



# SUPPLEMENTARY EUROPEAN SEARCH REPORT

Application number:  
EP 19 86 22 43

## Classification of the application (IPC):

E04B 1/68, E01C 11/02, E01D 19/06, E02B 3/16, E02D 29/16, E04B 1/66

## Technical fields searched (IPC):

E04B, E04F

| DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                  |                      |
|-------------------------------------|--------------------------------------------------------------------------------------------------|----------------------|
| Category                            | Citation of document with indication, where appropriate, of relevant passages                    | Relevant to claim    |
| X                                   | US 6491468 B1 (HAGEN PETER [US]) 10 December 2002 (2002-12-10)<br>* the whole document *         | 1, 2, 6, 7,<br>10-15 |
| Y                                   |                                                                                                  | 3-5, 8, 9            |
| Y                                   | US 2015068139 A1 (WITHERSPOON BILL [CA])<br>12 March 2015 (2015-03-12)<br>* the whole document * | 3, 5                 |
| Y                                   | US 9435114 B1 (PRESTON STEVEN [US])<br>06 September 2016 (2016-09-06)<br>* the whole document *  | 4, 8, 9              |

The supplementary search report has been based on the last set of claims valid and available at the start of the search.

|                              |                                                 |                              |
|------------------------------|-------------------------------------------------|------------------------------|
| Place of search<br>The Hague | Date of completion of the search<br>10 May 2022 | Examiner<br>Lorandi, Lorenzo |
|------------------------------|-------------------------------------------------|------------------------------|

## CATEGORY OF CITED DOCUMENTS

- |                                                                                 |                                                                        |
|---------------------------------------------------------------------------------|------------------------------------------------------------------------|
| X: particularly relevant if taken alone                                         | P: intermediate document                                               |
| Y: particularly relevant if combined with another document of the same category | T: theory or principle underlying the invention                        |
| A: technological background                                                     | E: earlier patent document, but published on, or after the filing date |
| O: non-written disclosure                                                       | D: document cited in the application                                   |
| & : member of the same patent family, corresponding document                    | L: document cited for other reasons                                    |

Disclaimer: this document has been automatically generated using data structured in accordance with WIPO standard ST.36 from the database of search reports of the European Patent Office. For technical reasons, its content and layout may differ from that of the original publication. Only the original published information is legally binding.



# ANNEX TO SUPPLEMENTARY EUROPEAN SEARCH REPORT

Application number:  
EP 19 86 22 43

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on 10-05-2022  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

| Patent document cited<br>in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|----|---------------------|----------------------------|---------------------|
| US 6491468                                | B1 | 10-12-2002          | NONE                       |                     |
| US 2015068139                             | A1 | 12-03-2015          | US 8365495 B1              | 05-02-2013          |
|                                           |    |                     | US 8739495 B1              | 03-06-2014          |
|                                           |    |                     | US 9644368 B1              | 09-05-2017          |
|                                           |    |                     | US 2015068139 A1           | 12-03-2015          |
|                                           |    |                     | US 2017130450 A1           | 11-05-2017          |
|                                           |    |                     | US 2017241132 A1           | 24-08-2017          |
| US 9435114                                | B1 | 06-09-2016          | US 9435114 B1              | 06-09-2016          |
|                                           |    |                     | US 10017936 B1             | 10-07-2018          |
|                                           |    |                     | US 10352040 B1             | 16-07-2019          |
|                                           |    |                     | US 2019277024 A1           | 12-09-2019          |