# (11) **EP 2 418 325 A3**

(12)

### **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3: 03.06.2015 Bulletin 2015/23

(51) Int Cl.: **E01F 15/14** (2006.01)

(43) Date of publication A2: 15.02.2012 Bulletin 2012/07

(21) Application number: 11175519.5

(22) Date of filing: 27.07.2011

(84) Designated Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR Designated Extension States:

BA ME

(30) Priority: 11.08.2010 KR 20100077206

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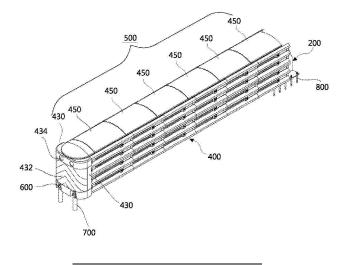
- Hwang, Yong-Soon 413-833 Paju-si (KR)
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## (54) Impact attenuator

(57) An impact attenuator includes: a plurality of support frames installed in a row at an interval, each support frame having first and second horizontal beams, a reinforcing member installed between the first and second horizontal beams, and at least one wire clip installed under the first horizontal beam; a rear support integrally formed with one of the support frames and having a vertical beam; a plurality of guard rail connecting units, each guard rail connecting unit including guard rails installed

on opposite sides of each of the support frames and a fixing member for movably installing the guard rails; and an absorbing tank including a front tank installed on a front surface of one of the support frames and a plurality of cushion tanks installed between the support frames, wherein a wire rope connects the support frames and the rear support to guide linear movements of the support frames.

Fig. 1





### **EUROPEAN SEARCH REPORT**

**Application Number** EP 11 17 5519

| 5  |          | ce européen<br>brevets  |  |                      | EP 11 17 5519  |  |
|----|----------|---|--|----------------------|--|--|
|    |          |   |  |                      |  |  |
|    |          | DOCUMENTS CONSID  | ERED TO BE RELEVANT                          |                      |  |  |
|    | Category | Citation of document with ir<br>of relevant pass  | ndication, where appropriate,<br>ages        | Relevant<br>to claim | CLASSIFICATION OF THE APPLICATION (IPC)                |  |
| 10 | X        | <br>  KR 100 668 759 B1 (<br>  [KR]) 16 January 20  | SHINDO INDUSTRY CO LTD                       | 1,3-8,14             | INV.<br>E01F15/14                                      |  |
|    | Υ        | * figures 1,3,4,5,6   | ia-b *                                       | 12,13                | 1 2011 13/ 14  |  |
| 15 | x        | CN 101 343 863 A (S   | HINDO QINGDAO CO LTD<br>TRAFFIC EQUIPMENT CO | 1,3-11               |  |  |
|    | Y        | LTD) 14 January 200<br>* figures 3,4,5,6,7<br>* page 8 *  | 12,13  |                      |  |  |
| 20 | X        | US 2006/103061 A1 (KENNEDY JAMES C JR [US]<br>ET AL KENNEDY JR JAMES C [US] ET AL)<br>18 May 2006 (2006-05-18)<br>* figures 11,12 * |  | 1,2                  |  |  |
|    | Υ        |   |  | 12,13                |  |  |
|    | x        | X CA 2 460 548 A1 (BARRIER SYSTEMS INC [ 3 April 2003 (2003-04-03)  * figures 1,6,8,10 *  * third paragraph; page 7 *               |  | 1-3,9-11             |  |  |
| 25 | Υ        |   | *  | 12,13                |  |  |
|    |          |   |  |                      | TECHNICAL FIELDS                                       |  |
| 30 | Υ        | FR 2 756 852 A1 (PH<br>12 June 1998 (1998-  |  | 12,13                | SEARCHED (IPC) E01F                                    |  |
|    |          | * figures 6,7 <sup>*</sup>  | ,<br>  |                      |  |  |
|    |          |   |  |                      |  |  |
| 35 |          |   |  |                      |  |  |
|    |          |   |  |                      |  |  |
| 40 |          |   |  |                      |  |  |
| 40 |          |   |  |                      |  |  |
|    |          |   |  |                      |  |  |
| 45 |          |   |  |                      |  |  |
|    |          | The present search report has   | ooon drawn up for all plaims                 | _                    |  |  |
|    | 1        | The present search report has been drawn up for all claims  Place of search  Date of completion of the search                       |  | Examiner             |  |  |
| 50 | 4C01)    | The Hague   | 23 April 2015                                | Tra                  | n, Kim Lien  |  |
| υ  | 22 (P0   | ATEGORY OF CITED DOCUMENTS  |  |                      | inderlying the invention<br>ment, but published on, or |  |
|    |          | ticularly relevant if taken alone   | after the filing dat                         | e · ·                |  |  |
|    | Y docu   | ticularly relevant if combined with anotl<br>ument of the same category<br>nnological background                                    | L : document cited fo                        |                      |  |  |
| 55 | ହି O∶non | nological background<br>n-written disclosure<br>rmediate document   | & : member of the sa<br>document             |                      |  |  |
| 55 | P:inte   | <u>-</u>  |  |                      |  |  |

#### ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 11 17 5519

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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 The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-04-2015

| 10 |
|----|
|----|

| 10 |   |                          |   | 23-04-2019   |
|----|---|--------------------------|---|--|
|    | Patent document<br>cited in search report | Publication<br>date      | Patent family<br>member(s)  | Publication<br>date  |
| 15 | KR 100668759 B1<br>CN 101343863 A         | 16-01-2007<br>14-01-2009 | CN 101343863 A<br>KR 20090005914 A  | 14-01-2009<br>14-01-2009   |
| 20 | US 2006103061 A1                          | 18-05-2006               | AU 2005307820 A1<br>CA 2587567 A1<br>EP 1812650 A2<br>US 7300223 B1<br>US 2006103061 A1<br>US 2009032789 A1<br>WO 2006055627 A2 | 26-05-2006<br>26-05-2006<br>01-08-2007<br>27-11-2007<br>18-05-2006<br>05-02-2009<br>26-05-2006 |
| 25 | CA 2460548 A1                             | 03-04-2003               | AU 2002326448 B2<br>CA 2460548 A1<br>KR 20040054687 A<br>NZ 532473 A<br>US 2003057410 A1<br>WO 03026924 A2                      | 06-03-2008<br>03-04-2003<br>25-06-2004<br>23-02-2007<br>27-03-2003<br>03-04-2003               |
| 30 | FR 2756852 A1                             | 12-06-1998               | NONE  |  |
| 35 |   |                          |   |  |
|    |   |                          |   |  |

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