

Electronic Acknowledgement Receipt

EFS ID:	11643168
Application Number:	13328798
International Application Number:	
Confirmation Number:	7263
Title of Invention:	SYSTEM FOR COOLING BUILDINGS CONTAINING HEAT GENERATING ELECTRONICS
First Named Inventor/Applicant Name:	Paul F. Rembach
Customer Number:	29637
Filer:	Wendy Buskop/Sarah Gernhart
Filer Authorized By:	Wendy Buskop
Attorney Docket Number:	1997.003
Receipt Date:	16-DEC-2011
Filing Date:	
Time Stamp:	17:09:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$530
RAM confirmation Number	4399
Deposit Account	501313
Authorized User	

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)

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	Application Data Sheet	1997-003_ADSFORM.pdf	1420844 <small>4ec896021925ed7d77b334527cd3339120 04b3e2</small>	no	4

Warnings:

Information:

2	Oath or Declaration filed	1997-003_DECLARATIONOATH.pdf	176203 <small>f236aef0a47825893a126f0099492abb5cfa 2773</small>	no	4
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Warnings:

Information:

3	Nonpublication request from applicant.	1997-003_NONPUBREQUEST.pdf	235043 <small>ddbe02fc1b65efdbbcebb881a530a5e9bc0 c46fa</small>	no	2
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Warnings:

Information:

4	Information Disclosure Statement (IDS) Form (SB08)	1997-003_IDSFORM.pdf	612082 <small>017214b5ae10017aea2a1e8570594a758a1 5ead8</small>	no	4
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Warnings:

Information:

5		1997-003_PA_APPLICATION.pdf	117684 <small>44d2d7ee925f7ea1bc96119098dbb773d7 16a2b</small>	yes	27
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Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	20
Claims	21	26
Abstract	27	27

Warnings:

Information:

6	Drawings-only black and white line drawings	1997-003_DRAWINGS.pdf	2058033 <small>597aa1c765b526c8674770d2ede2e35cf91 c7030</small>	no	11
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Warnings:

Information:					
7	Fee Worksheet (SB06)	fee-info.pdf	33214	no	2
			2e6cd01e4fe1662be7c76b9bcsfca6a050a54d23		
Warnings:					
Information:					
Total Files Size (in bytes):				4653103	
<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>					

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	SYSTEM FOR COOLING BUILDINGS CONTAINING HEAT GENERATING ELECTRONICS			
First Named Inventor/Applicant Name:	Paul F. Rembach			
Filer:	Wendy Buskop/Sarah Gernhart			
Attorney Docket Number:	1997.003			
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	95	95
Utility Search Fee	2111	1	310	310
Utility Examination Fee	2311	1	125	125
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				530

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	1997.003
		Application Number	
Title of Invention	SYSTEM FOR COOLING BUILDINGS CONTAINING HEAT GENERATING ELECTRONICS		
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. 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.			

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.)

Applicant Information:

Applicant 1					
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	
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Paul	F.	Rembach		
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
City	Houston	State/Province	TX	Country of Residence	US
Citizenship under 37 CFR 1.41(b)		US			
Mailing Address of Applicant:					
Address 1		11503 Dakar Drive			
Address 2					
City	Houston	State/Province	TX		
Postal Code	77065	Country	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					<input type="button" value="Add"/>

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
<input type="checkbox"/> An Address is being provided for the correspondence information of this application.			
Customer Number	29637		
Email Address	sarah.gernhart@buskoplaw.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

Application Information:

Title of the Invention	SYSTEM FOR COOLING BUILDINGS CONTAINING HEAT GENERATING ELECTRONICS		
Attorney Docket Number	1997.003	Small Entity Status Claimed	<input checked="" type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	11	Suggested Figure for Publication (if any)	

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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1997.003
	Application Number	
Title of Invention	SYSTEM FOR COOLING BUILDINGS CONTAINING HEAT GENERATING ELECTRONICS	

Publication Information:
 Request Early Publication (Fee required at time of Request 37 CFR 1.219)

 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.
Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One: Customer Number US Patent Practitioner Limited Recognition (37 CFR 11.9)

Customer Number: 29637

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

			Remove
Application Number	Country ¹	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			<input type="radio"/> Yes <input checked="" type="radio"/> No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1

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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1997.003
	Application Number	
Title of Invention	SYSTEM FOR COOLING BUILDINGS CONTAINING HEAT GENERATING ELECTRONICS	

If the Assignee is an Organization check here. <input type="checkbox"/>				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information:				
Address 1				
Address 2				
City		State/Province		
Country		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the Add button.				

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.				
Signature	/WBUSKOP/		Date (YYYY-MM-DD)	2011-12-16
First Name	Wendy	Last Name	Buskop	Registration Number
				32202

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.

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 the Freedom of Information Act requires disclosure of these records.
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 inspections 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.

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

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)	Attorney Docket Number	1997.003
	First Named Inventor	PAUL F. REMBACH
	COMPLETE IF KNOWN	
	Application Number	
	Filing Date	
	Art Unit	
Declaration Submitted With Initial Filing <input checked="" type="checkbox"/> OR Declaration Submitted After Initial Filing (surcharge (37 CFR 1.16(f)) required) <input type="checkbox"/>		Examiner Name

I hereby declare that: (1) Each inventor's residence, mailing address, and citizenship are as stated below next to their name; and (2) I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention titled:

SYSTEM FOR COOLING BUILDINGS CONTAINING HEAT GENERATING ELECTRONICS

(Title of the Invention)

the application of which

is attached hereto

OR

was filed on (MM/DD/YYYY) _____ as United States Application Number or PCT International Application Number _____ and was amended on (MM/DD/YYYY) _____ (if applicable).

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

I 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.

Authorization To Permit Access To Application by Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified patent application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the above-identified patent application is filed to have access to the above-identified patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the above-identified patent application with respect to: 1) the above-identified patent application-as-filed; 2) any foreign application to which the above-identified patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified patent application; and 3) any U.S. application-as-filed from which benefit is sought in the above-identified patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Offices.

[Page 1 of 3]

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 21 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.

DECLARATION — Utility or Design Patent Application

Claim of Foreign Priority Benefits

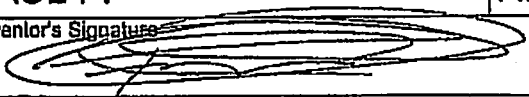
I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, 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.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional foreign application number(s) are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

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

DECLARATION — Utility or Design Patent Application

Direct all correspondence to: - <input checked="" type="checkbox"/>	The address associated with Customer Number: <input type="text" value="29637"/>	OR	<input type="checkbox"/> Correspondence address below -
Name			
Address			
City		State	Zip
Country	Telephone	Email	
<p>WARNING: Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available. Petitioner/applicant is advised that documents which form the record of a patent application (such as the PTO/SB/01) are placed into the Privacy Act system of records DEPARTMENT OF COMMERCE, COMMERCE-PAT-7, System name: <i>Patent Application Files</i>. Documents not retained in an application file (such as the PTO-2038) are placed into the Privacy Act system of COMMERCE/PAT-TM-10, System name: <i>Deposit Accounts and Electronic Funds Transfer Profiles</i>.</p> <p>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 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.</p>			
NAME OF SOLE OR FIRST INVENTOR:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any)) PAUL F.		Family Name or Surname REMBACH	
Inventor's Signature 		Date December 12, 2011	
Residence: City Houston	State TX	Country US	Citizenship US
Mailing Address 11503 Dakar Drive			
City Houston	State TX	Zip 77065	Country US
<input type="checkbox"/> Additional inventors or a legal representative are being named on the _____ supplemental sheet(s) PTO/SB/02A or 02LR attached hereto			

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.

NONPUBLICATION REQUEST UNDER 35 U.S.C. 122(b)(2)(B)(i)		Title SYSTEM FOR COOLING BUILDINGS CONTAIN ⁺	Attorney Docket Number 1997.003
		First Named Inventor Paul F. Rembach	

I hereby 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.

I hereby request that the attached application not be published under 35 U.S.C. 122(b).

Signature /WBUSKOP/	Wendy Buskop
Typed or printed name 713-275-3400	Telephone Number
Date December 16, 2011	Registration Number, if applicable 32202

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application upon filing.

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant must notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).

This collection of information is required by 37 CFR 1.213(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.

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	First Named Inventor	Paul F. Rembach	
	Art Unit		
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	Attorney Docket Number	1997.003	

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Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
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Application Number		
Filing Date		
First Named Inventor	Paul F. Rembach	
Art Unit		
Examiner Name		
Attorney Docket Number	1997.003	

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

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Signature	/WBUSKOP/	Date (YYYY-MM-DD)	2011-12-16
Name/Print	Wendy Buskop	Registration Number	32202

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APPLICATION FOR PATENT

INVENTOR:

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PAUL F. REMBACH

TITLE:

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**SYSTEM FOR COOLING BUILDINGS CONTAINING HEAT GENERATING
ELECTRONICS**

15

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ATTORNEY DOCKET NO.: 1997.003

25

SPECIFICATION

FIELD

5 [0001] The present embodiments generally relate to a portable, liftable, and moveable system for cooling one or more portable buildings with heat generating electronics mounted therein that can provide cooling while with a reduced dependency on air conditioning or chilled water systems relative to conventional systems for cooling facilities containing racked electronics.

10 BACKGROUND

[0002] A need exists for a system that uses less electrical power than current systems for cooling portable buildings.

[0003] A further need exists for a system than can be transported within containers.

15 [0004] A further need exists for a system that can manage temperatures in multiple portable buildings simultaneously from a single controller connected to a network, and can provide an executive dashboard for continuous simultaneous monitoring and controlling of temperatures therein, thereby preventing overheating while using less power than conventional systems.

[0005] The present embodiments meet these needs.

20

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The detailed description will be better understood in conjunction with the accompanying drawings as follows:

- [0007] Figure 1 depicts a perspective view of the system installed a portable building according to one or more embodiments.
- [0008] Figure 2 depicts a cut view of the system with an installed heat sink with accompanying equipment in the portable building according to one or more
5 embodiments.
- [0009] Figures 3A-3B depict an embodiment of a controller of the system according to one or more embodiments.
- [00010] Figure 4A depicts a detailed perspective view of the heat sink according to one or more embodiments.
- 10 [00011] Figure 4B depicts a detailed cut view of the heat sink according to one or more embodiments.
- [00012] Figure 5 depicts a side view of the portable building with the system installed therein with each heat sink can have six outer heat pipe assemblies according to one or more embodiments.
- 15 [00013] Figure 6 depicts a perspective view of the system installed into multiple portable buildings connected together according to one or more embodiments.
- [00014] Figure 7 depicts a cross sectional view of the system installed in the portable building can have an outside top mounted heat sinks according to one or more embodiments.
- [00015] Figure 8 depicts an embodiment of the system installed to a plurality of portable
20 building controlled by a single controller connected by a network.
- [00016] Figure 9 depicts an embodiment of a method for cooling a facility.
- [00017] The present embodiments are detailed below with reference to the listed Figures.

DETAILED DESCRIPTION OF THE EMBODIMENTS

- [00018] Before explaining the present system in detail, it is to be understood that the system is not limited to the particular embodiments and that it can be practiced or carried out in various ways.
- 5 [00019] The present embodiments generally relate to a system for cooling portable buildings which can be any type of mobile and/or modular facilities, such as portable facilities, data centers, or the like.
- [00020] The system can provide cooling to portable buildings containing heat generating electronics.
- 10 [00021] The system can be used with the portable buildings to enable the portable buildings to use less power by using less conventional air conditioning than currently available systems for cooling buildings with racked electronics having heat generating sources.
- [00022] One or more embodiments relate of the system can be designed to dramatically decrease electrical energy need to cool portable buildings.
- 15 [00023] A typical portable building can have multiple racks of standard data servers, such as fourteen racks. A total processing power for such a typical portable building is approximately twenty petabytes, depending on the arrangement of the servers that a client installs. Waste heat generated in this type of typical portable building is usually in amounts of about 25 kilowatts (KW) per vertical rack. For example, in a typical
- 20 portable building with fourteen racks, 350 KW in waste heat needs to be removed from the portable building interior.
- [00024] A typical cooling system in use today, such as a chill water or standard air conditioning (A/C) unit, can require approximately 99.609 tons of air conditioning per hour to cool this type of typical portable building. The electrical energy requirement can be approximately 211,990 KW/hour to effectively accomplish such
- 25 cooling, inclusive of losses of heat. For example, the electrical energy costs of

operating the typical cooling system hardware for the typical portable building with fourteen racks at an arbitrary cost of \$0.05 per KW/hour can be \$7,759.00 per month.

5 [00025] One or more of the present embodiments can reduce the costs of power required to cool portable buildings to approximately \$620.74 per month, and can dramatically reduce the need for power suppliers to generate the power to cool the portable buildings.

10 [00026] One or more of the present embodiments can have a significant positive impact on carbon emissions into the environment because less power is required to operate the portable buildings and system. One or more of the present embodiments can accomplish the energy requirement reduction by the elimination of hardware, including large three phase compressors, additional sub-systems inclusive of circulating water pumps, and large discharge blowers, as well as eliminating complicated connection piping. Embodiments can also eliminate the need for a support skid for the system, as well as the need for multiple top and/or multiple side
15 mounted AC units for the portable buildings.

[00027] In one or more embodiments, heat piping of the system can operate without requiring external power inputs to circulate a cooling medium, such as refrigerant compressors, which can be large power consumers. Embodiments of the system can operate exclusively using low power air circulation fans to move ambient air over heat sinks to dissipate heat into external air.
20

[00028] In embodiments, a small 1/5 capacity AC unit can be used to supplement cooling of the air in the portable buildings, such as if the external air near the portable buildings is over seventy degrees Fahrenheit.

25 [00029] In operation, when the heat is dissipated into the external air from the heat sinks, coolant inside the heat piping of the system can be naturally forced back inside a heat source by fluid disposed behind the coolant that has not had the heat removed, thereby causing a natural circulation from hot to cold. The fluid can continue to circulate without external energy inputs as long as an interior or chamber of the

portable buildings is hotter than the ambient external air.

- 5 [00030] Typical portable buildings can range in length from about 10 feet to about 60 feet. One or more embodiments can include a heat pipe configuration that is integral with a wall or ceiling of the portable building, and can form a portion of the wall or ceiling while using fins to collect and dissipate heat, thereby creating a heat transfer process that is highly efficient and reduces electrical consumption by the portable building for cooling by an average of 92 percent.
- 10 [00031] For example, if the system has 200 KW of continuous operation of heat removal, the dramatic reduction of electrical power requirements to cool the portable building can result in savings of as much as \$85,000 per year, relieve the energy requirements on utility systems, and reduce pollution.
- [00032] Turning now to the Figures, Figure 1 depicts an embodiment of a portable building 10, which can be an air cooled mobile and/or modular facility.
- 15 [00033] The portable building 10 can have a plurality of walls, such as wall 11a and wall 11b. The portable building 10 can have an inside ceiling 70 disposed in parallel and separated from an outside top to form a means for flowing air, a closable opening 14, and a base 16, which can be connected to the walls 11a-11b.
- [00034] The means for flowing air can be any structure that can provide for the controlled flow of air between two points, such as an air duct or an air flow space.
- 20 [00035] The closable opening 14 can be a locking, water-tight, sealed opening, such as a door.
- [00036] The portable building 10 can be made of welded steel, creating an integral structure that can be lifted, such as by a crane. In one or more embodiments, the portable building 10 can be made of plate steel having a thickness ranging from about 3/16 of an inch to about 3/4 of an inch.
- 25 [00037] The portable building 10 can have a height ranging from about 8 feet to about 25 feet, width ranging from about 4 feet to 15 about feet, and depth ranging from about 10

feet to about 60 feet.

- [00038] A small air conditioner 72 can be configured to be installed on a portion of the portable building 10 to provide additional cooling when required.
- [00039] Figure 2 depicts a cut view the portable building 10 detailing portions of a system 8.
- 5 [00040] The portable building 10 can have heat generating electronics 18 disposed within a chamber 17. For example, the heat generating electronics 18 can be computer equipment elements, telecommunications equipment, data archival equipment, processing equipment, testing equipment, event recording equipment, logging equipment, power electronics, or combinations thereof.
- 10 [00041] The heat generating electronics 18 can be racked within the chamber 17 of the portable building 10 surrounding an interior portion of the walls 11a-11b of the portable building 10.
- [00042] The heat generating electronics 18 can separate the chamber 17 into a first segment 13 and a second segment 15. The first segment 13 can have air with a first British thermal unit (BTU) content, such as inner heated air 38. The second segment 15 can have air with a second BTU content, such as cooler chamber air 39. The first BTU content can be larger than the second BTU content. In operation, the heat generating electronics 18 can draw in the cooler chamber air 39, such as through a heat generating electronics fan 21, for cooling the heat generating electronics 18. The heat generating electronics 18 can transfer heat to the cooler chamber air 39, thereby forming the inner heated air 38 for expulsion into the first segment 13.
- 15
- 20
- [00043] The portable building 10 can have the inside ceiling 70 disposed below the outside top 12 and above the base 16. The means for flowing air 19 can be formed between the inside ceiling 70 and the outside top 12.
- 25 [00044] A first interior fan 22 can be disposed on the inside ceiling 70, and can be used to cool the portable building 10 without the need for heavy duty air conditioning

systems that consume large amounts of power.

5 [00045] The first interior fan 22 can be a variable speed low voltage fan with one or more blades. For example, the first interior fan 22 can have a low voltage of 120 volts.

[00046] The first interior fan 22 can be connected to a power supply 24. The first interior fan
5 22 can blow air from the means for flowing air 19 towards the base 16, creating a first air flow 26. For example, the first air flow 26 can be at a speed of about 1,150 linear feet per minute.

[00047] The power supply 24 can be a 120 volt, 12 volt, 6 volt, 48 volt, or 220 volt power
10 supply. The power supply 24 can be electricity from an electric municipality grid, a generator, a fuel cell, a battery, a solar cell, a hydroelectric power supply, a wind power generator, or combinations thereof.

[00048] A second interior fan 28 can be connected to the power supply 24 to assist in
15 providing a general circulation of air 31 around the walls 11a-11b, the base 16, and between the outside top 12 and the inside ceiling 70. The second interior fan 28 can be disposed in a portion of the means for flowing air 19.

[00049] A heat sink 32, which can be a solid material, can be configured to be integrally
mounted in one of the walls 11a-11b of the portable building 10, such as the wall 11a.

[00050] The heat sink 32 can be an extruded metal block, which can be made of copper,
20 aluminum, or alloys thereof. The heat sink 32 can be totally or partially anodized to protect the heat sink 32 from environmental decay and to provide cathodic protection.

[00051] The heat sink 32 can have structural integrity, enabling the heat sink 32 to act as a
portion of a non-load bearing wall or non-load bearing ceiling of the portable building 10.

[00052] The heat sink 32 can have a length and height equal to or less than the length and
25 height of the wall 11a, and a depth slightly shallower than the wall 11a, such that the heat sink 32 can be attached to a wall frame assembly of the wall 11a.

- 5 [00053] The heat sink 32 can have one or more fins connected to a finless heat collecting portion, which can be solid. The fins can contact the inner heated air 38 in the portable building 10.
- 5 [00054] The fins of the heat sink 32 can transfer heat from the inner heated air 38 while the inner heated air 38 moves across the fins of the heat sink 32. In one or more embodiments, the heat sink 32 can have from about six fins to about four hundred fins.
- 10 [00055] The fins can be connected with an outer fluid filed finless heat collection portion of the heat sink 32, allowing for thermal dissipation of heat absorbed by the heat sink 32 into fluid of an outer heat pipe assembly 42 in thermal communication with the outer fluid filed finless heat collection portion. As such, the outer fluid filed finless heat collection portion can form a heated fluid.
- 15 [00056] The outer heat pipe assembly 42 can have outer fins for receiving the heated fluid from the outer fluid filed finless heat collection portion, and allowing for heat dissipation through the outer fins to form a cooled fluid.
- [00057] The outer fins of the outer heat pipe assembly 42 can be affected by a first external fan 46, which can pull external air 48 over the outer fins of the outer heat pipe assembly 42 through a forced air duct; thereby transferring heat from the outer fins to form a heated air 50.
- 20 [00058] A second external fan 52 can exhaust the heated air 50 away from the portable building 10. The first external fan 46 and the second external fan 52 can be variable speed fans, and can be connected to the power supply 24.
- [00059] The first interior fan 22, second interior fan 28, first external fan 46, and second external fan 52 can be controlled by a controller 62.
- 25 [00060] In embodiments, the controller 62 can be a variable speed controller for causing one or more of the first interior fan 22, second interior fan 28, first external fan 46, and

second external fan 52 to operate at one or more speeds simultaneously.

- 5
- [00061] For example, the controller 62 can include a program logic controller, which can allow the controller 62 to be configured for controlling one or more of the first interior fan 22, second interior fan 28, first external fan 46, and second external fan 52 based on preset limits that can be stored in the controller 62.
- [00062] The controller 62 can receive temperature signals from a first powered transducer 54. The first powered transducer 54 can be configured for installation within the portable building 10 for determining a first temperature within the portable building 10.
- 10 [00063] The controller 62 can connect to a second powered transducer 58 secured to a portion of the outer heat pipe assembly 42 for determining a second temperature.
- [00064] The controller 62 can connect to a third powered transducer 60, which can be secured proximate to the fins of the heat sink 32 for determining a third temperature, which can be a temperature of the inner heated air 38.
- 15 [00065] The first powered transducer 54, the second powered transducer 58, and the third powered transducer 60 can each be connected to both the controller 62 and the power supply 24. Each of the first powered transducer 54, the second powered transducer 58, and the third powered transducer 60 can be standard 100 ohm platinum transducers.
- 20 [00066] The controller 62 can communicate with a network 74. The network 74 can be the internet, a local area network, satellite network, or another communications network. The network 74 can be in communication with a client device 77 of a user 79, allowing for remote monitoring and controlling of the system 8.
- [00067] The portable building 10 can also have a display 63 disposed therein and in communication with the controller 62, allowing for local monitoring and controlling of the system 8.
- 25 [00068] The controller 62 can also be connected to the first interior fan 22, the second interior

fan 28, the first external fan 46, the second external fan 52, and the power supply 24.

5 [00069] The controller 62 can control the heat sink 32 by controlling air flow using the first interior fan 22, second interior fan 28, first external fan 46, and second external fan 52. In one or more embodiments, the controller 62 can be configured to control one or more of the heat sinks in parallel.

[00070] In embodiments, the controller 62 can be configured to dissipate thirty kilowatts of heat per vertical section in the portable building 10. Each of the vertical sections can be one vertical portioned off section of the overall portable building 10, which can have independent server blades, rackings, and power supplies.

10 [00071] The controller 62 can be configured to control the first interior fan 22, second interior fan 28, first external fan 46, and second external fan 52 to create a lateral airflow between the outside top 12 and the inside ceiling 70 simultaneously while creating an air flow from the heat sink 32 towards the inside ceiling 70 and into the means for flowing air 19.

15 [00072] The small air conditioner 72 can be mounted in the outside top 12 or one of the walls 11a-11b, such as the wall 11b, and can be connected to the power supply 24 and the controller 62. The small air conditioner 72 can have less than 1/5 of a cooling requirement for cooling the entire portable building 10. The small air conditioner 72 can be used when temperatures outside of the portable building 10 are above seventy
20 degrees Fahrenheit.

[00073] For example, a preset limit can be seventy degrees Fahrenheit for a low set point and eighty degrees Fahrenheit for a high set point within the portable building 10. The controller 62 can use computer instructions in a data storage thereof to keep the first temperature of the cooler chamber air 39 between these two set points, such as by
25 turning on and off the first interior fan 22, second interior fan 28, first external fan 46, and second external fan 52; adjusting the speeds of the first interior fan 22, second interior fan 28, first external fan 46, and second external fan 52; or turning on and off the small air conditioner 72.

- [00074]** Figures 3A-3B depict an embodiment of the controller 62, which can include a processor 64 in communication with the data storage 65 and the display 63.
- [00075]** The data storage 65 can have various computer instructions for monitoring and controlling temperatures inside of one or more portable buildings.
- 5 **[00076]** For example, the data storage 65 can include computer instructions to monitor the temperature of the inner heated air in the portable building 66a.
- [00077]** The data storage 65 can include computer instructions to monitor the temperature of at least one of the outer fins 66b.
- [00078]** The data storage 65 can include computer instructions to monitor the cooler chamber
10 air 66c.
- [00079]** The data storage 65 can include computer instructions to compare each monitored temperature to preset limits 66d.
- [00080]** The data storage 65 can include computer instructions to, when the monitored
15 temperatures meet or exceed the preset limits, individually: actuate the first interior fan, second interior fan, first external fan, and second external fan; regulate fan speeds of the first interior fan, second interior fan, first external fan, and second external fan; or turn off the first interior fan, second interior fan, first external fan, and second external fan 66e.
- [00081]** For example, if the preset limits 69 require the temperature of the cooler chamber air
20 to remain between 70 degrees Fahrenheit and 80 degrees Fahrenheit and the monitored temperature is determined, using one of the powered transducers, to be 85 degrees Fahrenheit, then the computer instructions can instruct the controller 62 to actuate the first interior fan, second interior fan, first external fan, and second external fan, or to increase a speed of the first interior fan, second interior fan, first external
25 fan, and second external fan.
- [00082]** The data storage 65 can include computer instructions to instruct the processor to

compare the monitored temperatures to preset limits, and to control fan speeds individually or simultaneously to cause temperatures in the portable building to remain within the preset limits 71.

- 5 **[00083]** The data storage 65 can include computer instructions to allow the processor to turn on and turn off and regulate air flow from the small air conditioner mounted in one of the walls or in the inside ceiling for use when outside air is over seventy degrees Fahrenheit or above another preset value 75.
- 10 **[00084]** The data storage 65 can include computer instructions to provide an alarm message when the monitored temperatures exceed or fall below the preset limits, wherein the alarm message is provided to: the client device, a computer, the display, or combinations thereof 78.
- [00085]** The data storage 65 can include computer instructions to ensure that air flowing across the inner heat sink remains in contact with each of the heat sinks to optimize heat transfer from the portable building 81.
- 15 **[00086]** The data storage 65 can include computer instructions to enable the user with the client device to connect to the controller and view a status of temperatures of at least one portable building over the network 90.
- [00087]** The data storage 65 can include computer instructions to form an executive dashboard on the client device enabling the user to simultaneously view the status of the multiple portable buildings 92.
- 20 **[00088]** The data storage 65 can include computer instructions for instructing the controller to control temperature and cooling of the vertical sections of the portable building, wherein the temperature and cooling of the vertical sections is controlled individually, in priority groupings, or simultaneously 93.
- 25 **[00089]** For example, if the portable building has three vertical sections, and if only one of the vertical sections is outside of the preset limits 69, then the controller 62 can control

one or more of the individual fans associated with that vertical section.

[00090] The data storage 65 can include computer instructions for instructing the controller to control temperature and cooling of the vertical sections of the portable building using the network 95.

5 **[00091]** The alarm message 79, preset limits 69, and monitored temperatures 67 can be stored in the data storage 65.

[00092] Figure 4A depicts a perspective view of the heat sink 32, and Figure 4B depicts a side cut view of the heat sink 32 and outer heat pipe assembly 42.

[00093] The heat sink 32 can be connected with the outer heat pipe assembly 42.

10 **[00094]** The heat sink 32 can include one or more fins 33 and a coating 68, which can be a non-electrically conductive coating. The coating 68 can be anodized gold, anodized silver, titanium, platinum, iridium, or a similar secondary heat conductive surface for preventing degradation from oxidation or other environmental factors.

15 **[00095]** In embodiments, the outer heat pipe assembly 42 can be coated, such as with an anodized aluminum, alloy of aluminum, copper, anodized copper, or combinations of these materials.

20 **[00096]** The outer heat pipe assembly 42 can be made of a metal pipe and can have an inner diameter that varies depending on a designed heat load. For example, the inner diameter of the outer heat pipe assembly 42 can include thousands of small pipes or capillaries therein, with each small pipe or capillary having an inner diameter of less than two mm. The outer heat pipe assembly 42 can have a pipe base with small pipes and fins, such as those made by ACT in Pennsylvania.

[00097] The fins 33 can be connected to a finless heat collecting portion 36, which can be solid.

25 **[00098]** An outer fluid filled finless heat collection portion 43 of the outer heat pipe assembly

42 can be disposed adjacent one or more outer fins 44, and between the outer fins 44 and the finless heat collecting portion 36. The outer fluid filled finless heat collection portion 43 can be in thermal communication with the finless heat collecting portion 36.

5 [00099] The outer fluid filled finless heat collection portion 43 can allow for thermal dissipation of heat absorbed by the heat sink 32 into fluid of the outer fins 44 of the outer heat pipe assembly 42.

[000100] The outer heat pipe assembly 42 can have a fan assembly, including the first external fan 46 and the second external fan 52 for forced air cooling.

10 [000101] In operation, heat from the inner heated air can be transferred to the fins 33, heat from the fins 33 can be transferred to the finless heat collecting portion 36, heat from the finless heat collecting portion 36 can be transferred to the outer fluid filled finless heat collection portion 43, and heat from the outer fluid filled finless heat collection portion 43 can be transferred to the outer fins 44.

15 [000102] For example, the outer fluid filled finless heat collection portion 43 can transfer heat from the finless heat collecting portion 36 into a fluid to form a heated fluid 40. The outer fins 44 can receive the heated fluid 40 from the outer fluid filled finless heat collection portion 43. Heat from the heated fluid 40 can be dissipated through the outer fins 44, thereby forming a cooled fluid 45, which can flow back to the outer
20 fluid filled finless heat collection portion 43.

[000103] For example, the first external fan 46 can draw in the external air 48 into a forced air duct 83, which can receive the external air 48 and flow the external air 48 across the outer fins 44, thereby causing a heat exchange and forming the heated air 50.

25 [000104] The second external fan 52 can draw the heated air 50 out away from the outer fins 44. The second external fan 52 can operate at a higher suction to draw the external air 48 through the outer heat pipe assembly 42.

- 5
- [000105] In one or more embodiments, the outer fins 44 can be very thin and short microstructures. A large quantity of the very thin and short microstructures can provide for fast and lightweight thermal dissipation.
- [000106] In one or more embodiments, the outer heat pipe assembly 42 can have several hundred of the outer fins 44.
- [000107] Figure 5 depicts a side view of an outside of the portable building 10 with one heat sink having six outer heat-pipe assemblies 42a- 42f.
- 10 [000108] The portable building 10 can have the vertical sections 76a-76g. Each of the vertical section 76a-76g can contain racks with servers that generate heat or other heat generating electronics.
- [000109] The portable building 10 can have the first external fans 46a-46n for drawing in the exterior air, and the second external fans 52a-52n for expelling the heated air.
- 15 [000110] Each of the first external fans 46a-46n and the second external fans 52a-52n for each of the vertical sections 76a-76g can be operated independently, simultaneously, or in priority groupings.
- [000111] The portable building 10 can have the small air conditioner 72, which can be a 15 ton A/C unit, such as one made by TRANE™.
- 20 [000112] The portable building 10 can be installed in a transportable container 73, such as a shipping container for easy transport by land or sea. In one or more embodiments, the transportable container 73 can contain multiple portable buildings.
- [000113] The transportable container 73 can be a vertical lift container, skid mounted container, or a container that can be transportable by rail, boat, or truck.
- 25 [000114] In one or more embodiments, the transportable container 73 can be a moveable custom made container, which can provide additional protection and additional space for the portable building 10.

- [000115] Figure 6 depicts an embodiment of the system installed into multiple portable buildings 10a-10b that can be connected together.
- [000116] The walls 11a-11c of the portable buildings 10a-10b can be removed and/or connected together, such that the portable buildings share the means for flowing air. For example, the wall 11a of the portable building 10a can be connected with the wall 11c of the portable building 10b.
- [000117] The portable buildings 10a-10b can have one or more of the heat sinks 32a-32b for transferring heat from within the portable buildings 10a-10b, as well as the outer heat pipe assemblies 42 for transferring the heat to the external air.
- 10 [000118] Figure 7 depicts an embodiment of the portable building 10 with the closable opening 14, as well as the inside ceiling 70 and the outside top 12 forming the means for flowing air 19.
- [000119] The inside ceiling 70 can have a first opening 23. The first interior fan 22 can blow air from within the means for flowing air 19 into the chamber 17 through the first opening 23.
- 15 [000120] The second interior fan 28 can blow air from a second opening 25 of the inside ceiling 70 into the means for flowing air 19, thereby creating a cross air flow 80.
- [000121] The portable building 10 can have the heat sink 32a, which can be wall mounted into one of the walls 11a-11b, such as the wall 11a. For example, the heat sink 32a can be disposed adjacent the heat generating electronics 18.
- 20 [000122] The portable building 10 can have the heat sink 32b and the heat sink 32c, which can both be configured to be installed on the outside top 12. For example, the heat sink 32b and the heat sink 32c can be used when the heat generating electronics 18 vent upwards into the means for flowing air 19.
- 25 [000123] Each of the heat sinks 32a-32c can be associated with the outer heat pipe assemblies 42a, 42b, and 42c, which can each have two pairs of circulating fans to provide for

faster thermal heat transfer from the chamber 17 of the portable building 10 to an outside of the portable building 10.

[000124] Each of the heat sinks 32a-32c associated with the outer heat pipe assemblies 42a-42c can be connected to the controller 62.

5 **[000125]** Figure 8 depicts a plurality of portable buildings 10a-10b controlled by one of the controllers 62.

[000126] The plurality of portable buildings 10a-10b can be connected to the controller 62, and the controller 62 can be connected to the network 74.

10 **[000127]** The client device 77 can be connected to the controller 62 and portable buildings 10a-10b through the network 74, allowing the user 79 to remotely monitor temperatures and receive alarm messages. The client device 77 can be a cell phone, computer, or other communications device.

[000128] The controller 62 can simultaneously operate the plurality of portable buildings 10a-10b.

15 **[000129]** The portable buildings 10a-10b can have thermal partitions 35a-35h formed by the heat generating electronics 18a, 18b, 18c, and 18d that extend from the bases 16a-16b to the inside ceilings 70a-70b.

[000130] The thermal partitions 35a-35h can form the chambers 17a and 17b, thereby separating the inner heated air 38a-38d from the cooler chamber air 39a-39d.

20 **[000131]** Each of the portable buildings 10a-10b can have the display 63a-63b for locally displaying temperatures and information on the system.

[000132] Each of the portable buildings 10a-10b can have one or more of the heat sinks 32a-32d, which can contact the inner heated air 38a-38d for cooling thereof.

25 **[000133]** Each of the portable buildings 10a-10b can have one or more outer heat pipe assemblies 42a-42d, which can transfer heat to the external air.

- [000134]** Each of the chambers 17a-17b can have one or more of the first interior fans 22a-22d. For example, the chamber 17a can have the first interior fan 22a and the first interior fan 22b, and the chamber 17b can have the first interior fan 22c and the first interior fan 22d.
- 5 **[000135]** The first interior fans 22a-22d can receive air from the second interior fans 28a-28d through the means for flowing air 19a-19b, and can provide the cooler chamber air 39a-39d to the chambers 17a-17b.
- [000136]** Each of the portable buildings 10a-10b can have the walls 11a-11d and outside tops 12a-12b.
- 10 **[000137]** Figure 9 depicts a diagram of an embodiment of the method for cooling a facility, such as a portable building.
- [000138]** The method can include mounting the heat sink in at least one wall or outside top of the facility containing the heat generating electronics, forming a non-load bearing integral portion of the wall or outside top, as illustrated by box 100.
- 15 **[000139]** The method can include mounting the outer heat pipe assembly to the finless heat collecting portion of the heat sink, as illustrated by box 102.
- [000140]** The method can include installing the forced air ducts around the outer heat pipe assembly to contain air flow around the heat pipes, as illustrated by box 104.
- [000141]** The method can include installing the first external fan to force air into the forced air
20 duct from outside of the facility, as illustrated by box 106.
- [000142]** The method can include installing the second external fan to pull air from the forced air duct to outside of the facility, as illustrated by box 108.
- [000143]** The method can include installing the first interior fan to flow air from a ceiling air duct into the facility, as illustrated by box 110.
- 25 **[000144]** The method can include installing the second interior fan to pull air from the facility

into the ceiling air duct, as illustrated by box 112.

[000145] The method can include installing the first powered transducer in the facility proximate to a section of the facility having the lowest temperature, as illustrated by box 114.

5 **[000146]** The method can include installing the second powered transducer in the facility in the air flow proximate to the fins of the outer heat pipe assembly, as illustrated by box 116.

[000147] The method can include installing the third powered transducer proximate to the fins of the heat sink, as illustrated by box 118.

10 **[000148]** The method can include connecting the first powered transducer, second powered transducer, third powered transducer, first external fan, second external fan, first interior fan, and second interior fan to the controller, wherein the controller has the processor and the data storage, as illustrated by box 120.

15 **[000149]** The method can include using computer instructions in the data storage to monitor temperature in the facility, actuate the fans, regulate the fan speeds, and stop the fans when monitored temperatures of the facility meet or exceed preset limits, as illustrated by box 122.

20 **[000150]** The method can include installing a small capacity air conditioning unit, connecting the small capacity air conditioning unit to the controller, and providing an assist to lower the temperature of air in the facility to a temperature less than the temperature outside of the facility, as illustrated by box 124.

[000151] While these embodiments have been described with emphasis on the embodiments, it should be understood that within the scope of the appended claims, the embodiments might be practiced other than as specifically described herein.

25

CLAIMS

What is claimed is:

1. A system for cooling a portable building comprising heat generating electronics mounted therein, the system comprising:
 - 5 a. a means for flowing air from a first segment of the portable building to a second segment of the portable building;
 - b. a first interior fan connected to a power supply for blowing interior air from the means for flowing air towards a base of the portable building creating a first air flow;
 - 10 c. a second interior fan connected to the power supply to assist in providing a general circulation of air in the portable building;
 - d. a heat sink with fins and a finless heat collecting portion, wherein the heat sink is configured to be integrally mounted in a wall or an outside top of the portable building such that the fins are in contact with inner heated air inside the portable building and transfer heat from the inner heated air into the finless heat collecting portion;
 - 15 e. an outer heat pipe assembly in thermal communication with the finless heat collecting portion, wherein the outer heat pipe assembly comprises outer fins, wherein fluid in the outer heat pipe assembly absorbs heat from the finless heat collecting portion forming a heated fluid therein, and wherein the heated fluid flows into the outer fins for thermal dissipation of the heat;
 - 20 f. a first external fan for pulling external air over the outer fins and transferring the heat from the outer fins forming a heated air;
 - g. a second external fan for exhausting the heated air away from the portable building;
 - 25

- h. a first powered transducer for installation in the portable building to determine a first temperature within the portable building;
 - i. a second powered transducer secured to the outer heat pipe assembly to determine a second temperature;
 - 5 j. a third powered transducer secured proximate to the fins for determining a third temperature of air in the portable building adjacent the fins; and
 - k. a controller connected to the first powered transducer, the second powered transducer, the third powered transducer, the first interior fan, the second interior fan, the first external fan, the second external fan, and the power supply, wherein
10 the controller comprises a processor in communication with a data storage, and wherein the data storage comprises:
 - (i) computer instructions to monitor temperatures in the portable building, proximate the outer heat pipe assembly, and proximate the fins;
 - (ii) computer instructions to compare monitored temperatures to preset limits;
15 and
 - (iii) computer instructions to actuate, regulate, or turn off the first interior fan, second interior fan, first external fan, and second external fan when the monitored temperatures meets or exceeds the preset limits.
2. The system of claim 1, wherein the controller is a variable speed controller for causing
20 one or more of the first interior fan, second interior fan, first external fan, and second external fan to operate at one or more speeds simultaneously.
3. The system of claim 1, wherein the heat sink is an extruded metal block.
4. The system of claim 1, wherein heat sink comprises from six fins to four hundred fins.
5. The system of claim 1, wherein a cross air flow is generated by the first interior fan and
25 the second interior fan through the means for flowing air, and wherein the cross air flow

flows the inner heated air from the first segment into the means for flowing air.

6. The system of claim 1, wherein one of the first interior fan and the second interior fan flows air from the heat sink towards the outside top or into the means for flowing air.
7. The system of claim 1, wherein the heat generating electronics comprises: computer
5 equipment elements, telecommunications equipment, data archival equipment, processing equipment, testing equipment, event recording equipment, logging equipment, power electronics, or combinations thereof.
8. The system of claim 1, further comprising at least two additional heat sinks having associated outer heat pipe assemblies and circulating fans, wherein each additional heat
10 sink is configured to be installed on the outside top to provide for faster thermal heat transfer from an interior of the portable building to outside of the portable building, and wherein the heat sink and each additional heat sink is connected to the controller.
9. The system of claim 1, further comprising a small air conditioner configured to be installed in one of the walls or the outside top of the portable building.
- 15 10. The system of claim 1, wherein when the system is connected to the portable building, and wherein the portable building and the system are containable and transportable in a transportable container.
11. The system of claim 10, wherein the transportable container is a vertical lift container, a skid mounted container, or a container that is transportable by rail, boat, or truck.
- 20 12. The system of claim 1, wherein the portable building has one or more vertical sections, wherein the controller communicates with a network, and wherein the controller is configured to dissipate thirty kilowatts of heat per vertical section of the portable building.
- 25 13. The system of claim 12, wherein the portable building has from two of the vertical sections to twenty five of the vertical sections, and wherein each of the vertical section generates from ten kilowatts to thirty kilowatts of heat.

14. The system of claim 1, further comprising computer instructions for instructing the controller to control temperature and cooling of the vertical sections of the portable building, wherein the temperature and cooling of the vertical sections is controlled individually, in priority groupings, or simultaneously.
- 5 15. The system of claim 1, further comprising computer instructions for instructing the controller to control temperature and cooling of the vertical sections of the portable building using a network.
16. The system of claim 1, further comprising computer instructions in the data storage to enable a user with a client device to connect to the controller and view a status of
10 temperatures of at least one portable facility over a network.
17. The system of claim 1, wherein the heat generating electronics extend from the base to an inside ceiling of the portable building, forming a thermal partition in a chamber separating the inner heated air from a cooler chamber air.
18. The system of claim 1, further comprising a display in communication with the controller
15 for displaying temperatures and information.
19. The system of claim 18, further comprising computer instructions to provide an alarm message when the monitored temperatures exceed or fall below the preset limits, wherein the alarm message is provided to a member of the group consisting of: a client device, a computer, the display, and combinations thereof.
- 20 20. A system for cooling one or more portable buildings comprising heat generating electronics mounted therein, the system comprising:
- a. a first interior fan for installation into one or more portable buildings for blowing interior air from a means for flowing air into a second segment of the one or more portable buildings creating a first air flow;
- 25 b. a second interior fan for installation into one or more portable buildings for drawing air from a first segment of the one or more portable buildings into the

means for flowing air;

- c. a heat sink configured to be mounted in the one or more portable buildings such that the heat sink is in contact with inner heated air inside the first segment of the one or more portable buildings;
- 5 d. an outer heat pipe assembly in thermal communication with the heat sink, wherein the outer heat pipe assembly comprises outer fins, wherein fluid in the outer heat pipe assembly absorbs heat from the heat sink to form a heated fluid therein, and wherein the heated fluid flows into the outer fins for thermal dissipation of the heat;
- 10 e. a first external fan for pulling external air over the outer fins and transferring the heat from the outer fins forming a heated air;
- f. a second external fan for exhausting the heated air away from the one or more portable buildings;
- 15 g. a first powered transducer for installation in the one or more portable buildings to determine a first temperature within the one or more portable buildings;
- h. a second powered transducer secured to the outer heat pipe assembly to determine a second temperature;
- i. a third powered transducer secured proximate to the heat sink for determining a third temperature; and
- 20 j. a controller connected to the first powered transducer, the second powered transducer, the third powered transducer, the first interior fan, second interior fan, first external fan, and second external fan, wherein the controller comprises a processor in communication with a data storage, and wherein the data storage comprises:
 - 25 (i) computer instructions to monitor temperatures in the one or more portable

buildings from the first powered transducer, the second powered transducer, and the third powered transducer;

(ii) computer instructions to compare monitored temperatures to preset limits;
and

5 (iii) computer instructions to actuate, regulate, or turn off the first interior fan, second interior fan, first external fan, and second external fan when the monitored temperatures meets or exceeds the preset limits.

ABSTRACT OF DISCLOSURE

A system for cooling portable facilities which include heat generating electronics, interior fans, a heat sink integrally serving as part of a wall or ceiling, and an outer heat pipe assembly in thermal communication with the heat sink allowing for heat dissipation. External fans pull
5 external air over the outer heat pipe assembly. A first transducer monitors inner air temperature within the portable building, a second transducer monitors the outer heat pipe assembly, and a third transducer is secured proximate to a fin side of the heat sink. A controller is connected to the transducers, fans, and power supply. Computer instructions monitor temperatures from the transducers, compare the temperatures to preset limits, and individually or simultaneously
10 actuate, regulate, or turn off the fans when monitored temperatures meet or exceed preset limits.

FIGURE 1

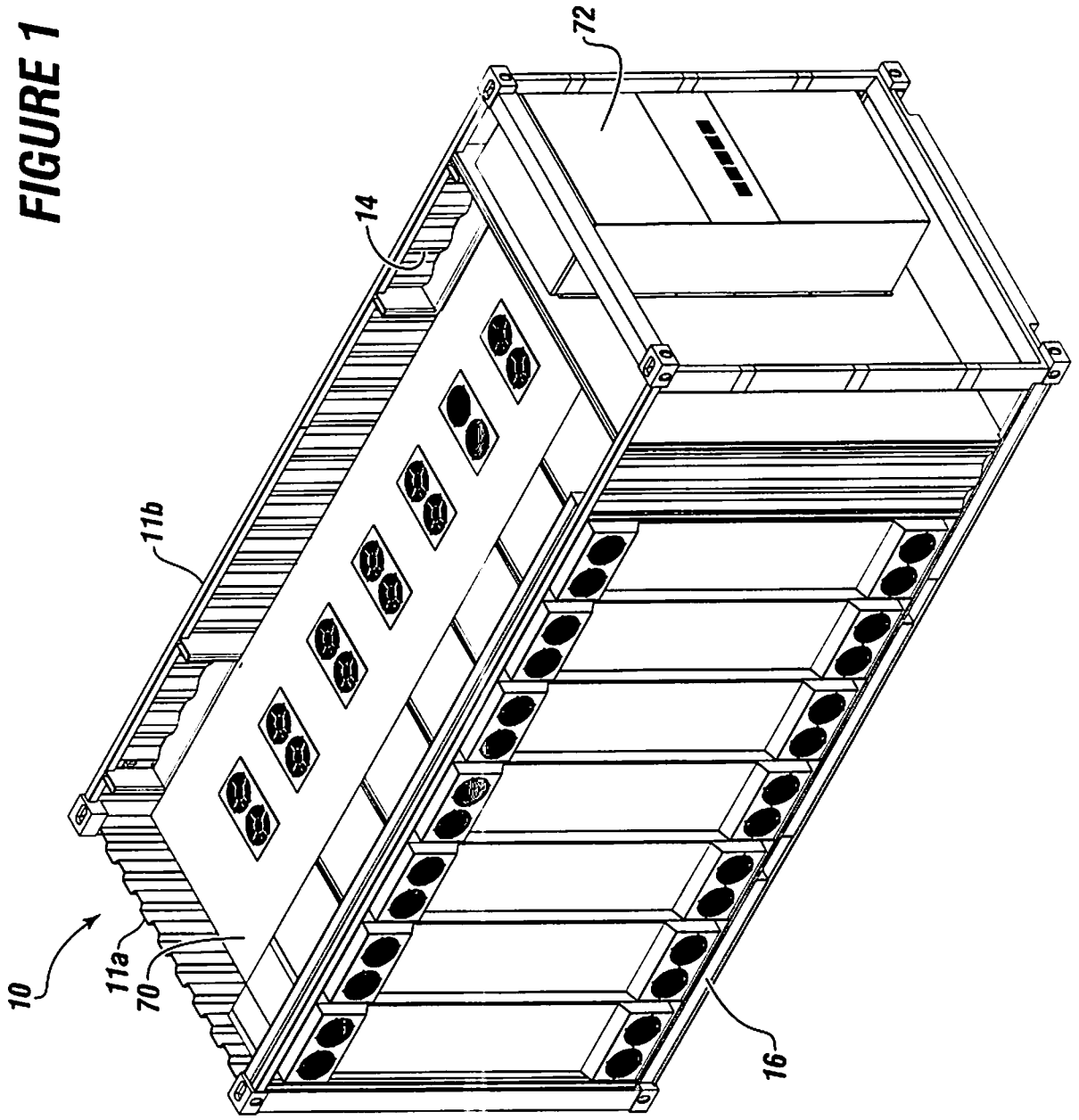
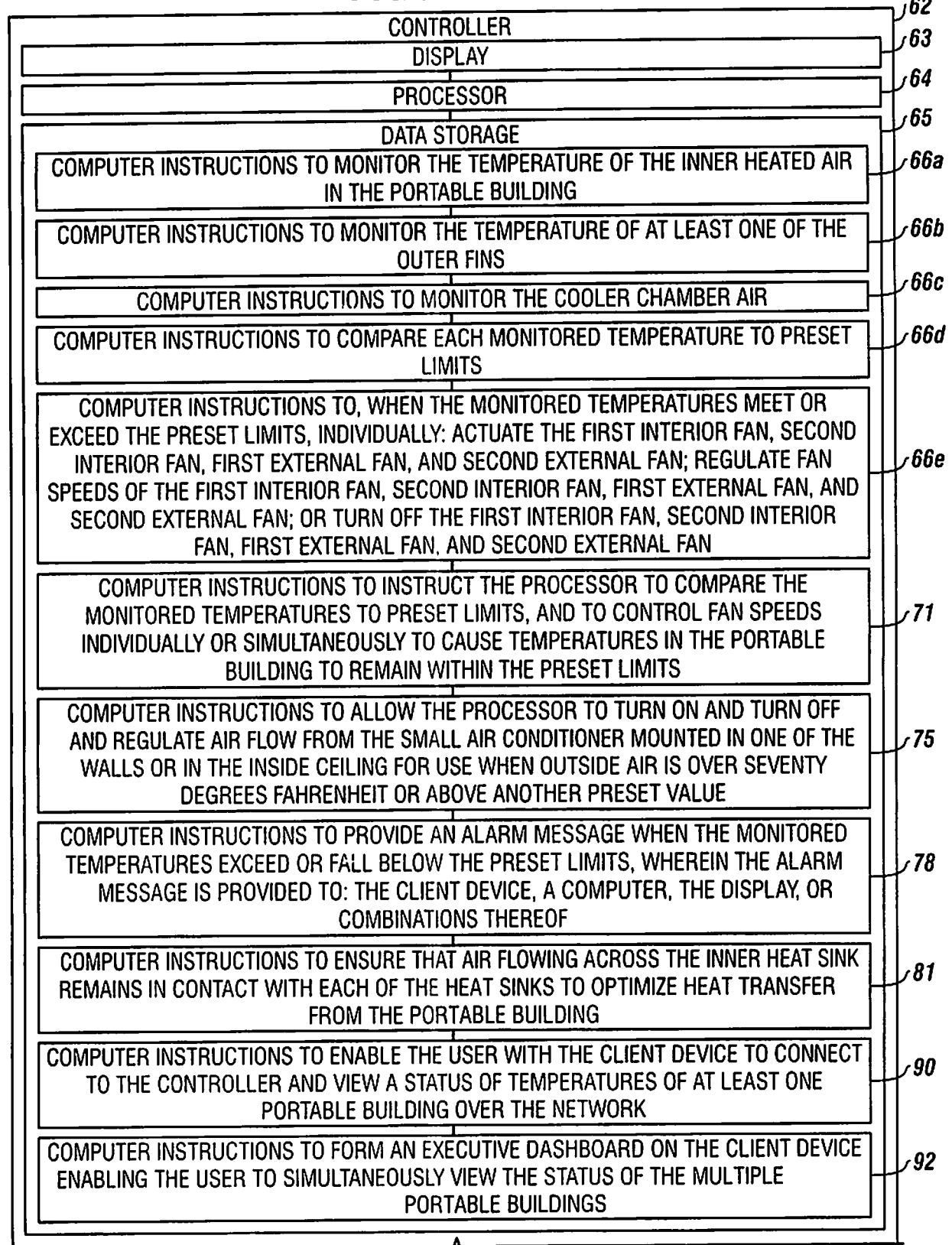


FIGURE 3A



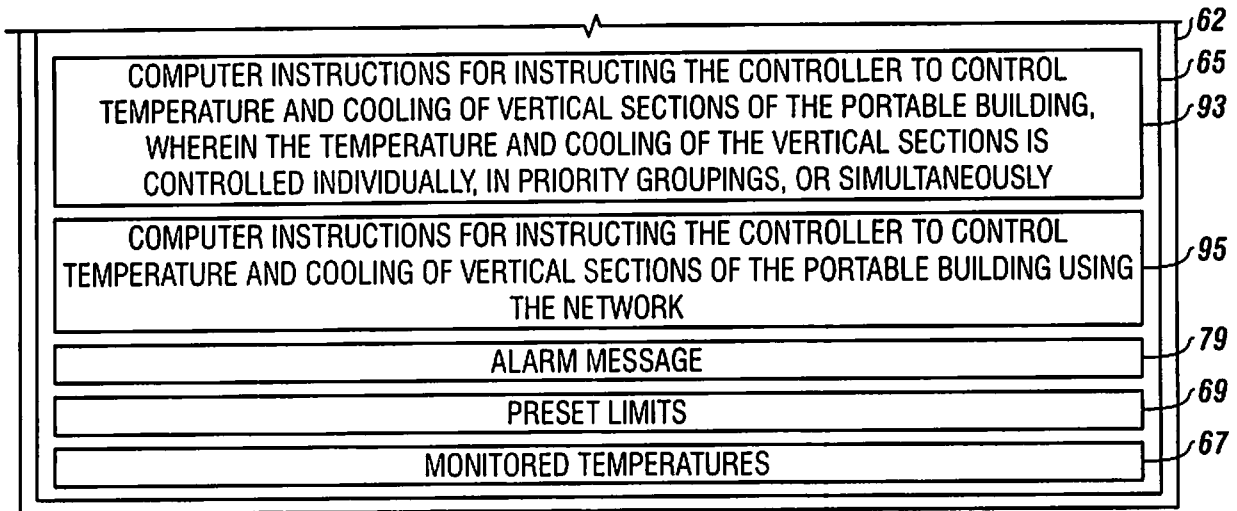


FIGURE 3B

FIGURE 4A

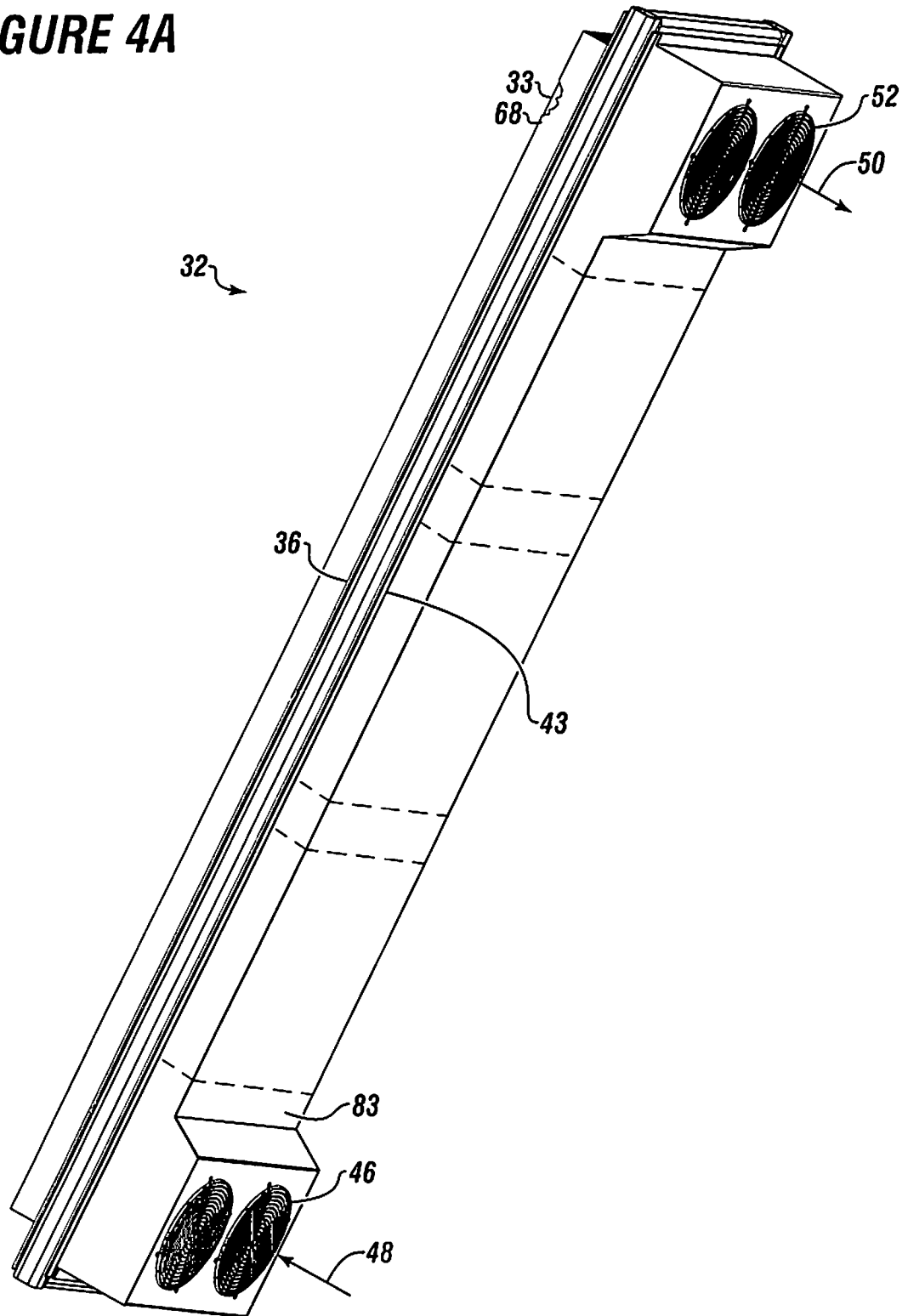


FIGURE 4B

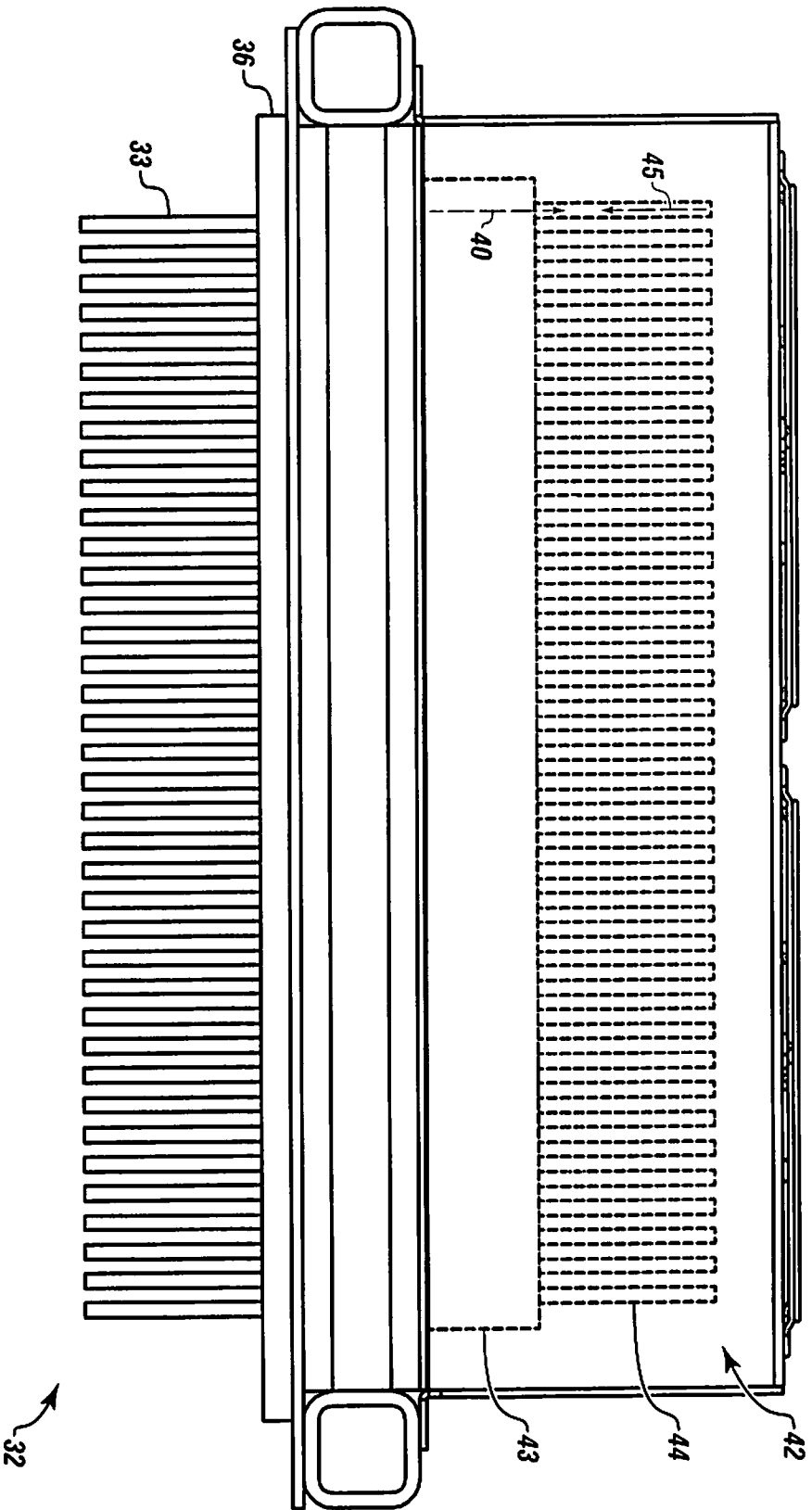


FIGURE 5

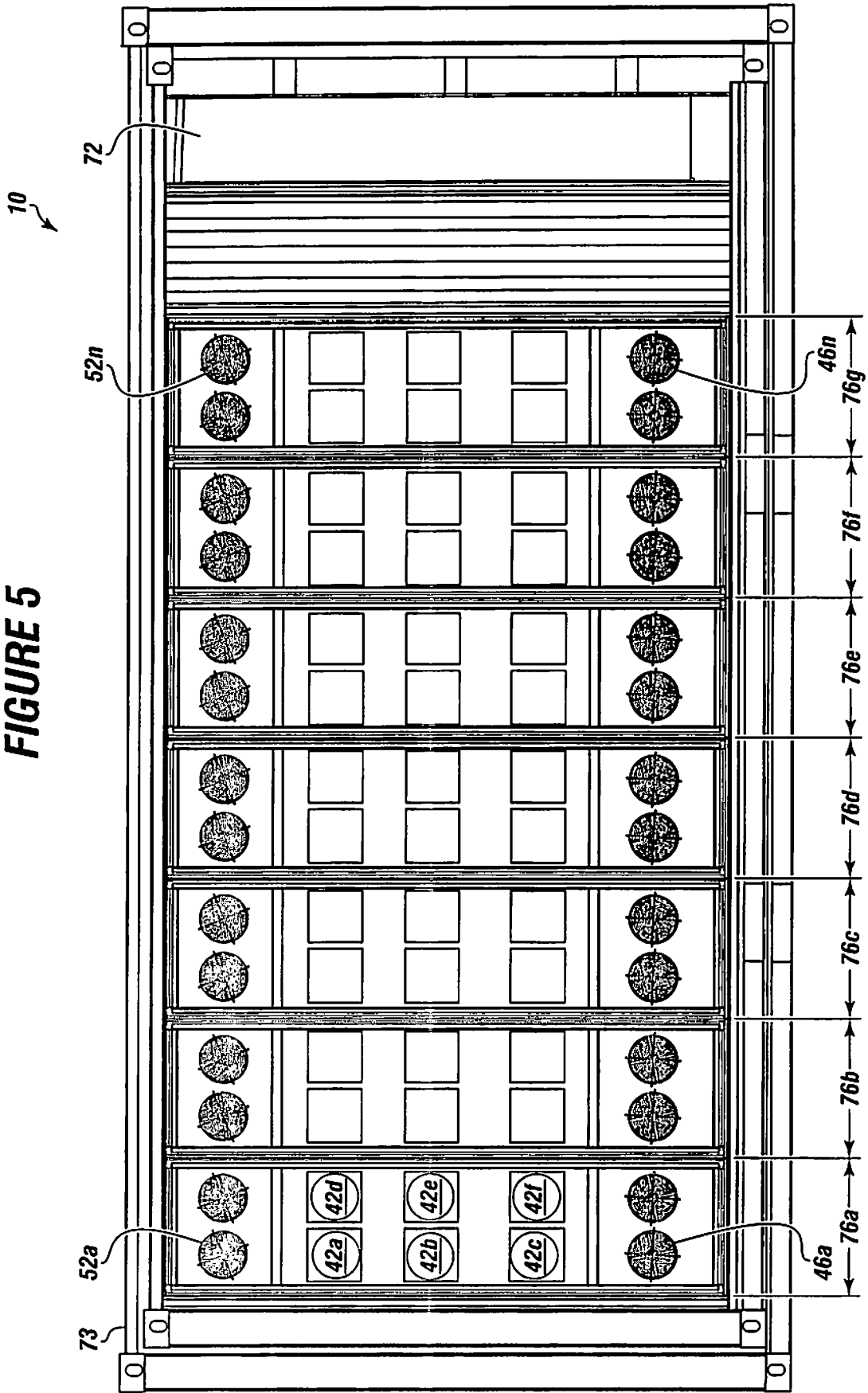
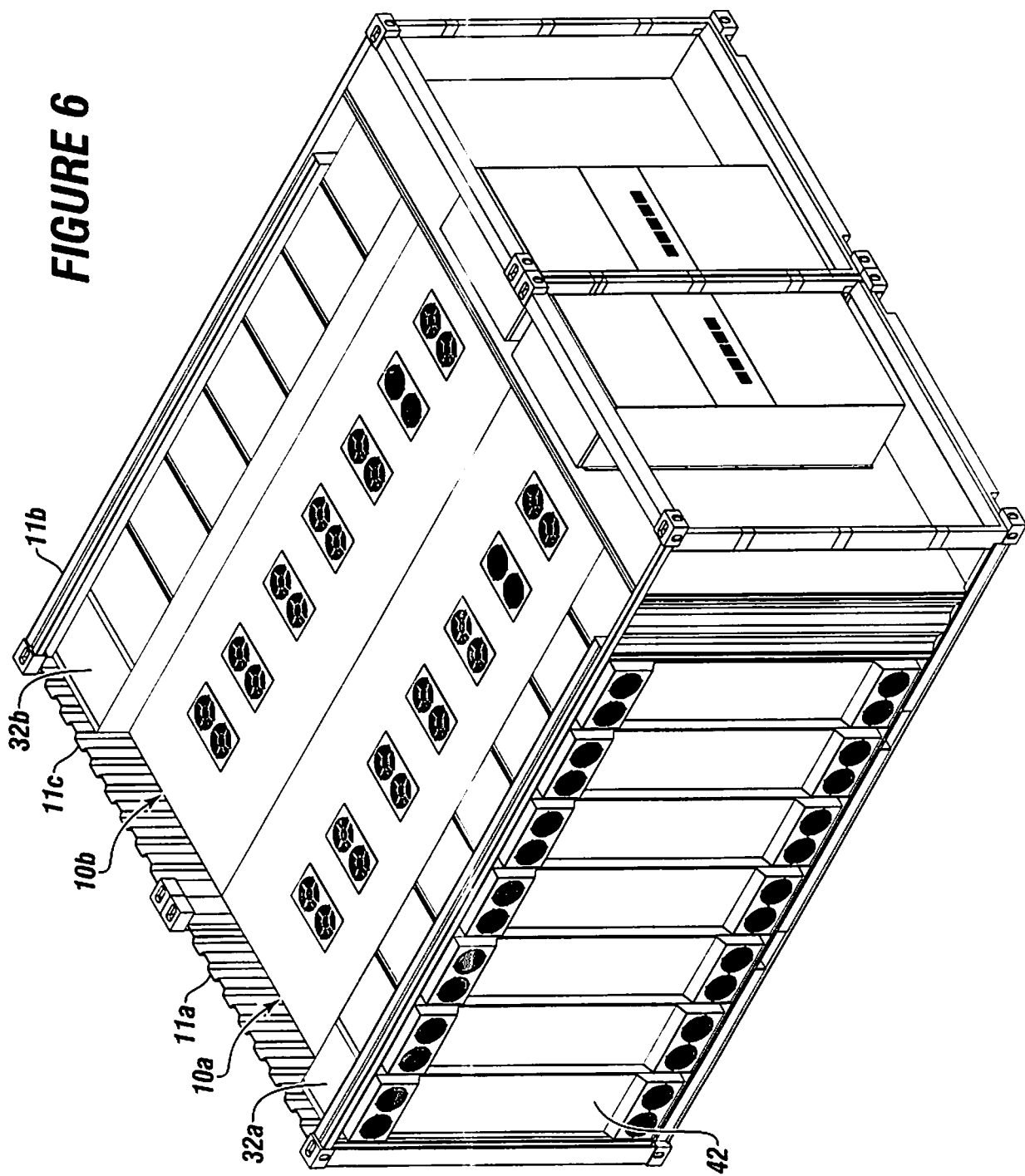


FIGURE 6



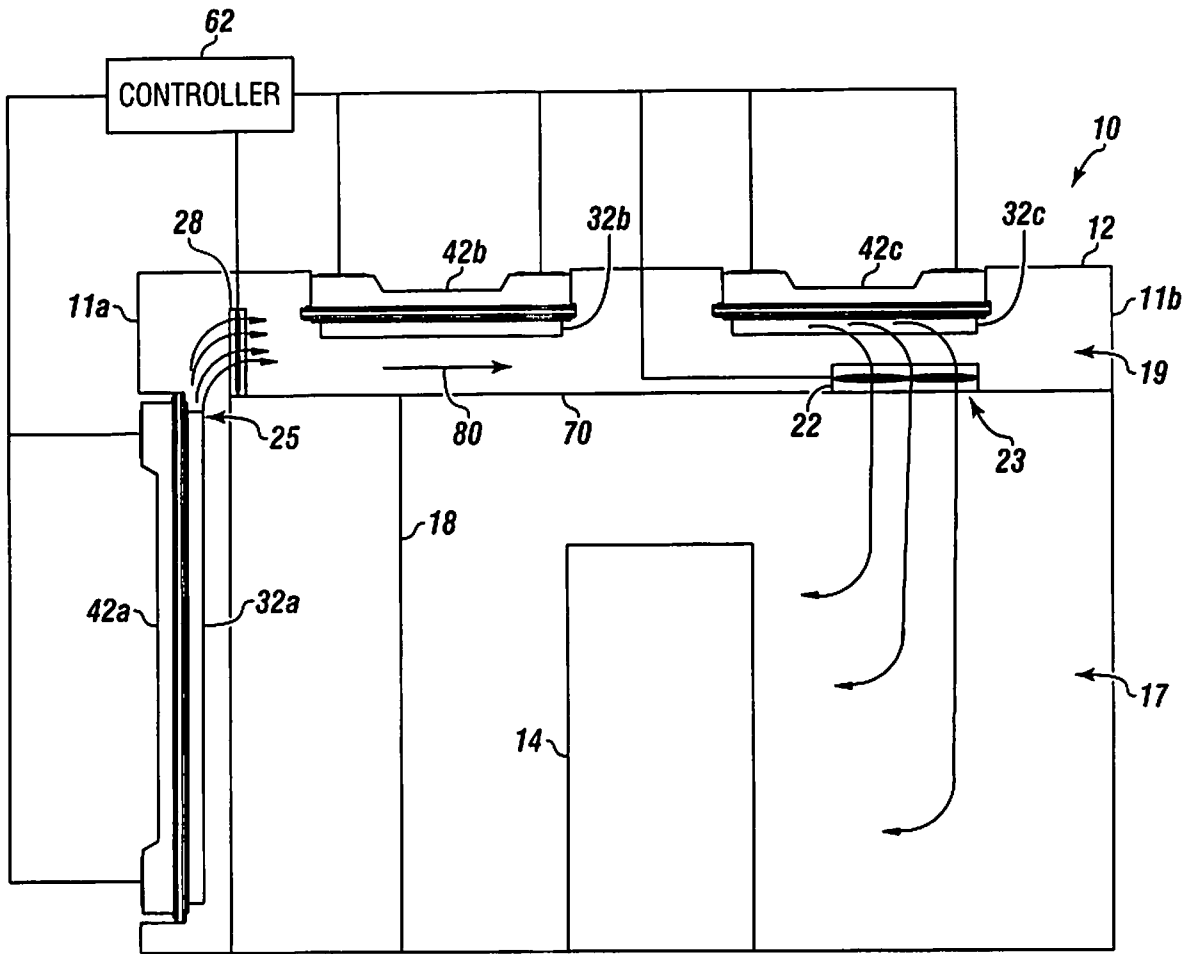


FIGURE 7

FIGURE 8

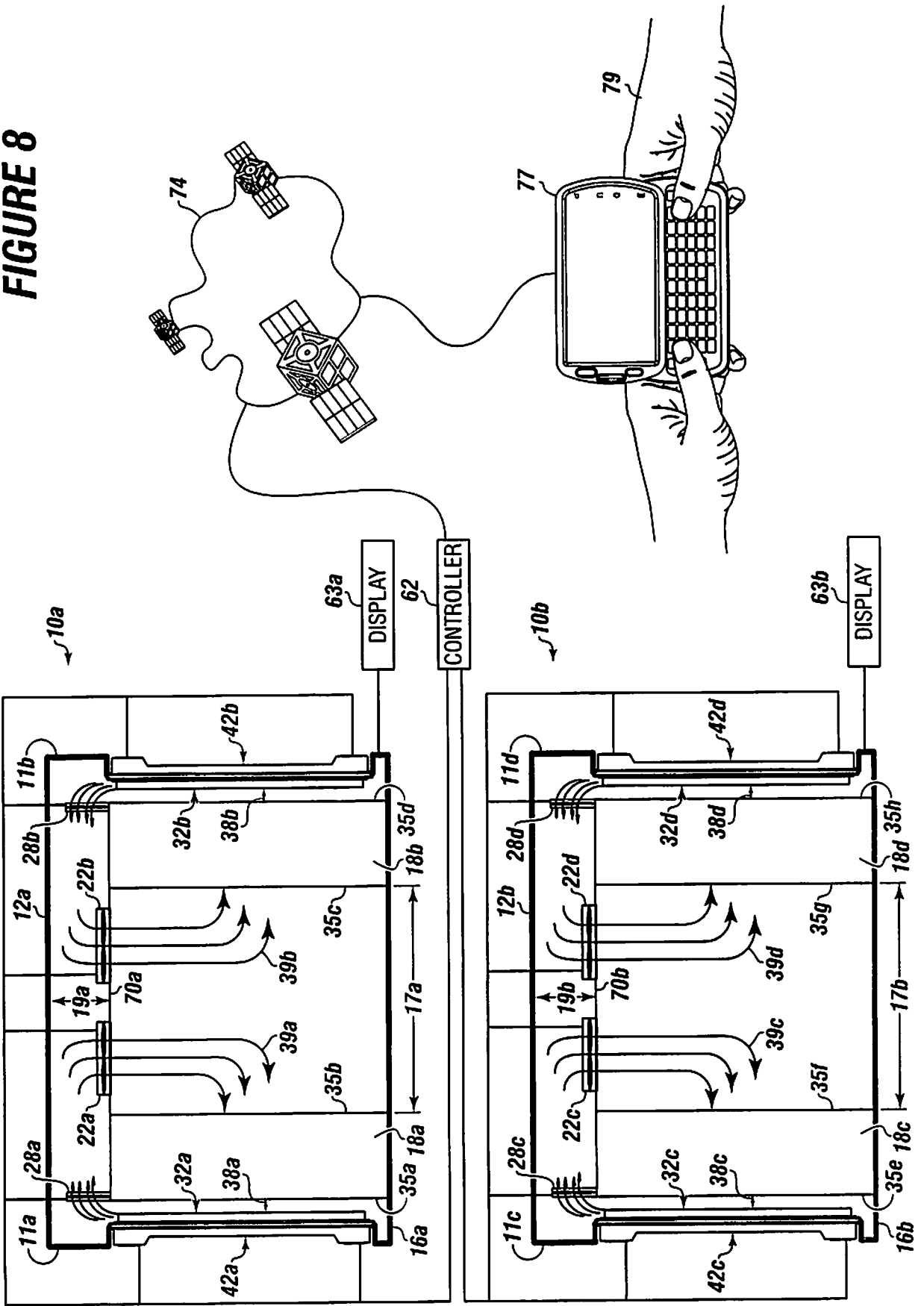


FIGURE 9

