2

Temp (F)	P (60-40)	P (58-42)	P (55-45)	P (R-22)
-60	8.982	8.81	8.552	8.836
-55	10.36	10.16	9.87	10.19
-50	11.9	11.68	11.35	11.7
-45	13.62	13.37	12.99	13.39
-40	15.52	15.24	14.82	15.26
-35	17.63	17.32	16.84	17.34
-30	19.96	19.61	19.08	19.62
-25	22.52	22.13	21.54	22.14
-20	25.33	24.9	24.25	24.91
-15	28.41	27.93	27.21	27.93
-10	31.76	31.23	30.44	31.23
-5	35.42	34.83	33.96	34.82
0	39.39	38.74	37.79	38.73
5	43.69	42.98	41.94	42.96
10	48.34	47.57	46.43	47.54
15	53.36	52.52	51.27	52.48
20	58.76	57.85	56.5	57.79
25	64.57	63.58	62.11	63.51
30	70.8	69.73	68.14	69.65
35	77.48	76.33	74.61	76.22
40	84.62	83.38	81.52	83.26
45	92.25	90.9	88.91	90.76
50	100.4	98.93	96.79	98.76
55	109	107.5	105.2	107.3
60	118.2	116.6	114.1	116.3
65	128	126.2	123.6	125.9
70	138.4	136.5	133.6	136.1
75	149.3	147.3	144.3	146.9
80	160.9	158.8	155.6	158.3
85	173.2	170.9	167.5	170.4
90	186.1	183.7	180.1	183.1
95	199.8	197.2	193.3	196.5
100	214.2	211.4	207.3	210.6
105	229.3	226.4	222.1	225.5
110	245.3	242.2	237.6	241.1
115	262	258.7	253.9	257.5
120	279.6	276.1	271	274.7
125	298.1	294.4	289	292.7
130	317.5	313.6	307.8	311.6
135	337.8	333.7	327.6	331.4
140	359.1	354.8	348.3	352.1
145	381.4	376.8	370.1	373.7
150	404.8	400	392.8	396.4
155	429.3	424.2	416.7	420
160	454.9	449.5	441.6	444.7

Claims

What is claimed as the invention is:

- 5 1. In an apparatus for refrigerating that is designed for use with ozone layer-damaging chlorodifluoromethane refrigerant known as R-22, the improvement comprising substituting the chlorodifluoromethane with a substitute blend refrigerant containing a lubricant less damaging to the Earth's ozone layer than chlorodifluoromethane,
- 10 said substitute refrigerant consisting of:
- about 40% to about 45% by weight pentafluoroethane;
- 15 about 55% to about 60% by weight tetrafluoroethane; and
- packaged with about 0% to about 20% by weight of the refrigerant with a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and
- 20 tetrafluoroethane.
2. The invention according to Claim 1, the lubricating oil having the following components:
- 25 65-88% hydrotreated light napthenic distillate, and
- 10-20% solvent refined light napthenic distillate petroleum.
- 30 3. The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 40% by weight to said tetrafluoroethane present in an amount of about 60% by weight.

4. The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 42% by weight to said tetrafluoroethane present in an amount of about 58% by weight.

5. The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 45% by weight to said tetrafluoroethane present in an amount of about 55% by weight.

6. A method for refilling an apparatus for refrigeration that is designed for use with ozone layer-damaging chlorodifluoromethane refrigerant, the method comprising:

(1) supplying a substitute refrigerant under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

(2) adding to said apparatus via the manifold a substitute refrigerant for chlorodifluoromethane, wherein said substitute refrigerant consists of:

about 40% to about 45% by weight pentafluoroethane ;

about 55% to about 60% by weight tetrafluoroethane; and

about 0% to about 20% by weight of the refrigerant of a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane.

7. The invention according to claim 6, the lubricating oil having the following components:

65-85% hydrotreated light naphthenic distillate, and

10-20% solvent refined light naphthenic distillate petroleum.

8. The invention according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 40% by weight to said tetrafluoroethane present in an amount of about 60% by weight.

5 9. The invention according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 42% by weight to said tetrafluoroethane present in an amount of about 58% by weight.

10 10. The invention according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 45% by weight to said tetrafluoroethane present in an amount of about 55% by weight.

11. In an apparatus for air-conditioning designed for use with ozone layer-damaging chlorodifluoromethane refrigerant the improvement comprising substituting
15 the chlorodifluoromethane with a refrigerant less damaging to the Earth's ozone layer than chlorodifluoromethane, the substitute refrigerant consisting of:

about 40% to about 45% by weight pentafluoroethane;

20 about 55% to about 60% by weight tetrafluoroethane; and

about 0% to about 20% by weight of the refrigerant of a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane.

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12. The invention according to claim 11, the lubricating oil having the following components:

65-85% hydrotreated light napthenic distillate, and

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10-20% solvent refined light napthenic distillate petroleum.

13. The invention according to claim 11 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 42% by weight to said tetrafluoroethane present in an amount of about 58% by weight.

5 14. The invention according to claim 11 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 45% by weight to said tetrafluoroethane present in an amount of about 55% by weight.

10 15. The invention according to claim 11 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 40% by weight to said tetrafluoroethane present in an amount of about 60% by weight.

15 16. A method for refilling an apparatus for air-conditioning that is designed for use with ozone layer-damaging chlorodifluoromethane refrigerant, the method comprising:

(1) supplying a substitute refrigerant under pressure in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

20

(2) adding to said apparatus via the manifold the substitute refrigerant for chlorodifluoromethane, wherein said substitute refrigerant consists of:

25

about 40% to about 45% by weight pentafluoroethane ;

about 55% to about 60% by weight tetrafluoroethane; and

30

about 0% to about 20% by weight of the refrigerant of a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane.

17. The invention according to claim 16, the lubricating oil having the following components:

65-85% hydrotreated light napthenic distillate, and

10-20% solvent refined light napthenic distillate petroleum.

18. The invention according to claim 16 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 42% by weight to said tetrafluoroethane present in an amount of about 58% by weight.

19. The invention according to claim 16 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 45% by weight to said tetrafluoroethane present in an amount of about 55% by weight.

20. The invention according to claim 16 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 40% by weight to said tetrafluoroethane present in an amount of about 60% by weight.

21. A refrigerant consisting of:

about 40% to about 45% by weight pentafluoroethane;

about 55% to about 60% by weight tetrafluoroethane; and

about 0% to about 20% by weight of the refrigerant of a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane.

22. The invention according to claim 21, the lubricating oil having the following components:

65-85% hydrotreated light napthenic distillate, and

10-20% solvent refined light napthenic distillate petroleum.

23. A refrigerant according to claim 21 wherein said pentafluoroethane is present in the ratio of about 40% by weight to said tetrafluoroethane present in an amount of about 60% by weight.

5 24. A refrigerant according to claim 21 wherein said pentafluoroethane is present in the ratio of about 45% by weight to said tetrafluoroethane present in an amount of about 55% by weight with a napthenic lubricant.

10 25. A refrigerant according to claim 21 wherein said pentafluoroethane is present in the ratio of about 40% by weight to said tetrafluoroethane present in an amount of about 60% by weight with a napthenic lubricant.

15 26. The invention according to any one of claims 1, 6, 11, 16, and 21, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

20 27. The invention according to any one of claims 2, 7, 12, 17, and 22, wherein the lubricating oil further includes an acrylic polymer or a corrosion inhibitor or both.

25 28. The invention according to any one of claims 6, 11, 16, and 21, wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants and mixtures thereof, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, synthetic alkyl aromatic lubricants mixed with polyol ester, mineral oil, and polyol ester.

29. The invention according to claim 28, wherein the synthetic alkyl aromatic lubricant includes an alkylbenzene.

ABSTRACT

An apparatus and method wherein potential ozone layer-damaging chlorodifluoromethane (Refrigerant R-22) is substituted with a mix of less environmentally damaging refrigerants pentafluoroethane and tetrafluoroethane in chlorodifluoromethane-based air-cooling systems mainly in residential cooling. While less environmentally damaging than chlorodifluoromethane, the substitute refrigerant has a temperature-pressure relationship similar to that of chlorodifluoromethane, making the substitute refrigerant suitable for use with chlorodifluoromethane-based air-cooling systems. In this event, it is mixed with a relatively small percentage of a lubricating oil which is compatible with both the unit refrigerant and typical R-22 system design.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	821920-1031
		Application Number	
Title of Invention	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

Secrecy Order 37 CFR 5.2

- ☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

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	Kenneth	M.	Ponder		
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Mailing Address of Applicant:					
Address 1		105 Highland View Drive			
Address 2					
City	Cumming	State/Province	GA		
Postal Code	30040	Country i	US		
Applicant 2					Remove
Applicant Authority		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Party of Interest under 35 U.S.C. 118
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	Steffan		Thomas		Jr.
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Address 2					
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EXHIBIT 1004

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	821920-1031	
		Application Number		
Title of Invention	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT			
Customer Number	24504			
Email Address	todd.deveau@tkhr.com		<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

Application Information:

Title of the Invention	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT		
Attorney Docket Number	821920-1031	Small Entity Status Claimed	<input checked="" type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter			
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	1	Suggested Figure for Publication (if any)	

Publication Information:

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<input type="checkbox"/>	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Prior Application Status	Pending	<input type="button" value="Remove"/>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	10937736	2004-09-08
Prior Application Status		<input type="button" value="Remove"/>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
10937736	non provisional of	60501049	2003-09-08

EXHIBIT 1004

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	821920-1031
		Application Number	
Title of Invention	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT		

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Signature	/Todd Deveau/		Date (YYYY-MM-DD)	2010-12-06
First Name	Todd	Last Name	Deveau	Registration Number
			29526	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	821920-1031
		Application Number	
Title of Invention	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT		

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DECLARATION FOR PATENT APPLICATION

Attorney Docket No: 821920-1030

As the below named inventor(s), I/we hereby declare that:

Our residences, post office addresses and citizenships are as stated below next to our names.

We believe we are the original, first, and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled **Environmentally Safer Replacement Refrigerant with Naphthenic Oil for Refrigerant R22-Based Refrigeration Systems**, the specification of which:

- ☐ is attached hereto.
☒ was filed on September 8, 2004 as Application Serial No. 10/937,736.
☐ was filed on _____ under U.S. Express Mail No. _____;
☐ is set forth in PCT International Application No. _____;
filed on _____ and as amended Under PCT Article 19 on _____ (if any).

I/we hereby state that I/we have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I/we acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I/we hereby claim foreign priority benefits under Title 35, United States Code, 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America listed below and have also identified below any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed: **NOT APPLICABLE**.

I/we hereby appoint all attorneys and agents of Thomas, Kayden, Horstemeyer & Risley, LLP, who are listed under the USPTO Customer Number shown below as my/our attorneys and agents to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith, recognizing that the specific attorneys and agents listed under that Customer Number may be changed from time to time at the sole discretion of Thomas, Kayden, Horstemeyer & Risley, LLP, and request that all correspondence be addressed to the address filed under the same USPTO Customer Number.

24504

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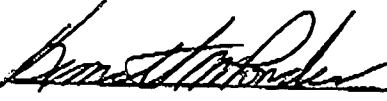
Address all correspondence to:

Todd Deveau
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& RISLEY, L.L.P.
100 Galleria Parkway, N.W., Suite 1750
Atlanta, Georgia 30339-5948

Page 1 of 3

Docket No. 821920-1030

I/we hereby declare that all statements made herein of my/our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statement and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of First Inventor: Kenneth M PonderResidence: 105 Highland View Drive, Cumming, Georgia 30040 US Citizenship: USPost Office Address: 105 Highland View Drive, Cumming, Georgia 30040 USInventor's Signature: Date: 12/22/04

Full Name of Second Inventor: Steffan Thomas, Jr.
Residence: 4250 Bethany Road, Buckhead, Georgia US Citizenship: US
Post Office Address: 4250 Bethany Road, Buckhead, Georgia US

Inventor's Signature: Steffan Thomas, Jr. Date: 12/22/04

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Application Number: 12961045

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