

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/JP2019/043305

| <p><b>A. CLASSIFICATION OF SUBJECT MATTER</b><br/>                 Int.Cl. H01M10/48 (2006.01) i, B60L3/00 (2019.01) i, H02J7/00 (2006.01) i,<br/>                 B60L58/10 (2019.01) i, G01R31/367 (2019.01) i<br/>                 FI: B60L58/10, G01R31/367, H01M10/48P, H01M10/48301, H02J7/00X,<br/>                 H02J7/00Y, B60L3/00S<br/>                 According to International Patent Classification (IPC) or to both national classification and IPC</p>   |   |   |  |  |  |           |   |           |  |  |     |   |   |     |   |  |     |
|--|---|---|--|--|--|-----------|---|-----------|--|--|-----|---|---|-----|---|--|-----|
| <p><b>B. FIELDS SEARCHED</b><br/>                 Minimum documentation searched (classification system followed by classification symbols)<br/>                 Int.Cl. H01M10/48, B60L3/00, H02J7/00, B60L58/10, G01R31/367</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:80%;">Published examined utility model applications of Japan</td> <td style="text-align: right;">1922-1996</td> </tr> <tr> <td>Published unexamined utility model applications of Japan</td> <td style="text-align: right;">1971-2020</td> </tr> <tr> <td>Registered utility model specifications of Japan</td> <td style="text-align: right;">1996-2020</td> </tr> <tr> <td>Published registered utility model applications of Japan</td> <td style="text-align: right;">1994-2020</td> </tr> </table> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)</p>  |   |   | Published examined utility model applications of Japan | 1922-1996  | Published unexamined utility model applications of Japan | 1971-2020 | Registered utility model specifications of Japan  | 1996-2020 | Published registered utility model applications of Japan | 1994-2020  |     |   |   |     |   |  |     |
| Published examined utility model applications of Japan   | 1922-1996   |   |  |  |  |           |   |           |  |  |     |   |   |     |   |  |     |
| Published unexamined utility model applications of Japan   | 1971-2020   |   |  |  |  |           |   |           |  |  |     |   |   |     |   |  |     |
| Registered utility model specifications of Japan   | 1996-2020   |   |  |  |  |           |   |           |  |  |     |   |   |     |   |  |     |
| Published registered utility model applications of Japan   | 1994-2020   |   |  |  |  |           |   |           |  |  |     |   |   |     |   |  |     |
| <p><b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">Category*</th> <th style="width:70%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width:20%;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td align="center">X</td> <td>JP 2013-89424 A (INTERNATIONAL BUSINESS MACHINES CORPORATION) 13.05.2013 (2013-05-13), particularly, paragraphs [0015], [0025]-[0053], fig. 1-6</td> <td align="center">1-2, 7</td> </tr> <tr> <td align="center">Y</td> <td>WO 2016/071941 A1 (TOSHIBA SOLUTIONS CORPORATION) 12.05.2016 (2016-05-12), particularly, paragraphs [0010]-[0039], [0047], fig. 1-11</td> <td align="center">1-7</td> </tr> <tr> <td align="center">Y</td> <td>JP 2006-211789 A (TOYOTA MOTOR CORPORATION) 10.08.2006 (2006-08-10), particularly, paragraphs [0026]-[0039]</td> <td align="center">1-7</td> </tr> <tr> <td align="center">Y</td> <td>JP 2016-13819 A (TOYOTA MOTOR CORPORATION) 28.01.2016 (2016-01-28), particularly, paragraph [0055]</td> <td align="center">4-6</td> </tr> </tbody> </table> |   |   | Category*  | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No.                                    | X         | JP 2013-89424 A (INTERNATIONAL BUSINESS MACHINES CORPORATION) 13.05.2013 (2013-05-13), particularly, paragraphs [0015], [0025]-[0053], fig. 1-6 | 1-2, 7    | Y  | WO 2016/071941 A1 (TOSHIBA SOLUTIONS CORPORATION) 12.05.2016 (2016-05-12), particularly, paragraphs [0010]-[0039], [0047], fig. 1-11 | 1-7 | Y | JP 2006-211789 A (TOYOTA MOTOR CORPORATION) 10.08.2006 (2006-08-10), particularly, paragraphs [0026]-[0039] | 1-7 | Y | JP 2016-13819 A (TOYOTA MOTOR CORPORATION) 28.01.2016 (2016-01-28), particularly, paragraph [0055] | 4-6 |
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| <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.   |   | <input checked="" type="checkbox"/> See patent family annex.  |  |  |  |           |   |           |  |  |     |   |   |     |   |  |     |
| <p>* Special categories of cited documents:</p> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>  |   | <p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&amp;” document member of the same patent family</p> |  |  |  |           |   |           |  |  |     |   |   |     |   |  |     |
| Date of the actual completion of the international search<br>17.01.2020  |   | Date of mailing of the international search report<br>04.02.2020  |  |  |  |           |   |           |  |  |     |   |   |     |   |  |     |
| Name and mailing address of the ISA/<br>Japan Patent Office<br>3-4-3, Kasumigaseki, Chiyoda-ku,<br>Tokyo 100-8915, Japan   |   | Authorized officer<br><br>Telephone No.   |  |  |  |           |   |           |  |  |     |   |   |     |   |  |     |

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                             | Relevant to claim No. |
|-----------|--|-----------------------|
| Y         | JP 2017-28874 A (AUTOMOTIVE ENERGY SUPPLY CORPORATION) 02.02.2017 (2017-02-02), particularly, paragraph [0027] | 4-6                   |
| A         | JP 2018-148649 A (GS YUASA INTERNATIONAL LTD.) 20.09.2018 (2018-09-20), entire text, all drawings              | 1-7                   |
| A         | US 2015/0251556 A1 (FORD GROBAL TECHNOLOGIES, LLC) 10.09.2015 (2015-09-10), entire text, all drawings          | 1-7                   |

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

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|                    |            |   |
|--------------------|------------|---|
| JP 2013-89424 A    | 13.05.2013 | US 2013/0096858 A1<br>particularly, paragraphs [0032],<br>[0045]-[0086], fig. 1-6<br>CN 103048625 A |
| WO 2016/071941 A1  | 12.05.2016 | (Family: none)  |
| JP 2006-211789 A   | 10.08.2006 | (Family: none)  |
| JP 2016-13819 A    | 28.01.2016 | US 2016/0006377 A1<br>particularly, paragraph [0080]<br>CN 105270194 A                              |
| JP 2017-28874 A    | 02.02.2017 | (Family: none)  |
| JP 2018-148649 A   | 20.09.2018 | (Family: none)  |
| US 2015/0251556 A1 | 10.09.2015 | DE 102015203789 A<br>CN 104898063 A   |