



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**10.10.2018 Bulletin 2018/41**

(51) Int Cl.:  
**B66F 7/08 (2006.01) B66F 7/06 (2006.01)**

(21) Application number: **18166392.3**

(22) Date of filing: **09.04.2018**

(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**  
Designated Validation States:  
**KH MA MD TN**

(71) Applicant: **ABER- Embraiagens e Comandos Hidraulicos**  
**Antonio Bernardes, Lda.**  
**4470-410 Maia (PT)**

(72) Inventor: **RUI JORGE, DA SILVA BERNARDES**  
**4470-410 MAIA (PT)**

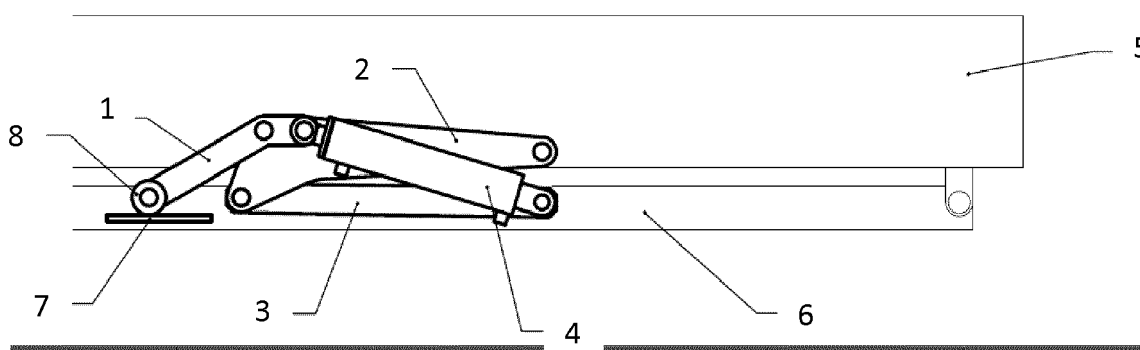
(74) Representative: **Patentree**  
**Edificio Net**  
**Rua de Salazares, 842**  
**4149-002 Porto (PT)**

(30) Priority: **07.04.2017 PT 2017110018**  
**03.08.2017 PT 2017110234**

(54) **LEVERAGED TILTING OR LIFTING SCISSORS SYSTEM, METHOD OF OPERATION AND USES THEREOF**

(57) Scissors device for tilting or lifting a movable platform (5,6), comprising at least one hydraulic/pneumatic/electric cylinder (4) for actuating the scissors device and hinged at its first end to a base (7), a scissors having two arms (2, 3) hinged together, one arm coupled to an upper platform and an arm coupled to a base, wherein the lower arm is hinged to the base and the upper

arm is hinged to the cargo platform; a lever arm (1) hinged to at least one of the scissors arms and to a second end of the hydraulic cylinder, wherein said lever arm comprises a protruding end (8) for supporting one of the arms in a portion of the start-up/return movement of said scissors comprising its closed (open) position, by linearly sliding on a surface solidary to the base.



**Fig. 1**

## Description

### Technical Domain

**[0001]** The present disclosure relates to a leveraged tilting or lifting scissors, methods of operation and uses thereof.

### State of the Art

**[0002]** Nowadays the tilting or lifting scissors systems used are not leveraged and this creates a lot of effort both to the structure and to the hydraulic system, such as stress concentration, deformations, breakages, extremely high hydraulic pressures, hydraulic pressure peaks, pressure surges, counter-pressures etc.

### General Description

**[0003]** A scissors device is described for tilting or lifting a platform, of a cargo platform, with respect to a base, comprising

at least one hydraulic/pneumatic/electric cylinder (4) for actuating the scissors device and hinged to the base at its first end,  
a scissors having two arms hinged together, wherein the first arm is coupled to an upper platform and the second arm is coupled to a base, wherein the lower arm is hinged to the base and the upper arm is hinged to the platform, preferably a platform for cargo or people, for example in a wheelchair;  
a lever arm hinged to at least one of the scissors arms and to a second end of the hydraulic cylinder, wherein said lever arm comprises a protruding end for supporting one of the arms in a portion of the start-up/return movement of said scissors comprising its closed (open) position, by linearly sliding over a surface solidary to the base.

**[0004]** In a preferred embodiment, the base is incorporated in a cargo vehicle, or on the ground.

**[0005]** A scissors device is further described for tilting a cargo platform with respect to a base, comprising

a hydraulic cylinder (4) for actuating the scissors device which is hinged at its first end to the base;  
a scissors with two arms hinged together, an upper arm and a lower arm, wherein the lower arm is hinged to the base and the upper arm is hinged to the cargo platform;  
a lever arm hinged to the upper arm and to a second end of the hydraulic cylinder, wherein said lever arm comprises a protruding end for supporting the upper arm in a portion of the movement of said scissors comprising its closed position, by linearly sliding over a surface solidary to the base.

**[0006]** In a preferred embodiment, the hinge with the base of the hydraulic cylinder (4) and the hinge with the base of the lower arm is the same hinge.

**[0007]** In a preferred embodiment, the lever arm is V-shaped, in particular with the inflection of the V in the hinge with the upper arm.

**[0008]** In a preferred embodiment, the surface solidary to the base comprises a sliding rail, preferably the protruding end of the lever is a bearing, a caster, a bushing, a pulley, or a skid, among others.

**[0009]** In a preferred embodiment, the protruding end of said lever arm comprises a roller for linearly sliding over the surface solidary to the base.

**[0010]** In a preferred embodiment, said device may comprise a plurality of scissors, namely 2, 3, 4, 5 or more.

**[0011]** In a preferred embodiment, said scissors device for tilting or lifting a cargo platform relative to a base, comprises a hydraulic cylinder for actuating the scissors device, two arms hinged together allowing their relative movement and a lever arm, the cylinder being hinged at its first end to the base, the upper arm being hinged to the cargo platform and the lower arm being hinged to the base; the lever arm is hinged to the upper arm and the second end of the hydraulic/pneumatic cylinder, wherein said lever arm comprises a protruding end with a skid enabling the upper arm to be supported in part of the movement of said scissors comprising its closed position, by linearly sliding over a surface solidary to the base, the same applying to the opening thereof.

**[0012]** In a preferred embodiment, said device for tilting a platform comprises a hydraulic/pneumatic/electric cylinder for actuating the scissors device and hinged at its first end to the base, a scissors having two arms hinged together, an upper arm and a lower arm, wherein the lower arm is hinged to a base and the upper arm is hinged to the movable platform; a lever arm hinged to the upper arm and to a second end of the cylinder, wherein said lever arm comprises a protruding end for supporting the upper arm in a portion of the movement of said scissors comprising its closed position, by linearly sliding over a surface solidary to the base.

**[0013]** A platform, preferably a cargo platform, is further described which comprises the scissors device described in any of the foregoing embodiments.

**[0014]** An elevator, preferably a cargo elevator, comprising the above platform is further described.

**[0015]** A mechanism comprising the scissors device described in any of the foregoing embodiments is further described.

### Brief Description of the Figures

**[0016]** For an easier understanding of the present disclosure, figures are herein attached, which represent preferred embodiments which however are not intended to limit the object of the present disclosure.

**Figure 1** - Leveraged tilting scissors system and

movable case/platform in a start-up or stop position (end of cycle).

**Figure 2** - Leveraged tilting scissors system and movable case/platform, preferably a cargo platform, at the end of start-up by leverage.

**Figure 3** - Leveraged tilting scissors system and movable case/platform, at the end of the tilting movement.

**Figure 4** - Leveraged lifting scissors system and movable case/platform at the end of start-up by leverage.

**Figure 5** - Leveraged lifting scissors system and movable case/platform, at the end of the tilting movement.

**[0017]** Identification of components, wherein:

1. Represents the lever/levers;
2. Represents the upper arms;
3. Represents the lower arms;
4. Represents the cylinder;
5. Represents the movable case/platform of the mechanism;
6. Represents the bottom profiles of the case/platform of the mechanism;
7. Represents the leveraged base;
8. Represents the lever support.

### Detailed Description

**[0018]** The present disclosure relates to a leveraged tilting scissors system consisting of one or more levers (1), upper arms (2), lower arms (3), a cylinder (4) and a lever base/leveraged base (7), with a range of various capacities designed to equip the most varied cargo cases, or platforms existing on the market, among other mechanisms.

**[0019]** In one embodiment, the three critical points of the current tilting scissors are the start-up (**figure 1**), end of tilting movement (**figure 3**) and stop (end of cycle) (**figure 1**).

**[0020]** In one embodiment, at start-up the movable case/platform (**figure 3**) is loaded and the tilting scissors system is at a very closed angle, in particular an angle of 5-10°.

**[0021]** In one embodiment, at the end of the tilting movement (**figure 3**) and at the stop (end of cycle) (**figure 1**), abrupt mechanical stops occur which are reflected in the form of stresses either in the structure of the tilting scissors system and movable case/platform, or in the hydraulic/pneumatic/electric system, such as stress concentration, deformations, breakages, very high pressures, pressure peaks, pressure surges, counter-pressures, etc. These are currently circumvented with exter-

nal limit switches.

**[0022]** In one embodiment, the leveraged tilting system described herein incorporates in its operation the damping at start-up (**figure 1/2**) and at the stop of the movable case/platform (end of cycle) (**figure 1/2**).

**[0023]** In one embodiment, in the two tilting/lifting devices the damping at start-up is achieved by the actuation of the lever arm and the sliding base.

**[0024]** Another feature of the present disclosure is the design of the leveraged scissors structure enabling it to be more compact in height (**Figure 4/5**). This design is possible because the device is actuated by the lever arm and the sliding base.

**[0025]** All of these characteristics make this system unique and provide various advantages such as the reduction of the vertical maximum dimension of the leveraged tilting or lifting scissors, making the solution vertically more compact, increasing for example the space for cargo, reducing maximum working pressure which allows the structure of the leveraged scissors to be lightened by reducing the weight thereof and fuel consumption in the case of a vehicle, less shocks and abrupt mechanical contacts thus reducing stresses, deformations and/or breakages, and the damping at start-up (**figure 1/4**) and at the stop of the cargo case/platform (end of cycle) (**figure 1/4**) allows not to install more limit switches, or install them as a safety redundancy, making the system safer.

**[0026]** Throughout the description and claims the word "comprises" and variations of the word, have no intention of excluding other technical features, such as other components, or steps. Additional objects, advantages and features of the invention will become apparent to those skilled in the art upon examination of the description or may be learned by practicing the invention.

**[0027]** The following examples and figures are provided for illustrating purposes, and are not intended to be limiting of the present invention. In addition, the present invention encompasses all possible combinations of particular or preferred embodiments described herein.

**[0028]** Although in the present disclosure only particular embodiments thereof have been represented and described, the person skilled in the art will know how to make modifications and substitute technical features for equivalent ones, depending on the requirements of each situation, without departing from the scope of protection defined by the appended claims.

**[0029]** The embodiments presented are combinable with each other.

**[0030]** The following claims further define embodiments.

### Claims

1. A scissors device for tilting or lifting a movable platform, comprising at least one hydraulic/pneumatic/electric cylinder for

actuating the scissors device and hinged at its first end to a base,

a scissors with two arms hinged together, an arm coupled to an upper platform and an arm coupled to a base, wherein the lower arm is hinged to the base and the upper arm is hinged to the cargo platform; a lever arm hinged to at least one of the scissors arms and with a second end of the hydraulic cylinder, wherein said lever arm comprises a protruding end for supporting one of the arms in a portion of the start-up/return movement of said scissors comprising its closed (open) position, by linearly sliding over a surface solidary to the base.

2. A scissors device according to the preceding claim wherein the base is incorporated in a cargo mechanism. 15
3. A scissors device according to the preceding claim for tilting a movable platform 20  
wherein  
the hydraulic/pneumatic/electric cylinder for actuating the scissors device and hinged at its first end on a cargo platform,  
a scissors wherein the lower arm is hinged to the base and the upper arm is hinged to the cargo platform; 25  
a lever arm hinged to the upper arm and to a second end of the hydraulic cylinder, wherein said lever arm comprises a protruding end for supporting the upper arm in a portion of the movement of said scissors comprising its closed position, by linearly sliding over a surface solidary to the base. 30
4. A scissors device according to the preceding claim wherein the hinge with the base of the hydraulic/pneumatic/electric cylinder (4) and the hinge with the base of the lower arm is the same hinge. 35
5. A scissors device according to any of the preceding claims wherein the lever arm is V-shaped, in particular with the inflection of the V in the hinge with the upper arm. 40
6. A scissors device according to any of the preceding claims wherein the surface solidary to the base comprises a slide rail. 45
7. A scissors device according to any of the preceding claims wherein the protruding end of said lever arm comprises a roller for linearly sliding over the surface solidary to the base. 50
8. A scissors device according to the preceding claim wherein the protruding end of said lever arm is a bearing, a caster, or a bush, sheave, skid. 55
9. A scissors device according to any of the preceding

claims wherein said device comprises a plurality of scissors.

10. A scissors device according to any of the preceding claims wherein the movable platform is a cargo platform. 5
11. A movable platform comprising the scissors device described in any one of the preceding claims. 10
12. A mobile platform according to the preceding claim wherein the mobile platform is a cargo platform.
13. An elevator comprising the platform device described in the preceding claim.
14. A mechanism comprising the scissors device described in any of the preceding claims.

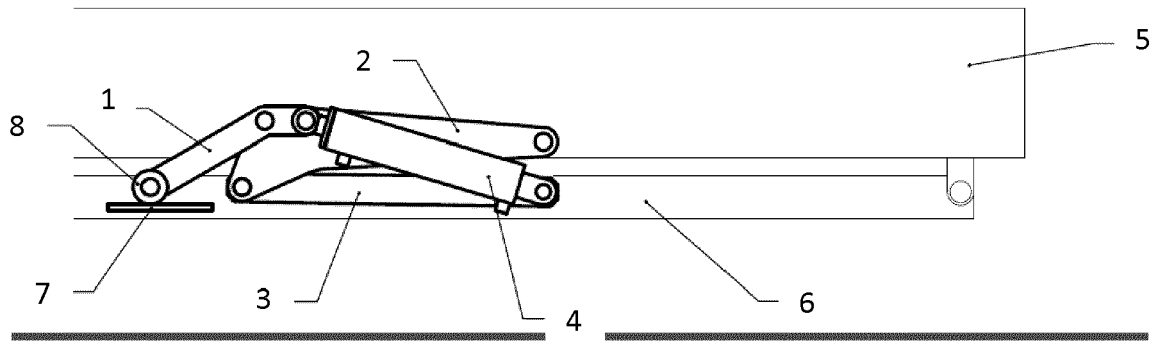


Fig. 1

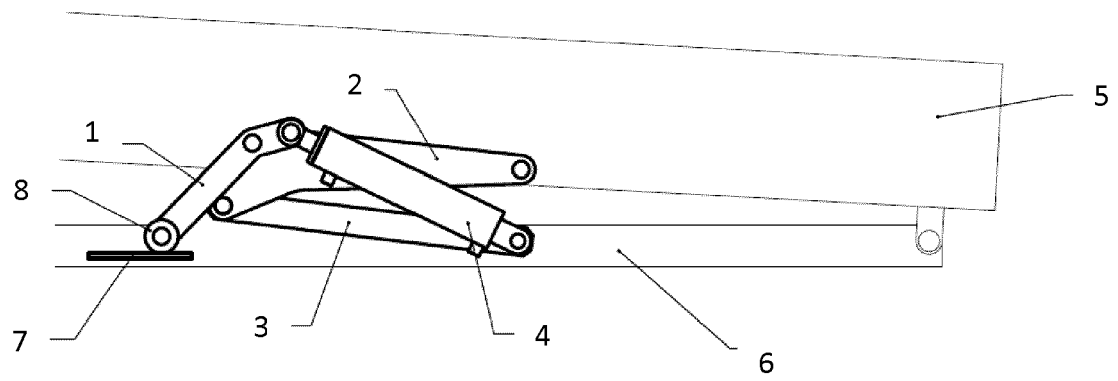


Fig. 2

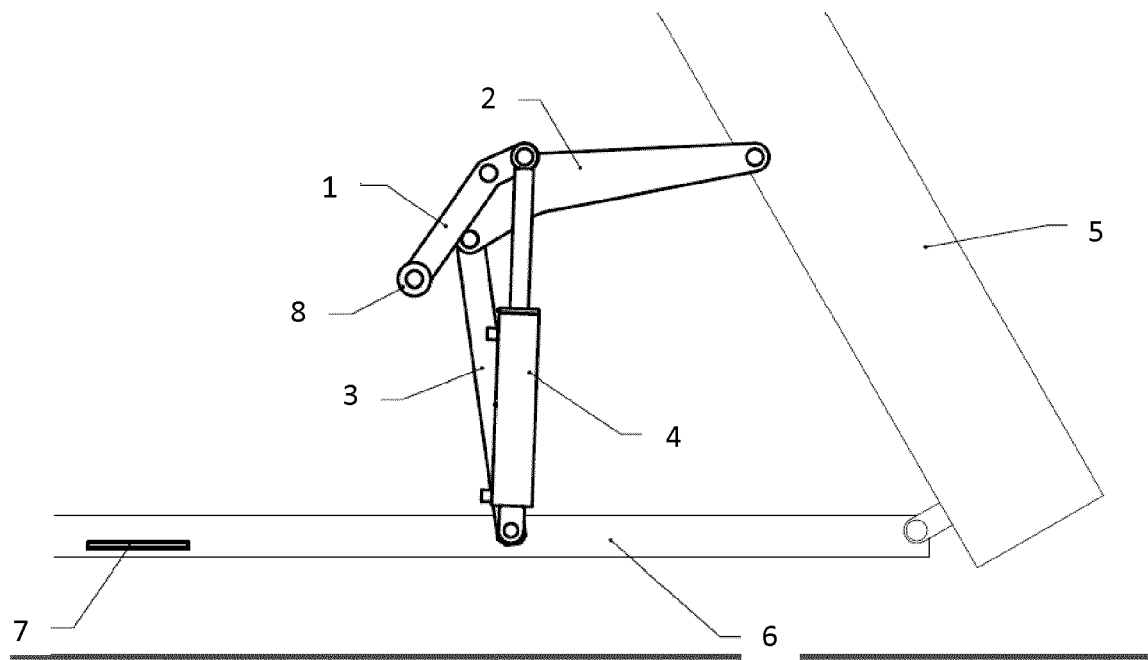


Fig. 3

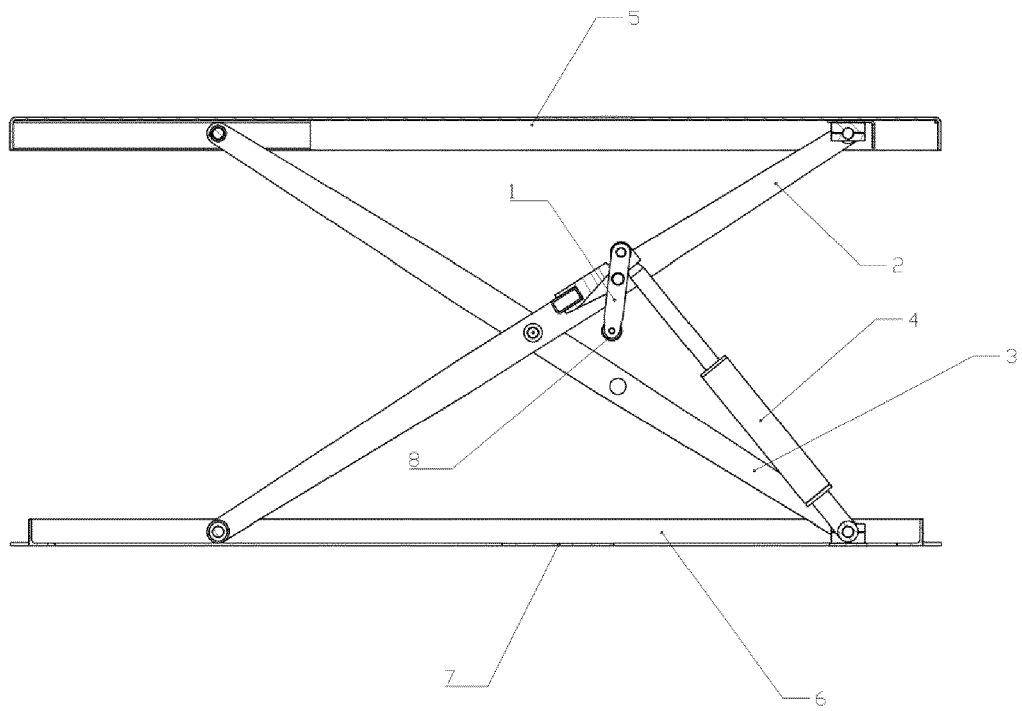


Fig. 4

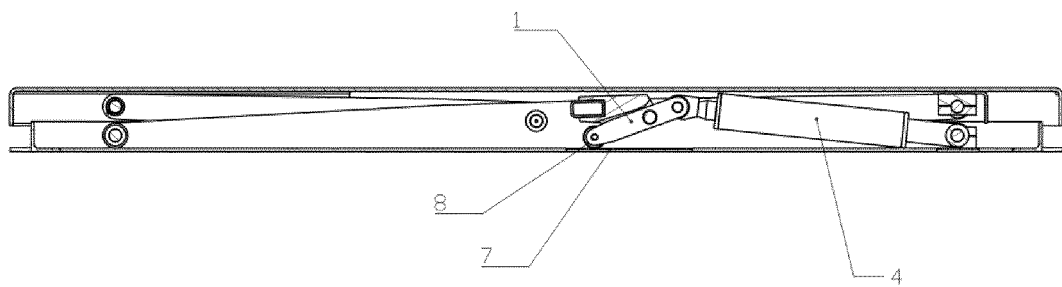


Fig. 5



## EUROPEAN SEARCH REPORT

Application Number  
EP 18 16 6392

5

10

15

20

25

30

35

40

45

50

55

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                               |                                                    |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                 | Relevant to claim                                  | CLASSIFICATION OF THE APPLICATION (IPC) |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US 2007/235266 A1 (DANTAS ROY [CA] ET AL)<br>11 October 2007 (2007-10-11)                     | 1-3,6-8, 10-14                                     | INV.<br>B66F7/08                        |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | * the whole document *                                                                        | 4,5,9                                              | B66F7/06                                |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | WO 01/27499 A1 (SNAP ON TECH INC [US];<br>GRANATA TEBALDO [IT])<br>19 April 2001 (2001-04-19) | 4,9                                                |                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | * abstract; figures 2,3 *                                                                     | 1,13,14                                            |                                         |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | WO 90/04565 A1 (SEHLSTEDT PER OLOF [SE])<br>3 May 1990 (1990-05-03)                           | 5                                                  |                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | * the whole document *                                                                        | 1,13,14                                            |                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DE 299 20 934 U1 (MAHA GMBH & CO KG [DE])<br>24 February 2000 (2000-02-24)                    | 1,13,14                                            |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | * abstract; figures *                                                                         |                                                    |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | * claim 1 *                                                                                   |                                                    |                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DE 92 05 900 U1 (OTTO NUSSBAUM GMBH & CO<br>KG) 1 October 1992 (1992-10-01)                   | 1,13,14                                            |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | * page 6, paragraph 3; figures *                                                              |                                                    |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                               |                                                    | TECHNICAL FIELDS<br>SEARCHED (IPC)      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                               |                                                    | B66F                                    |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                               |                                                    |                                         |
| Place of search<br>The Hague                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                               | Date of completion of the search<br>27 August 2018 | Examiner<br>Verheul, Omiros             |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                               |                                                    |                                         |

EPO FORM 1503 03.82 (P04C01)

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

EP 18 16 6392

5

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.

27-08-2018

10

15

20

25

30

35

40

45

50

55

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)                                                                                                                               | Publication<br>date                                                                                                        |
|-------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| US 2007235266 A1                          | 11-10-2007          | NONE                                                                                                                                                     |                                                                                                                            |
| WO 0127499 A1                             | 19-04-2001          | AU 6226599 A<br>DE 69909532 D1<br>DE 69909532 T2<br>EP 1221002 A1<br>ES 2203184 T3<br>JP 4434540 B2<br>JP 2003513868 A<br>US 6601826 B1<br>WO 0127499 A1 | 23-04-2001<br>14-08-2003<br>03-06-2004<br>10-07-2002<br>01-04-2004<br>17-03-2010<br>15-04-2003<br>05-08-2003<br>19-04-2001 |
| WO 9004565 A1                             | 03-05-1990          | DE 8915859 U1<br>JP H04501401 A<br>SE 462282 B<br>US 5192053 A<br>WO 9004565 A1                                                                          | 07-11-1991<br>12-03-1992<br>28-05-1990<br>09-03-1993<br>03-05-1990                                                         |
| DE 29920934 U1                            | 24-02-2000          | DE 29920934 U1<br>DK 1122205 T3<br>EP 1122205 A1<br>ES 2215546 T3<br>US 6464205 B2<br>US 2001025952 A1                                                   | 24-02-2000<br>29-03-2004<br>08-08-2001<br>16-10-2004<br>15-10-2002<br>04-10-2001                                           |
| DE 9205900 U1                             | 01-10-1992          | DE 9205900 U1<br>JP H0672698 A                                                                                                                           | 01-10-1992<br>15-03-1994                                                                                                   |

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82