

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.

|                                                                                                                                     |                                         |                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------|
| <b>UTILITY<br/>PATENT APPLICATION<br/>TRANSMITTAL</b><br><br><i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i> | <b>Attorney Docket No.</b>              | <b>230-046-CON</b>                                            |
|                                                                                                                                     | <b>First Named Inventor</b>             | <b>John Douglas STEINBERG</b>                                 |
|                                                                                                                                     | <b>Title</b>                            | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY... |
|                                                                                                                                     | <b>Priority Mail Express® Label No.</b> |                                                               |

|                                                                                                            |                                                                                                                   |
|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>APPLICATION ELEMENTS</b><br><i>See MPEP chapter 600 concerning utility patent application contents.</i> | <b>ADDRESS TO:</b><br><b>Commissioner for Patents</b><br><b>P.O. Box 1450</b><br><b>Alexandria, VA 22313-1450</b> |
|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> <b>Fee Transmittal Form</b><br/>(PTO/SB/17 or equivalent)</li> <li>2. <input type="checkbox"/> <b>Applicant asserts small entity status.</b><br/>See 37 CFR 1.27</li> <li>3. <input type="checkbox"/> <b>Applicant certifies micro entity status.</b> See 37 CFR 1.29.<br/>Applicant must attach form PTO/SB/15A or B or equivalent.</li> <li>4. <input checked="" type="checkbox"/> <b>Specification</b> [Total Pages <u>22</u>]<br/>Both the claims and abstract must start on a new page.<br/>(See MPEP § 608.01(a) for information on the preferred arrangement)</li> <li>5. <input checked="" type="checkbox"/> <b>Drawing(s)</b> (35 U.S.C. 113) [Total Sheets <u>13</u>]</li> <li>6. <b>Inventor's Oath or Declaration</b> [Total Pages <u>2</u>]<br/>(including substitute statements under 37 CFR 1.64 and assignments<br/>serving as an oath or declaration under 37 CFR 1.63(e))             <ol style="list-style-type: none"> <li>a. <input type="checkbox"/> Newly executed (original or copy)</li> <li>b. <input checked="" type="checkbox"/> A copy from a prior application (37 CFR 1.63(d))</li> </ol> </li> <li>7. <input checked="" type="checkbox"/> <b>Application Data Sheet</b> * See note below.<br/>See 37 CFR 1.76 (PTO/AIA/14 or equivalent)</li> <li>8. <b>CD-ROM or CD-R</b><br/>in duplicate, large table, or Computer Program (Appendix)<br/><input type="checkbox"/> Landscape Table on CD</li> <li>9. <b>Nucleotide and/or Amino Acid Sequence Submission</b><br/>(if applicable, items a. – c. are required)             <ol style="list-style-type: none"> <li>a. <input type="checkbox"/> Computer Readable Form (CRF)</li> <li>b. <input type="checkbox"/> Specification Sequence Listing on:                 <ol style="list-style-type: none"> <li>i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or</li> <li>ii. <input type="checkbox"/> Paper</li> </ol> </li> <li>c. <input type="checkbox"/> Statements verifying identity of above copies</li> </ol> </li> </ol> | <b>ACCOMPANYING APPLICATION PAPERS</b><br><br><ol style="list-style-type: none"> <li>10. <input type="checkbox"/> <b>Assignment Papers</b><br/>(cover sheet &amp; document(s))<br/>Name of Assignee _____</li> <li>11. <input checked="" type="checkbox"/> <b>37 CFR 3.73(c) Statement</b> <input checked="" type="checkbox"/> <b>Power of Attorney</b><br/>(when there is an assignee)</li> <li>12. <input type="checkbox"/> <b>English Translation Document</b><br/>(if applicable)</li> <li>13. <input type="checkbox"/> <b>Information Disclosure Statement</b><br/>(PTO/SB/08 or PTO-1449)<br/><input type="checkbox"/> Copies of citations attached</li> <li>14. <input type="checkbox"/> <b>Preliminary Amendment</b></li> <li>15. <input type="checkbox"/> <b>Return Receipt Postcard</b><br/>(MPEP § 503) (Should be specifically itemized)</li> <li>16. <input type="checkbox"/> <b>Certified Copy of Priority Document(s)</b><br/>(if foreign priority is claimed)</li> <li>17. <input type="checkbox"/> <b>Nonpublication Request</b><br/>Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35<br/>or equivalent.</li> <li>18. <input type="checkbox"/> <b>Other:</b> _____<br/>_____<br/>_____<br/>_____</li> </ol> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**\*Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 must be included in an Application Data Sheet (ADS).  
 (2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

|                                                                                                                                                         |                         |          |  |                                   |            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------|--|-----------------------------------|------------|
| <b>19. CORRESPONDENCE ADDRESS</b>                                                                                                                       |                         |          |  |                                   |            |
| <input checked="" type="checkbox"/> The address associated with Customer Number: <u>144465</u> OR <input type="checkbox"/> Correspondence address below |                         |          |  |                                   |            |
| Name                                                                                                                                                    |                         |          |  |                                   |            |
| Address                                                                                                                                                 |                         |          |  |                                   |            |
| City                                                                                                                                                    | State                   | Zip Code |  |                                   |            |
| Country                                                                                                                                                 | Telephone               | Email    |  |                                   |            |
| Signature                                                                                                                                               | /Daniel A. Tanner, III/ |          |  | Date                              | 2023-02-01 |
| Name (Print/Type)                                                                                                                                       | Daniel A. Tanner, III   |          |  | Registration No. (Attorney/Agent) | 54734      |

This collection of information is required by 37 CFR 1.53(b). 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 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.

## 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.

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.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              |                        |             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------|-------------|
| <b>Application Data Sheet 37 CFR 1.76</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                              | Attorney Docket Number | 230-046-CON |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              | Application Number     |             |
| Title of Invention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |                        |             |
| <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:**

|                          |                                                                                                                                                                                                                                       |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | 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.) |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Inventor Information:**

|                                                                                                                                                                                 |                   |                       |                    |                             |               |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|--------------------|-----------------------------|---------------|--|
| <b>Inventor 1</b>                                                                                                                                                               |                   |                       |                    |                             | <b>Remove</b> |  |
| <b>Legal Name</b>                                                                                                                                                               |                   |                       |                    |                             |               |  |
| <b>Prefix</b>                                                                                                                                                                   | <b>Given Name</b> | <b>Middle Name</b>    | <b>Family Name</b> | <b>Suffix</b>               |               |  |
|                                                                                                                                                                                 | John              | Douglas               | STEINBERG          |                             |               |  |
| <b>Residence Information (Select One)</b> <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service |                   |                       |                    |                             |               |  |
| <b>City</b>                                                                                                                                                                     | Millbrae          | <b>State/Province</b> | CA                 | <b>Country of Residence</b> | US            |  |
| <b>Mailing Address of Inventor:</b>                                                                                                                                             |                   |                       |                    |                             |               |  |
| <b>Address 1</b>                                                                                                                                                                | 873 Hacienda Way  |                       |                    |                             |               |  |
| <b>Address 2</b>                                                                                                                                                                |                   |                       |                    |                             |               |  |
| <b>City</b>                                                                                                                                                                     | Millbrae          | <b>State/Province</b> | CA                 |                             |               |  |
| <b>Postal Code</b>                                                                                                                                                              | 94030             | <b>Country</b>        | US                 |                             |               |  |
| <b>Inventor 2</b>                                                                                                                                                               |                   |                       |                    |                             | <b>Remove</b> |  |
| <b>Legal Name</b>                                                                                                                                                               |                   |                       |                    |                             |               |  |
| <b>Prefix</b>                                                                                                                                                                   | <b>Given Name</b> | <b>Middle Name</b>    | <b>Family Name</b> | <b>Suffix</b>               |               |  |
|                                                                                                                                                                                 | Scott             | Douglas               | HUBLU              |                             |               |  |
| <b>Residence Information (Select One)</b> <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service |                   |                       |                    |                             |               |  |
| <b>City</b>                                                                                                                                                                     | Redwood City      | <b>State/Province</b> | CA                 | <b>Country of Residence</b> | US            |  |
| <b>Mailing Address of Inventor:</b>                                                                                                                                             |                   |                       |                    |                             |               |  |
| <b>Address 1</b>                                                                                                                                                                | 747 Lakeview Way  |                       |                    |                             |               |  |
| <b>Address 2</b>                                                                                                                                                                |                   |                       |                    |                             |               |  |
| <b>City</b>                                                                                                                                                                     | Redwood City      | <b>State/Province</b> | CA                 |                             |               |  |
| <b>Postal Code</b>                                                                                                                                                              | 94062             | <b>Country</b>        | US                 |                             |               |  |
| All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the <b>Add</b> button.                                     |                   |                       |                    |                             | <b>Add</b>    |  |

**Correspondence Information:**

|                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Enter either Customer Number or complete the Correspondence Information section below.</p> <p>For further information see 37 CFR 1.33(a).</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------|

|                                           |                                                                              |                        |             |
|-------------------------------------------|------------------------------------------------------------------------------|------------------------|-------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                              | Attorney Docket Number | 230-046-CON |
|                                           |                                                                              | Application Number     |             |
| Title of Invention                        | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |                        |             |

☐ An Address is being provided for the correspondence information of this application.

|                 |                  |                                          |                                             |
|-----------------|------------------|------------------------------------------|---------------------------------------------|
| Customer Number | 144465           |                                          |                                             |
| Email Address   | dan@tannerip.com | <input type="button" value="Add Email"/> | <input type="button" value="Remove Email"/> |

### Application Information:

|                                         |                                                                              |                                           |                          |
|-----------------------------------------|------------------------------------------------------------------------------|-------------------------------------------|--------------------------|
| Title of the Invention                  | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |                                           |                          |
| Attorney Docket Number                  | 230-046-CON                                                                  | Small Entity Status Claimed               | <input type="checkbox"/> |
| Application Type                        | Nonprovisional                                                               |                                           |                          |
| Subject Matter                          | Utility                                                                      |                                           |                          |
| Total Number of Drawing Sheets (if any) | 13                                                                           | Suggested Figure for Publication (if any) |                          |

### Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

|                                                        |                          |                                            |
|--------------------------------------------------------|--------------------------|--------------------------------------------|
| Application number of the previously filed application | Filing date (YYYY-MM-DD) | Intellectual Property Authority or Country |
|                                                        |                          |                                            |

### 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). Either enter 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: | <input checked="" type="radio"/> Customer Number | <input type="radio"/> US Patent Practitioner | <input type="radio"/> Limited Recognition (37 CFR 11.9) |
| Customer Number    | 144465                                           |                                              |                                                         |

|                                           |                                                                              |                        |             |
|-------------------------------------------|------------------------------------------------------------------------------|------------------------|-------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                              | Attorney Docket Number | 230-046-CON |
|                                           |                                                                              | Application Number     |             |
| Title of Invention                        | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |                        |             |

## Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim 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.

When referring to the current application, please leave the "Application Number" field blank.

|                          |                 |                          |                                    |               |                         |
|--------------------------|-----------------|--------------------------|------------------------------------|---------------|-------------------------|
| Prior Application Status | Pending         | <a href="#">Remove</a>   |                                    |               |                         |
| Application Number       | Continuity Type | Prior Application Number | Filing or 371(c) Date (YYYY-MM-DD) |               |                         |
|                          | Continuation of | 17700409                 | 2022-03-21                         |               |                         |
| Prior Application Status | Abandoned       | <a href="#">Remove</a>   |                                    |               |                         |
| Application Number       | Continuity Type | Prior Application Number | Filing or 371(c) Date (YYYY-MM-DD) |               |                         |
| 17700409                 | Continuation of | 16806779                 | 2020-03-02                         |               |                         |
| Prior Application Status | Patented        | <a href="#">Remove</a>   |                                    |               |                         |
| Application Number       | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD)           | Patent Number | Issue Date (YYYY-MM-DD) |
| 16806779                 | Continuation of | 16374083                 | 2019-04-03                         | 10612983      | 2020-04-07              |
| Prior Application Status | Abandoned       | <a href="#">Remove</a>   |                                    |               |                         |
| Application Number       | Continuity Type | Prior Application Number | Filing or 371(c) Date (YYYY-MM-DD) |               |                         |
| 16374083                 | Continuation of | 15905251                 | 2018-02-26                         |               |                         |
| Prior Application Status | Patented        | <a href="#">Remove</a>   |                                    |               |                         |
| Application Number       | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD)           | Patent Number | Issue Date (YYYY-MM-DD) |
| 15905251                 | Division of     | 14731221                 | 2015-06-04                         | 9939333       | 2018-04-10              |
| Prior Application Status | Patented        | <a href="#">Remove</a>   |                                    |               |                         |
| Application Number       | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD)           | Patent Number | Issue Date (YYYY-MM-DD) |
| 14731221                 | Continuation of | 13861189                 | 2013-04-11                         | 9057649       | 2015-06-16              |
| Prior Application Status | Patented        | <a href="#">Remove</a>   |                                    |               |                         |
| Application Number       | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD)           | Patent Number | Issue Date (YYYY-MM-DD) |
| 13861189                 | Continuation of | 13230610                 | 2011-09-12                         | 8423322       | 2013-04-06              |
| Prior Application Status | Patented        | <a href="#">Remove</a>   |                                    |               |                         |
| Application Number       | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD)           | Patent Number | Issue Date (YYYY-MM-DD) |
| 13230610                 | Continuation of | 12211690                 | 2008-09-16                         | 8019567       | 2011-09-13              |

|                                                                                                                       |                                                                              |                          |                                    |
|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------|------------------------------------|
| <b>Application Data Sheet 37 CFR 1.76</b>                                                                             |                                                                              | Attorney Docket Number   | 230-046-CON                        |
|                                                                                                                       |                                                                              | Application Number       |                                    |
| Title of Invention                                                                                                    | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |                          |                                    |
| Prior Application Status                                                                                              | Expired                                                                      | <a href="#">Remove</a>   |                                    |
| Application Number                                                                                                    | Continuity Type                                                              | Prior Application Number | Filing or 371(c) Date (YYYY-MM-DD) |
| 12211690                                                                                                              | Claims benefit of provisional                                                | 60994011                 | 2007-09-17                         |
| Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the <b>Add</b> button. |                                                                              |                          |                                    |

## Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. 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. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)<sup>i</sup> the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

|                                                                                                        |                      |                          |                                          |
|--------------------------------------------------------------------------------------------------------|----------------------|--------------------------|------------------------------------------|
|                                                                                                        |                      |                          | <a href="#">Remove</a>                   |
| Application Number                                                                                     | Country <sup>i</sup> | Filing Date (YYYY-MM-DD) | Access Code <sup>i</sup> (if applicable) |
|                                                                                                        |                      |                          |                                          |
| Additional Foreign Priority Data may be generated within this form by selecting the <b>Add</b> button. |                      |                          |                                          |

## Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

☐ NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

|                                           |                                                                              |                        |             |
|-------------------------------------------|------------------------------------------------------------------------------|------------------------|-------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                              | Attorney Docket Number | 230-046-CON |
|                                           |                                                                              | Application Number     |             |
| Title of Invention                        | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |                        |             |

## Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

**NOTE:** This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

### 1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

**A. Priority Document Exchange (PDX)** - Unless box A in subsection 2 (opt-out of authorization) is 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 State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

**B. Search Results from U.S. Application to EPO** - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

### 2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

**NOTE:** Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

|                                           |                                                                              |                        |             |
|-------------------------------------------|------------------------------------------------------------------------------|------------------------|-------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                              | Attorney Docket Number | 230-046-CON |
|                                           |                                                                              | Application Number     |             |
| Title of Invention                        | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |                        |             |

## Applicant Information:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                        |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------------------------------------------------------|-------|
| Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                          |                                                                        |       |
| <b>Applicant 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                          |                                                                        |       |
| <p>If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.</p> |                          |                                                                        |       |
| <input type="button" value="Clear"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |                                                                        |       |
| <input checked="" type="radio"/> Assignee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          | <input type="radio"/> Legal Representative under 35 U.S.C. 117         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          | <input type="radio"/> Joint Inventor                                   |       |
| <input type="radio"/> Person to whom the inventor is obligated to assign.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          | <input type="radio"/> Person who shows sufficient proprietary interest |       |
| If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |                                                                        |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                        |       |
| Name of the Deceased or Legally Incapacitated Inventor: <input type="text"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                                                                        |       |
| If the Applicant is an Organization check here. <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                          |                                                                        |       |
| Organization Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ECOFACOR, INC.           |                                                                        |       |
| <b>Mailing Address Information For Applicant:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |                                                                        |       |
| Address 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 441 California Avenue #2 |                                                                        |       |
| Address 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |                                                                        |       |
| City                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Palo Alto                | State/Province                                                         | CA    |
| Country                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | US                       | Postal Code                                                            | 94306 |
| Phone Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          | Fax Number                                                             |       |
| Email Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |                                                                        |       |
| Additional Applicant Data may be generated within this form by selecting the Add button.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |                                                                        |       |

## Assignee Information including Non-Applicant Assignee Information:

|                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                           |                                                                              |                        |             |
|-------------------------------------------|------------------------------------------------------------------------------|------------------------|-------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                              | Attorney Docket Number | 230-046-CON |
|                                           |                                                                              | Application Number     |             |
| Title of Invention                        | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |                        |             |

**Assignee 1**

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

|        |            |             |             |        |
|--------|------------|-------------|-------------|--------|
| Prefix | Given Name | Middle Name | Family Name | Suffix |
|        |            |             |             |        |

**Mailing Address Information For Assignee including Non-Applicant Assignee:**

|                      |  |                |  |
|----------------------|--|----------------|--|
| Address 1            |  |                |  |
| Address 2            |  |                |  |
| City                 |  | State/Province |  |
| Country <sup>i</sup> |  | Postal Code    |  |
| Phone Number         |  | Fax Number     |  |
| Email Address        |  |                |  |

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

**Signature:**

**NOTE:** This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

|            |                         |           |                   |                     |
|------------|-------------------------|-----------|-------------------|---------------------|
| Signature  | /Daniel A. Tanner, III/ |           | Date (YYYY-MM-DD) | 2023-02-01          |
| First Name | Daniel                  | Last Name | TANNER            | Registration Number |
| 54734      |                         |           |                   |                     |

Additional Signature may be generated within this form by selecting the Add button.

|                                           |                                                                              |                        |             |
|-------------------------------------------|------------------------------------------------------------------------------|------------------------|-------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                              | Attorney Docket Number | 230-046-CON |
|                                           |                                                                              | Application Number     |             |
| Title of Invention                        | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |                        |             |

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.

**SYSTEM AND METHOD FOR  
EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM**

**BACKGROUND**

[0001] This application is a Continuation of U.S. Patent Application No. 17/700,409, entitled “System And Method For Evaluating Changes In The Efficiency Of An HVAC System,” by Steinberg et al., filed in the U.S. Patent and Trademark Office (“USPTO”) on March 21, 2022, which in turn is a Continuation of U.S. Patent Application No. 16/806,779, entitled “System And Method For Evaluating Changes In The Efficiency Of An HVAC System,” by Steinberg et al., filed in the USPTO on March 3, 2020, which in turn is a Continuation of U.S. Patent Application No. 16/374,083, filed in the USPTO on April 3, 2019, and issued as U.S. Patent No. 10,612,983 on April 7, 2020, which in turn is a Continuation of U.S. Patent Application No. 15/905,251, filed in the USPTO on February 26, 2018, now abandoned, which in turn is a Division of U.S. Patent Application No. 14/731,221, filed in the USPTO on June 4, 2015, and issued as U.S. Patent No. 9,939,333 on April 10, 2018, which in turn is a Continuation of U.S. Patent Application No. 13/861,189, filed in the USPTO on April 11, 2013, and issued as U.S. Patent No. 9,057,649 on June 16, 2015, which in turn is a Continuation of U.S. Patent Application No. 13/230,610, filed in the USPTO on September 12, 2011, and issued as U.S. Patent No. 8,423,322 on April 6, 2013, which in turn is a Continuation of U.S. Patent Application No. 12/211,690, filed in the USPTO on September 16, 2008, and issued as U.S. Patent No. 8,019,567 on September 13, 2011, which in turn claims the benefit of U.S. Provisional Patent Application No. 60/994,011, filed in the USPTO on September 17, 2007, the disclosures of all of which are hereby incorporated by reference herein in their entirety.

1. **Field of the Invention**

[0002] This invention relates to the use of thermostatic HVAC controls that are connected to a computer network. More specifically, communicating thermostats are combined with a computer network in order to evaluate changes in the operational efficiency of an HVAC system over time.

2. **Related Art**

[0003] Climate control systems such as heating and cooling systems for buildings (heating, ventilation and cooling, or HVAC systems) have been controlled for decades by thermostats. At the most basic level, a thermostat includes a means to allow a user to set a desired temperature, a

means to sense actual temperature, and a means to signal the heating and/or cooling devices to turn on or off in order to try to change the actual temperature to equal the desired temperature. The most basic versions of thermostats use components such as a coiled bi-metallic spring to measure actual temperature and a mercury switch that opens or completes a circuit when the spring coils or uncoils with temperature changes. More recently, electronic digital thermostats have become prevalent. These thermostats use solid-state devices such as thermistors or thermal diodes to measure temperature, and microprocessor-based circuitry to control the switch and to store and operate based upon user-determined protocols for temperature vs. time.

**[0004]** These programmable thermostats generally offer a very restrictive user interface, limited by the cost of the devices, the limited real estate of the small wall-mounted boxes, and the inability to take into account more than two variables: the desired temperature set by the user, and the ambient temperature sensed by the thermostat. Users can generally only set one series of commands per day, and in order to change one parameter (e.g., to change the late-night temperature) the user often has to cycle through several other parameters by repeatedly pressing one or two buttons.

**[0005]** Because the interface of programmable thermostats is so poor, the significant theoretical savings that are possible with them (sometimes cited as 25% of heating and cooling costs) are rarely realized. In practice, studies have found that more than 50% of users never program their thermostats at all. Significant percentages of the thermostats that are programmed are programmed sub-optimally, in part because, once programmed, people tend to not to re-invest the time needed to change the settings very often.

**[0006]** A second problem with standard programmable thermostats is that they represent only a small evolutionary step beyond the first, purely mechanical thermostats. Like the first thermostats, they only have two input signals – ambient temperature and the preset desired temperature. The entire advance with programmable thermostats is that they can shift between multiple present temperatures at different times.

#### **SUMMARY OF THE INVENTION**

**[0007]** There are many other sources of information that could be used to increase comfort, decrease energy use, or both. For example, outside temperature and humidity strongly affect subjective comfort. On a 95 degree, 90 percent humidity day in August, when people tend to dress

in lightweight clothing, a house cooled to 70 degrees will feel cool or even uncomfortably cold. On a below-freezing day in January, when people tend to wear sweaters and heavier clothes, that same 70 degree home will feel too warm. It would therefore be advantageous for a thermostat system to automatically incorporate information about external weather conditions when setting the desired temperature.

**[0008]** Thermostats are used to regulate temperature for the benefit of the occupants in a given space. (Usually this means people, but it can of course also mean critical equipment, such as in a room filled with computer equipment.) In general, thermostats read temperature from the sensor located within the “four corners” of the thermostat. With a properly designed system, the thermostat may well be located such that the temperature read at the precise location of the thermostat accurately reflects the conditions where the human (or other) occupants tend to be. But there are many reasons and circumstances in which that will not be the case. A single thermostat may produce accurate readings in some circumstances but not others; it may be located in a place far from the occupants, or too far from the ductwork controlled by the thermostat, etc. In one house, for example, the thermostat may be located in a spot that receives direct sunlight on hot afternoons. This could cause the thermostat to sense that the local ambient temperature is extremely high, and as a result signal the A/C to run too long, making the rest of the home too cold, and wasting considerable energy. In another house, the thermostat may be located in a hallway without ductwork or where the nearby ducts have been closed. In such a scenario, the thermostat is likely to (correctly) report cold temperatures in the winter, leading the heating system to overheat the rest of the house and waste considerable energy.

**[0009]** These problems can be reduced or eliminated through use of additional remote temperature sensors connected to the thermostat’s control circuitry. However, such systems require additional hardware, additional thermostat complexity, and skilled installation and configuration.

**[0010]** It would therefore be desirable for a thermostat system using only a single temperature sensor to take such sub-optimal installations into account and to correct for the erroneous readings generated by such thermostats.

**[0011]** Different structures will respond to changes in conditions such as external temperature in different ways. For example, houses built 50 or more years ago will generally have little or no insulation, be poorly sealed, and have simple single-glazed windows. Such houses will do a very poor job of retaining internal heat in the winter and rejecting external heat in the summer. In the

absence of applications of thermal measures such as heating and air conditioning, the inside temperature in such houses will trend to track outside temperatures very closely. Such houses may be said to have low thermal mass. A house built in recent years, using contemporary techniques for energy efficiency such as high levels of insulation, double-glazed windows and other techniques, will, in the absence of intervention, tend to absorb external heat and release internal heat very slowly. The newer house can be thought of as having higher thermal mass than the older house.

**[0012]** A conventional thermostat has no mechanism by which it might take the thermal mass of the structure into account, but thermal mass significantly affects many parameters relating to energy efficiency.

**[0013]** The cost to an electric utility to produce power varies over time. Indeed, the cost of production between low demand and peak demand periods can vary by as much as an order of magnitude. Traditionally, residential customers paid the same price regardless of time or the cost to produce. Thus consumers have had little financial incentive to reduce consumption during periods of high demand and high production cost. Many electric utilities are now seeking to bring various forms of variable rates to the retail energy markets. Under such schemes, consumers can reduce costs by taking into account not just how much energy they use, but when they use it.

**[0014]** Thus many consumers now can see real benefits from optimizing not just the total number of kilowatt-hours of electricity consumed, but also optimizing when it is used. The optimum strategy for energy use over time will vary based upon many variables, one of which is the thermal mass of the structure being heated or cooled. In a structure with high thermal mass, heating and cooling can effectively be shifted away from high cost periods to lower cost “shoulder” periods with little or no effect on comfort. If, for example, a utility charges much higher rates on hot summer afternoons, it is likely that pre-cooling a high-thermal mass structure just before the high-cost period and then shutting down the air conditioning during the peak will allow the house to remain comfortable. But in a house with low thermal mass, the benefits of pre-cooling will quickly dissipate, and the house will rapidly become uncomfortable if the air conditioning is shut off. Thus it would be advantageous for a temperature control system to take thermal mass into account when setting desired temperatures.

**[0015]** Many factors affect the efficiency of HVAC systems. Some may be thought of as essentially fixed, such as the theoretical efficiency of a central air conditioner (often expressed as

its SEER rating), the matching of a given system to the characteristics of a given home, the location and size of forced-air ductwork, etc. Other contributors to efficiency are more dynamic, such as clogged filters, refrigerant leaks, duct leakage and “pop-offs,” and the like.

**[0016]** Most of these problems are likely to manifest themselves in the form of higher energy bills. But the “signature” of each different problem can be discerned from the way in which each such problem affects the cycle times of a given HVAC system over time and relative to weather conditions and the performance of other HVAC systems in other houses. If two otherwise identical houses are located next door to each other and have gas furnaces, but one is rated at 50,000 BTUs and the other is rated at 100,000 BTUs, the cycle times for the higher-capacity furnace should be shorter than for the lower-capacity unit. If both of those same houses have identical furnaces, but one has a clogged filter, the cycle times should be longer in the house with the clogged filter. Because cycling of the HVAC system is controlled by the thermostat, those differences in cycle time would be reflected in the data sensed by and control signals generated by the thermostat. It would be advantageous for a thermostat system to be able to use that information to diagnose problems and make recommendations based upon that data.

**[0017]** These needs are satisfied by at least one embodiment of the invention that includes a system for calculating a value for the effective thermal mass of a building comprising: at least one HVAC control system that measures temperature at at least a first location conditioned by said HVAC system, and reporting said temperature measurements as well as the status of said HVAC control system; one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC control systems and compare said temperature measurements from said first location with expected temperature measurements wherein the expected temperature measurements are based at least in part upon past temperature measurements obtained by said HVAC control system and said outside temperature measurements; and one or more databases that store at least said temperatures measured at said first location over time; calculating one or more rates of change in temperature at said first location; and relating said calculated rates of change to said outside temperature measurements.

**[0018]** Another embodiment includes a system for calculating a value for the operational efficiency of an HVAC system comprising at least one HVAC control system that measures temperature at at least a first location conditioned by said HVAC system, and reporting said temperature measurements as well as the status of said HVAC control system; one or more

processors that receive measurements of outside temperatures from at least one source other than said HVAC control systems and compare said temperature measurements from said first location with expected temperature measurements wherein the expected temperature measurements are based at least in part upon past temperature measurements obtained by said HVAC control system and said outside temperature measurements; and one or more databases that store at least said temperatures measured at said first location over time; calculating one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is “on”; calculating one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is “off”; and relating said calculated rates of change to said outside temperature measurements.

**[0019]** A further embodiment includes a system for evaluating changes in the operational efficiency of an HVAC system over time comprising at least one HVAC control system that measures temperature at at least a first location conditioned by said HVAC system, and reporting said temperature measurements as well as the status of said HVAC control system; one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC control systems and compare said temperature measurements from said first location with expected temperature measurements wherein the expected temperature measurements are based at least in part upon past temperature measurements obtained by said HVAC control system and said outside temperature measurements; and one or more databases that store at least said temperatures measured at said first location over time.

**[0020]** A further embodiment includes a system for detecting and correcting for anomalous behavior in HVAC control systems comprising a first HVAC control system that measures temperature at at least a first location conditioned by said first HVAC system, and reporting said temperature measurements as well as the status of said first HVAC control system; at least a second HVAC control system that measures temperature at at least a second location conditioned by said second HVAC system, and reporting said temperature measurements as well as the status of said second HVAC control system; one or more processors that receive measurements of outside temperatures from at least one source other than said first and second HVAC control systems and compare said temperature measurements from said first HVAC control system and said second HVAC control system and said outside temperature measurements; and one or more databases that store said temperatures measurements.

**[0021]** In at least one embodiment, the invention comprises a thermostat attached to an HVAC system, a local network connecting the thermostat to a larger network such as the Internet, and one or more additional thermostats attached to the network, and a server in bi-directional communication with a plurality of such thermostats. The server logs the ambient temperature sensed by each thermostat vs. time and the signals sent by the thermostats to their HVAC systems. The server preferably also logs outside temperature and humidity data for the geographic locations for the buildings served by the connected HVAC systems. Such information is widely available from various sources that publish detailed weather information based on geographic areas such as by ZIP code. The server also stores other data affecting the load upon the system, such as specific model of HVAC system, occupancy, building characteristics, etc. Some of this data may be supplied by the individual users of the system, while other data may come from third-party sources such as the electric and other utilities who supply energy to those users.

**[0022]** Combining these data sources will also allow the server to calculate the effective thermal mass of the structures conditioned by those thermostats. By combining data from multiple thermostats in a given neighborhood, the system can correct for flaws in the location of a given thermostat, and can evaluate the efficiency of a given system, as well as assist in the diagnosis of problems and malfunctions in such systems.

**[0023]** This and other advantages of certain embodiments of the invention are explained in the detailed description and claims that make reference to the accompanying diagrams and flowcharts.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0024]** FIG. 1 shows an example of an overall environment in which an embodiment of the invention may be used.

**[0025]** FIG. 2 shows a high-level illustration of the architecture of a network showing the relationship between the major elements of one embodiment of the subject invention.

**[0026]** FIG. 3 shows an embodiment of the website to be used as part of the subject invention.

**[0027]** FIG. 4 shows a high-level schematic of the thermostat used as part of the subject invention.

**[0028]** FIG. 5 shows one embodiment of the database structure used as part of the subject invention.

**[0029]** FIGS. 6a and 6b show graphical representations of inside and outside temperatures in two different homes, one with high thermal mass and one with low thermal mass.

**[0030]** FIGS. 7a and 7b show graphical representations of inside and outside temperatures in the same homes as in FIGS. 6a and 6b, showing the cycling of the air conditioning systems in those houses.

**[0031]** FIGS. 8a and 8b show graphical representations of inside and outside temperatures in the same home as in FIGS. 6a and 7a, showing the cycling of the air conditioning on two different days in order to demonstrate the effect of a change in operating efficiency on the parameters measured by the thermostat.

**[0032]** FIGS. 9a and 9b show the effects of employing a pre-cooling strategy in two different houses.

**[0033]** FIGS. 10a and 10b show graphical representations of inside and outside temperatures in two different homes in order to demonstrate how the system can correct for erroneous readings in one house by referencing readings in another.

**[0034]** FIG. 11 is a flowchart illustrating the steps involved in calculating the effective thermal mass of a home using the subject invention.

**[0035]** FIG. 12 is a flowchart illustrating the steps involved in determining whether an HVAC system has developed a problem that impairs efficiency using the subject invention.

**[0036]** FIG. 13 is a flowchart illustrating the steps involved in correcting for erroneous readings in one house by referencing readings in another using the subject invention.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

**[0037]** FIG. 1 shows an example of an overall environment 100 in which an embodiment of the invention may be used. The environment 100 includes an interactive communication network 102 with computers 104 connected thereto. Also connected to network 102 are one or more server computers 106, which store information and make the information available to computers 104. The network 102 allows communication between and among the computers 104 and 106.

**[0038]** Presently preferred network 102 comprises a collection of interconnected public and/or private networks that are linked together by a set of standard protocols to form a distributed network. While network 102 is intended to refer to what is now commonly referred to as the Internet, it is also intended to encompass variations which may be made in the future, including changes additions to existing standard protocols.

**[0039]** When a user of the subject invention wishes to access information on network 102, the buyer initiates connection from his computer 104. For example, the user invokes a browser, which executes on computer 104. The browser, in turn, establishes a communication link with network 102. Once connected to network 102, the user can direct the browser to access information on server 106.

**[0040]** One popular part of the Internet is the World Wide Web. The World Wide Web contains a large number of computers 104 and servers 106, which store HyperText Markup Language (HTML) documents capable of displaying graphical and textual information. HTML is a standard coding convention and set of codes for attaching presentation and linking attributes to informational content within documents.

**[0041]** The servers 106 that provide offerings on the World Wide Web are typically called websites. A website is often defined by an Internet address that has an associated electronic page. Generally, an electronic page is a document that organizes the presentation of text graphical images, audio and video.

**[0042]** In addition to the Internet, the network 102 can comprise a wide variety of interactive communication media. For example, network 102 can include local area networks, interactive television networks, telephone networks, wireless data systems, two-way cable systems, and the like.

**[0043]** In one embodiment, computers 104 and servers 106 are conventional computers that are equipped with communications hardware such as modem or a network interface card. The computers include processors such as those sold by Intel and AMD. Other processors may also be used, including general-purpose processors, multi-chip processors, embedded processors and the like.

**[0044]** Computers 104 can also be handheld and wireless devices such as personal digital assistants (PDAs), cellular telephones and other devices capable of accessing the network.

**[0045]** Computers 104 utilize a browser configured to interact with the World Wide Web. Such browsers may include Microsoft Explorer, Mozilla, Firefox, Opera or Safari. They may also include browsers used on handheld and wireless devices.

**[0046]** The storage medium may comprise any method of storing information. It may comprise random access memory (RAM), electronically erasable programmable read only memory

(EEPROM), read only memory (ROM), hard disk, floppy disk, CD-ROM, optical memory, or other method of storing data.

**[0047]** Computers 104 and 106 may use an operating system such as Microsoft Windows, Apple Mac OS, Linux, Unix or the like.

**[0048]** Computers 106 may include a range of devices that provide information, sound, graphics and text, and may use a variety of operating systems and software optimized for distribution of content via networks.

**[0049]** FIG.2 illustrates in further detail the architecture of the specific components connected to network 102 showing the relationship between the major elements of one embodiment of the subject invention. Attached to the network are thermostats 108 and computers 104 of various users. Connected to thermostats 108 are HVAC units 110. The HVAC units may be conventional air conditioners, heat pumps, or other devices for transferring heat into or out of a building. Each user is connected to the server 106 via wired or wireless connection such as Ethernet or a wireless protocol such as IEEE 802.11, a gateway 110 that connects the computer and thermostat to the Internet via a broadband connection such as a digital subscriber line (DSL) or other form of broadband connection to the World Wide Web. Server 106 contains the content to be served as web pages and viewed by computers 104, as well as databases containing information used by the servers.

**[0050]** In the currently preferred embodiment, the website 200 includes a number of components accessible to the user, as shown in FIG. 3. Those components may include a means to enter temperature settings 202, a means to enter information about the user's home 204, a means to enter the user's electricity bills 206, means to calculate energy savings that could result from various thermostat-setting strategies 208, and means to enable and choose between various arrangements 210 for demand reduction with their electric utility provider as intermediated by the demand reduction service provider.

**[0051]** FIG. 4 shows a high-level block diagram of thermostat 108 used as part of the subject invention. Thermostat 108 includes temperature sensing means 252, which may be a thermistor, thermal diode or other means commonly used in the design of electronic thermostats. It includes a microprocessor 254, memory 256, a display 258, a power source 260, a relay 262, which turns the HVAC system on and off in response to a signal from the microprocessor, and contacts by which the relay is connected to the wires that lead to the HVAC system. To allow the thermostat

to communicate bi-directionally with the computer network, the thermostat also includes means 264 to connect the thermostat to a local computer or to a wireless network. Such means could be in the form of Ethernet, wireless protocols such as IEEE 802.11, IEEE 802.15.4, Bluetooth, cellular systems such as CDMA, GSM and GPRS, or other wireless protocols. The thermostat 250 may also include controls 266 allowing users to change settings directly at the thermostat, but such controls are not necessary to allow the thermostat to function.

**[0052]** The data used to generate the content delivered in the form of the website is stored on one or more servers 106 within one or more databases. As shown in FIG. 5, the overall database structure 300 may include temperature database 400, thermostat settings database 500, energy bill database 600, HVAC hardware database 700, weather database 800, user database 900, transaction database 1000, product and service database 1100 and such other databases as may be needed to support these and additional features.

**[0053]** The website will allow users of connected thermostats 250 to create personal accounts. Each user's account will store information in database 900, which tracks various attributes relative to users of the site. Such attributes may include the make and model of the specific HVAC equipment in the user's home; the age and square footage of the home, the solar orientation of the home, the location of the thermostat in the home, the user's preferred temperature settings, whether the user is a participant in a demand reduction program, etc.

**[0054]** As shown in FIG. 3, the website 200 will permit thermostat users to perform through the web browser substantially all of the programming functions traditionally performed directly at the physical thermostat, such as temperature set points, the time at which the thermostat should be at each set point, etc. Preferably the website will also allow users to accomplish more advanced tasks such as allow users to program in vacation settings for times when the HVAC system may be turned off or run at more economical settings, and set macros that will allow changing the settings of the temperature for all periods with a single gesture such as a mouse click.

**[0055]** In addition to using the system to allow better signaling and control of the HVAC system, which relies primarily on communication running from the server to the thermostat, the bi-directional communication will also allow the thermostat 108 to regularly measure and send to the server information about the temperature in the building. By comparing outside temperature, inside temperature, thermostat settings, cycling behavior of the HVAC system, and other variables,

the system will be capable of numerous diagnostic and controlling functions beyond those of a standard thermostat.

**[0056]** For example, FIG. 6a shows a graph of inside temperature and outside temperature for a 24-hour period in House A, assuming no HVAC activity. House A has double-glazed windows and is well-insulated. When outside temperature 302 increases, inside temperature 304 follows, but with significant delay because of the thermal mass of the building.

**[0057]** FIG. 6b shows a graph of inside temperature and outside temperature for the same 24-hour period in House B. House B is identical to House A except that it (i) is located a block away and (ii) has single-glazed windows and is poorly insulated. Because the two houses are so close to each other, outside temperature 302 is the same in FIG. 6a and FIG. 6b. But the lower thermal mass of House B means that the rate at which the inside temperature 306 changes in response to the changes in outside temperature is much greater.

**[0058]** The differences in thermal mass will affect the cycling behavior of the HVAC systems in the two houses as well. FIG. 7a shows a graph of inside temperature and outside temperature in House A for the same 24-hour period as shown in FIG. 6a, but assuming that the air conditioning is being used to try to maintain an internal temperature of 70 degrees. Outside temperatures 302 are the same as in FIGS. 6a and 6b. Because of the high thermal mass of the house, the air conditioning does not need to run for very long to maintain the target temperature, as shown by shaded areas 310.

**[0059]** FIG. 7b shows a graph of inside temperature 312 and outside temperature 302 for the same 24-hour period in House B, assuming use of the air conditioning as in FIG. 7a. Because of the lower thermal mass of House B, the air conditioning system in House B has to run longer in order to maintain the same target temperature, as shown by shaded areas 314.

**[0060]** Because server 106a logs the temperature readings from inside each house (whether once per minute or over some other interval), as well as the timing and duration of air conditioning cycles, database 300 will contain a history of the thermal performance of each house. That performance data will allow the server 106a to calculate an effective thermal mass for each such structure - that is, the speed with the temperature inside a given building will change in response to changes in outside temperature and differences between inside and outside temperatures. Because the server will also log these inputs against other inputs including time of day, humidity,

etc., the server will be able to predict, at any given time on any given day, the rate at which inside temperature should change for given inside and outside temperatures.

**[0061]** The server will also record the responses of each house to changes in outside conditions and cycling behavior over time. That will allow the server to diagnose problems as and when they develop. For example, FIG. 8a shows a graph of outside temperature 402, inside temperature 404 and HVAC cycle times 406 in House A for a specific 24-hour period on date X. Assume that, based upon comparison of the performance of House A on date X relative to House A's historical performance, and in comparison to the performance of House A relative to other nearby houses on date X, the HVAC system in House A is presumed to be operating at normal efficiency, and that House A is in the 86th percentile as compared to those other houses. FIG. 8b shows a graph of outside temperature 408, inside temperature 410 and HVAC cycle times 412 in House A for the 24-hour period on date X + 1. House A's HVAC system now requires significantly longer cycle times in order to try to maintain the same internal temperature. If those longer cycle times were due to higher outside temperatures, those cycle times would not indicate the existence of any problems. But because server 106 is aware of the outside temperature, the system can eliminate that possibility as an explanation for the higher cycle times. Because server 106 is aware of the cycle times in nearby houses, it can determine that, for example, on date X + 1 the efficiency of House A is only in the 23rd percentile. The server will be programmed with a series of heuristics, gathered from predictive models and past experience, correlating the drop in efficiency and the time interval over which it has occurred with different possible causes. For example, a 50% drop in efficiency in one day may be correlated with a refrigerant leak, especially if followed by a further drop in efficiency on the following day. A reduction of 10% over three months may be correlated with a clogged filter. Based upon the historical data recorded by the server, the server 106 will be able to alert the homeowner that there is a problem and suggest a possible cause.

**[0062]** Because the system will be able to calculate effective thermal mass, it will be able to determine the cost effectiveness of strategies such as pre-cooling for specific houses under different conditions. FIG. 9a shows a graph of outside temperature 502, inside temperature 504 and HVAC cycling times 506 in House A for a specific 24-hour period on date Y assuming that the system has used a pre-cooling strategy to avoid running the air conditioning during the afternoon, when rates are highest. Because House A has high thermal mass, the house is capable of "banking" cool, and energy consumed during off-peak hours is in effect stored, allowing the

house to remain cool even when the system is turned off. Temperatures keep rising during the period the air conditioning is off, but because thermal mass is high, the rate of increase is low, and the house is still comfortable six hours later. Although the pre-cooling cycle time is relatively long, the homeowner may still benefit because the price per kilowatt during the morning pre-cooling phase is lower than the price during the peak load period. FIG. 9b shows a graph of the same outside temperature 502 in House B as in House A in FIG. 9a for the same 24-hour period and using the same pre-cooling strategy as shown by cycling times 506. But because House B has minimal thermal mass, using additional electricity in order to pre-cool the house does not have the desired effect; inside temperature 508 warms up so fast that the cool that had been banked is quickly lost. Thus the system will recommend that House A pre-cool in order to save money, but not recommend pre-cooling for House B.

**[0063]** The system can also help compensate for anomalies such as measurement inaccuracies due to factors such as poor thermostat location. It is well-known that thermostats should be placed in a location that will be likely to experience “average” temperatures for the overall structure, and should be isolated from windows and other influences that could bias the temperatures they “see.” But for various reasons, not all thermostat installations are that ideal. FIG. 10a shows a graph of outside temperature 602, the average inside temperature for the entire house 604, and inside temperature as read by the thermostat 606 in House C for a specific 24-hour period on September 15th, assuming that the thermostat is located so that from 4 PM until 5:30 PM on that day the thermostat is in direct sunlight. Until the point at which the sun hits the thermostat, the average inside temperature and temperature as read by the thermostat track very closely. But when the direct sunlight hits the thermostat, the thermostat and the surrounding area can heat up, causing the internal temperature as read by the thermostat to diverge significantly from the average temperature for the rest of the house. Conventional thermostats have no way of distinguishing this circumstance from a genuinely hot day, and will both over-cool the rest of the house and waste considerable energy when it cycles the air conditioner in order to reduce the temperature as sensed by the thermostat. If the air conditioning is turned off, this phenomenon will manifest as a spike in temperature as measured by the thermostat. If the air conditioning is turned on (and has sufficient capacity to respond to the distorted temperature signal caused by the sunlight), this phenomenon will likely manifest as relatively small changes in the temperature as sensed by the thermostat, but significantly increased HVAC usage (as well as excessively lowered temperatures

in the rest of the house, but this result may not be directly measured in a single sensor environment. The subject system, in contrast, has multiple mechanisms that will allow it to correct for such distortions. First, because the subject system compares the internal readings from House C with the external temperature, it will be obvious that the rise in temperature at 4:00 PM is not correlated with a corresponding change in outside temperature. Second, because the system is also monitoring the readings from the thermostat in nearby House D, which (as shown in FIG. 10b) is exposed to the same outside temperature 602, but has no sudden rise in measured internal temperature 608 at 4:00, the system has further validation that the temperature increase is not caused by climatic conditions. And finally, because the system has monitored and recorded the temperature readings from the thermostat in House C for each previous day, and has compared the changing times of the aberration with the progression of the sun, the system can distinguish the patterns likely to indicate solar overheating from other potential causes.

**[0064]** FIG. 11 illustrates the steps involved in calculating comparative thermal mass, or the thermal mass index. In step 1102, the server retrieves climate data related to home X. Such data may include current outside temperature, outside temperature during the preceding hours, outside humidity, wind direction and speed, whether the sun is obscured by clouds, and other factors. In step 1104, the server retrieves HVAC duty cycle data for home X. Such data may include target settings set by the thermostat in current and previous periods, the timing of switch-on and switch-off events and other data. In step 1106, the server retrieves data regarding recent temperature readings as recorded by the thermostat in home X. In step 1108, the server retrieves profile data for home X. Such data may include square footage and number of floors, when the house was built and/or renovated, the extent to which it is insulated, its address, make, model and age of its furnace and air conditioning hardware, and other data. In step 1110, the server retrieves the current inside temperature reading as transmitted by the thermostat. In step 1112, the server calculates the thermal mass index for the home under those conditions; that is, for example, it calculates the likely rate of change for internal temperature in home X from a starting point of 70 degrees when the outside temperature is 85 degrees at 3:00 PM on August 10th when the wind is blowing at 5 mph from the north and the sky is cloudy. The server accomplishes this by applying a basic algorithm that weighs each of these external variables as well as variables for various characteristics of the home itself (such as size, level of insulation, method of construction, etc.) and data from other houses and environments.

**[0065]** FIG. 12 illustrates the steps involved in diagnosing defects in the HVAC system for specific home X. In step 1202, the server retrieves climate data related to home X. Such data may include current outside temperature, outside temperature during the preceding hours, outside humidity, wind direction and speed, whether the sun is obscured by clouds, and other factors. In step 1204, the server retrieves HVAC duty cycle data for home X. Such data may include target settings set by the thermostat in current and previous periods, the timing of switch-on and switch-off events and other data. In step 1206, the server retrieves data regarding current and recent temperature readings as recorded by the thermostat in home X. In step 1208, the server retrieves profile data for home X. Such data may include square footage and number of floors, when the house was built and/or renovated, the extent to which it is insulated, its address, make, model and age of its furnace and air conditioning hardware, and other data. In step 1210, the server retrieves comparative data from other houses that have thermostats that also report to the server. Such data may include interior temperature readings, outside temperature for those specific locations, duty cycle data for the HVAC systems at those locations, profile data for the structures and HVAC systems in those houses and the calculated thermal mass index for those other houses. In step 1212, the server calculates the current relative efficiency of home X as compared to other homes. Those comparisons will take into account differences in size, location, age, etc., in making those comparisons.

**[0066]** The server will also take into account that relative efficiency is not absolute, but will vary depending on conditions. For example, a house that has extensive south-facing windows is likely to experience significant solar gain. On sunny winter days, that home will appear more efficient than on cloudy winter days. That same house will appear more efficient at times of day and year when trees or overhangs shade those windows than it will when summer sun reaches those windows. Thus the server will calculate efficiency under varying conditions.

**[0067]** In step 1214, the server compares the HVAC system's efficiency, corrected for the relevant conditions, to its efficiency in the past. If the current efficiency is substantially the same as the historical efficiency, the server concludes, in step 1216, that there is no defect and the diagnostic routine ends. If the efficiency has changed, the server proceeds to compare the historical and current data against patterns of changes known to indicate specific problems. For example, in step 1218, the server compares that pattern of efficiency changes against the known pattern for a clogged air filter, which is likely to show a slow, gradual degradation over a period of weeks or

even months. If the pattern of degradation matches the clogged filter paradigm, the server creates and transmits to the homeowner a message, in step 1220, alerting the homeowner to the possible problem. If the problem does not match the clogged filter paradigm, the system compares, in step 1222, the pattern to the known pattern for a refrigerant leak, which is likely to show a degradation over a period of a few hours to a few days. If the pattern of degradation matches the refrigerant leak paradigm, the server creates and transmits to the homeowner a message, in step 1224, alerting the homeowner to the possible problem. If the problem does not match the refrigerant leak paradigm, the system compares, in step 1226, the pattern to the known pattern for an open window or door, which is likely to show significant changes for relatively short periods at intervals uncorrelated with climatic patterns. If the pattern of degradation matches the open door/window paradigm, the server creates and transmits to the homeowner a message, in step 1228, alerting the homeowner to the possible problem. If the problem does not match the refrigerant leak paradigm, the system continues to step through remaining known patterns N, in step 1230, until either a pattern is matched and reported in step 1232, or the list has been exhausted without a match, and an unknown problem is reported in step 1234.

**[0068]** FIG. 13 illustrates the steps involved in diagnosing inaccurate thermostat readings due to improper location. In step 1302, the server retrieves climate data related to home X. Such data may include current outside temperature, outside temperature during the preceding hours, outside humidity, wind direction and speed, whether the sun is obscured by clouds, and other factors. In step 1304, the server retrieves HVAC duty cycle data for home X. Such data may include target settings set by the thermostat in current and previous periods, the timing of switch-on and switch-off events and other data. In step 1306, the server retrieves data regarding current and recent temperature readings as recorded by the thermostat in home X. In step 1308, the server retrieves profile data for home X. Such data may include square footage and number of floors, when the house was built and/or renovated, the extent to which it is insulated, its address, make, model and age of its furnace and air conditioning hardware, and other data. In step 1310, the server retrieves comparative data from other houses that have thermostats that also report to the server. Such data may include interior temperature readings, outside temperature for those specific locations, duty cycle data for the HVAC systems at those locations, profile data for the structures and HVAC systems in those houses and the calculated thermal mass index for those other houses. In step 1312, the server calculates the expected thermostat temperature reading based upon the input data.

In step 1314, the server compares the predicted and actual values. If the calculated and actual values are at least roughly equivalent, the server concludes, in step 1316, that there is no thermostat-related anomaly. If the calculated and actual values are not roughly equivalent, the server retrieves additional historical information about past thermostat readings in step 1318. In step 1320, the server retrieves solar progression data, i.e., information regarding the times at which the sun rises and sets on the days being evaluated at the location of the house being evaluated, and the angle of the sun at that latitude, etc. In step 1322, the server compares the characteristics of the anomalies over time, to see if, for example, abnormally high readings began at 3:06 on June 5th, 3:09 on June 6th, 3:12 on June 7th, and the solar progression data suggests that at the house being analyzed, that sun would be likely to reach a given place in that house three minutes later on each of those days. If the thermostat readings do not correlate with the solar progression data, the server concludes, in step 1324, that the sun is not causing the distortion by directly hitting the thermostat. If the thermostat readings do correlate with solar progression, the server then calculates, in step 1326, the predicted duration of the distortion caused by the sun. In step 1328, the server calculates the appropriate setpoint information to be used by the thermostat to maintain the desired temperature and correct for the distortion for the expected length of the event. For example, if the uncorrected setpoint during the predicted event is 72 degrees, and the sun is expected to elevate the temperature reading by eight degrees, the server will instruct the thermostat to maintain a setpoint of 80 degrees. In step 1330, the server sends the homeowner a message describing the problem.

**[0069]** The system installed in a subscriber's home may optionally include additional temperature sensors at different locations within the building. These additional sensors may be connected to the rest of the system via a wireless system such as 802.11 or 802.15.4, or may be connected via wires. Additional temperature and/or humidity sensors may allow increased accuracy of the system, which can in turn increase user comfort or energy savings.

**[0070]** While particular embodiments have been shown and described, it is apparent that changes and modifications may be made without departing from the invention in its broader aspects and, therefore, the invention may be carried out in other ways without departing from the true spirit and scope. These and other equivalents are intended to be covered by the following claims.

**WHAT IS CLAIMED IS:**

1. A control system for an environment inside a structure, comprising:  
a climate control device in the structure that receives first temperatures from inside the structure;  
a processor that:  
receives second temperatures from outside the structure from at least one source outside the structure; and  
compares the first temperatures and the second temperatures over time to calculate an operating profile for the climate control device; and  
a database that stores the operating profile for the climate control device,  
wherein the processor (a) compares a portion of the operating profile for the climate control device with a temperature profile to evaluate an operation of the climate control device, and (b) outputs a result of the evaluation.
2. The control system of claim 1, wherein the first temperatures are received from a programmable thermostat communicating with the climate control device.
3. The control system of claim 2, wherein the programmable thermostat includes a display device,  
and the result of the evaluation is displayed on the display device of the programmable thermostat.
4. The control system of claim 1, wherein:  
the portion of the operating profile for the climate control device is limited to a first time interval, and  
the temperature profile is another portion of the operating profile for the climate control device limited to a second time interval.
5. The control system of claim 4, wherein the evaluation of the operation of the climate control device detects a change in the operating profile of the climate control device between the first time interval and the second time interval.
6. The control system of claim 5, wherein:  
the database stores a plurality of temperature profiles associated with potential defects identified by changes in the operating profile of the climate control device over time; and

the processor identifies one or more of the potential defects based on the detected change in the operating profile of the climate control device between the first time interval and the second time interval.

7. The control system of claim 1, wherein the second temperatures comprise outside air temperatures for a geographic region surrounding the first structure.
8. The control system of claim 7, wherein the temperature profile is a prediction of a coming change in the second temperatures.
9. The control system of claim 8, wherein the result of the evaluation is a modification in an operating interval for the climate control device based on the prediction.
10. The control system of claim 9, wherein the modification is in at least one of (a) an “on” or an “off” time for the climate control device, and (b) an “on” or an “off” temperature for the climate control device.
11. A method for controlling an environment inside a structure, comprising:
  - receiving, with a processor, first temperatures inside the structure from a climate control device inside the structure;
  - receiving, with the processor, second temperatures outside the structure from at least one source outside the structure;
  - comparing, with the processor, the first temperatures and the second temperatures over time to calculate an operating profile for the climate control device; and
  - storing, with the processor, the operating profile for the climate control device in a database,
  - comparing, with the processor, a portion of the operating profile for the climate control device with a temperature profile to evaluate an operation of the climate control device, and
  - outputting, with the processor, a result of the evaluation.
12. The method of claim 11, wherein the processor receives the first temperatures from a programmable thermostat communicating with the climate control device.
13. The method of claim 12, wherein the programmable thermostat includes a display device, the processor outputs the result of the evaluation in a format to be displayed on the display device of the programmable thermostat.
14. The method of claim 11, wherein:

the portion of the operating profile for the climate control device is limited to a first time interval, and

the temperature profile is another portion of the operating profile for the climate control device limited to a second time interval.

15. The method of claim 14, wherein the evaluation of the operation of the climate control device comprises the processor detecting a change in the operating profile of the climate control device between the first time interval and the second time interval.

16. The method of claim 15, wherein:

the database stores a plurality of temperature profiles associated with potential defects identified by changes in the operating profile of the climate control device over time; and

the processor identifies one or more of the potential defects based on the detected change in the operating profile of the climate control device between the first time interval and the second time interval.

17. The method of claim 11, wherein the second temperatures comprise outside air temperatures for a geographic region surrounding the first structure.

18. The method of claim 17, wherein the temperature profile is a prediction of a coming change in the second temperatures.

19. The method of claim 18, wherein the result of the evaluation is a modification, by the processor, in an operating interval for the climate control device based on the prediction.

20. The method of claim 19, wherein the processor modifies at least one of (a) an “on” or an “off” time for the climate control device, and (b) an “on” or an “off” temperature for the climate control device.

**ABSTRACT OF THE DISCLOSURE**

The invention comprises systems and methods for evaluating changes in the operational efficiency of an HVAC system over time. The climate control system obtains temperature measurements from at least a first location conditioned by the climate system, and status of said HVAC system. One or more processors receives measurements of outside temperatures from at least one source other than said HVAC system and compares said temperature measurements from said first location with expected temperature measurements. The expected temperature measurements are based at least in part upon past temperature measurements.

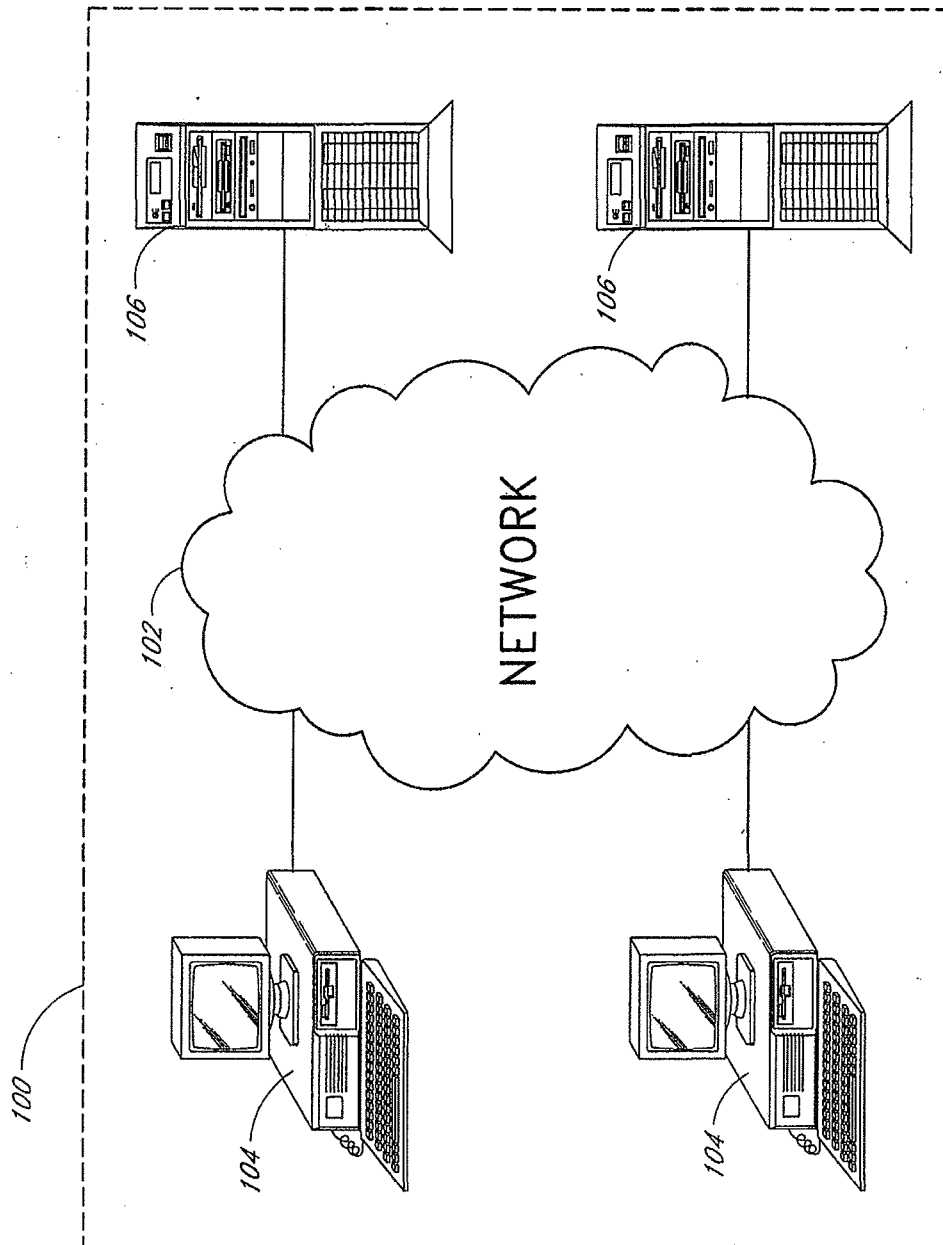
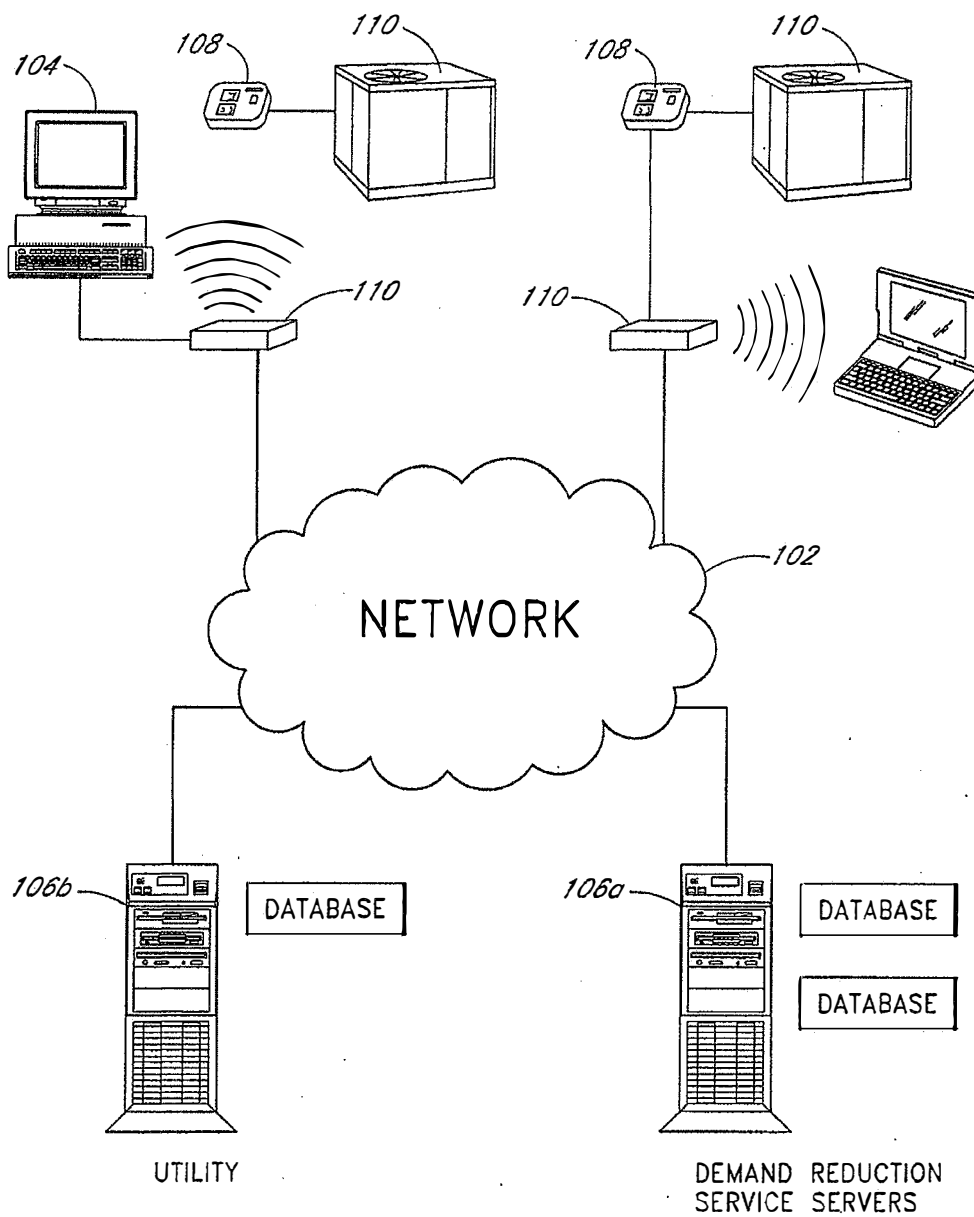


FIG. 1

*FIG. 2*

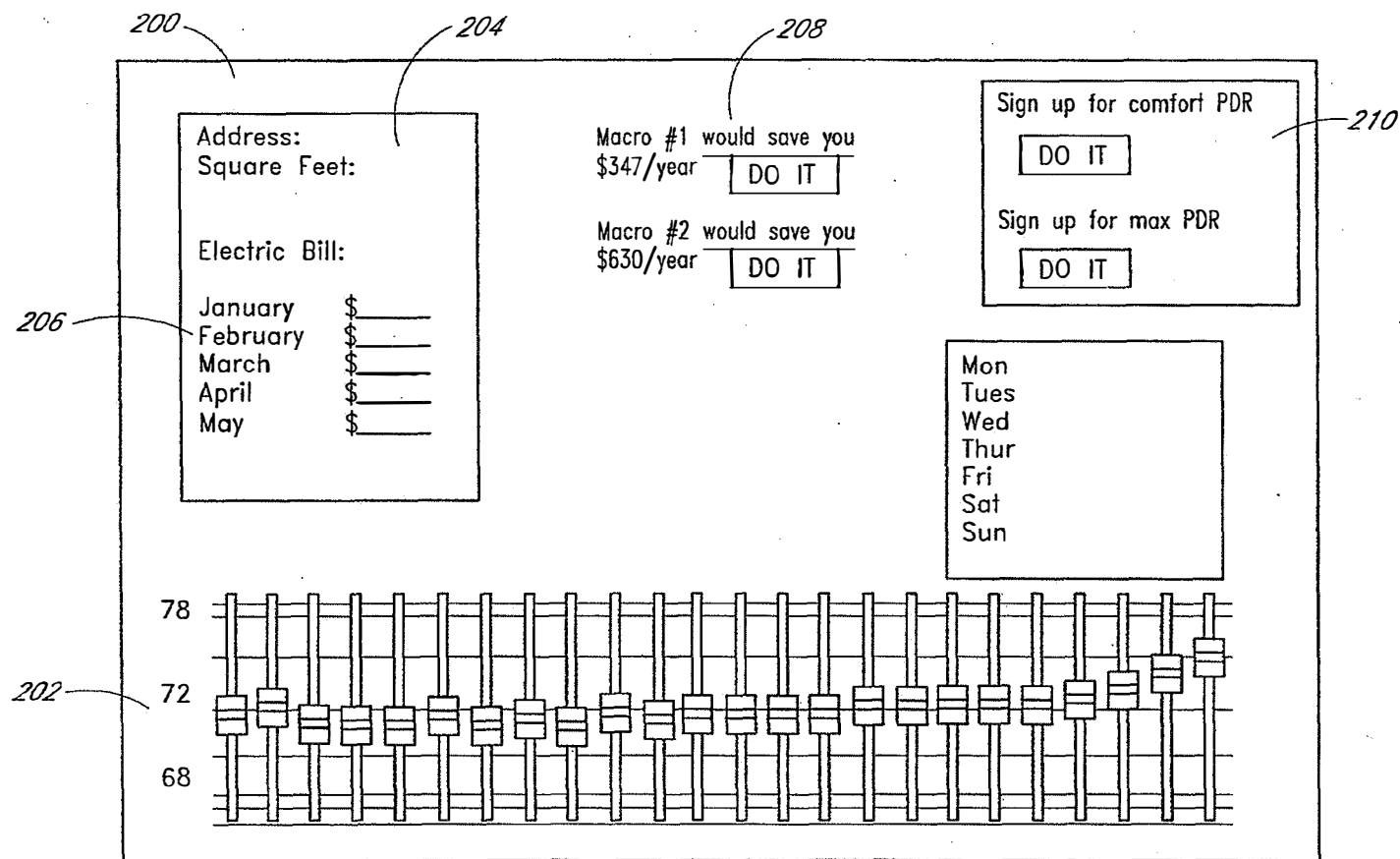


FIG. 3

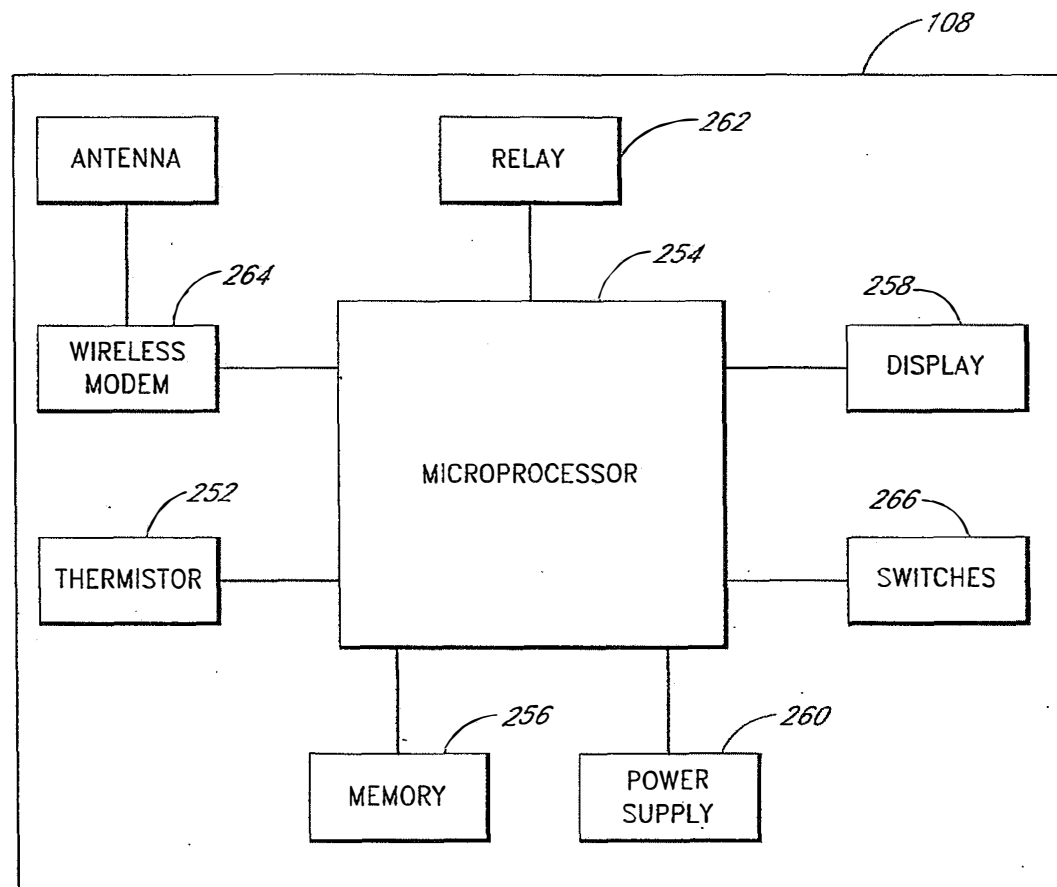


*FIG. 4*

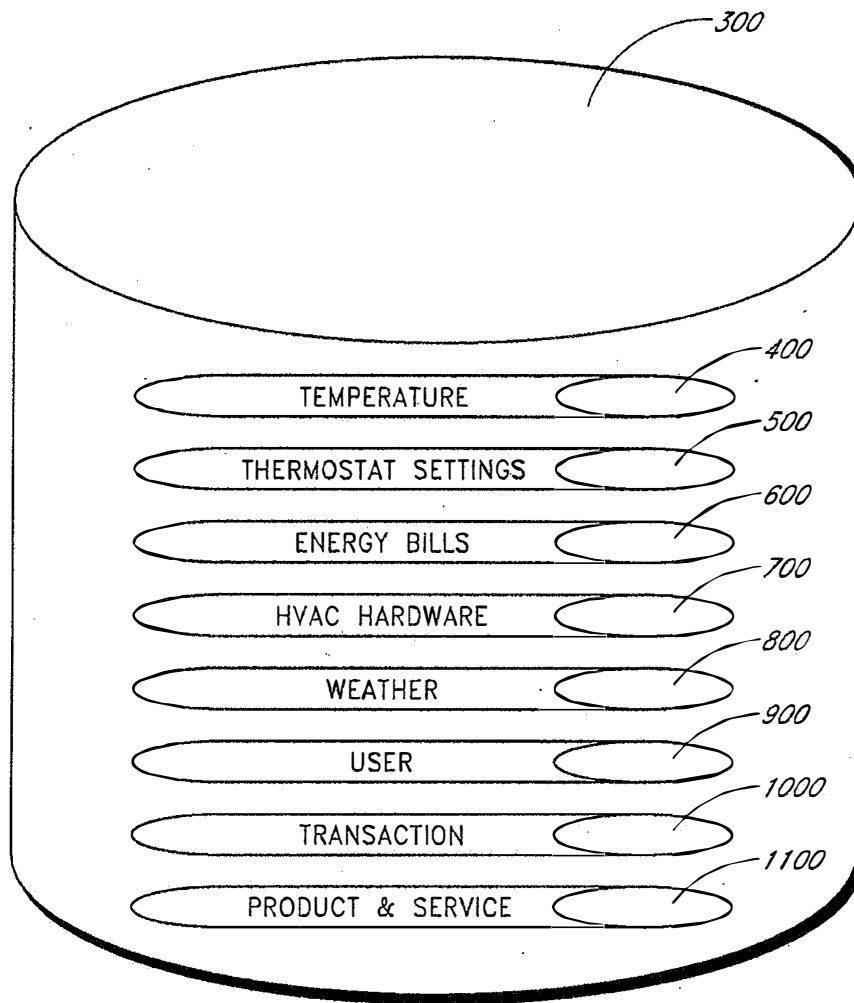


*FIG. 5*

6/13

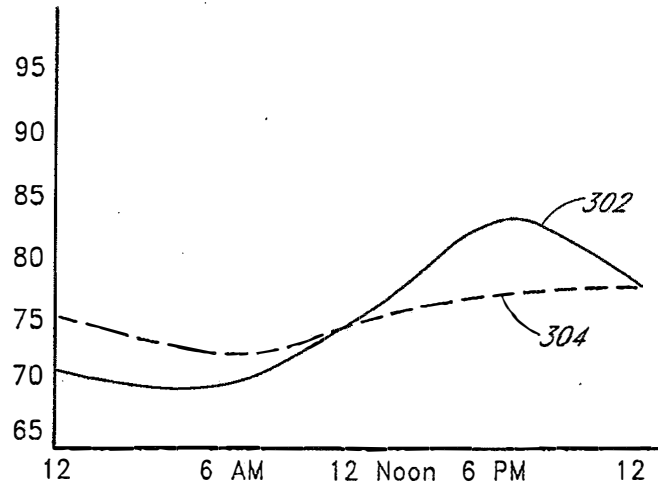


*FIG. 6A*

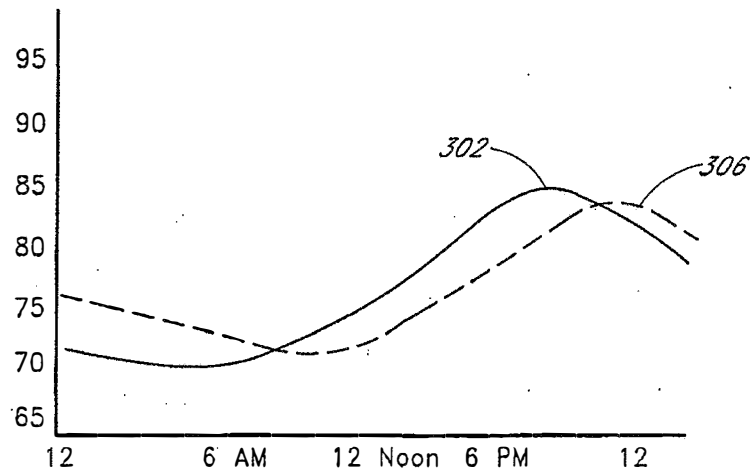


*FIG. 6B*

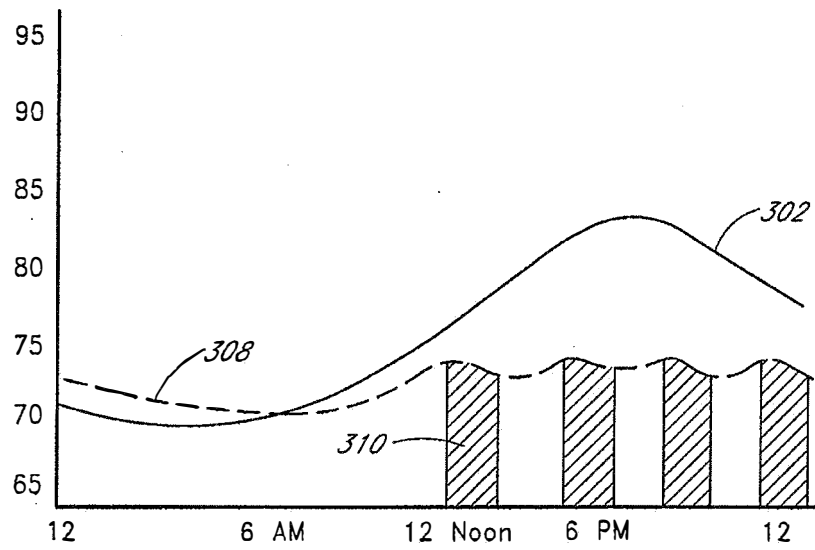


FIG. 7A

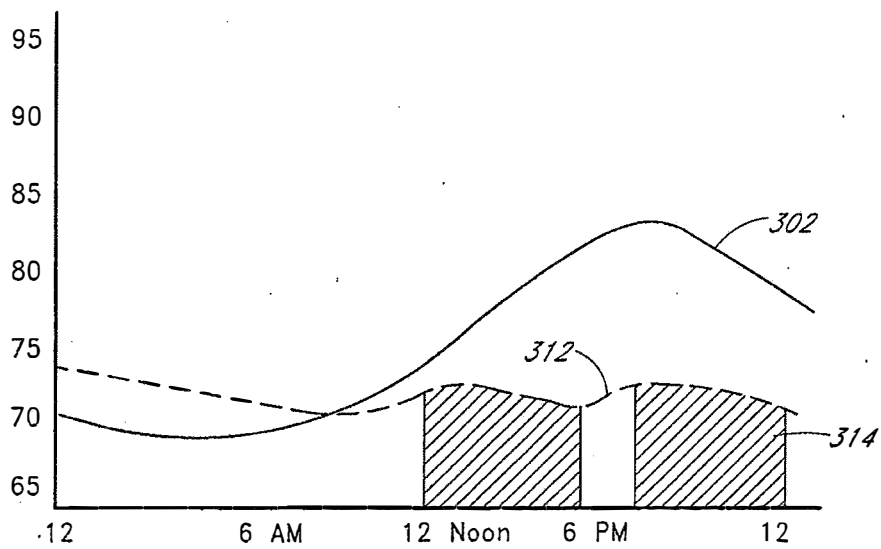


FIG. 7B

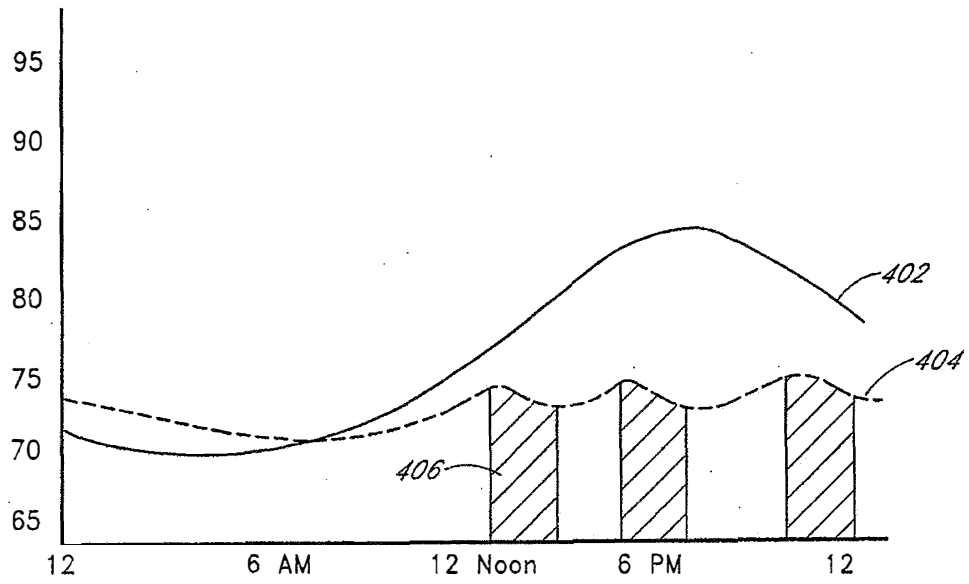


FIG. 8A

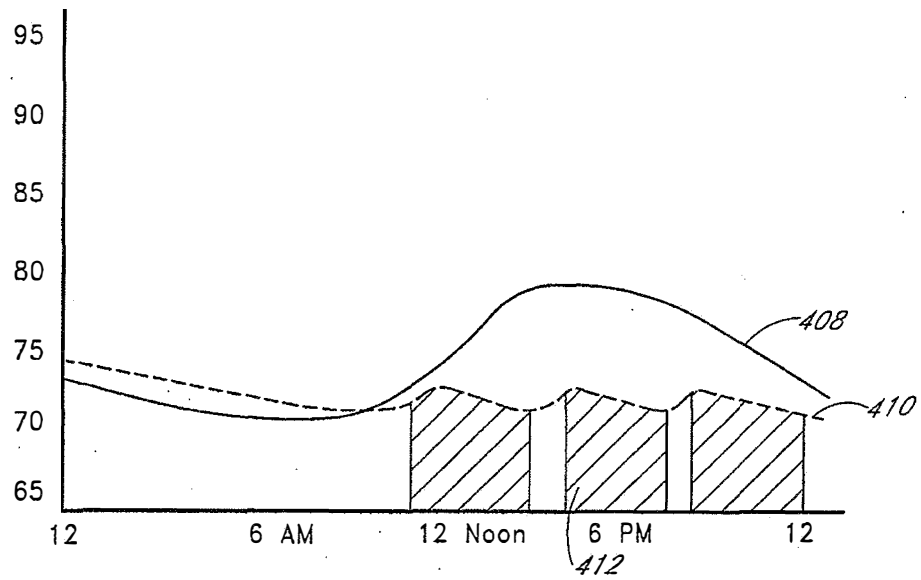


FIG. 8B

9/13

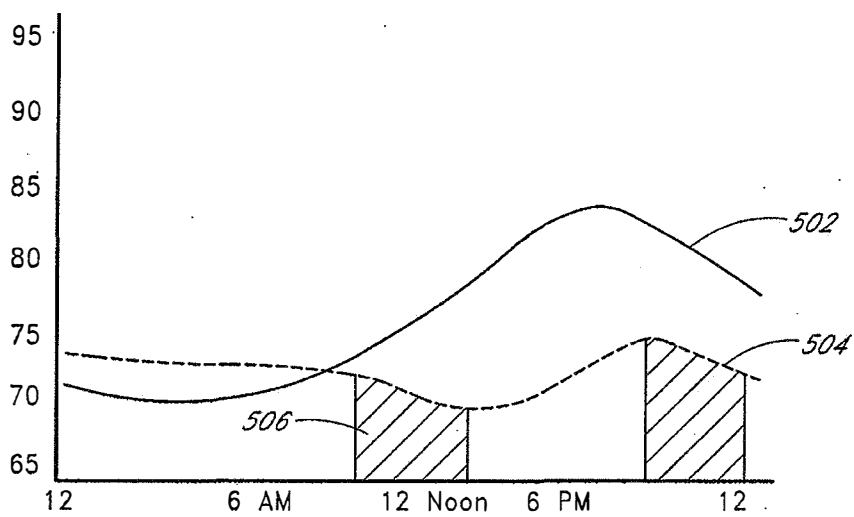


*FIG. 9A*

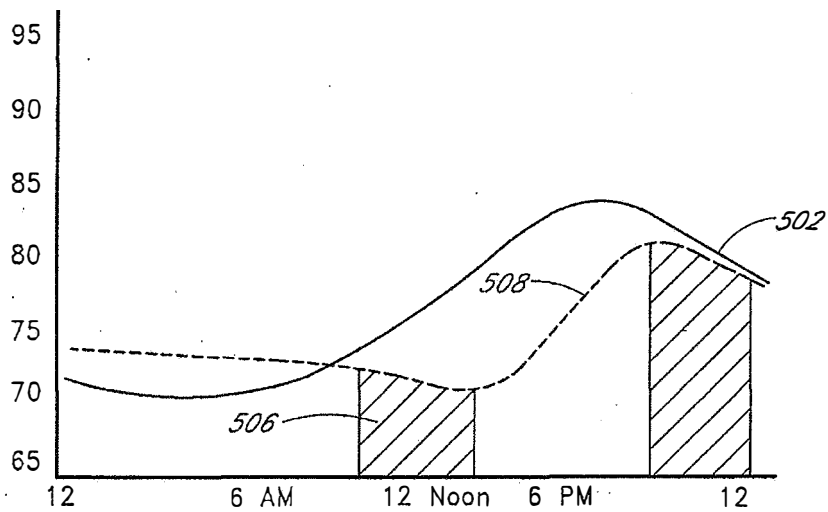


*FIG. 9B*

10/13

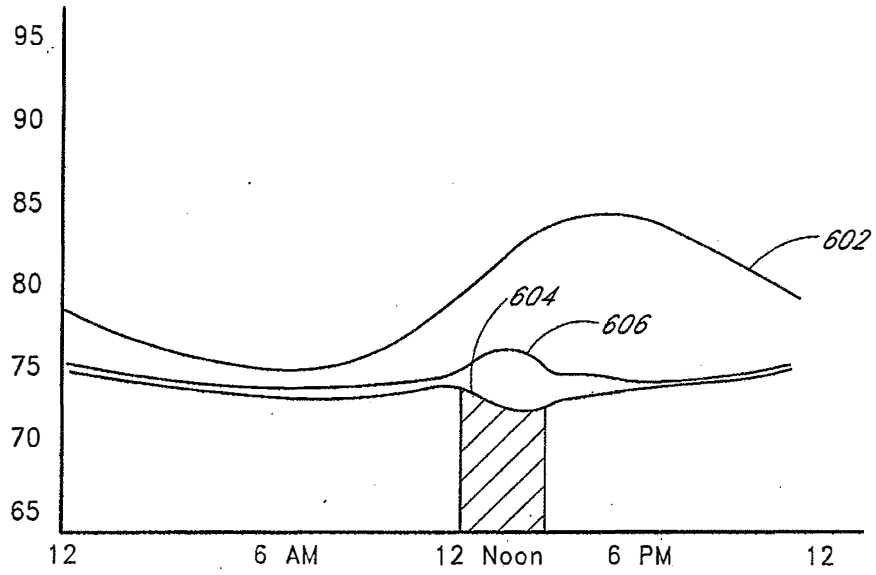


*FIG. 10A*

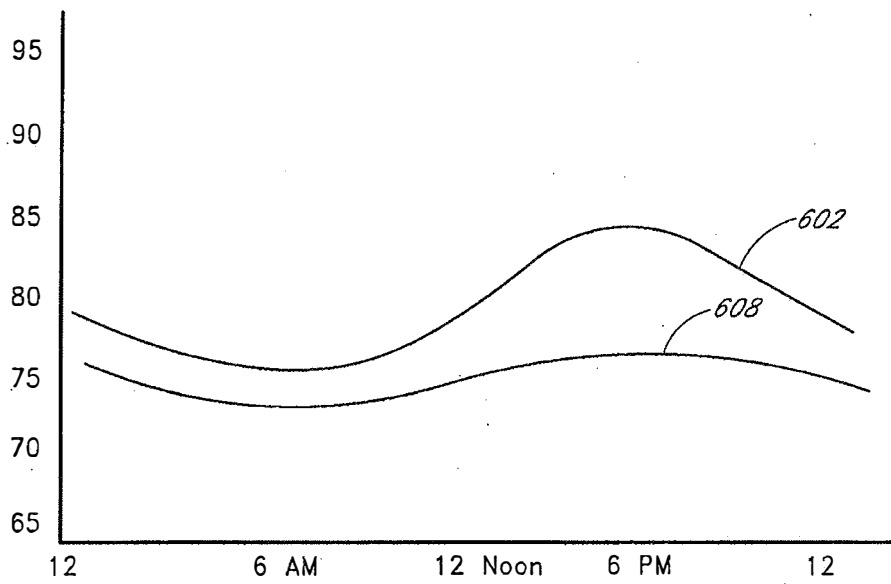
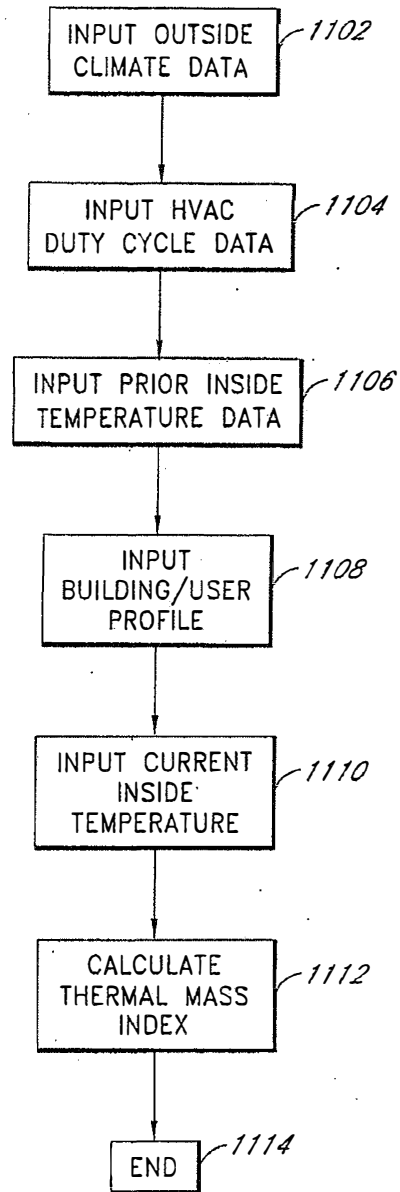


*FIG. 10B*

*FIG. 11*

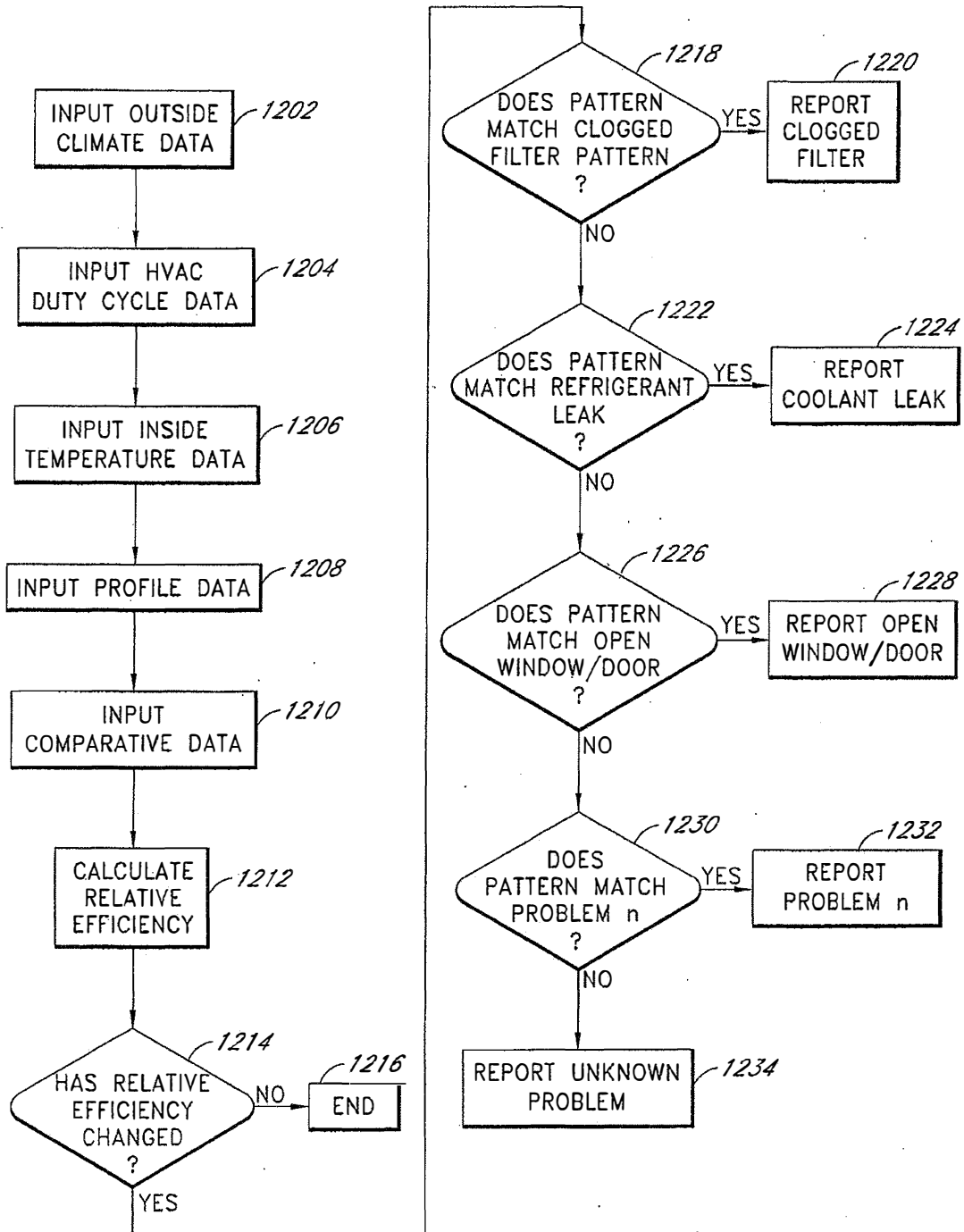


FIG. 12

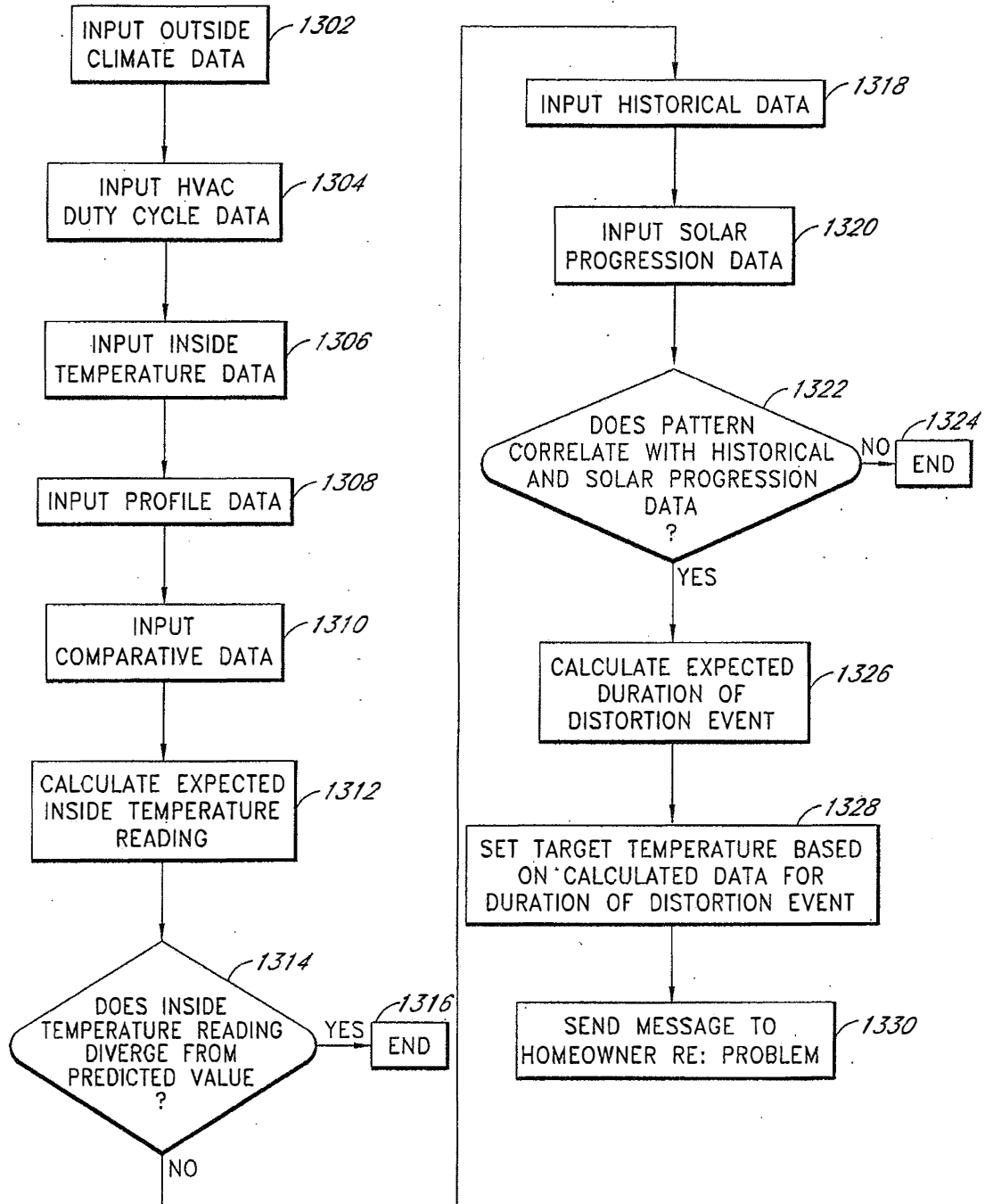


FIG. 13



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.

# DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

|                    |                                                                              |
|--------------------|------------------------------------------------------------------------------|
| Title of Invention | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |
|--------------------|------------------------------------------------------------------------------|

As the below named inventor, I hereby declare that:

This declaration is directed to: ☐ The attached application, or ☒ United States application or PCT international application number 13/861189  
 filed on April 11, 2013

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

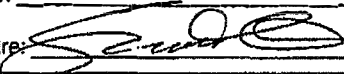
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

**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.

LEGAL NAME OF INVENTOR

Inventor: Scott Douglas Hublou Date (Optional): 12/12/13

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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 1 minute 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.

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.

**STATEMENT UNDER 37 CFR 3.73(c)**Applicant/Patent Owner: ECOFACOR, INC.Application No./Patent No.: New U.S. Patent Application Filed/Issue Date: 2 02302-01Titled: SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEMECOFACOR, INC., a CORPORATION

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is \_\_\_\_\_%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose one of options A or B below):

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 025711, Frame 0873, or for which a copy thereof is attached.
- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at

Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

2. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at

Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

[ Page 1 of 2 ]

This collection of information is required by 37 CFR 3.73(b). 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 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.

**STATEMENT UNDER 37 CFR 3.73(c)**

3. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
 Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

4. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
 Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

5. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
 Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

6. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
 Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Daniel A. Tanner, III/

2023-02-01

Signature

Date

Daniel A. Tanner, III

54734

Printed or Typed Name

Title or Registration Number

## 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.

**POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO**

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:



Practitioners associated with Customer Number:

144465

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

| Name | Registration Number |
|------|---------------------|
|      |                     |
|      |                     |
|      |                     |
|      |                     |
|      |                     |
|      |                     |

| Name | Registration Number |
|------|---------------------|
|      |                     |
|      |                     |
|      |                     |
|      |                     |
|      |                     |
|      |                     |

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:



The address associated with Customer Number: 144465

OR



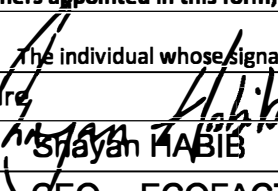
|                         |       |     |
|-------------------------|-------|-----|
| Firm or individual name |       |     |
| Address                 |       |     |
| City                    | State | Zip |
| Country                 |       |     |
| Telephone               | Email |     |

Assignee name and address:

**A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.**

**SIGNATURE of Assignee of Record**

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

|                                                                                               |                        |
|-----------------------------------------------------------------------------------------------|------------------------|
| Signature  | Date 2022-03-18        |
| Name Srayan HABIB                                                                             | Telephone 646-344-0736 |
| Title CEO – ECOFACTOR, INC.                                                                   |                        |

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 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:                                                                              |          |                                                                              |        |                      |
| Filing Date:                                                                                     |          |                                                                              |        |                      |
| Title of Invention:                                                                              |          | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |        |                      |
| First Named Inventor/Applicant Name:                                                             |          | John Douglas STEINBERG                                                       |        |                      |
| Filer:                                                                                           |          | Daniel Albert Tanner                                                         |        |                      |
| Attorney Docket Number:                                                                          |          | 230-046-CON                                                                  |        |                      |
| Filed as Large Entity                                                                            |          |                                                                              |        |                      |
| Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a) |          |                                                                              |        |                      |
| Description                                                                                      | Fee Code | Quantity                                                                     | Amount | Sub-Total in USD(\$) |
| Basic Filing:                                                                                    |          |                                                                              |        |                      |
| UTILITY APPLICATION FILING                                                                       | 1011     | 1                                                                            | 320    | 320                  |
| UTILITY SEARCH FEE                                                                               | 1111     | 1                                                                            | 700    | 700                  |
| UTILITY EXAMINATION FEE                                                                          | 1311     | 1                                                                            | 800    | 800                  |
| REQUEST FOR PRIORITIZED EXAMINATION                                                              | 1817     | 1                                                                            | 4200   | 4200                 |
| Pages:                                                                                           |          |                                                                              |        |                      |
| Claims:                                                                                          |          |                                                                              |        |                      |
| Miscellaneous-Filing:                                                                            |          |                                                                              |        |                      |

| Description                              | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|------------------------------------------|----------|----------|--------|----------------------|
| PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL   | 1504     | 1        | 0      | 0                    |
| PROCESSING FEE, EXCEPT PROV. APPLS.      | 1830     | 1        | 140    | 140                  |
| <b>Petition:</b>                         |          |          |        |                      |
| <b>Patent-Appeals-and-Interference:</b>  |          |          |        |                      |
| <b>Post-Allowance-and-Post-Issuance:</b> |          |          |        |                      |
| <b>Extension-of-Time:</b>                |          |          |        |                      |
| <b>Miscellaneous:</b>                    |          |          |        |                      |
| <b>Total in USD (\$)</b>                 |          |          |        | <b>6160</b>          |

## Electronic Acknowledgement Receipt

|                                             |                                                                              |
|---------------------------------------------|------------------------------------------------------------------------------|
| <b>EFS ID:</b>                              | 47467249                                                                     |
| <b>Application Number:</b>                  | 18104767                                                                     |
| <b>International Application Number:</b>    |                                                                              |
| <b>Confirmation Number:</b>                 | 6379                                                                         |
| <b>Title of Invention:</b>                  | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |
| <b>First Named Inventor/Applicant Name:</b> | John Douglas STEINBERG                                                       |
| <b>Customer Number:</b>                     | 144465                                                                       |
| <b>Filer:</b>                               | Daniel Albert Tanner                                                         |
| <b>Filer Authorized By:</b>                 |                                                                              |
| <b>Attorney Docket Number:</b>              | 230-046-CON                                                                  |
| <b>Receipt Date:</b>                        | 01-FEB-2023                                                                  |
| <b>Filing Date:</b>                         |                                                                              |
| <b>Time Stamp:</b>                          | 22:15:54                                                                     |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)                                                  |

### Payment information:

|                                          |                  |
|------------------------------------------|------------------|
| Submitted with Payment                   | yes              |
| Payment Type                             | DA               |
| Payment was successfully received in RAM | \$6160           |
| RAM confirmation Number                  | E202321M16521679 |
| Deposit Account                          |                  |
| Authorized User                          |                  |

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

| <b>File Listing:</b>                            |                                                            |                                     |                                          |                  |                  |
|-------------------------------------------------|------------------------------------------------------------|-------------------------------------|------------------------------------------|------------------|------------------|
| Document Number                                 | Document Description                                       | File Name                           | File Size(Bytes)/<br>Message Digest      | Multi Part /.zip | Pages (if appl.) |
| 1                                               | Track One Request                                          | Track1_Request_ForFiling.pdf        | 550728                                   | no               | 2                |
|                                                 |                                                            |                                     | 74fbc3e50562408db4ea347209c5c1d030864bfd |                  |                  |
| <b>Warnings:</b>                                |                                                            |                                     |                                          |                  |                  |
| <b>Information:</b>                             |                                                            |                                     |                                          |                  |                  |
| 2                                               | Transmittal of New Application                             | ApplicationTransmittalForFiling.pdf | 1180149                                  | no               | 2                |
|                                                 |                                                            |                                     | b4bd5a197b925395ce1a2c7401d5eb8e4676136c |                  |                  |
| <b>Warnings:</b>                                |                                                            |                                     |                                          |                  |                  |
| <b>Information:</b>                             |                                                            |                                     |                                          |                  |                  |
| 3                                               | Application Data Sheet                                     | ADSForFiling.pdf                    | 1893048                                  | no               | 9                |
|                                                 |                                                            |                                     | 1c8ce8d4bfdacadb79e5e45bd95b6f5d98f33a0b |                  |                  |
| <b>Warnings:</b>                                |                                                            |                                     |                                          |                  |                  |
| <b>Information:</b>                             |                                                            |                                     |                                          |                  |                  |
| This is not an USPTO supplied ADS fillable form |                                                            |                                     |                                          |                  |                  |
| 4                                               |                                                            | 230-046-CON-AppForFiling.pdf        | 5623425                                  | yes              | 22               |
|                                                 |                                                            |                                     | ecca93c99d42b6103b15e77075608b83934a9306 |                  |                  |
|                                                 | <b>Multipart Description/PDF files in .zip description</b> |                                     |                                          |                  |                  |
|                                                 | <b>Document Description</b>                                |                                     | <b>Start</b>                             | <b>End</b>       |                  |
|                                                 | Specification                                              |                                     | 1                                        | 18               |                  |
|                                                 | Claims                                                     |                                     | 19                                       | 21               |                  |
|                                                 | Abstract                                                   |                                     | 22                                       | 22               |                  |
| <b>Warnings:</b>                                |                                                            |                                     |                                          |                  |                  |
| <b>Information:</b>                             |                                                            |                                     |                                          |                  |                  |

|                              |                                               |                           |                                          |    |    |
|------------------------------|-----------------------------------------------|---------------------------|------------------------------------------|----|----|
| 5                            | Drawings-only black and white line drawings   | DrawingsForFiling.pdf     | 6202664                                  | no | 13 |
|                              |                                               |                           | 757fe41de01a428576e6b97d183848aff02e4d7c |    |    |
| Warnings:                    |                                               |                           |                                          |    |    |
| Information:                 |                                               |                           |                                          |    |    |
| 6                            | Oath or Declaration filed                     | DecForFiling.pdf          | 3082624                                  | no | 2  |
|                              |                                               |                           | b9eead974ae6f0dab24a056c900d7230ed378afa |    |    |
| Warnings:                    |                                               |                           |                                          |    |    |
| Information:                 |                                               |                           |                                          |    |    |
| 7                            | Assignee showing of ownership per 37 CFR 3.73 | 373StatementForFiling.pdf | 2285245                                  | no | 3  |
|                              |                                               |                           | a5b15e8377a5d42fe4e88a85226f3ef23942774f |    |    |
| Warnings:                    |                                               |                           |                                          |    |    |
| Information:                 |                                               |                           |                                          |    |    |
| 8                            | Power of Attorney                             | POAForFiling.pdf          | 1027230                                  | no | 2  |
|                              |                                               |                           | 301d23221f07b463d15a92c917ff245c5e8a117c |    |    |
| Warnings:                    |                                               |                           |                                          |    |    |
| Information:                 |                                               |                           |                                          |    |    |
| 9                            | Fee Worksheet (SB06)                          | fee-info.pdf              | 50764                                    | no | 2  |
|                              |                                               |                           | 8d3084a8d576321066a8cf3bd570dcac7f0758aa |    |    |
| Warnings:                    |                                               |                           |                                          |    |    |
| Information:                 |                                               |                           |                                          |    |    |
| Total Files Size (in bytes): |                                               |                           | 21895877                                 |    |    |

**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.**

**CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION  
UNDER 37 CFR 1.102(e) (Page 1 of 1)**

|                       |                                                                              |                                               |  |
|-----------------------|------------------------------------------------------------------------------|-----------------------------------------------|--|
| First Named Inventor: | John Douglas STEINBERG                                                       | Nonprovisional Application Number (if known): |  |
| Title of Invention:   | System and Method for Evaluating Changes in the Efficiency of an HVAC System |                                               |  |

**APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.**

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently \$0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.
2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.
3. The applicable box is checked below:

**I. ☒ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)**

- i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.  
---OR---  
(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.
- ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, or the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

**II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)**

- i. A request for continued examination has been filed with, or prior to, this form.
- ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
- iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
- iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
- v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

|                                                 |                                               |
|-------------------------------------------------|-----------------------------------------------|
| Signature <b>/Daniel A. Tanner, III/</b>        | Date <b>2023-02-01</b>                        |
| Name (Print/Typed) <b>Daniel A. Tanner, III</b> | Practitioner Registration Number <b>54734</b> |

**Note:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.\*

☐ \*Total of \_\_\_\_\_ forms are submitted.

## 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.



# 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<br>NUMBER | FILING or<br>371(c) DATE | GRP ART<br>UNIT | FIL FEE REC'D | ATTY. DOCKET NO | TOT CLAIMS | IND CLAIMS |
|-----------------------|--------------------------|-----------------|---------------|-----------------|------------|------------|
| 18/104,767            | 02/01/2023               |                 | 1820          | 230-046-CON     | 20         | 2          |

CONFIRMATION NO. 6379

144465  
Tanner IP, PLLC  
149 West Gilpin Avenue  
Norfolk, VA 23503

## FILING RECEIPT



0000000054274285

Date Mailed: 03/03/2023

Receipt is acknowledged of this non-provisional utility 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 FIRST INVENTOR, 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 corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction 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 provided that the request is grantable.

### Inventor(s)

John Douglas STEINBERG, Millbrae, CA;  
Scott Douglas HUBLOU, Redwood City, CA;

### Applicant(s)

ECOFACITOR, INC., Palo Alto, CA;

**Power of Attorney:** The patent practitioners associated with Customer Number 144465

### Domestic Priority data as claimed by applicant

This application is a CON of 17/700,409 03/21/2022  
which is a CON of 16/806,779 03/02/2020 ABN  
which is a CON of 16/374,083 04/03/2019 PAT 10,612,983  
which is a CON of 15/905,251 02/26/2018 ABN  
which is a DIV of 14/731,221 06/04/2015 PAT 9,939,333  
which is a CON of 13/861,189 04/11/2013 PAT 9,057,649  
which is a CON of 13/230,610 09/12/2011 PAT 8,423,322  
which is a CON of 12/211,690 09/16/2008 PAT 8,019,567  
which claims benefit of 60/994,011 09/17/2007

**Foreign Applications** for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

*Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.*

**Permission to Access Application via Priority Document Exchange:** Yes

**Permission to Access Search Results:** Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

**If Required, Foreign Filing License Granted:** 02/28/2023

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 18/104,767**

**Projected Publication Date:** 06/08/2023

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC  
SYSTEM

**Preliminary Class**

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## **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 (1-866-999-4258).

## **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**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

---

### ***SelectUSA***

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor

community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

# PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number  
18/104,767

## 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<br>(37 CFR 1.16(a), (b), or (c))                                | N/A                                                                                                                                                                                                                           | N/A             | N/A      |              | N/A      | 320                     |  |
| SEARCH FEE<br>(37 CFR 1.16(k), (l), or (m))                               | N/A                                                                                                                                                                                                                           | N/A             | N/A      |              | N/A      | 700                     |  |
| EXAMINATION FEE<br>(37 CFR 1.16(o), (p), or (q))                          | N/A                                                                                                                                                                                                                           | N/A             | N/A      |              | N/A      | 800                     |  |
| TOTAL CLAIMS<br>(37 CFR 1.16(i))                                          | 20                                                                                                                                                                                                                            | minus 20 =<br>0 |          |              | x        | = 0                     |  |
| INDEPENDENT CLAIMS<br>(37 CFR 1.16(h))                                    | 2                                                                                                                                                                                                                             | minus 3 =<br>*  |          |              | x        | = 0                     |  |
| APPLICATION SIZE FEE<br>(37 CFR 1.16(s))                                  | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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                       |  |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))                         |                                                                                                                                                                                                                               |                 |          |              |          | 0                       |  |
| * If the difference in column 1 is less than zero, enter "0" in column 2. |                                                                                                                                                                                                                               |                 | TOTAL    |              | TOTAL    | 1820                    |  |

## APPLICATION AS AMENDED - PART II

|             |                                                                 | (Column 1)                       | (Column 2)                         | (Column 3)    | SMALL ENTITY       |                    | OTHER THAN SMALL ENTITY |                    |
|-------------|-----------------------------------------------------------------|----------------------------------|------------------------------------|---------------|--------------------|--------------------|-------------------------|--------------------|
|             |                                                                 | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE(\$)           | ADDITIONAL FEE(\$) | RATE(\$)                | ADDITIONAL FEE(\$) |
| AMENDMENT A | Total<br>(37 CFR 1.16(i))                                       | *                                | Minus **                           | =             | x                  | =                  | x                       | =                  |
|             | Independent<br>(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<br>ADD'L FEE |                    | TOTAL<br>ADD'L FEE      |                    |
| AMENDMENT B | Total<br>(37 CFR 1.16(i))                                       | *                                | Minus **                           | =             | x                  | =                  | x                       | =                  |
|             | Independent<br>(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<br>ADD'L FEE |                    | TOTAL<br>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.



# 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.        | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|------------------------|-------------|------------------------|---------------------|------------------|
| 18/104,767             | 02/01/2023  | John Douglas STEINBERG | 230-046-CON         | 6379             |
| 144465                 | 7590        | 03/30/2023             | EXAMINER            |                  |
| Tanner IP, PLLC        |             |                        | CENTRAL, DOCKET     |                  |
| 149 West Gilpin Avenue |             |                        | ART UNIT            |                  |
| Norfolk, VA 23503      |             |                        | PAPER NUMBER        |                  |
|                        |             |                        | OPAP                |                  |
|                        |             |                        | NOTIFICATION DATE   |                  |
|                        |             |                        | DELIVERY MODE       |                  |
|                        |             |                        | 03/30/2023          |                  |
|                        |             |                        | 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):

dan@tannerip.com  
eofficeaction@appcoll.com  
james@tannerip.com

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                      |                                         |                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------|--------------------------------|
| <b><i>Decision Granting Request for Prioritized Examination (Track I)</i></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Application No.</b><br>18/104,767 | <b>Applicant(s)</b><br>STEINBERG et al. |                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Examiner</b><br>FIKIRTE A GEREMEW | <b>Art Unit</b><br>OMBL                 | <b>AIA (FITF) Status</b><br>No |
| <p>1. THE REQUEST FILED <u>01 February 2023</u> IS <b><u>GRANTED</u></b>.</p> <p>The above-identified application has met the requirements for prioritized examination</p> <p>A. <input checked="" type="checkbox"/> for an original nonprovisional application (Track I).</p> <p>B. <input type="checkbox"/> for an application undergoing continued examination (RCE).</p> <p>2. <b>The above-identified application will undergo prioritized examination.</b> The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:</p> <p>A. filing a <b><u>petition for extension of time</u></b> to extend the time period for filing a reply;</p> <p>B. filing an <b><u>amendment to amend the application to contain more than four independent claims, more than thirty total claims</u></b>, or a multiple dependent claim;</p> <p>C. filing a <b><u>request for continued examination</u></b> ;</p> <p>D. filing a notice of appeal;</p> <p>E. filing a request for suspension of action;</p> <p>F. mailing of a notice of allowance;</p> <p>G. mailing of a final Office action;</p> <p>H. completion of examination as defined in 37 CFR 41.102; or</p> <p>I. abandonment of the application.</p> <p>Telephone inquiries with regard to this decision should be directed to FIKIRTE GEREMEW at (703) 756-1930. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.</p> |                                      |                                         |                                |
| /FIKIRTE A GEREMEW/<br>PROGRAM SUPPORT ASSISTANT, OMBL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                      |                                         |                                |

# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

## **U.S.PATENTS**

[Remove](#)

| Examiner Initial* | Cite No | Patent Number | Kind Code <sup>1</sup> | Issue Date | Name of Patentee or Applicant of cited Document | Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear |
|-------------------|---------|---------------|------------------------|------------|-------------------------------------------------|--------------------------------------------------------------------------|
|                   | 1       | 10569036      | B2                     | 2020-02-25 | Delangre et al.                                 |                                                                          |
|                   | 2       | 10339232      | B1                     | 2019-07-02 | Hoff                                            |                                                                          |
|                   | 3       | 10316581      | B1                     | 2019-06-11 | Nagel et al.                                    |                                                                          |
|                   | 4       | 8583288       | B1                     | 2013-11-12 | Rossi et al.                                    |                                                                          |
|                   | 5       | 7099748       | B2                     | 2006-08-29 | Rayburn                                         |                                                                          |
|                   | 6       | 6868293       | B1                     | 2005-03-15 | Schurr et al.                                   |                                                                          |
|                   | 7       | 6789739       | B2                     | 2004-09-14 | Rosen                                           |                                                                          |
|                   | 8       | 6671586       | B2                     | 2003-12-30 | Davis et al.                                    |                                                                          |

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

|    |         |    |            |           |  |
|----|---------|----|------------|-----------|--|
| 9  | 6478233 | B1 | 2002-11-12 | Shah      |  |
| 10 | 5197666 | A  | 1993-03-30 | Wedeki nd |  |
| 11 | 4987798 | A  | 1990-01-30 | Cler      |  |

If you wish to add additional U.S. Patent citation information please click the Add button.

Add

**U.S.PATENT APPLICATION PUBLICATIONS**

Remove

| Examiner Initial* | Cite No | Publication Number | Kind Code <sup>1</sup> | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|-------------------|---------|--------------------|------------------------|------------------|-------------------------------------------------|------------------------------------------------------------------------|
|                   | 1       | 20180087795        | A1                     | 2018-03-29       | Okita et al.                                    |                                                                        |
|                   | 2       | 20170329357        | A1                     | 2017-11-16       | Torres et al.                                   |                                                                        |
|                   | 3       | 20160290668        | A1                     | 2016-10-06       | Taylor et al.                                   |                                                                        |
|                   | 4       | 20150159928        | A1                     | 2015-06-11       | Hancock                                         |                                                                        |
|                   | 5       | 20140352340        | A1                     | 2014-12-04       | Berg et al.                                     |                                                                        |
|                   | 6       | 20140277795        | A1                     | 2014-09-18       | Matsuoka et al.                                 |                                                                        |

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

|                        |                        |             |
|------------------------|------------------------|-------------|
| Application Number     |                        | 18104767    |
| Filing Date            |                        | 2023-02-01  |
| First Named Inventor   | John Douglas STEINBERG |             |
| Art Unit               |                        | 2857        |
| Examiner Name          | Tung S. LAU            |             |
| Attorney Docket Number |                        | 230-046-CON |

|    |             |    |            |                |  |
|----|-------------|----|------------|----------------|--|
| 7  | 20120271576 | A1 | 2012-10-25 | Kamel et al.   |  |
| 8  | 20120234932 | A1 | 2012-09-20 | Okamoto et al. |  |
| 9  | 20120125592 | A1 | 2012-05-24 | Fadell et al.  |  |
| 10 | 20120065789 | A1 | 2012-03-15 | Scelzi et al.  |  |
| 11 | 20110282504 | A1 | 2011-11-17 | Besore et al.  |  |
| 12 | 20100211224 | A1 | 2010-08-19 | Keeling et al. |  |
| 13 | 20090281667 | A1 | 2009-11-12 | Masui et al.   |  |
| 14 | 20090216382 | A1 | 2009-08-27 | Ng             |  |
| 15 | 20090140060 | A1 | 2009-06-04 | Stoner et al.  |  |
| 16 | 20090013703 | A1 | 2009-01-15 | Werner         |  |
| 17 | 20070267508 | A1 | 2007-11-22 | Hoglund et al. |  |

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

|    |             |    |            |                    |
|----|-------------|----|------------|--------------------|
| 18 | 20070044501 | A1 | 2007-03-01 | Schnell et al.     |
| 19 | 20070043477 | A1 | 2007-02-22 | Ehlers et al.      |
| 20 | 20050159846 | A1 | 2005-07-21 | Van Ostrand et al. |
| 21 | 20040117330 | A1 | 2004-06-17 | Ehlers et al.      |
| 22 | 20030131623 | A1 | 2003-07-17 | Suppes             |

If you wish to add additional U.S. Published Application citation information please click the Add button.

**FOREIGN PATENT DOCUMENTS**

| Examiner Initial* | Cite No | Foreign Document Number <sup>3</sup> | Country Code <sup>2</sup> | Kind Code <sup>4</sup> | Publication Date | Name of Patentee or Applicant of cited Document | Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear | T <sup>5</sup> |
|-------------------|---------|--------------------------------------|---------------------------|------------------------|------------------|-------------------------------------------------|--------------------------------------------------------------------------|----------------|
|                   | 1       |                                      |                           |                        |                  |                                                 |                                                                          |                |

If you wish to add additional Foreign Patent Document citation information please click the Add button.

**NON-PATENT LITERATURE DOCUMENTS**

| Examiner Initials* | Cite No | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published. | T <sup>5</sup> |
|--------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
|                    | 1       |                                                                                                                                                                                                                                                                 |                |

If you wish to add additional non-patent literature document citation information please click the Add button.

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

**EXAMINER SIGNATURE**

|                    |  |                 |  |
|--------------------|--|-----------------|--|
| Examiner Signature |  | Date Considered |  |
|--------------------|--|-----------------|--|

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

|            |                         |                     |            |
|------------|-------------------------|---------------------|------------|
| Signature  | /Daniel A. Tanner, III/ | Date (YYYY-MM-DD)   | 2023-04-11 |
| Name/Print | Daniel A. Tanner, III   | Registration Number | 54734      |

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

## 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.

## Electronic Acknowledgement Receipt

|                                             |                                                                              |
|---------------------------------------------|------------------------------------------------------------------------------|
| <b>EFS ID:</b>                              | 47825869                                                                     |
| <b>Application Number:</b>                  | 18104767                                                                     |
| <b>International Application Number:</b>    |                                                                              |
| <b>Confirmation Number:</b>                 | 6379                                                                         |
| <b>Title of Invention:</b>                  | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |
| <b>First Named Inventor/Applicant Name:</b> | John Douglas STEINBERG                                                       |
| <b>Customer Number:</b>                     | 144465                                                                       |
| <b>Filer:</b>                               | Daniel Albert Tanner                                                         |
| <b>Filer Authorized By:</b>                 |                                                                              |
| <b>Attorney Docket Number:</b>              | 230-046-CON                                                                  |
| <b>Receipt Date:</b>                        | 11-APR-2023                                                                  |
| <b>Filing Date:</b>                         | 01-FEB-2023                                                                  |
| <b>Time Stamp:</b>                          | 17:16:25                                                                     |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)                                                  |

### Payment information:

|                        |    |
|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

### File Listing:

| Document Number | Document Description                               | File Name       | File Size(Bytes)/<br>Message Digest      | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------------------------------------|-----------------|------------------------------------------|------------------|------------------|
| 1               | Information Disclosure Statement (IDS) Form (SB08) | 230-046-IDS.pdf | 1264462                                  | no               | 7                |
|                 |                                                    |                 | 3737810f631b644b7f75180f650600d4feacbefb |                  |                  |

### Warnings:

076

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |
| <b>Total Files Size (in bytes):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1264462 |
| <p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> <b>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.</b></p> |         |



# 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.        | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|------------------------|-------------|------------------------|---------------------|------------------|
| 18/104,767             | 02/01/2023  | John Douglas STEINBERG | 230-046-CON         | 6379             |
| 144465                 | 7590        | 04/14/2023             | EXAMINER            |                  |
| Tanner IP, PLLC        |             |                        | LAU, TUNG S         |                  |
| 149 West Gilpin Avenue |             |                        | ART UNIT            |                  |
| Norfolk, VA 23503      |             |                        | PAPER NUMBER        |                  |
|                        |             |                        | 2857                |                  |
|                        |             |                        | NOTIFICATION DATE   |                  |
|                        |             |                        | DELIVERY MODE       |                  |
|                        |             |                        | 04/14/2023          |                  |
|                        |             |                        | 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):

dan@tannerip.com  
eofficeaction@appcoll.com  
james@tannerip.com

**Office Action Summary****Application No.**

18/104,767

**Applicant(s)**

STEINBERG et al.

**Examiner**

TUNG S LAU

**Art Unit**

2857

**AIA (FITF) Status**

No

-- 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 MONTHS 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 02/01/2023.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_.

2a) ☐ This action is **FINAL**.

2b) ☒ This action is non-final.

3) ☐ 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.

4) ☐ 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\***

5) ☒ Claim(s) 1-20 is/are pending in the application.

5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.

6) ☐ Claim(s) \_\_\_\_ is/are allowed.

7) ☒ Claim(s) 1-20 is/are rejected.

8) ☐ Claim(s) \_\_\_\_ is/are objected to.

9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

**Application Papers**

10) ☐ The specification is objected to by the Examiner.

11) ☒ The drawing(s) filed on 02/01/2023 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).

**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).

**Certified copies:**

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)).

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

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

3) ☒ Interview Summary (PTO-413)

Paper No(s)/Mail Date \_\_\_\_.

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)

4) ☐ Other: \_\_\_\_.

Paper No(s)/Mail Date \_\_\_\_.

***Notice of Pre-AIA or AIA Status***

The present application is being examined under the pre-AIA first to invent provisions.

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

**DETAILED ACTION**

**Track One**

1. Current case Track One request on 02/01/2023 and has been Granted on 03/30/2023.

***Double Patenting***

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).  
A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).  
Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-20 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-20 of a related Application: No. 18104772, claims 1-20 of 18104,779.

Related Application 14/731,221 now US Patent 9,939,333 (claims 1-9), 13/861,189 now US Patent 9,057,649 (claims 1-14), 13/230610 now US Patent 8,423,322 (claims 1-14), 12/211690 now US Patent 8,019,567 (claim 1-20).

Although the conflicting claims are not identical, they are not patentably distinct from each other because the limitations of the claims in the current application are encompassed in the previous application. The latter pending application encompasses the same process as the pending application and is different version of the previous application because of a rearrangement of the claim language.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4-12 and 14-20 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Rayburn (US Patent Application Publication 2005/0288822, Pub. Date: Dec 29, 2005).

**Regarding claim 1:**

Rayburn describes a control system for an environment inside a structure (abstract), comprising: a climate control device in the structure that receives first temperatures from inside the structure (abstract, sense inside structure temperature); a processor that (fig. 1, controller 20): receives second temperatures from outside the structure from at least one source outside the structure (Abstract, sensors sense the temperature both inside and outside the structure); and compares the first temperatures and the second temperatures over time to calculate an operating profile for the climate control device (abstract, device to drive the temperature of the structure through a temperature change); and a database that stores the operating profile for the climate control device (abstract, the recovery time calculation being obtained by multiplying the difference between the sensed temperature inside the structure and the second temperature by the previously calculated air treatment rate), wherein the processor (a) compares a portion of the operating profile for the climate control device with a temperature profile to evaluate an operation of the climate control device (0005, calculating a preliminary recovery time for a HVAC&R device), and (b) outputs a result of the evaluation (0005, to drive the sensed temperature inside the structure to a predetermined temperature setting).

**Regarding claim 11:**

Rayburn describes a method for controlling an environment inside a structure (abstract), comprising: receiving, with a processor (fig. 1, controller 20), first temperatures inside the structure from a climate control device inside the structure (abstract, sense inside structure temperature); receiving, with the processor, second temperatures outside the structure from at least one source outside the structure (Abstract, sensors sense the temperature both inside and outside the structure); comparing, with the processor, the first temperatures and the second temperatures over time to calculate an operating profile for the climate control device (abstract, device to drive the temperature of the structure through a temperature change); and storing, with the processor, the operating profile for the climate control device in a database (abstract, the recovery time calculation being obtained by multiplying the difference between the sensed temperature inside the structure and the second temperature by the previously calculated air treatment rate), comparing, with the processor, a portion of the operating profile for the climate control device with a temperature profile to evaluate an operation of the climate control device (0005, calculating a preliminary recovery time for a HVAC&R device), and outputting, with the processor, a result of the evaluation (0005, to drive the sensed temperature inside the structure to a predetermined temperature setting).

**Regarding claim 2, 12,** Rayburn further describes wherein the first temperatures are received from a programmable thermostat communicating with the climate control device (0005, fig. 1, controller 20, receive sensor and control the temperature of the structure).

**Regarding claim 4 and 14:** Rayburn further describes the portion of the operating profile for the climate control device is limited to a first time interval, and the temperature profile is another portion of the operating profile for the climate control device limited to a second time interval (fig. 2, 120, different time sense).

**Regarding claim 5 and 15:** Rayburn further describes wherein the evaluation of the operation of the climate control device detects a change in the operating profile of the climate control device between the first time interval and the second time interval (fig. 2, 120, different time interval).

**Regarding claim 6 and 16:** Rayburn further describes the database stores a plurality of temperature profiles associated with potential defects identified by changes in the operating profile of the climate control device over time (0005, correction factor); and the processor identifies one or more of the potential defects based on the detected change in the operating profile of the climate control device between the first time interval and the second time interval (0005, correction recovery time).

**Regarding claim 7 and 17:** Rayburn further describes wherein the second temperatures comprise outside air temperatures for a geographic region surrounding the first structure (0006, outside temperature).

**Regarding claim 8 and 18:** Rayburn further describes wherein the temperature profile is a prediction of a coming change in the second temperatures (0018, ATR calculated).

**Regarding claim 9 and 19:** Rayburn further describes wherein the result of the evaluation is a modification in an operating interval for the climate control device based on the prediction (0018, ATR calculated).

**Regarding claim 10 and 20:** Rayburn further describes wherein the modification is in at least one of (a) an “on” or an “off” time for the climate control device, and (b) an “on” or an “off” temperature for the climate control device ( 0005-0006, turn on/off HVAC&R device to maintain inside structure temperate).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of pre-AIA 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, 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.

Claims 3 and 13 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Rayburn (US Patent Application Publication 2005/0288822, Pub. Date: Dec 29, 2005).

**Regarding claim 3, 13,** Rayburn further describes wherein the programmable thermostat includes a device (0005), and the result of the evaluation is on the display device of the programmable thermostat (0005, 0006, temperature control unit)

Rayburn does not shown display. Rayburn discloses the controller including a microprocessor and other support electronic (0014).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rayburn to have the display when using microprocessor and its support electronic as is common in the art to use display with microcontroller to support external function (control HVAC).

#### **Contact information**

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung Lau whose telephone number is (571)272-2274, email is Tungs.lau@uspto.gov. The examiner can normally be reached on Tuesday-Friday 7:00 AM-5:00 PM EST.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene, can be reached on 571-272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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 <https://ppair-my.uspto.gov/pair/PrivatePair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll- free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272- 1000.

/TUNG S LAU/  
Primary Examiner, Art Unit 2857  
Technology Center 2800  
April 11, 2023

|                                                    |                                      |                                         |                                                  |                       |
|----------------------------------------------------|--------------------------------------|-----------------------------------------|--------------------------------------------------|-----------------------|
| <b><i>Examiner-Initiated Interview Summary</i></b> | <b>Application No.</b><br>18/104,767 | <b>Applicant(s)</b><br>STEINBERG et al. |                                                  |                       |
|                                                    | <b>Examiner</b><br>TUNG S LAU        | <b>Art Unit</b><br>2857                 | <b>AIA (First Inventor to File) Status</b><br>No | <b>Page</b><br>1 of 1 |

| <b>All Participants</b> (applicant, applicants representative, PTO personnel) | <b>Title</b>     | <b>Type</b> |
|-------------------------------------------------------------------------------|------------------|-------------|
| TUNG S LAU                                                                    | Primary Examiner | Telephonic  |
| Daniel A.Tanner                                                               | Attorney         |             |

**Date of Interview:** 11 April 2023

**Issues Discussed:**

**Other**

Talked to the applicant about potential ODP and prior art. The examiner appreciated the applicant for the courtesy and professionalism and in a genuine effort to advance prosecution.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| /TUNG S LAU/<br>Primary Examiner, Art Unit 2857                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <p><b>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</b></p> <p>Please further see:<br/>MPEP 713.04<br/>Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)<br/>37 CFR § 1.2 Business to be transacted in writing</p> |  |

**Applicant recordation instructions:** It is not necessary for applicant to provide a separate record of the substance of interview.

**Examiner recordation instructions:** Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

|                                          |                                       |                                                                |             |
|------------------------------------------|---------------------------------------|----------------------------------------------------------------|-------------|
| <b><i>Notice of References Cited</i></b> | Application/Control No.<br>18/104,767 | Applicant(s)/Patent Under<br>Reexamination<br>STEINBERG et al. |             |
|                                          | Examiner<br>TUNG S LAU                | Art Unit<br>2857                                               | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name                    | CPC Classification | US Classification |
|---|---|--------------------------------------------------|-----------------|-------------------------|--------------------|-------------------|
| * | A | US-8423322-B2                                    | 04-2013         | Steinberg; John Douglas | G01M99/005         | 236/1C            |
| * | B | US-8019567-B2                                    | 09-2011         | Steinberg; John Douglas | G01M99/005         | 165/238           |
| * | C | US-10612983-B2                                   | 04-2020         | Steinberg; John Douglas | F24F11/30          | 1/1               |
| * | D | US-8596550-B2                                    | 12-2013         | Steinberg; John Douglas | F24F11/30          | 236/94            |
| * | E | US-8886488-B2                                    | 11-2014         | Steinberg; John Douglas | F24F11/62          | 702/182           |
| * | F | US-9939333-B2                                    | 04-2018         | Steinberg; John Douglas | F24F11/63          | 1/1               |
| * | G | US-9057649-B2                                    | 06-2015         | Steinberg; John Douglas | F24F11/30          | 1/1               |
| * | H | US-20050288822-A1                                | 12-2005         | Rayburn, Ronald Richard | F24F11/30          | 236/46R           |
|   | I |                                                  |                 |                         |                    |                   |
|   | J |                                                  |                 |                         |                    |                   |
|   | K |                                                  |                 |                         |                    |                   |
|   | L |                                                  |                 |                         |                    |                   |
|   | M |                                                  |                 |                         |                    |                   |

**FOREIGN PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Country | Name | CPC 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.

|                                                                                                                 |                                              |                                                                    |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------|
| <b><i>Search Notes</i></b><br> | <b>Application/Control No.</b><br>18/104,767 | <b>Applicant(s)/Patent Under Reexamination</b><br>STEINBERG et al. |
|                                                                                                                 | <b>Examiner</b><br>TUNG S LAU                | <b>Art Unit</b><br>2857                                            |

| CPC - Searched*                                                                                     |            |          |
|-----------------------------------------------------------------------------------------------------|------------|----------|
| Symbol                                                                                              | Date       | Examiner |
| G01K 13/00, F24F 11/30, F24F 11/63, G01M 99/005, F24F 11/47, F24F 11/52, F24F 2130/00, F24F 2130/10 | 04/11/2023 | TL       |

| CPC Combination Sets - Searched* |      |          |
|----------------------------------|------|----------|
| Symbol                           | Date | Examiner |
|                                  |      |          |

| US Classification - Searched* |          |      |          |
|-------------------------------|----------|------|----------|
| Class                         | Subclass | Date | Examiner |
|                               |          |      |          |

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes                                  |            |          |
|-----------------------------------------------|------------|----------|
| Search Notes                                  | Date       | Examiner |
| Text, class, Inventor, Assignment PE2E search | 04/11/2023 | TL       |
| PE2E search                                   | 04/11/2023 | TL       |
| Google Scholar Search                         | 04/11/2023 | TL       |
| IP-COM Search                                 | 04/11/2023 | TL       |

| Interference Search |                       |            |          |
|---------------------|-----------------------|------------|----------|
| US Class/CPC Symbol | US Subclass/CPC Group | Date       | Examiner |
| G01K 13/00          |                       | 04/11/2023 | TL       |

|                                                 |  |
|-------------------------------------------------|--|
| /TUNG S LAU/<br>Primary Examiner, Art Unit 2857 |  |
|-------------------------------------------------|--|



## Bibliographic Data

Application No: 18/104,767

Foreign Priority claimed: ☐ Yes ☒ No

35 USC 119 (a-d) conditions met: ☐ Yes ☒ No ☐ Met After Allowance

Verified and Acknowledged:

/TUNG S LAU/

Examiner's Signature

Initials

Title:

SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE  
EFFICIENCY OF AN HVAC SYSTEM

---

| FILING or 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|-----------------------|-------|----------------|---------------------|
| 02/01/2023            | 702   | 2857           | 230-046-CON         |
| <b>RULE</b>           |       |                |                     |

### APPLICANTS

ECOFACITOR, INC., Palo Alto, CA, UNITED STATES

### INVENTORS

John Douglas STEINBERG, Millbrae, CA, UNITED STATES

Scott Douglas HUBLOU,

### CONTINUING DATA

This application is a CON of 17700409 03/21/2022

17700409 is a CON of 16806779 03/02/2020ABN

16806779 is a CON of 16374083 04/03/2019 PAT 10612983

16374083 is a CON of 15905251 02/26/2018ABN

15905251 is a DIV of 14731221 06/04/2015 PAT 9939333

14731221 is a CON of 13861189 04/11/2013 PAT 9057649

13861189 is a CON of 13230610 09/12/2011 PAT 8423322

13230610 is a CON of 12211690 09/16/2008 PAT 8019567

12211690 has PRO of 60994011 09/17/2007

### FOREIGN APPLICATIONS

#### IF REQUIRED, FOREIGN LICENSE GRANTED\*\*

02/28/2023

### STATE OR COUNTRY

UNITED STATES

### ADDRESS

Tanner IP, PLLC  
149 West Gilpin Avenue  
Norfolk, VA 23503

UNITED STATES  
**FILING FEE RECEIVED**  
\$6,160

Main Concept Text

=====

temperature inside and outside HVAC structure and time correction thermostat calculation

(No Concept Modifiers)

=====

(No Filters)

=====

Options

=====

De-dup: None

Relevance Cut-off: None

Sort: Relevance

Content: Patent Publications (169)

=====

US Patents

US Designs

US Applications

EPO Patents

EPO Applications

China Patents

China Applications

Japan Patents  
Japan Applications  
Korea Patents  
Korea Applications  
WIPO Applications  
Argentina Patents  
Argentina Applications  
Brazil Patents  
Brazil Applications  
Canada Patents  
Canada Applications  
Chile Patents  
Chile Applications  
Colombia Applications  
Costa Rica Applications  
Cuba Patents  
Cuba Applications  
Dominican Republic Applications  
Ecuador Patents  
Ecuador Applications  
El Salvador Applications  
Guatemala Applications  
Honduras Applications  
Mexico Patents  
Mexico Applications  
Nicaragua Patents  
Panama Applications  
Peru Applications  
Trinidad & Tobago Patents

Uruguay Applications

Austria Patents

Austria Applications

Belarus Patents

Belgium Patents

Belgium Applications

Bosnia & Herzegovina Patents

Bosnia & Herzegovina Applications

Bulgaria Patents

Bulgaria Applications

Croatia Patents

Croatia Applications

Czech Republic Patents

Czech Republic Applications

Czechoslovakia Patents

Czechoslovakia Applications

Denmark Patents

Denmark Applications

Estonia Patents

Estonia Applications

EUIPO Patents

Finland Patents

Finland Applications

France Patents

France Applications

Germany Patents

Germany Applications

Great Britain Patents

Great Britain Applications

Greece Patents  
Greece Applications  
Hungary Patents  
Hungary Applications  
Iceland Patents  
Iceland Applications  
Ireland Patents  
Ireland Applications  
Italy Patents  
Italy Applications  
Latvia Patents  
Latvia Applications  
Lithuania Patents  
Lithuania Applications  
Luxembourg Patents  
Luxembourg Applications  
Malta Patents  
Monaco Patents  
Montenegro Patents  
Montenegro Applications  
Netherlands Patents  
Netherlands Applications  
Norway Patents  
Norway Applications  
Poland Patents  
Poland Applications  
Portugal Patents  
Portugal Applications  
Republic of Moldova Patents

Republic of Moldova Applications  
Romania Patents  
Romania Applications  
San Marino Patents  
San Marino Applications  
Serbia Patents  
Serbia Applications  
Slovakia Patents  
Slovakia Applications  
Slovenia Patents  
Spain Patents  
Spain Applications  
Sweden Patents  
Sweden Applications  
Switzerland Patents  
Switzerland Applications  
Ukraine Patents  
Yugoslavia/Serbia and Montenegro Patents  
Yugoslavia/Serbia and Montenegro Applications  
Armenia Patents  
Australia Patents  
Australia Applications  
Cyprus Patents  
Gulf Cooperation Council Patents  
Hong Kong Patents  
India Patents  
India Applications  
Indonesia Patents  
Indonesia Applications

Israel Patents  
Israel Applications  
Jordan Patents  
Jordan Applications  
Kyrgyzstan Patents  
Macao Applications  
Malaysia Patents  
Mongolia Patents  
New Zealand Patents  
Philippines Patents  
Philippines Applications  
Saudi Arabia Patents  
Saudi Arabia Applications  
Singapore Patents  
Singapore Applications  
Taiwan Patents  
Taiwan Applications  
Tajikistan Patents  
Tajikistan Applications  
Thailand Patents  
Thailand Applications  
Uzbekistan Patents  
Vietnam Patents  
Algeria Patents  
ARIPO Patents  
ARIPO Applications  
Egypt Patents  
Kenya Patents  
Malawi Patents

Morocco Patents

Morocco Applications

OAPI Patents

South Africa Patents

Tunisia Applications

Zambia Patents

Zimbabwe Patents

EAPO Patents

EAPO Applications

Georgia Patents

Georgia Applications

Kazakhstan Patents

Kazakhstan Applications

Russia Patents

Russia Applications

Turkey Patents

Turkey Applications

Main Concept Text

=====

temperature inside and outside HVAC structure system and time correction thermostat calculation

(No Concept Modifiers)

=====

(No Filters)

=====

Options

=====

De-dup: None

Relevance Cut-off: None

Sort: Relevance

Content: Patent Publications (169)

=====

US Patents

US Designs

US Applications

EPO Patents

EPO Applications

China Patents

China Applications

Japan Patents

Japan Applications

Korea Patents

Korea Applications

WIPO Applications

Argentina Patents

Argentina Applications

Brazil Patents

Brazil Applications

Canada Patents  
Canada Applications  
Chile Patents  
Chile Applications  
Colombia Applications  
Costa Rica Applications  
Cuba Patents  
Cuba Applications  
Dominican Republic Applications  
Ecuador Patents  
Ecuador Applications  
El Salvador Applications  
Guatemala Applications  
Honduras Applications  
Mexico Patents  
Mexico Applications  
Nicaragua Patents  
Panama Applications  
Peru Applications  
Trinidad & Tobago Patents  
Uruguay Applications  
Austria Patents  
Austria Applications  
Belarus Patents  
Belgium Patents  
Belgium Applications  
Bosnia & Herzegovina Patents  
Bosnia & Herzegovina Applications  
Bulgaria Patents

Bulgaria Applications  
Croatia Patents  
Croatia Applications  
Czech Republic Patents  
Czech Republic Applications  
Czechoslovakia Patents  
Czechoslovakia Applications  
Denmark Patents  
Denmark Applications  
Estonia Patents  
Estonia Applications  
EUIPO Patents  
Finland Patents  
Finland Applications  
France Patents  
France Applications  
Germany Patents  
Germany Applications  
Great Britain Patents  
Great Britain Applications  
Greece Patents  
Greece Applications  
Hungary Patents  
Hungary Applications  
Iceland Patents  
Iceland Applications  
Ireland Patents  
Ireland Applications  
Italy Patents

Italy Applications

Latvia Patents

Latvia Applications

Lithuania Patents

Lithuania Applications

Luxembourg Patents

Luxembourg Applications

Malta Patents

Monaco Patents

Montenegro Patents

Montenegro Applications

Netherlands Patents

Netherlands Applications

Norway Patents

Norway Applications

Poland Patents

Poland Applications

Portugal Patents

Portugal Applications

Republic of Moldova Patents

Republic of Moldova Applications

Romania Patents

Romania Applications

San Marino Patents

San Marino Applications

Serbia Patents

Serbia Applications

Slovakia Patents

Slovakia Applications

Slovenia Patents

Spain Patents

Spain Applications

Sweden Patents

Sweden Applications

Switzerland Patents

Switzerland Applications

Ukraine Patents

Yugoslavia/Serbia and Montenegro Patents

Yugoslavia/Serbia and Montenegro Applications

Armenia Patents

Australia Patents

Australia Applications

Cyprus Patents

Gulf Cooperation Council Patents

Hong Kong Patents

India Patents

India Applications

Indonesia Patents

Indonesia Applications

Israel Patents

Israel Applications

Jordan Patents

Jordan Applications

Kyrgyzstan Patents

Macao Applications

Malaysia Patents

Mongolia Patents

New Zealand Patents

Philippines Patents  
Philippines Applications  
Saudi Arabia Patents  
Saudi Arabia Applications  
Singapore Patents  
Singapore Applications  
Taiwan Patents  
Taiwan Applications  
Tajikistan Patents  
Tajikistan Applications  
Thailand Patents  
Thailand Applications  
Uzbekistan Patents  
Vietnam Patents  
Algeria Patents  
ARIPO Patents  
ARIPO Applications  
Egypt Patents  
Kenya Patents  
Malawi Patents  
Morocco Patents  
Morocco Applications  
OAPI Patents  
South Africa Patents  
Tunisia Applications  
Zambia Patents  
Zimbabwe Patents  
EAPO Patents  
EAPO Applications

Georgia Patents

Georgia Applications

Kazakhstan Patents

Kazakhstan Applications

Russia Patents

Russia Applications

Turkey Patents

Turkey Applications

Main Concept Text

=====

temperature inside and outside HVAC structure system and time correction adjustment thermostat calculation

(No Concept Modifiers)

=====

(No Filters)

=====

Options

=====

De-dup: None

Relevance Cut-off: None

Sort: Relevance

Content: Patent Publications (169)

=====

US Patents

US Designs

US Applications

EPO Patents

EPO Applications

China Patents

China Applications

Japan Patents

Japan Applications

Korea Patents

Korea Applications

WIPO Applications

Argentina Patents

Argentina Applications

Brazil Patents

Brazil Applications

Canada Patents

Canada Applications

Chile Patents

Chile Applications

Colombia Applications

Costa Rica Applications

Cuba Patents

Cuba Applications

Dominican Republic Applications

Ecuador Patents  
Ecuador Applications  
El Salvador Applications  
Guatemala Applications  
Honduras Applications  
Mexico Patents  
Mexico Applications  
Nicaragua Patents  
Panama Applications  
Peru Applications  
Trinidad & Tobago Patents  
Uruguay Applications  
Austria Patents  
Austria Applications  
Belarus Patents  
Belgium Patents  
Belgium Applications  
Bosnia & Herzegovina Patents  
Bosnia & Herzegovina Applications  
Bulgaria Patents  
Bulgaria Applications  
Croatia Patents  
Croatia Applications  
Czech Republic Patents  
Czech Republic Applications  
Czechoslovakia Patents  
Czechoslovakia Applications  
Denmark Patents  
Denmark Applications

Estonia Patents  
Estonia Applications  
EUIPO Patents  
Finland Patents  
Finland Applications  
France Patents  
France Applications  
Germany Patents  
Germany Applications  
Great Britain Patents  
Great Britain Applications  
Greece Patents  
Greece Applications  
Hungary Patents  
Hungary Applications  
Iceland Patents  
Iceland Applications  
Ireland Patents  
Ireland Applications  
Italy Patents  
Italy Applications  
Latvia Patents  
Latvia Applications  
Lithuania Patents  
Lithuania Applications  
Luxembourg Patents  
Luxembourg Applications  
Malta Patents  
Monaco Patents

Montenegro Patents  
Montenegro Applications  
Netherlands Patents  
Netherlands Applications  
Norway Patents  
Norway Applications  
Poland Patents  
Poland Applications  
Portugal Patents  
Portugal Applications  
Republic of Moldova Patents  
Republic of Moldova Applications  
Romania Patents  
Romania Applications  
San Marino Patents  
San Marino Applications  
Serbia Patents  
Serbia Applications  
Slovakia Patents  
Slovakia Applications  
Slovenia Patents  
Spain Patents  
Spain Applications  
Sweden Patents  
Sweden Applications  
Switzerland Patents  
Switzerland Applications  
Ukraine Patents  
Yugoslavia/Serbia and Montenegro Patents

Yugoslavia/Serbia and Montenegro Applications

Armenia Patents

Australia Patents

Australia Applications

Cyprus Patents

Gulf Cooperation Council Patents

Hong Kong Patents

India Patents

India Applications

Indonesia Patents

Indonesia Applications

Israel Patents

Israel Applications

Jordan Patents

Jordan Applications

Kyrgyzstan Patents

Macao Applications

Malaysia Patents

Mongolia Patents

New Zealand Patents

Philippines Patents

Philippines Applications

Saudi Arabia Patents

Saudi Arabia Applications

Singapore Patents

Singapore Applications

Taiwan Patents

Taiwan Applications

Tajikistan Patents

Tajikistan Applications  
Thailand Patents  
Thailand Applications  
Uzbekistan Patents  
Vietnam Patents  
Algeria Patents  
ARIPO Patents  
ARIPO Applications  
Egypt Patents  
Kenya Patents  
Malawi Patents  
Morocco Patents  
Morocco Applications  
OAPI Patents  
South Africa Patents  
Tunisia Applications  
Zambia Patents  
Zimbabwe Patents  
EAPO Patents  
EAPO Applications  
Georgia Patents  
Georgia Applications  
Kazakhstan Patents  
Kazakhstan Applications  
Russia Patents  
Russia Applications  
Turkey Patents  
Turkey Applications

## PE2E SEARCH - Search History (Prior Art)

| Ref # | Hits | Search Query   | DBs                                                                          | Default Operator | Plurals | British Equivalents | Time Stamp          |
|-------|------|----------------|------------------------------------------------------------------------------|------------------|---------|---------------------|---------------------|
| L1    | 5    | "7099748".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 07:53 AM |
| L2    | 5    | "8423322".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:06 AM |
| L3    | 3    | "8019567".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:07 AM |
| L4    | 2    | "10612983".pn. | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:11 AM |
| L5    | 2    | "8596550".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:12 AM |
| L6    | 2    | "8886488".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:12 AM |
| L7    | 4    | "5197666".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:31 AM |
| L8    | 3    | "20050288822"  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:39 AM |
| L9    | 5    | "7099748".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:57 AM |
| L10   | 7    | "9939333".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT;          | OR               | ON      | ON                  | 2023/04/11 09:11 AM |

|     |      |                                                                                          |                                                                                          |    |    |    |                        |
|-----|------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |      |                                                                                          | IBM_TDB)                                                                                 |    |    |    |                        |
| L11 | 3    | "9057649".pn.                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>09:13 AM |
| L12 | 5    | "8423322".pn.                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>09:14 AM |
| L13 | 3    | "8019567".pn.                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>09:15 AM |
| L14 | 5    | "8423322".pn.                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:36 AM |
| L15 | 2313 | temperature WITH<br>inside WITH outside<br>SAME HVAC                                     | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:51 AM |
| L16 | 1682 | temperature WITH<br>inside WITH outside<br>WITH HVAC                                     | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:51 AM |
| L17 | 119  | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure                   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:51 AM |
| L18 | 86   | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure AND<br>thermostat | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:51 AM |
| L19 | 20   | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure SAME profile      | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:52 AM |
| L20 | 81   | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure SAME time         | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:53 AM |
| L21 | 0    | temperature WITH<br>inside WITH outside                                                  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,                                                 | OR | ON | ON | 2023/04/11<br>10:53 AM |

|     |    |                                                                                                     |                                                                                          |    |    |    |                        |
|-----|----|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |    | WITH HVAC WITH<br>structure SAME time<br>SAME recover\$4                                            | WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                             |    |    |    |                        |
| L22 | 0  | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure SAME time<br>AND recover\$4  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:53 AM |
| L23 | 0  | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure SAME time<br>WITH recover\$4 | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:53 AM |
| L24 | 44 | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure SAME time<br>AND correct\$4  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:54 AM |
| L25 | 48 | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure AND time<br>AND correct\$4   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:54 AM |
| L26 | 3  | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure AND time<br>AND recover\$3   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:55 AM |
| L27 | 48 | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure AND time<br>AND correct\$4   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:55 AM |
| L28 | 7  | (G01K 13/00 .cpc.)<br>AND I27                                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:57 AM |
| L29 | 43 | (F24F 11/30 .cpc.) AND<br>I27                                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:57 AM |
| L30 | 43 | (F24F 11/63 .cpc.) AND<br>I27                                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:58 AM |
| L31 | 7  | (G01M 99/005 .cpc.)<br>AND I27                                                                      | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:58 AM |

|     |    |                                                                                       |                                                                              |    |    |    |                     |
|-----|----|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----|----|----|---------------------|
| L32 | 43 | (F24F 11/47 .cpc.) AND I27                                                            | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 10:58 AM |
| L33 | 43 | (F24F 11/52 .cpc.) AND I27                                                            | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 10:58 AM |
| L34 | 43 | (F24F 2130/00 .cpc.) AND I27                                                          | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 10:58 AM |
| L35 | 43 | (F24F 2130/10 .cpc.) AND I27                                                          | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 10:59 AM |
| L36 | 8  | (ECOFACOR .as.) AND L27                                                               | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 10:59 AM |
| L37 | 0  | (Eohn near3 Douglas near3 STEINBERG .in.) AND L27                                     | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 11:00 AM |
| L38 | 11 | (John near3 Douglas near3 STEINBERG .in.) AND L27                                     | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 11:00 AM |
| L39 | 6  | (Scott near3 Douglas near3 HUBLOU .in.) AND L27                                       | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 11:01 AM |
| L40 | 48 | temperature WITH inside WITH outside WITH HVAC WITH structure AND time AND correct\$4 | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 11:02 AM |
| L41 | 3  | "8,019,567" .pn.                                                                      | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 11:14 AM |
| L42 | 5  | "8,423,322" .pn.                                                                      | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT;          | OR | ON | ON | 2023/04/11 11:14 AM |

|  |  |  |          |  |  |  |  |
|--|--|--|----------|--|--|--|--|
|  |  |  | IBM_TDB) |  |  |  |  |
|--|--|--|----------|--|--|--|--|

## PE2E SEARCH - Search History (Interference)

| Ref # | Hits | Search Query                                                                                      | DBs               | Default Operator | Plurals | British Equivalents | Time Stamp             |
|-------|------|---------------------------------------------------------------------------------------------------|-------------------|------------------|---------|---------------------|------------------------|
| N1    | 39   | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure AND time<br>AND correct\$4 | (US-PGPUB; USPAT) | OR               | ON      | ON                  | 2023/04/11<br>10:55 AM |
| N2    | 39   | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure AND time<br>AND correct\$4 | (US-PGPUB; USPAT) | OR               | ON      | ON                  | 2023/04/11<br>11:02 AM |

# Web Search History

| date, time            | web site       | search string                                                                                       |
|-----------------------|----------------|-----------------------------------------------------------------------------------------------------|
| 4/11/2023 11:04:04 AM | Google Scholar | temperature inside and outside HVAC structure and time correction thermostat calculation            |
| 4/11/2023 11:04:24 AM | Google Scholar | temperature inside and outside HVAC structure and time correction thermostat adjustment calculation |

TO: dan@tannerip.com,james@tannerip.com,eofficeaction@appcoll.com  
FROM: noreply@uspto.gov  
CC: PatentCenter\_eOfficeAction@uspto.gov  
SUBJECT: USPTO: Patent Electronic System - e-Postcard Notification for Customer Number 144465

Fri Apr 21 08:35:43 EDT 2023

Dear Patent Center Customer:

Correspondence Address:

Tanner IP, PLLC  
149 West Gilpin Avenue  
Norfolk,VIRGINIA,23503  
UNITED STATES

An email notification regarding the correspondence was sent to the following email address(es) associated with customer number 144465:

dan@tannerip.com  
james@tannerip.com  
eofficeaction@appcoll.com

This is a courtesy reminder that new correspondence is available for the application. If you have not done so already, please review the correspondence listed below. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

| Application | Document | Mailroom Date | Attorney Docket No. |
|-------------|----------|---------------|---------------------|
| 18104767    | CTNF     | 04/14/2023    | 230-046-CON         |

To view your correspondence online, please sign in to [Patent Center](#) and then select Workbench/View correspondence. Or to update your email addresses, select Manage/Manage customer numbers.

If you have any questions, please contact the [Patent Electronic Business Center](#) (EBC) at [ebc@uspto.gov](mailto:ebc@uspto.gov) or 866-217-9197 Monday – Friday, 6 a.m. to midnight ET.

Please do not reply to this email as it was sent from an unmonitored mailbox.

Sincerely,

The Patent Center Team



# 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 |
|--------------------|-----------------------|------------------------|------------------------|
| 18/104,767         | 02/01/2023            | John Douglas STEINBERG | 230-046-CON            |

**CONFIRMATION NO. 6379**

## PUBLICATION NOTICE



\*OC000000138035957\*

144465  
Tanner IP, PLLC  
149 West Gilpin Avenue  
Norfolk, VA 23503

Date Mailed: 06/08/2023

**Title:**SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

**Publication No.**US-2023-0175894-A1

**Publication Date:**06/08/2023

## 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](http://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 the applicant. A copy of the publication may be obtained from the Office upon payment of the application fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571)272-3150 or (800)972-6382, by facsimile at (571)273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, 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](http://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 <https://portal.uspto.gov/pair/> PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Furhter 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

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.

|                                                                                                                                 |                                                                |                                                                                                                                                                                                                               |       |                                            |     |                           |  |                                       |  |   |
|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------|-----|---------------------------|--|---------------------------------------|--|---|
| <b>PATENT APPLICATION FEE DETERMINATION RECORD</b><br>Substitute for Form PTO-875                                               |                                                                |                                                                                                                                                                                                                               |       | Application or Docket Number<br>18/104,767 |     | Filing Date<br>02/01/2023 |  | <input type="checkbox"/> To be Mailed |  |   |
| ENTITY: <input checked="" type="checkbox"/> LARGE <input type="checkbox"/> SMALL <input type="checkbox"/> MICRO                 |                                                                |                                                                                                                                                                                                                               |       |                                            |     |                           |  |                                       |  |   |
| <b>APPLICATION AS FILED - PART I</b>                                                                                            |                                                                |                                                                                                                                                                                                                               |       |                                            |     |                           |  |                                       |  |   |
|                                                                                                                                 |                                                                | (Column 1)                                                                                                                                                                                                                    |       | (Column 2)                                 |     |                           |  |                                       |  |   |
| FOR                                                                                                                             |                                                                | NUMBER FILED                                                                                                                                                                                                                  |       | NUMBER EXTRA                               |     | RATE (\$)                 |  | FEE (\$)                              |  |   |
| <input type="checkbox"/> BASIC FEE<br>(37 CFR 1.16(a), (b), or (c))                                                             |                                                                | N/A                                                                                                                                                                                                                           |       | N/A                                        |     | N/A                       |  |                                       |  |   |
| <input type="checkbox"/> SEARCH FEE<br>(37 CFR 1.16(k), (i), or (m))                                                            |                                                                | N/A                                                                                                                                                                                                                           |       | N/A                                        |     | N/A                       |  |                                       |  |   |
| <input type="checkbox"/> EXAMINATION FEE<br>(37 CFR 1.16(o), (p), or (q))                                                       |                                                                | N/A                                                                                                                                                                                                                           |       | N/A                                        |     | N/A                       |  |                                       |  |   |
| TOTAL CLAIMS<br>(37 CFR 1.16(i))                                                                                                |                                                                | minus 20 = *                                                                                                                                                                                                                  |       |                                            |     | x \$100 =                 |  |                                       |  |   |
| INDEPENDENT CLAIMS<br>(37 CFR 1.16(h))                                                                                          |                                                                | minus 3 = *                                                                                                                                                                                                                   |       |                                            |     | x \$480 =                 |  |                                       |  |   |
| <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 \$310 (\$155 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.                                                       |                                                                |                                                                                                                                                                                                                               |       |                                            |     | TOTAL                     |  |                                       |  |   |
| <b>APPLICATION AS AMENDED - PART II</b>                                                                                         |                                                                |                                                                                                                                                                                                                               |       |                                            |     |                           |  |                                       |  |   |
|                                                                                                                                 |                                                                | (Column 1)                                                                                                                                                                                                                    |       | (Column 2)                                 |     | (Column 3)                |  |                                       |  |   |
| <b>AMENDMENT</b>                                                                                                                | 07/14/2023                                                     | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                              |       | HIGHEST NUMBER PREVIOUSLY PAID FOR         |     | PRESENT EXTRA             |  | RATE (\$)                             |  |   |
|                                                                                                                                 |                                                                |                                                                                                                                                                                                                               |       |                                            |     |                           |  | ADDITIONAL FEE (\$)                   |  |   |
|                                                                                                                                 | Total<br>(37 CFR 1.16(i))                                      | * 20                                                                                                                                                                                                                          | Minus | ** 20                                      | = 0 | x \$100 =                 |  | 0                                     |  |   |
|                                                                                                                                 | Independent<br>(37 CFR 1.16(h))                                | * 2                                                                                                                                                                                                                           | Minus | *** 3                                      | = 0 | x \$480 =                 |  | 0                                     |  |   |
|                                                                                                                                 | <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                       |  | 0 |
|                                                                                                                                 |                                                                | (Column 1)                                                                                                                                                                                                                    |       | (Column 2)                                 |     | (Column 3)                |  |                                       |  |   |
| <b>AMENDMENT</b>                                                                                                                |                                                                | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                              |       | HIGHEST NUMBER PREVIOUSLY PAID FOR         |     | PRESENT EXTRA             |  | RATE (\$)                             |  |   |
|                                                                                                                                 |                                                                |                                                                                                                                                                                                                               |       |                                            |     |                           |  | ADDITIONAL FEE (\$)                   |  |   |
|                                                                                                                                 | Total<br>(37 CFR 1.16(i))                                      | *                                                                                                                                                                                                                             | Minus | **                                         | =   | x \$0 =                   |  |                                       |  |   |
|                                                                                                                                 | Independent<br>(37 CFR 1.16(h))                                | *                                                                                                                                                                                                                             | Minus | ***                                        | =   | x \$0 =                   |  |                                       |  |   |
|                                                                                                                                 | <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                       |  |   |
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3.                                           |                                                                |                                                                                                                                                                                                                               |       |                                            |     |                           |  | SLIE                                  |  |   |
| ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".                                       |                                                                |                                                                                                                                                                                                                               |       |                                            |     |                           |  | /JULIET MCMILLAN/                     |  |   |
| *** 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 number found in the appropriate box in column 1. |                                                                |                                                                                                                                                                                                                               |       |                                            |     |                           |  |                                       |  |   |

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.*

**TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING  
REJECTION OVER A PENDING "REFERENCE" APPLICATION**Docket Number (Optional)  
230-046-CON

In re Application of: John D. STEINBERG et al.

Application No.: 18/104,767

Filed: February 1, 2023

For: SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

The applicant, EcoFactor, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending **reference** Application Number 18/104,772 filed, February 1, 2023, as the term of any patent granted on said **reference** application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending **reference** application. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the **reference** application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term of any patent granted on said **reference** application, "as the term of any patent granted on said **reference** application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending **reference** application," in the event that: any such patent granted on the pending **reference** application expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 54734

/Daniel A. Tanner, III/  
Signature

2023-07-14  
Date

Daniel A. Tanner, III  
Typed or printed name

Attorney of Record  
Title

703-772-6738  
Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included.

**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.**

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0031. Public burden for this form is estimated to average 12 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. If filing this completed form by mail, 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. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). <https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) 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)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

## Additional Uses

Additional USPTO uses of the information in this record may include disclosure to: 1) the International Bureau of the World Intellectual Property Organization, if the record is related to an international application filed under the Patent Cooperation Treaty; 2) the public i) after publication of the application pursuant to 35 U.S.C. 122(b), ii) after issuance of a patent pursuant to 35 U.S.C. 151, iii) 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, or iv) without publication of the application or patent under the specific circumstances provided for by 37 CFR 1.14(a)(1)(v)-(vii); and/or 3) the National Archives and Records Administration, for inspection of records.

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.

**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING  
REJECTION OVER A "PRIOR" PATENT**Docket Number (Optional)  
230-046-CON

In re Application of: John D. STEINBERG et al.

Application No.: 18/104767

Filed: February 1, 2023

For: SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

The applicant, EcoFactor, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 8,019,567 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 54734

/Daniel A. Tanner, III/ 2023-07-14  
Signature Date

Daniel A. Tanner, III  
Typed or printed name

Attorney of Record 703-772-6738  
Title Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

**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.**

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0031. Public burden for this form is estimated to average 12 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. If filing this completed form by mail, 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. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). <https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) 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)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

## Additional Uses

Additional USPTO uses of the information in this record may include disclosure to: 1) the International Bureau of the World Intellectual Property Organization, if the record is related to an international application filed under the Patent Cooperation Treaty; 2) the public i) after publication of the application pursuant to 35 U.S.C. 122(b), ii) after issuance of a patent pursuant to 35 U.S.C. 151, iii) 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, or iv) without publication of the application or patent under the specific circumstances provided for by 37 CFR 1.14(a)(1)(v)-(vii); and/or 3) the National Archives and Records Administration, for inspection of records.

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.

**TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING  
REJECTION OVER A PENDING "REFERENCE" APPLICATION**Docket Number (Optional)  
230-046-CON

In re Application of: John D. STEINBERG et al.

Application No.: 18/104,767

Filed: February 1, 2023

For: SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

The applicant, EcoFactor, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending **reference** Application Number 18/104,779, filed, February 1, 2023, as the term of any patent granted on said **reference** application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending **reference** application. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the **reference** application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term of any patent granted on said **reference** application, "as the term of any patent granted on said **reference** application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending **reference** application," in the event that: any such patent granted on the pending **reference** application expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 54734

/Daniel A. Tanner, III/

Signature

2023-07-14

Date

Daniel A. Tanner, III

Typed or printed name

Attorney of Record

Title

703-772-6738

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included.

**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.**

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0031. Public burden for this form is estimated to average 12 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. If filing this completed form by mail, 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. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). <https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) 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)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

## Additional Uses

Additional USPTO uses of the information in this record may include disclosure to: 1) the International Bureau of the World Intellectual Property Organization, if the record is related to an international application filed under the Patent Cooperation Treaty; 2) the public i) after publication of the application pursuant to 35 U.S.C. 122(b), ii) after issuance of a patent pursuant to 35 U.S.C. 151, iii) 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, or iv) without publication of the application or patent under the specific circumstances provided for by 37 CFR 1.14(a)(1)(v)-(vii); and/or 3) the National Archives and Records Administration, for inspection of records.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

|                                                                                              |   |                                   |
|----------------------------------------------------------------------------------------------|---|-----------------------------------|
| In re Application of:                                                                        | : | Confirmation No.: <b>6379</b>     |
|                                                                                              | : |                                   |
| <b>John D. STEINBERG et al.</b>                                                              | : | Attorney Ref.: <b>230-046-CON</b> |
|                                                                                              | : |                                   |
| Application No.: <b>18/104,767</b>                                                           | : | Examiner: <b>Tung S. LAU</b>      |
|                                                                                              | : |                                   |
| Filing Date: <b>February 1, 2023</b>                                                         | : | Group Art Unit: <b>2857</b>       |
|                                                                                              | : |                                   |
| For: <b>SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE<br/>EFFICIENCY OF AN HVAC SYSTEM</b> |   |                                   |

**RESPONSE TO NON-FINAL OFFICE ACTION**

**MAIL STOP: AMENDMENT  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450**

Commissioner:

In reply to the April 14, 2023 Non-Final Office Action regarding the above-identified application, and in consideration of the concurrently-filed Terminal Disclaimers, kindly enter and consider the following amendments and remarks.

**Listing of Claims** begins on page 2 of this paper.

**Remarks** begin on page 7 of this paper.

## **LISTING OF CLAIMS**

For the ease of examination, this listing of claims is provided to replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A control system for an environment inside a structure, comprising:
  - a climate control device in the structure that receives first temperatures from inside the structure;
  - a processor that:
    - receives second temperatures from outside the structure from at least one source outside the structure; and
    - compares the first temperatures and the second temperatures over time to calculate ~~an operating~~ a current operating profile for the climate control device; and
    - a database that stores the current operating profile for the climate control device, wherein the processor (a) compares a portion of the current operating profile for the climate control device with a stored temperature profile that represents a previous operating profile for the climate control device calculated at a different time to evaluate whether an operation-operational efficiency of the climate control device has decreased over time, and (b) outputs a result of the evaluation.
2. (Currently Amended) The control system of claim 1, wherein the first temperatures are received from a programmable thermostat located inside the structure communicating with the climate control device.
3. (Original) The control system of claim 2, wherein the programmable thermostat includes a display device,

and the result of the evaluation is displayed on the display device of the programmable thermostat.

4. (Currently Amended) The control system of claim 1, wherein:

the portion of the current operating profile for the climate control device is limited to a specified first time interval, and

the stored temperature profile is ~~another portion of the operating profile for the climate control device~~ limited to a specified earlier second time interval.

5. (Currently Amended) The control system of claim 4, wherein the evaluation of the ~~operation~~ operational efficiency of the climate control device detects a change ~~in the in an~~ overall operating profile of the climate control device between the specified first time interval and the specified earlier second time interval.

6. (Currently Amended) The control system of claim 5, wherein:

the database stores a plurality of separate diagnostic temperature profiles associated with a plurality of potential defects identified by changes in the ~~operating profile~~ operational efficiency of the climate control device over time; and

the processor identifies one or more of the potential defects based on the ~~detected change in the operating profile~~ evaluation of the operational efficiency of the climate control device between the specified first time interval and the specified earlier second time interval.

7. (Currently Amended) The control system of claim 1, wherein the second temperatures comprise outside air temperatures for a geographic region surrounding the ~~first structure~~ structure measured by one or more sensors positioned remotely from the structure.

8. (Currently Amended) The control system of claim 7, wherein ~~the temperature~~ another temperature profile is developed and stored as a prediction of a coming change in the second temperatures.

9. (Currently Amended) The control system of claim 8, wherein the ~~result of~~ processor references the evaluation is a modification in of the operational efficiency of the climate control device to modify an operating interval for the climate control device based on the prediction.

10. (Currently Amended) The control system of claim 9, wherein the ~~modification is in processor modifies~~ at least one of (a) an “on” or an “off” time for the climate control device, and (b) an “on” or an “off” temperature for the climate control device.

11. (Currently Amended) A method for controlling an environment inside a structure, comprising:

receiving, with a processor, first temperatures inside the structure from a climate control device inside the structure;

receiving, with the processor, second temperatures outside the structure from at least one source outside the structure;

comparing, with the processor, the first temperatures and the second temperatures over time to calculate ~~an operating~~ a current operating for the climate control device; and

storing, with the processor, the current operating profile for the climate control device in a database,

comparing, with the processor, a portion of the current operating profile for the climate control device with a stored temperature profile that represents a previous operating profile for the climate control device calculated at a different time to evaluate whether an operation-operational efficiency of the climate control device has decreased over time, and

outputting, with the processor, a result of the evaluation.

12. (Currently Amended) The method of claim 11, wherein the processor receives the first temperatures from a programmable thermostat located inside the structure communicating with the climate control device.

13. (Original) The method of claim 12, wherein the programmable thermostat includes a display device, the processor outputs the result of the evaluation in a format to be displayed on the display device of the programmable thermostat.

14. (Currently Amended) The method of claim 11, wherein:  
the portion of the current operating profile for the climate control device is limited to a specified first time interval, and  
the stored temperature profile is ~~another portion of the operating profile for the climate control device~~ limited to a specified earlier second time interval.

15. (Currently Amended) The method of claim 14, wherein the evaluation of the ~~operation~~ operational efficiency of the climate control device comprises the processor detecting a change ~~in the~~ in an overall operating profile of the climate control device between the specified first time interval and the specified earlier second time interval.

16. (Currently Amended) The method of claim 15, wherein:  
the database stores a plurality of separate diagnostic temperature profiles associated with a plurality of potential defects identified by changes in the ~~operating profile~~ operational efficiency of the climate control device over time; and  
the processor identifies one or more of the potential defects based on the ~~detected change in the operating profile~~ evaluation of the operational efficiency of the climate control device between the specified first time interval and the specified earlier second time interval.

17. (Currently Amended) The method of claim 11, wherein the second temperatures comprise outside air temperatures for a geographic region surrounding the ~~first structure.~~

structure measured by one or more sensors positioned remotely from the structure.

18. (Currently Amended) The method of claim 17, wherein ~~the temperature~~ another temperature profile is developed and stored as a prediction of a coming change in the second temperatures.

19. (Currently Amended) The method of claim 18, wherein the ~~result of processor~~ references the evaluation is a modification, by the processor, in of the operational efficiency of the climate control device to modify an operating interval for the climate control device based on the prediction.

20. (Original) The method of claim 19, wherein the processor modifies at least one of (a) an “on” or an “off” time for the climate control device, and (b) an “on” or an “off” temperature for the climate control device.

### **REMARKS**

Claims 1-20 are pending in this application. By this Amendment, claims 1, 2, 4-12 and 14-19 are amended. No new matter is added as the amendments to claim 1 and 11 are fully supported by Applicants' specification, as originally filed. Reconsideration and allowance of the application in view of the above amendments and following remarks are respectfully requested.

The Office Action on page 2, at paragraph 2, provisionally rejects claims 1-20 for alleged obviousness-type double patenting over claims in a number of co-owned related cases. While not conceding the propriety of the double patenting rejections, and purely in an effort to advance prosecution of this application to allowance, Applicants concurrently file Terminal Disclaimers to accompany this Response in order to obviate these rejections.

Reconsideration and withdrawal of the obviousness-type double patenting rejections of the pending claims enumerated in the Office Action are respectfully requested.

The Office Action on page 2, at paragraph 3, rejects claims 1, 2, 4-12 and 14-20 under pre-AIA 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent Application Publication No. 2005/0288822 to Rayburn. The Office Action, on page 8, at paragraph 4, rejects claims 3 and 13 under pre-AIA 35 U.S.C. §103(a) as allegedly being unpatentable over Rayburn. These rejections are respectfully traversed.

At the outset, Applicants believe that the Office Action improperly rejects the pending claims as allegedly being taught by, or otherwise having been rendered obvious over, Rayburn based on an overly-broad application of the reference.

Pending independent claims 1 and 11 include detailed amendments for clarity, and to further distance the features recited in those claims, and the claims depending therefrom, over an even-broad application of Rayburn to the subject matter of the pending claims. Specifically, Rayburn cannot reasonably be considered to teach, or otherwise to have suggested, a system or a

method in which a processor “compares a portion of the current operating profile for the climate control device with a stored temperature profile that represents a previous operating profile for the climate control device calculated at a different time to evaluate whether an operational efficiency of the climate control device has decreased over time,” as now required by the claims. Rayburn teaches no such comparison, nor would it have suggested it, to assess a deviation in operational efficiency of the climate control device.

It is also respectfully submitted that the clarifications made to several of the pending dependent claims further distinguish those claims over Rayburn, rendering those claims separately patentable for the features they recite as well.

For at least the foregoing reasons, Applicants respectfully submit that the pending claims, as amended, are patentable over Rayburn.

Accordingly, reconsideration and withdrawal of the rejections of all of the pending claims as allegedly being taught by, of having been obvious over, Rayburn are respectfully requested.

**CONCLUSION**

Having addressed all of the rejections of the Office Action, Applicants respectfully submit that the subject application is in condition for allowance, and a Notice to that effect is earnestly solicited. Should any questions arise regarding this Response, all inquiries may be directed to Applicants' undersigned representative at the telephone number set forth below.

Respectfully submitted,

Date: July 14, 2023

By: /Daniel A. Tanner, III/

Correspondence Address:  
Customer No. 144465  
*TannerIP PLLC*

Daniel A. Tanner, III  
Attorney of Record  
Registration No. 54,734

Telephone No. 703-232-1160 (Ext. 101)  
Facsimile No. 571-393-3610

**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING  
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)

230-046-CON

In re Application of: John D. STEINBERG et al.

Application No.: 18/104767

Filed: February 1, 2023

For: SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

The applicant, EcoFactor, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 8,423,322 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;

is held unenforceable;

is found invalid by a court of competent jurisdiction;

is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;

has all claims canceled by a reexamination certificate;

is reissued; or

is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 54734

/Daniel A. Tanner, III/

Signature

2023-07-14

Date

Daniel A. Tanner, III

Typed or printed name

Attorney of Record

Title

703-772-6738

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

**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.**

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0031. Public burden for this form is estimated to average 12 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. If filing this completed form by mail, 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. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). <https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) 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)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

## Additional Uses

Additional USPTO uses of the information in this record may include disclosure to: 1) the International Bureau of the World Intellectual Property Organization, if the record is related to an international application filed under the Patent Cooperation Treaty; 2) the public i) after publication of the application pursuant to 35 U.S.C. 122(b), ii) after issuance of a patent pursuant to 35 U.S.C. 151, iii) 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, or iv) without publication of the application or patent under the specific circumstances provided for by 37 CFR 1.14(a)(1)(v)-(vii); and/or 3) the National Archives and Records Administration, for inspection of records.

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.

**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING  
REJECTION OVER A "PRIOR" PATENT**Docket Number (Optional)  
230-046-CON

In re Application of: John D. STEINBERG et al.

Application No.: 18/104767

Filed: February 1, 2023

For: SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

The applicant, EcoFactor, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 9,939,333 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;  
is held unenforceable;  
is found invalid by a court of competent jurisdiction;  
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;  
has all claims canceled by a reexamination certificate;  
is reissued; or  
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 54734

/Daniel A. Tanner, III/ 2023-07-14  
Signature Date

Daniel A. Tanner, III  
Typed or printed name

Attorney of Record 703-772-6738  
Title Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

**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.**

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0031. Public burden for this form is estimated to average 12 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. If filing this completed form by mail, 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. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). <https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) 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)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

## Additional Uses

Additional USPTO uses of the information in this record may include disclosure to: 1) the International Bureau of the World Intellectual Property Organization, if the record is related to an international application filed under the Patent Cooperation Treaty; 2) the public i) after publication of the application pursuant to 35 U.S.C. 122(b), ii) after issuance of a patent pursuant to 35 U.S.C. 151, iii) 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, or iv) without publication of the application or patent under the specific circumstances provided for by 37 CFR 1.14(a)(1)(v)-(vii); and/or 3) the National Archives and Records Administration, for inspection of records.

| Electronic Patent Application Fee Transmittal |          |                                                                              |        |                      |
|-----------------------------------------------|----------|------------------------------------------------------------------------------|--------|----------------------|
| Application Number:                           |          | 18104767                                                                     |        |                      |
| Filing Date:                                  |          | 01-Feb-2023                                                                  |        |                      |
| Title of Invention:                           |          | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |        |                      |
| First Named Inventor/Applicant Name:          |          | John Douglas STEINBERG                                                       |        |                      |
| Filer:                                        |          | Daniel Albert Tanner                                                         |        |                      |
| Attorney Docket Number:                       |          | 230-046-CON                                                                  |        |                      |
| Filed as Large Entity                         |          |                                                                              |        |                      |
| Filing Fees for Utility under 35 USC 111(a)   |          |                                                                              |        |                      |
| 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:                            |          |                                                                              |        |                      |

| Description                      | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|----------------------------------|----------|----------|--------|----------------------|
| <b>Miscellaneous:</b>            |          |          |        |                      |
| STATUTORY OR TERMINAL DISCLAIMER | 1814     | 6        | 170    | 1020                 |
| <b>Total in USD (\$)</b>         |          |          |        | <b>1020</b>          |

## Electronic Acknowledgement Receipt

|                                             |                                                                              |
|---------------------------------------------|------------------------------------------------------------------------------|
| <b>EFS ID:</b>                              | 48300937                                                                     |
| <b>Application Number:</b>                  | 18104767                                                                     |
| <b>International Application Number:</b>    |                                                                              |
| <b>Confirmation Number:</b>                 | 6379                                                                         |
| <b>Title of Invention:</b>                  | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |
| <b>First Named Inventor/Applicant Name:</b> | John Douglas STEINBERG                                                       |
| <b>Customer Number:</b>                     | 144465                                                                       |
| <b>Filer:</b>                               | Daniel Albert Tanner                                                         |
| <b>Filer Authorized By:</b>                 |                                                                              |
| <b>Attorney Docket Number:</b>              | 230-046-CON                                                                  |
| <b>Receipt Date:</b>                        | 14-JUL-2023                                                                  |
| <b>Filing Date:</b>                         | 01-FEB-2023                                                                  |
| <b>Time Stamp:</b>                          | 16:48:36                                                                     |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)                                                  |

### Payment information:

|                                          |                  |
|------------------------------------------|------------------|
| Submitted with Payment                   | yes              |
| Payment Type                             | CARD             |
| Payment was successfully received in RAM | \$ 1020          |
| RAM confirmation Number                  | E20237DG50146124 |
| Deposit Account                          |                  |
| Authorized User                          |                  |

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

|                 |                                                                 |                                       |                                          |                  |                  |
|-----------------|-----------------------------------------------------------------|---------------------------------------|------------------------------------------|------------------|------------------|
|                 |                                                                 |                                       |                                          |                  |                  |
| File Listing:   |                                                                 |                                       |                                          |                  |                  |
| Document Number | Document Description                                            | File Name                             | File Size(Bytes)/ Message Digest         | Multi Part /.zip | Pages (if appl.) |
| 1               |                                                                 | 230-046-CON-NFOAResponseForFiling.pdf | 165367                                   | yes              | 9                |
|                 |                                                                 |                                       | b0fcce1baaeaba597957da6ef528184f57de680c |                  |                  |
|                 | Multipart Description/PDF files in .zip description             |                                       |                                          |                  |                  |
|                 | Document Description                                            |                                       | Start                                    |                  | End              |
|                 | Amendment/Request for Reconsideration-After Non-Final Rejection |                                       | 1                                        |                  | 1                |
|                 | Claims                                                          |                                       | 2                                        |                  | 6                |
|                 | Applicant Arguments/Remarks Made in an Amendment                |                                       | 7                                        |                  | 9                |
| Warnings:       |                                                                 |                                       |                                          |                  |                  |
| Information:    |                                                                 |                                       |                                          |                  |                  |
| 2               | Terminal Disclaimer Filed                                       | TD772App.pdf                          | 313081                                   | no               | 2                |
|                 |                                                                 |                                       | 303e282c48a5e87335deb15e50d427f63c79b636 |                  |                  |
| Warnings:       |                                                                 |                                       |                                          |                  |                  |
| Information:    |                                                                 |                                       |                                          |                  |                  |
| 3               | Terminal Disclaimer Filed                                       | TD779App.pdf                          | 313074                                   | no               | 2                |
|                 |                                                                 |                                       | 94e8367f82e532f3a5ebcb26ecf08a7f3a567481 |                  |                  |
| Warnings:       |                                                                 |                                       |                                          |                  |                  |
| Information:    |                                                                 |                                       |                                          |                  |                  |
| 4               | Terminal Disclaimer Filed                                       | TD567Patent.pdf                       | 225650                                   | no               | 2                |
|                 |                                                                 |                                       | 7b38dc6f97f0134d07ed8a54c3067278e8ffa2e  |                  |                  |
| Warnings:       |                                                                 |                                       |                                          |                  |                  |
| Information:    |                                                                 |                                       |                                          |                  |                  |
| 5               | Terminal Disclaimer Filed                                       | TD649Patent.pdf                       | 225607                                   | no               | 2                |
|                 |                                                                 |                                       | b95cc192ebf7feb4f8a59f119360f90161bf0afa |                  |                  |
|                 |                                                                 | 145                                   |                                          |                  |                  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |                 |                                          |    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------|------------------------------------------|----|---|
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |                 |                                          |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |                 |                                          |    |   |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Terminal Disclaimer Filed | TD322Patent.pdf | 225596                                   | no | 2 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |                 | 14f9e502459be7ba48f16154e451427cc1488f91 |    |   |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |                 |                                          |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |                 |                                          |    |   |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Terminal Disclaimer Filed | TD333Patent.pdf | 225607                                   | no | 2 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |                 | 44245159cff072e47704c702561108706c36ecdd |    |   |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |                 |                                          |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |                 |                                          |    |   |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Fee Worksheet (SB06)      | fee-info.pdf    | 37708                                    | no | 2 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |                 | b285b8e245e429f7b9764abfdc4bc0b1c7c13873 |    |   |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |                 |                                          |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |                 |                                          |    |   |
| <b>Total Files Size (in bytes):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |                 | 1731690                                  |    |   |
| <p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> <b>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.</b></p> |                           |                 |                                          |    |   |

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.

**TERMINAL DISCLAIMER TO OBIATE A DOUBLE PATENTING  
REJECTION OVER A "PRIOR" PATENT**Docket Number (Optional)  
230-046-CON

In re Application of: John D. STEINBERG et al.

Application No.: 18/104767

Filed: February 1, 2023

For: SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

The applicant, EcoFactor, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 9,057,649 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 54734

/Daniel A. Tanner, III/ 2023-07-14  
Signature Date

Daniel A. Tanner, III  
Typed or printed name

Attorney of Record 703-772-6738  
Title Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

**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.**

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0031. Public burden for this form is estimated to average 12 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. If filing this completed form by mail, 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. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). <https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) 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)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

## Additional Uses

Additional USPTO uses of the information in this record may include disclosure to: 1) the International Bureau of the World Intellectual Property Organization, if the record is related to an international application filed under the Patent Cooperation Treaty; 2) the public i) after publication of the application pursuant to 35 U.S.C. 122(b), ii) after issuance of a patent pursuant to 35 U.S.C. 151, iii) 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, or iv) without publication of the application or patent under the specific circumstances provided for by 37 CFR 1.14(a)(1)(v)-(vii); and/or 3) the National Archives and Records Administration, for inspection of records.

|                                                    |                                                  |                                                                        |  |
|----------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------|--|
| <b>Application Number</b><br><b>* 18/104,767 *</b> | <b>Application/Control No.</b><br><br>18/104,767 | <b>Applicant(s)/Patent under Reexamination</b><br><br>STEINBERG et al. |  |
|                                                    | <b>Examiner</b><br>LAU, TUNG S                   | <b>Art Unit</b><br>2857                                                |  |
| <b>Document Code - DISQ</b>                        |                                                  | <b>Internal Document - DO NOT MAIL</b>                                 |  |

|                                 |                                                        |                                             |
|---------------------------------|--------------------------------------------------------|---------------------------------------------|
| <b>TERMINAL DISCLAIMER</b>      | <input checked="" type="checkbox"/> <b>APPROVED</b>    | <input type="checkbox"/> <b>DISAPPROVED</b> |
| Date Filed: <u>14 July 2023</u> | <b>This patent is subject to a Terminal Disclaimer</b> |                                             |

|                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Approved/Disapproved by:</b>                                                                                                                  |
| /6/Tds all approved.<br>/LAWANA R HIXON/<br><br><b>Technology Center: <u>OPLC</u></b><br><br><b>Telephone: <u>(571)272-6074</u></b><br><br>_____ |



# 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

144465 7590 07/27/2023  
Tanner IP, PLLC  
149 West Gilpin Avenue  
Norfolk, VA 23503

EXAMINER

LAU, TUNG S

ART UNIT

PAPER NUMBER

2857

DATE MAILED: 07/27/2023

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|------------------------|---------------------|------------------|
| 18/104,767      | 02/01/2023  | John Douglas STEINBERG | 230-046-CON         | 6379             |

TITLE OF INVENTION: SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

| APPLN. TYPE    | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|---------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | UNDISCOUNTED  | \$1200        | \$0.00              | \$0.00               | \$1200           | 10/27/2023 |

**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 ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

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. 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: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at [www.uspto.gov/PatentMaintenanceFees](http://www.uspto.gov/PatentMaintenanceFees).**

# PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

By fax, send to: (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 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. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

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.

144465 7590 07/27/2023  
Tanner IP, PLLC  
149 West Gilpin Avenue  
Norfolk, VA 23503

## 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 transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

|                         |
|-------------------------|
| (Typed or printed name) |
| (Signature)             |
| (Date)                  |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|------------------------|---------------------|------------------|
| 18/104,767      | 02/01/2023  | John Douglas STEINBERG | 230-046-CON         | 6379             |

TITLE OF INVENTION: SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

| APPLN. TYPE    | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|---------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | UNDISCOUNTED  | \$1200        | \$0.00              | \$0.00               | \$1200           | 10/27/2023 |

| EXAMINER    | ART UNIT | CLASS-SUBCLASS |
|-------------|----------|----------------|
| LAU, TUNG S | 2857     | 702-182000     |

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/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or 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 \_\_\_\_\_  
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 must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). 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. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via Patent Center or EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. \_\_\_\_\_

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

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_



# 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.                                                | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------------------------------------------------------|-------------|------------------------|---------------------|------------------|
| 18/104,767                                                     | 02/01/2023  | John Douglas STEINBERG | 230-046-CON         | 6379             |
| 144465                                                         | 7590        | 07/27/2023             | EXAMINER            |                  |
| Tanner IP, PLLC<br>149 West Gilpin Avenue<br>Norfolk, VA 23503 |             |                        | LAU, TUNG S         |                  |
|                                                                |             |                        | ART UNIT            | PAPER NUMBER     |
|                                                                |             |                        | 2857                |                  |
| DATE MAILED: 07/27/2023                                        |             |                        |                     |                  |

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

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

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.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B 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 30 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.

### 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.

|                               |                                      |                                         |                                |
|-------------------------------|--------------------------------------|-----------------------------------------|--------------------------------|
| <b>Notice of Allowability</b> | <b>Application No.</b><br>18/104,767 | <b>Applicant(s)</b><br>STEINBERG et al. |                                |
|                               | <b>Examiner</b><br>TUNG S LAU        | <b>Art Unit</b><br>2857                 | <b>AIA (FITF) Status</b><br>No |

**-- 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 7-24-2023.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_.

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 1-3,5-13 and 15-20. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

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. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
☐ 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).**

6. ☐ 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)**

|                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)<br>2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date ____.<br>3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material ____.<br>4. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. | 5. <input checked="" type="checkbox"/> Examiner's Amendment/Comment<br>6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance<br>7. <input type="checkbox"/> Other _____. |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                 |  |
|-------------------------------------------------|--|
| /TUNG S LAU/<br>Primary Examiner, Art Unit 2857 |  |
|-------------------------------------------------|--|

***Notice of Pre-AIA or AIA Status***

The present application is being examined under the pre-AIA first to invent provisions.

**DETAILED ACTION**

**Terminal Disclaimer**

1. Terminal Disclaimer filed on 07/14/2023 has been approved by the office.

**EXAMINER'S AMENDMENT**

2. 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 Daniel A. Tanner, III on July 21, 2023.

The application has been amended as follows:

Cancel claim 4

Cancel claim 14

In claim 5, line 1, replace "claim 4" with "claim 1"

In claim 15, line 1 replace "claim 14" with "claim 11"

In claim 1, line 15, after evaluation add:

, wherein: the portion of the current operating profile for the climate control device is limited to a specified first time interval, and the stored temperature profile is limited to a specified earlier second time interval

In claim 11, line 15, after evaluation add:

, wherein: the portion of the current operating profile for the climate control device is limited to a specified first time interval, and the stored temperature profile is limited to a specified earlier second time interval

Remarks: The above change(s) is/are to define the invention better.

***Allowable Subject Matter***

3. Claims 1-3, 5-13 and 15-20 are allowed.

***Reasons for Allowance***

4. The following is an examiner's statement of reasons for allowance:

Independent claims 1 and 11 contain allowable subject matter. None of the prior art of record shows or fairly suggests the claimed invention.

Regarding claim 1:

The primary reason for the allowance of claim 1 is the inclusion of a control system for an environment inside a structure, comprising: wherein: the portion of the current operating profile for the climate control device is limited to a specified first time interval, and the stored temperature profile is limited to a specified

earlier second time interval. It is these features found in the claim, as they are claimed in the combination and claimed elements arranged as in the claim, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

Claims 2-3 and 5-10 are allowed due to their dependency on claim 1.

Regarding claim 11:

The primary reason for the allowance of claim 11 is the inclusion of a method for controlling an environment inside a structure, comprising: wherein: the portion of the current operating profile for the climate control device is limited to a specified first time interval, and the stored temperature profile is limited to a specified earlier second time interval. It is these features found in the claim, as they are claimed in the combination and claimed elements arranged as in the claim, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

Claims 12-13 and 15-20 are allowed due to their dependency on claim 1.

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."

### **Contact information**

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung Lau whose telephone number is (571)272-2274, email is Tungs.lau@uspto.gov. The examiner can normally be reached on Tuesday-Friday 7:00 AM-5:00 PM EST.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene, can be reached on 571-272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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 <https://ppair-my.uspto.gov/pair/PrivatePair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll- free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272- 1000.

Application/Control Number: 18/104,767  
Art Unit: 2857

Page 6

/TUNG S LAU/  
Primary Examiner, Art Unit 2857  
Technology Center 2800  
July 21, 2023

|                                                    |                                      |                                         |                                                  |                       |
|----------------------------------------------------|--------------------------------------|-----------------------------------------|--------------------------------------------------|-----------------------|
| <b><i>Examiner-Initiated Interview Summary</i></b> | <b>Application No.</b><br>18/104,767 | <b>Applicant(s)</b><br>STEINBERG et al. |                                                  |                       |
|                                                    | <b>Examiner</b><br>TUNG S LAU        | <b>Art Unit</b><br>2857                 | <b>AIA (First Inventor to File) Status</b><br>No | <b>Page</b><br>1 of 1 |

| <b>All Participants</b> (applicant, applicants representative, PTO personnel) | <b>Title</b>     | <b>Type</b> |
|-------------------------------------------------------------------------------|------------------|-------------|
| TUNG S LAU                                                                    | Primary Examiner | Telephonic  |
| Daniel A. Tanner, III                                                         | Attorney         |             |

**Date of Interview:** 21 July 2023

**Issues Discussed:**

**Other**

Agreed to move dependent claim 4 to claim 1 and claim 14 to 11. The examiner appreciated the applicant for the courtesy and professionalism and in a genuine effort to advance prosecution.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| /TUNG S LAU/<br>Primary Examiner, Art Unit 2857                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <p><b>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</b></p> <p>Please further see:<br/>MPEP 713.04<br/>Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)<br/>37 CFR § 1.2 Business to be transacted in writing</p> |  |

**Applicant recordation instructions:** It is not necessary for applicant to provide a separate record of the substance of interview.

**Examiner recordation instructions:** Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

|                                   |                                       |  |                                                                |             |
|-----------------------------------|---------------------------------------|--|----------------------------------------------------------------|-------------|
| <b>Notice of References Cited</b> | Application/Control No.<br>18/104,767 |  | Applicant(s)/Patent Under<br>Reexamination<br>STEINBERG et al. |             |
|                                   | Examiner<br>TUNG S LAU                |  | Art Unit<br>2857                                               | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name                    | CPC Classification | US Classification |
|---|---|--------------------------------------------------|-----------------|-------------------------|--------------------|-------------------|
| * | A | US-6059027-A                                     | 05-2000         | Lake; Barry J.          | B60H1/3207         | 165/204           |
| * | B | US-8751186-B2                                    | 06-2014         | Steinberg; John Douglas | F24F11/58          | 702/182           |
|   | C |                                                  |                 |                         |                    |                   |
|   | D |                                                  |                 |                         |                    |                   |
|   | E |                                                  |                 |                         |                    |                   |
|   | F |                                                  |                 |                         |                    |                   |
|   | G |                                                  |                 |                         |                    |                   |
|   | H |                                                  |                 |                         |                    |                   |
|   | I |                                                  |                 |                         |                    |                   |
|   | J |                                                  |                 |                         |                    |                   |
|   | K |                                                  |                 |                         |                    |                   |
|   | L |                                                  |                 |                         |                    |                   |
|   | M |                                                  |                 |                         |                    |                   |

**FOREIGN PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Country | Name | CPC 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.

|                                                                                                                 |                                              |                                                                    |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------|
| <b><i>Search Notes</i></b><br> | <b>Application/Control No.</b><br>18/104,767 | <b>Applicant(s)/Patent Under Reexamination</b><br>STEINBERG et al. |
|                                                                                                                 | <b>Examiner</b><br>TUNG S LAU                | <b>Art Unit</b><br>2857                                            |

| CPC - Searched*                                                                                     |            |          |
|-----------------------------------------------------------------------------------------------------|------------|----------|
| Symbol                                                                                              | Date       | Examiner |
| G01K 13/00, F24F 11/30, F24F 11/63, G01M 99/005, F24F 11/47, F24F 11/52, F24F 2130/00, F24F 2130/10 | 07/21/2023 | TL       |

| CPC Combination Sets - Searched* |      |          |
|----------------------------------|------|----------|
| Symbol                           | Date | Examiner |
|                                  |      |          |

| US Classification - Searched* |          |      |          |
|-------------------------------|----------|------|----------|
| Class                         | Subclass | Date | Examiner |
|                               |          |      |          |

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes                                  |            |          |
|-----------------------------------------------|------------|----------|
| Search Notes                                  | Date       | Examiner |
| Text, class, Inventor, Assignment PE2E search | 07/21/2023 | TL       |
| PE2E search                                   | 07/21/2023 | TL       |
| Google Scholar Search                         | 07/21/2023 | TL       |
| IP-COM Search                                 | 07/21/2023 | TL       |

| Interference Search |                       |            |          |
|---------------------|-----------------------|------------|----------|
| US Class/CPC Symbol | US Subclass/CPC Group | Date       | Examiner |
| G01K 13/00          |                       | 07/21/2023 | TL       |

|                                                 |  |
|-------------------------------------------------|--|
| /TUNG S LAU/<br>Primary Examiner, Art Unit 2857 |  |
|-------------------------------------------------|--|

|                                                                                                                  |                                              |                                                                    |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>18/104,767 | <b>Applicant(s)/Patent Under Reexamination</b><br>STEINBERG et al. |
|                                                                                                                  | <b>Examiner</b><br>TUNG S LAU                | <b>Art Unit</b><br>2857                                            |

| CPC    |   |      |   |     |      |            |
|--------|---|------|---|-----|------|------------|
| Symbol |   |      |   |     | Type | Version    |
| G01K   | / | 13   | / | 00  | F    | 2013-01-01 |
| G01M   | / | 99   | / | 005 | I    | 2013-01-01 |
| F24F   | / | 11   | / | 30  | I    | 2018-01-01 |
| F24F   | / | 11   | / | 63  | I    | 2018-01-01 |
| F24F   | / | 2130 | / | 00  | A    | 2018-01-01 |
| F24F   | / | 2130 | / | 10  | A    | 2018-01-01 |
| F24F   | / | 11   | / | 52  | A    | 2018-01-01 |
| F24F   | / | 11   | / | 47  | A    | 2018-01-01 |

| CPC Combination Sets |      |     |         |         |
|----------------------|------|-----|---------|---------|
| Symbol               | Type | Set | Ranking | Version |
| /                    |      |     |         |         |

|                                                                              |  |                                    |                          |
|------------------------------------------------------------------------------|--|------------------------------------|--------------------------|
| NONE<br><br>(Assistant Examiner) (Date)                                      |  | <b>Total Claims Allowed:</b><br>18 |                          |
| /TUNG S LAU/<br>Primary Examiner, Art Unit 2857<br>(Primary Examiner) (Date) |  | 21 July 2023<br>(Date)             | O.G. Print Claim(s)<br>1 |
|                                                                              |  |                                    | O.G. Print Figure<br>1   |

|                                                                                                                  |                                              |                                                                    |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>18/104,767 | <b>Applicant(s)/Patent Under Reexamination</b><br>STEINBERG et al. |
|                                                                                                                  | <b>Examiner</b><br>TUNG S LAU                | <b>Art Unit</b><br>2857                                            |

|                                     |   |    |      |
|-------------------------------------|---|----|------|
| <b>INTERNATIONAL CLASSIFICATION</b> |   |    |      |
| <b>CLAIMED</b>                      |   |    |      |
| G01K                                | / | 13 | / 00 |
| <b>NON-CLAIMED</b>                  |   |    |      |
| /                                   | / |    |      |

|                                   |                 |
|-----------------------------------|-----------------|
| <b>US ORIGINAL CLASSIFICATION</b> |                 |
| <b>CLASS</b>                      | <b>SUBCLASS</b> |
|                                   |                 |

|                            |                                          |  |  |  |  |  |
|----------------------------|------------------------------------------|--|--|--|--|--|
| <b>CROSS REFERENCES(S)</b> |                                          |  |  |  |  |  |
| <b>CLASS</b>               | <b>SUBCLASS (ONE SUBCLASS PER BLOCK)</b> |  |  |  |  |  |
|                            |                                          |  |  |  |  |  |

|                                                 |              |                              |                   |
|-------------------------------------------------|--------------|------------------------------|-------------------|
| NONE                                            |              | <b>Total Claims Allowed:</b> |                   |
| (Assistant Examiner)                            | (Date)       | 18                           |                   |
| /TUNG S LAU/<br>Primary Examiner, Art Unit 2857 | 21 July 2023 | O.G. Print Claim(s)          | O.G. Print Figure |
| (Primary Examiner)                              | (Date)       | 1                            | 1                 |

|                                                                                                                  |                                              |                                                                    |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>18/104,767 | <b>Applicant(s)/Patent Under Reexamination</b><br>STEINBERG et al. |
|                                                                                                                  | <b>Examiner</b><br>TUNG S LAU                | <b>Art Unit</b><br>2857                                            |

|                                                                                                                                                                                              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|
| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input checked="" type="checkbox"/> T.D. <input type="checkbox"/> R.1.47 |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| <b>CLAIMS</b>                                                                                                                                                                                |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| <b>Final</b>                                                                                                                                                                                 | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> |
| 1                                                                                                                                                                                            | 1               | 9            | 10              | 17           | 19              |              |                 |              |                 |              |                 |              |                 |              |                 |
| 2                                                                                                                                                                                            | 2               | 10           | 11              | 18           | 20              |              |                 |              |                 |              |                 |              |                 |              |                 |
| 5                                                                                                                                                                                            | 3               | 11           | 12              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
|                                                                                                                                                                                              | 4               | 14           | 13              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| 3                                                                                                                                                                                            | 5               |              | 14              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| 6                                                                                                                                                                                            | 6               | 12           | 15              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| 4                                                                                                                                                                                            | 7               | 15           | 16              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| 7                                                                                                                                                                                            | 8               | 13           | 17              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| 8                                                                                                                                                                                            | 9               | 16           | 18              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |

|                                                                                          |  |                                    |                                              |
|------------------------------------------------------------------------------------------|--|------------------------------------|----------------------------------------------|
| NONE<br><br>(Assistant Examiner) _____ (Date) _____                                      |  | <b>Total Claims Allowed:</b><br>18 |                                              |
| /TUNG S LAU/<br>Primary Examiner, Art Unit 2857<br>(Primary Examiner) _____ (Date) _____ |  | 21 July 2023<br>(Date)             | O.G. Print Claim(s) 1<br>O.G. Print Figure 1 |

## Web Search History

| date, time           | web site       | search string                                                                                                |
|----------------------|----------------|--------------------------------------------------------------------------------------------------------------|
| 7/21/2023 2:53:20 PM | Google Scholar | temperature inside outside of HVAC structure over time with operational decrease efficiency                  |
| 7/21/2023 2:54:26 PM | Google Scholar | temperature inside outside of HVAC structure over time with operational decrease efficiency detection        |
| 7/21/2023 2:54:44 PM | Google Scholar | varies temperature inside outside of HVAC structure over time with operational decrease efficiency detection |

## Bibliographic Data

Application No: 18/104,767

Foreign Priority claimed: ☐ Yes ☒ No

35 USC 119 (a-d) conditions met: ☐ Yes ☒ No ☒ Met After Allowance

Verified and Acknowledged:

/TUNG S LAU/

Examiner's Signature

T.S.L

Initials

Title:

SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE  
EFFICIENCY OF AN HVAC SYSTEM

---

| FILING or 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|-----------------------|-------|----------------|---------------------|
| 02/01/2023            | 702   | 2857           | 230-046-CON         |
| <b>RULE</b>           |       |                |                     |

### APPLICANTS

ECOFACITOR, INC., Palo Alto, CA, UNITED STATES

### INVENTORS

John Douglas STEINBERG, Millbrae, CA, UNITED STATES

Scott Douglas HUBLOU, Redwood City, CA, UNITED STATES

### CONTINUING DATA

This application is a CON of 17700409 03/21/2022

17700409 is a CON of 16806779 03/02/2020ABN

16806779 is a CON of 16374083 04/03/2019 PAT 10612983

16374083 is a CON of 15905251 02/26/2018ABN

15905251 is a DIV of 14731221 06/04/2015 PAT 9939333

14731221 is a CON of 13861189 04/11/2013 PAT 9057649

13861189 is a CON of 13230610 09/12/2011 PAT 8423322

13230610 is a CON of 12211690 09/16/2008 PAT 8019567

12211690 has PRO of 60994011 09/17/2007

### FOREIGN APPLICATIONS

#### IF REQUIRED, FOREIGN LICENSE GRANTED\*\*

02/28/2023

### STATE OR COUNTRY

UNITED STATES

### ADDRESS

Tanner IP, PLLC  
149 West Gilpin Avenue  
Norfolk, VA 23503

UNITED STATES  
**FILING FEE RECEIVED**  
\$6,160

## PE2E SEARCH - Search History (Prior Art)

| Ref # | Hits | Search Query   | DBs                                                                          | Default Operator | Plurals | British Equivalents | Time Stamp          |
|-------|------|----------------|------------------------------------------------------------------------------|------------------|---------|---------------------|---------------------|
| L1    | 5    | "7099748".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 07:53 AM |
| L2    | 5    | "8423322".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:06 AM |
| L3    | 3    | "8019567".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:07 AM |
| L4    | 2    | "10612983".pn. | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:11 AM |
| L5    | 2    | "8596550".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:12 AM |
| L6    | 2    | "8886488".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:12 AM |
| L7    | 4    | "5197666".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:31 AM |
| L8    | 3    | "20050288822"  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:39 AM |
| L9    | 5    | "7099748".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2023/04/11 08:57 AM |
| L10   | 7    | "9939333".pn.  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT;          | OR               | ON      | ON                  | 2023/04/11 09:11 AM |

|     |      |                                                                                          |                                                                                          |    |    |    |                        |
|-----|------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |      |                                                                                          | IBM_TDB)                                                                                 |    |    |    |                        |
| L11 | 3    | "9057649".pn.                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>09:13 AM |
| L12 | 5    | "8423322".pn.                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>09:14 AM |
| L13 | 3    | "8019567".pn.                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>09:15 AM |
| L14 | 5    | "8423322".pn.                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:36 AM |
| L15 | 2313 | temperature WITH<br>inside WITH outside<br>SAME HVAC                                     | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:51 AM |
| L16 | 1682 | temperature WITH<br>inside WITH outside<br>WITH HVAC                                     | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:51 AM |
| L17 | 119  | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure                   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:51 AM |
| L18 | 86   | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure AND<br>thermostat | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:51 AM |
| L19 | 20   | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure SAME profile      | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:52 AM |
| L20 | 81   | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure SAME time         | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:53 AM |
| L21 | 0    | temperature WITH<br>inside WITH outside                                                  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,                                                 | OR | ON | ON | 2023/04/11<br>10:53 AM |

|     |    |                                                                                                     |                                                                                          |    |    |    |                        |
|-----|----|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |    | WITH HVAC WITH<br>structure SAME time<br>SAME recover\$4                                            | WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                             |    |    |    |                        |
| L22 | 0  | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure SAME time<br>AND recover\$4  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:53 AM |
| L23 | 0  | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure SAME time<br>WITH recover\$4 | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:53 AM |
| L24 | 44 | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure SAME time<br>AND correct\$4  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:54 AM |
| L25 | 48 | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure AND time<br>AND correct\$4   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:54 AM |
| L26 | 3  | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure AND time<br>AND recover\$3   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:55 AM |
| L27 | 48 | temperature WITH<br>inside WITH outside<br>WITH HVAC WITH<br>structure AND time<br>AND correct\$4   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:55 AM |
| L28 | 7  | (G01K 13/00 .cpc.)<br>AND I27                                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:57 AM |
| L29 | 43 | (F24F 11/30 .cpc.) AND<br>I27                                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:57 AM |
| L30 | 43 | (F24F 11/63 .cpc.) AND<br>I27                                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:58 AM |
| L31 | 7  | (G01M 99/005 .cpc.)<br>AND I27                                                                      | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>10:58 AM |

|     |    |                                                                                       |                                                                              |    |    |    |                     |
|-----|----|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----|----|----|---------------------|
| L32 | 43 | (F24F 11/47 .cpc.) AND I27                                                            | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 10:58 AM |
| L33 | 43 | (F24F 11/52 .cpc.) AND I27                                                            | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 10:58 AM |
| L34 | 43 | (F24F 2130/00 .cpc.) AND I27                                                          | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 10:58 AM |
| L35 | 43 | (F24F 2130/10 .cpc.) AND I27                                                          | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 10:59 AM |
| L36 | 8  | (ECOFACOR .as.) AND L27                                                               | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 10:59 AM |
| L37 | 0  | (Eohn near3 Douglas near3 STEINBERG .in.) AND L27                                     | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 11:00 AM |
| L38 | 11 | (John near3 Douglas near3 STEINBERG .in.) AND L27                                     | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 11:00 AM |
| L39 | 6  | (Scott near3 Douglas near3 HUBLOU .in.) AND L27                                       | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 11:01 AM |
| L40 | 48 | temperature WITH inside WITH outside WITH HVAC WITH structure AND time AND correct\$4 | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 11:02 AM |
| L41 | 3  | "8,019,567" .pn.                                                                      | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/11 11:14 AM |
| L42 | 5  | "8,423,322" .pn.                                                                      | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT;          | OR | ON | ON | 2023/04/11 11:14 AM |

|     |     |                                                                                                                      |                                                                                          |    |    |    |                        |
|-----|-----|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |     |                                                                                                                      | IBM_TDB)                                                                                 |    |    |    |                        |
| L43 | 3   | "20050288822"                                                                                                        | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>05:15 PM |
| L44 | 56  | temperature SAME<br>inside WITH outside<br>WITH HVAC WITH<br>structure AND time<br>AND correct\$4                    | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>05:19 PM |
| L45 | 75  | temperature SAME<br>inside WITH outside<br>SAME HVAC WITH<br>structure AND time<br>AND correct\$4                    | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>05:19 PM |
| L46 | 18  | control\$4 WITH<br>temperature SAME<br>inside WITH outside<br>SAME HVAC WITH<br>structure AND time<br>AND correct\$4 | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>05:20 PM |
| L47 | 264 | control\$4 WITH HVAC<br>AND temperature<br>SAME inside WITH<br>outside WITH structure<br>AND time AND<br>correct\$4  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>05:21 PM |
| L48 | 77  | control\$4 WITH HVAC<br>SAME temperature<br>SAME inside WITH<br>outside WITH structure<br>AND time AND<br>correct\$4 | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>05:21 PM |
| L49 | 149 | control\$4 WITH HVAC<br>AND temperature<br>SAME inside WITH<br>outside WITH structure<br>SAME time AND<br>correct\$4 | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>05:22 PM |
| L50 | 115 | control\$4 WITH HVAC<br>AND temperature WITH<br>inside WITH outside<br>WITH structure SAME<br>time AND correct\$4    | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>05:22 PM |
| L51 | 5   | control\$4 WITH HVAC<br>AND temperature WITH<br>inside WITH outside<br>WITH structure SAME<br>time WITH correct\$4   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>05:22 PM |
| L52 | 5   | control\$4 WITH HVAC<br>AND temperature WITH<br>inside WITH outside<br>WITH structure SAME                           | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;             | OR | ON | ON | 2023/04/11<br>05:23 PM |

|     |      |                                                                                                                               |                                                                                          |    |    |    |                        |
|-----|------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |      | time SAME correct\$4                                                                                                          | IBM_TDB)                                                                                 |    |    |    |                        |
| L53 | 5    | control\$4 WITH HVAC<br>AND temperature WITH<br>inside WITH outside<br>WITH structure SAME<br>time SAME correct\$4            | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/04/11<br>05:23 PM |
| L54 | 0    | "20050288822" AND<br>efficienc\$4 WITH<br>decreas\$4                                                                          | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/07/21<br>11:23 AM |
| L55 | 1172 | HVAC near3 control\$3<br>AND efficienc\$4 WITH<br>decreas\$4                                                                  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/07/21<br>11:23 AM |
| L56 | 795  | HVAC near3 control\$3<br>AND efficienc\$4 near3<br>decreas\$4                                                                 | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/07/21<br>11:23 AM |
| L57 | 418  | HVAC near3 control\$3<br>WITH temperature AND<br>efficienc\$4 near3<br>decreas\$4                                             | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/07/21<br>11:24 AM |
| L58 | 81   | HVAC near3 control\$3<br>WITH temperature AND<br>efficienc\$4 near3<br>decreas\$4 WITH time                                   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/07/21<br>11:24 AM |
| L59 | 38   | HVAC near3 control\$3<br>WITH building WITH<br>temperature AND<br>efficienc\$4 near3<br>decreas\$4 WITH time                  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/07/21<br>11:24 AM |
| L60 | 0    | HVAC near3 control\$3<br>WITH inside WITH<br>building WITH<br>temperature AND<br>efficienc\$4 near3<br>decreas\$4 WITH time   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/07/21<br>11:24 AM |
| L61 | 5    | HVAC near3 control\$3<br>WITH insid\$3 WITH<br>building WITH<br>temperature AND<br>efficienc\$4 near3<br>decreas\$4 WITH time | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/07/21<br>11:25 AM |
| L62 | 81   | HVAC near3 control\$3<br>WITH temperature AND<br>efficienc\$4 near3<br>decreas\$4 WITH time                                   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/07/21<br>02:32 PM |

## PE2E SEARCH - Search History (Interference)

| Ref # | Hits | Search Query                                                                          | DBs               | Default Operator | Plurals | British Equivalents | Time Stamp          |
|-------|------|---------------------------------------------------------------------------------------|-------------------|------------------|---------|---------------------|---------------------|
| N1    | 39   | temperature WITH inside WITH outside WITH HVAC WITH structure AND time AND correct\$4 | (US-PGPUB; USPAT) | OR               | ON      | ON                  | 2023/04/11 10:55 AM |
| N2    | 39   | temperature WITH inside WITH outside WITH HVAC WITH structure AND time AND correct\$4 | (US-PGPUB; USPAT) | OR               | ON      | ON                  | 2023/04/11 11:02 AM |
| N3    | 71   | HVAC near3 control\$3 WITH temperature AND efficienc\$4 near3 decreas\$4 WITH time    | (US-PGPUB; USPAT) | OR               | ON      | ON                  | 2023/07/21 02:32 PM |

Main Concept Text

=====

temperature inside outside of HVAC structure over time with operational decrease efficiency

(No Concept Modifiers)

=====

(No Filters)

=====

Options

=====

De-dup: None

Relevance Cut-off: None

Sort: Relevance

Content: Patent Publications (169)

=====

US Patents

US Designs

US Applications

EPO Patents

EPO Applications

China Patents

China Applications

Japan Patents  
Japan Applications  
Korea Patents  
Korea Applications  
WIPO Applications  
Argentina Patents  
Argentina Applications  
Brazil Patents  
Brazil Applications  
Canada Patents  
Canada Applications  
Chile Patents  
Chile Applications  
Colombia Applications  
Costa Rica Applications  
Cuba Patents  
Cuba Applications  
Dominican Republic Applications  
Ecuador Patents  
Ecuador Applications  
El Salvador Applications  
Guatemala Applications  
Honduras Applications  
Mexico Patents  
Mexico Applications  
Nicaragua Patents  
Panama Applications  
Peru Applications  
Trinidad & Tobago Patents

Uruguay Applications

Austria Patents

Austria Applications

Belarus Patents

Belgium Patents

Belgium Applications

Bosnia & Herzegovina Patents

Bosnia & Herzegovina Applications

Bulgaria Patents

Bulgaria Applications

Croatia Patents

Croatia Applications

Czech Republic Patents

Czech Republic Applications

Czechoslovakia Patents

Czechoslovakia Applications

Denmark Patents

Denmark Applications

Estonia Patents

Estonia Applications

EUIPO Patents

Finland Patents

Finland Applications

France Patents

France Applications

Germany Patents

Germany Applications

Great Britain Patents

Great Britain Applications

Greece Patents  
Greece Applications  
Hungary Patents  
Hungary Applications  
Iceland Patents  
Iceland Applications  
Ireland Patents  
Ireland Applications  
Italy Patents  
Italy Applications  
Latvia Patents  
Latvia Applications  
Lithuania Patents  
Lithuania Applications  
Luxembourg Patents  
Luxembourg Applications  
Malta Patents  
Monaco Patents  
Montenegro Patents  
Montenegro Applications  
Netherlands Patents  
Netherlands Applications  
Norway Patents  
Norway Applications  
Poland Patents  
Poland Applications  
Portugal Patents  
Portugal Applications  
Republic of Moldova Patents

Republic of Moldova Applications  
Romania Patents  
Romania Applications  
San Marino Patents  
San Marino Applications  
Serbia Patents  
Serbia Applications  
Slovakia Patents  
Slovakia Applications  
Slovenia Patents  
Spain Patents  
Spain Applications  
Sweden Patents  
Sweden Applications  
Switzerland Patents  
Switzerland Applications  
Ukraine Patents  
Yugoslavia/Serbia and Montenegro Patents  
Yugoslavia/Serbia and Montenegro Applications  
Armenia Patents  
Australia Patents  
Australia Applications  
Cyprus Patents  
Gulf Cooperation Council Patents  
Hong Kong Patents  
India Patents  
India Applications  
Indonesia Patents  
Indonesia Applications

Israel Patents  
Israel Applications  
Jordan Patents  
Jordan Applications  
Kyrgyzstan Patents  
Macao Applications  
Malaysia Patents  
Mongolia Patents  
New Zealand Patents  
Philippines Patents  
Philippines Applications  
Saudi Arabia Patents  
Saudi Arabia Applications  
Singapore Patents  
Singapore Applications  
Taiwan Patents  
Taiwan Applications  
Tajikistan Patents  
Tajikistan Applications  
Thailand Patents  
Thailand Applications  
Uzbekistan Patents  
Vietnam Patents  
Algeria Patents  
ARIPO Patents  
ARIPO Applications  
Egypt Patents  
Kenya Patents  
Malawi Patents

Morocco Patents

Morocco Applications

OAPI Patents

South Africa Patents

Tunisia Applications

Zambia Patents

Zimbabwe Patents

EAPO Patents

EAPO Applications

Georgia Patents

Georgia Applications

Kazakhstan Patents

Kazakhstan Applications

Russia Patents

Russia Applications

Turkey Patents

Turkey Applications

Main Concept Text

=====

temperature control inside outside of HVAC structure over time with operational decrease efficiency

(No Concept Modifiers)

=====

(No Filters)

=====

Options

=====

De-dup: None

Relevance Cut-off: None

Sort: Relevance

Content: Patent Publications (169)

=====

US Patents

US Designs

US Applications

EPO Patents

EPO Applications

China Patents

China Applications

Japan Patents

Japan Applications

Korea Patents

Korea Applications

WIPO Applications

Argentina Patents

Argentina Applications

Brazil Patents

Brazil Applications

Canada Patents  
Canada Applications  
Chile Patents  
Chile Applications  
Colombia Applications  
Costa Rica Applications  
Cuba Patents  
Cuba Applications  
Dominican Republic Applications  
Ecuador Patents  
Ecuador Applications  
El Salvador Applications  
Guatemala Applications  
Honduras Applications  
Mexico Patents  
Mexico Applications  
Nicaragua Patents  
Panama Applications  
Peru Applications  
Trinidad & Tobago Patents  
Uruguay Applications  
Austria Patents  
Austria Applications  
Belarus Patents  
Belgium Patents  
Belgium Applications  
Bosnia & Herzegovina Patents  
Bosnia & Herzegovina Applications  
Bulgaria Patents

Bulgaria Applications  
Croatia Patents  
Croatia Applications  
Czech Republic Patents  
Czech Republic Applications  
Czechoslovakia Patents  
Czechoslovakia Applications  
Denmark Patents  
Denmark Applications  
Estonia Patents  
Estonia Applications  
EUIPO Patents  
Finland Patents  
Finland Applications  
France Patents  
France Applications  
Germany Patents  
Germany Applications  
Great Britain Patents  
Great Britain Applications  
Greece Patents  
Greece Applications  
Hungary Patents  
Hungary Applications  
Iceland Patents  
Iceland Applications  
Ireland Patents  
Ireland Applications  
Italy Patents

Italy Applications  
Latvia Patents  
Latvia Applications  
Lithuania Patents  
Lithuania Applications  
Luxembourg Patents  
Luxembourg Applications  
Malta Patents  
Monaco Patents  
Montenegro Patents  
Montenegro Applications  
Netherlands Patents  
Netherlands Applications  
Norway Patents  
Norway Applications  
Poland Patents  
Poland Applications  
Portugal Patents  
Portugal Applications  
Republic of Moldova Patents  
Republic of Moldova Applications  
Romania Patents  
Romania Applications  
San Marino Patents  
San Marino Applications  
Serbia Patents  
Serbia Applications  
Slovakia Patents  
Slovakia Applications

Slovenia Patents

Spain Patents

Spain Applications

Sweden Patents

Sweden Applications

Switzerland Patents

Switzerland Applications

Ukraine Patents

Yugoslavia/Serbia and Montenegro Patents

Yugoslavia/Serbia and Montenegro Applications

Armenia Patents

Australia Patents

Australia Applications

Cyprus Patents

Gulf Cooperation Council Patents

Hong Kong Patents

India Patents

India Applications

Indonesia Patents

Indonesia Applications

Israel Patents

Israel Applications

Jordan Patents

Jordan Applications

Kyrgyzstan Patents

Macao Applications

Malaysia Patents

Mongolia Patents

New Zealand Patents

Philippines Patents  
Philippines Applications  
Saudi Arabia Patents  
Saudi Arabia Applications  
Singapore Patents  
Singapore Applications  
Taiwan Patents  
Taiwan Applications  
Tajikistan Patents  
Tajikistan Applications  
Thailand Patents  
Thailand Applications  
Uzbekistan Patents  
Vietnam Patents  
Algeria Patents  
ARIPO Patents  
ARIPO Applications  
Egypt Patents  
Kenya Patents  
Malawi Patents  
Morocco Patents  
Morocco Applications  
OAPI Patents  
South Africa Patents  
Tunisia Applications  
Zambia Patents  
Zimbabwe Patents  
EAPO Patents  
EAPO Applications

Georgia Patents

Georgia Applications

Kazakhstan Patents

Kazakhstan Applications

Russia Patents

Russia Applications

Turkey Patents

Turkey Applications

Doc code: IDS

PTO/SB/08a (01-22)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 05/31/2024. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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.

# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

| U.S.PATENTS       |         |               |                        |            |                                                 | <a href="#">Remove</a>                                                 |
|-------------------|---------|---------------|------------------------|------------|-------------------------------------------------|------------------------------------------------------------------------|
| Examiner Initial* | Cite No | Patent Number | Kind Code <sup>1</sup> | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|                   | 1       | 10569036      | B2                     | 2020-02-25 | Delangre et al.                                 |                                                                        |
|                   | 2       | 10339232      | B1                     | 2019-07-02 | Hoff                                            |                                                                        |
|                   | 3       | 10316581      | B1                     | 2019-06-11 | Nagel et al.                                    |                                                                        |
|                   | 4       | 8583288       | B1                     | 2013-11-12 | Rossi et al.                                    |                                                                        |
|                   | 5       | 7099748       | B2                     | 2006-08-29 | Rayburn                                         |                                                                        |
|                   | 6       | 6868293       | B1                     | 2005-03-15 | Schurr et al.                                   |                                                                        |
|                   | 7       | 6789739       | B2                     | 2004-09-14 | Rosen                                           |                                                                        |
|                   | 8       | 6671586       | B2                     | 2003-12-30 | Davis et al.                                    |                                                                        |

# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

|    |         |    |            |          |  |
|----|---------|----|------------|----------|--|
| 9  | 6478233 | B1 | 2002-11-12 | Shah     |  |
| 10 | 5197666 | A  | 1993-03-30 | Wedekind |  |
| 11 | 4987798 | A  | 1990-01-30 | Cler     |  |

If you wish to add additional U.S. Patent citation information please click the Add button.

Add

## **U.S.PATENT APPLICATION PUBLICATIONS**

Remove

| Examiner Initial* | Cite No | Publication Number | Kind Code <sup>1</sup> | Publication Date | Name of Patentee or Applicant of cited Document | Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear |
|-------------------|---------|--------------------|------------------------|------------------|-------------------------------------------------|--------------------------------------------------------------------------|
|                   | 1       | 20180087795        | A1                     | 2018-03-29       | Okita et al.                                    |                                                                          |
|                   | 2       | 20170329357        | A1                     | 2017-11-16       | Torres et al.                                   |                                                                          |
|                   | 3       | 20160290668        | A1                     | 2016-10-06       | Taylor et al.                                   |                                                                          |
|                   | 4       | 20150159928        | A1                     | 2015-06-11       | Hancock                                         |                                                                          |
|                   | 5       | 20140352340        | A1                     | 2014-12-04       | Berg et al.                                     |                                                                          |
|                   | 6       | 20140277795        | A1                     | 2014-09-18       | Matsuoka et al.                                 |                                                                          |

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

|    |             |    |            |                |
|----|-------------|----|------------|----------------|
| 7  | 20120271576 | A1 | 2012-10-25 | Kamel et al.   |
| 8  | 20120234932 | A1 | 2012-09-20 | Okamoto et al. |
| 9  | 20120125592 | A1 | 2012-05-24 | Fadell et al.  |
| 10 | 20120065789 | A1 | 2012-03-15 | Scelzi et al.  |
| 11 | 20110282504 | A1 | 2011-11-17 | Besore et al.  |
| 12 | 20100211224 | A1 | 2010-08-19 | Keeling et al. |
| 13 | 20090281667 | A1 | 2009-11-12 | Masui et al.   |
| 14 | 20090216382 | A1 | 2009-08-27 | Ng             |
| 15 | 20090140060 | A1 | 2009-06-04 | Stoner et al.  |
| 16 | 20090013703 | A1 | 2009-01-15 | Werner         |
| 17 | 20070267508 | A1 | 2007-11-22 | Hoglund et al. |

# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

|    |             |    |            |                    |
|----|-------------|----|------------|--------------------|
| 18 | 20070044501 | A1 | 2007-03-01 | Schnell et al.     |
| 19 | 20070043477 | A1 | 2007-02-22 | Ehlers et al.      |
| 20 | 20050159846 | A1 | 2005-07-21 | Van Ostrand et al. |
| 21 | 20040117330 | A1 | 2004-06-17 | Ehlers et al.      |
| 22 | 20030131623 | A1 | 2003-07-17 | Suppes             |

If you wish to add additional U.S. Published Application citation information please click the Add button.

Add

## FOREIGN PATENT DOCUMENTS

Remove

| Examiner Initial* | Cite No | Foreign Document Number <sup>3</sup> | Country Code <sup>2</sup> | Kind Code <sup>4</sup> | Publication Date | Name of Patentee or Applicant of cited Document | Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear | T <sup>5</sup> |
|-------------------|---------|--------------------------------------|---------------------------|------------------------|------------------|-------------------------------------------------|--------------------------------------------------------------------------|----------------|
|                   | 1       |                                      |                           |                        |                  |                                                 |                                                                          |                |

If you wish to add additional Foreign Patent Document citation information please click the Add button

Add

## NON-PATENT LITERATURE DOCUMENTS

Remove

| Examiner Initials* | Cite No | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published. | T <sup>5</sup> |
|--------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
|                    | 1       |                                                                                                                                                                                                                                                                 |                |

If you wish to add additional non-patent literature document citation information please click the Add button

Add

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

**EXAMINER SIGNATURE**

|                    |              |                 |            |
|--------------------|--------------|-----------------|------------|
| Examiner Signature | /TUNG S LAU/ | Date Considered | 07/21/2023 |
|--------------------|--------------|-----------------|------------|

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

## **CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

### **SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

|            |                         |                     |            |
|------------|-------------------------|---------------------|------------|
| Signature  | /Daniel A. Tanner, III/ | Date (YYYY-MM-DD)   | 2023-04-11 |
| Name/Print | Daniel A. Tanner, III   | Registration Number | 54734      |

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

## 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.

# PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

By fax, send to: (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 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. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize expediency.**

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.

144465 7590 07/27/2023  
Tanner IP, PLLC  
149 West Gilpin Avenue  
Norfolk, VA 23503

## 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 transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

|                         |
|-------------------------|
| (Typed or printed name) |
| (Signature)             |
| (Date)                  |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|------------------------|---------------------|------------------|
| 18/104,767      | 02/01/2023  | John Douglas STEINBERG | 230-046-CON         | 6379             |

TITLE OF INVENTION: SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

| APPLN. TYPE    | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|---------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | UNDISCOUNTED  | \$1200        | \$0.00              | \$0.00               | \$1200           | 10/27/2023 |

| EXAMINER    | ART UNIT | CLASS-SUBCLASS |
|-------------|----------|----------------|
| LAU, TUNG S | 2857     | 702-182000     |

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/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or 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. TannerIP PLLC  
2. Daniel A. Tanner, III  
3. James E. Golladay II

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 must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE  
EcoFactor, Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)  
Palo Alto, California

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

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☒ Electronic Payment via Patent Center or EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PT-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. \_\_\_\_\_

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

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Daniel A. Tanner, III/

Date 2023-10-25

Typed or printed name Daniel A. Tanner, III

Registration No. 54734

| Electronic Patent Application Fee Transmittal |          |                                                                              |        |                      |
|-----------------------------------------------|----------|------------------------------------------------------------------------------|--------|----------------------|
| Application Number:                           |          | 18104767                                                                     |        |                      |
| Filing Date:                                  |          | 01-Feb-2023                                                                  |        |                      |
| Title of Invention:                           |          | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |        |                      |
| First Named Inventor/Applicant Name:          |          | John Douglas STEINBERG                                                       |        |                      |
| Filer:                                        |          | Daniel Albert Tanner                                                         |        |                      |
| Attorney Docket Number:                       |          | 230-046-CON                                                                  |        |                      |
| Filed as Large Entity                         |          |                                                                              |        |                      |
| Filing Fees for Utility under 35 USC 111(a)   |          |                                                                              |        |                      |
| 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                        | 1501     | 1                                                                            | 1200   | 1200                 |

| Description        | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|--------------------|----------|----------|--------|----------------------|
| Extension-of-Time: |          |          |        |                      |
| Miscellaneous:     |          |          |        |                      |
| Total in USD (\$)  |          |          |        | 1200                 |

## Electronic Acknowledgement Receipt

|                                             |                                                                              |
|---------------------------------------------|------------------------------------------------------------------------------|
| <b>EFS ID:</b>                              | 48764347                                                                     |
| <b>Application Number:</b>                  | 18104767                                                                     |
| <b>International Application Number:</b>    |                                                                              |
| <b>Confirmation Number:</b>                 | 6379                                                                         |
| <b>Title of Invention:</b>                  | SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM |
| <b>First Named Inventor/Applicant Name:</b> | John Douglas STEINBERG                                                       |
| <b>Customer Number:</b>                     | 144465                                                                       |
| <b>Filer:</b>                               | Daniel Albert Tanner                                                         |
| <b>Filer Authorized By:</b>                 |                                                                              |
| <b>Attorney Docket Number:</b>              | 230-046-CON                                                                  |
| <b>Receipt Date:</b>                        | 25-OCT-2023                                                                  |
| <b>Filing Date:</b>                         | 01-FEB-2023                                                                  |
| <b>Time Stamp:</b>                          | 23:32:41                                                                     |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)                                                  |

### Payment information:

|                                          |                  |
|------------------------------------------|------------------|
| Submitted with Payment                   | yes              |
| Payment Type                             | DA               |
| Payment was successfully received in RAM | \$ 1200          |
| RAM confirmation Number                  | E202300N33276206 |
| Deposit Account                          |                  |
| Authorized User                          |                  |

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

| <b>File Listing:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             |                                             |                                              |                  |                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------------------------------|----------------------------------------------|------------------|------------------|
| Document Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Document Description        | File Name                                   | File Size(Bytes)/<br>Message Digest          | Multi Part /.zip | Pages (if appl.) |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Issue Fee Payment (PTO-85B) | 230-046-CON-<br>IssueFeeTrans_ForFiling.pdf | 1008541                                      | no               | 1                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |                                             | 397e5f3182e9281a675606c82b2006c338f<br>c6cd  |                  |                  |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |                                             |                                              |                  |                  |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |                                             |                                              |                  |                  |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Fee Worksheet (SB06)        | fee-info.pdf                                | 37876                                        | no               | 2                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |                                             | dfedea9bebb170e43d49e5087442ced613e<br>8a0b9 |                  |                  |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |                                             |                                              |                  |                  |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |                                             |                                              |                  |                  |
| <b>Total Files Size (in bytes):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |                                             | 1046417                                      |                  |                  |
| <p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> 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><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> 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><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> 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> |                             |                                             |                                              |                  |                  |

# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18104767               |
| Filing Date            | 2023-02-01             |
| First Named Inventor   | John Douglas STEINBERG |
| Art Unit               | 2857                   |
| Examiner Name          | Tung S. LAU            |
| Attorney Docket Number | 230-046-CON            |

|    |         |    |                                  |                          |  |
|----|---------|----|----------------------------------|--------------------------|--|
| 9  | 6478233 | B1 | 2002-11-12                       | Shah                     |  |
| 10 | 5197666 | A  | 1993-03-30                       | Wedekind                 |  |
| 11 | 4987798 | A  | 01/1991<br><del>1990-01-30</del> | Funahashi et al.<br>Cler |  |

Change(s) applied  
to document,  
/B.I./

If you wish to add additional U.S. Patent citation information please click the Add button.

Add

8/11/2023

## **U.S.PATENT APPLICATION PUBLICATIONS**

Remove

| Examiner Initial* | Cite No | Publication Number | Kind Code <sup>1</sup> | Publication Date | Name of Patentee or Applicant of cited Document | Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear |
|-------------------|---------|--------------------|------------------------|------------------|-------------------------------------------------|--------------------------------------------------------------------------|
|                   | 1       | 20180087795        | A1                     | 2018-03-29       | Okita et al.                                    |                                                                          |
|                   | 2       | 20170329357        | A1                     | 2017-11-16       | Torres et al.                                   |                                                                          |
|                   | 3       | 20160290668        | A1                     | 2016-10-06       | Taylor et al.                                   |                                                                          |
|                   | 4       | 20150159928        | A1                     | 2015-06-11       | Hancock                                         |                                                                          |
|                   | 5       | 20140352340        | A1                     | 2014-12-04       | Berg et al.                                     |                                                                          |
|                   | 6       | 20140277795        | A1                     | 2014-09-18       | Matsuoka et al.                                 |                                                                          |



| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|------------|------------|---------------------|------------------|
| 18/104,767      | 12/05/2023 | 11835394   | 230-046-CON         | 6379             |

144465 7590 11/15/2023

Tanner IP, PLLC  
149 West Gilpin Avenue  
Norfolk, VA 23503

## ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at <https://patentcenter.uspto.gov/>. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at <https://certifiedcopycenter.uspto.gov/index.html>. The Certified Copy Center may be reached at (800)972-6382.

### **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 Center (<https://patentcenter.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 Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

**INVENTOR(s)** (Please see PATENT CENTER site <https://patentcenter.uspto.gov> for additional inventors):

John Douglas STEINBERG, Millbrae, CA;  
Scott Douglas HUBLOU, Redwood City, CA;

**APPLICANT(s)** (Please see PATENT CENTER site <https://patentcenter.uspto.gov> for additional applicants):

ECOFACOR, INC., Palo Alto, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit [SelectUSA.gov](https://selectusa.gov).



# 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.        | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|------------------------|-------------|------------------------|---------------------|------------------|
| 18/104,767             | 02/01/2023  | John Douglas STEINBERG | 230-046-CON         | 6379             |
| 144465                 | 7590        | 12/05/2023             | EXAMINER            |                  |
| Tanner IP, PLLC        |             |                        | LAU, TUNG S         |                  |
| 149 West Gilpin Avenue |             |                        |                     |                  |
| Norfolk, VA 23503      |             |                        |                     |                  |
|                        |             |                        | ART UNIT            | PAPER NUMBER     |
|                        |             |                        | 2857                |                  |
|                        |             |                        | NOTIFICATION DATE   | DELIVERY MODE    |
|                        |             |                        | 12/05/2023          | 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):

dan@tannerip.com  
eofficeaction@appcoll.com  
james@tannerip.com



## 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](http://www.uspto.gov)

| APPLICATION NO. | ISSUE DATE  | PATENT NO. |
|-----------------|-------------|------------|
| 18/104,767      | 05-Dec-2023 | 11835394   |

Tanner IP, PLLC  
149 West Gilpin Avenue  
Norfolk, VA 23503

### EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at <https://patentcenter.uspto.gov>

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit <https://www.uspto.gov/electronicgrants>