



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**02.09.2015 Bulletin 2015/36**

(51) Int Cl.:  
**E05D 15/06 (2006.01)**

(21) Application number: **14460012.9**

(22) Date of filing: **28.02.2014**

(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**

(71) Applicant: **Laguna Invest Sp. z o.o. S.K.A.**  
**80-298 Gdansk (PL)**

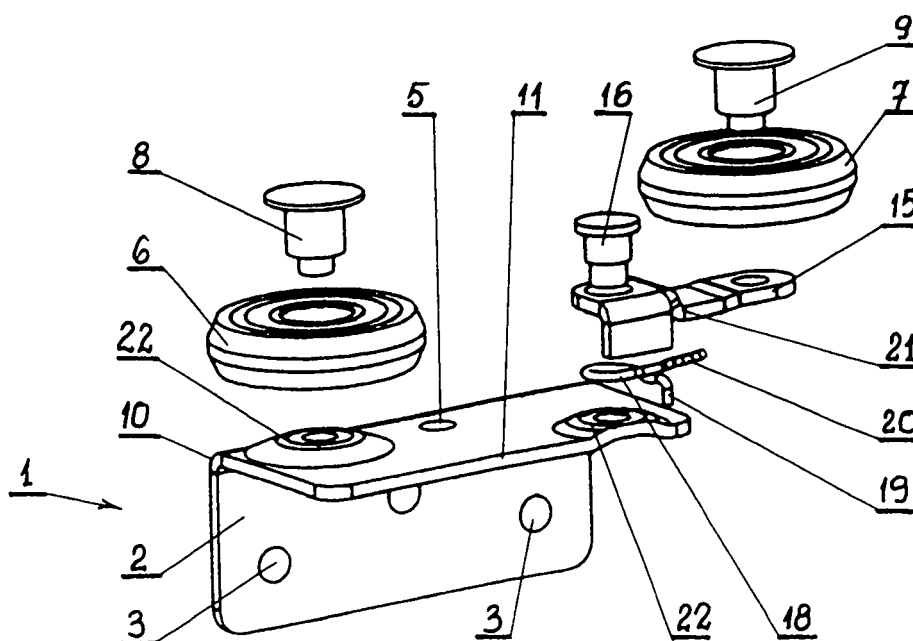
(72) Inventor: **Dolny, Grzegorz**  
**80-171 Gdansk (PL)**

(74) Representative: **Czabajski, Jacek**  
**TRASET**  
**Rzecznicy Patentowi Sp.p**  
**Ul. Piecewska 27**  
**80-288 Gdansk (PL)**

(54) **Sliding door upper guide**

(57) Sliding door upper guide comprises a body (1) in the form of an angle section. To a horizontal arm (4) of the body (1) two rollers (6, 7) are attached. The contour of the outer circumference of both rollers (6, 7) extends beyond the contour of the body arms (2, 4). The rotation axis (9) of the roller (7) is fixed to the horizontal body (1) arm (4) by means of a tilting arm (15). The tilting arm (15)

is fixed on its own axis (16), where an extreme arrangement of the tilting arm (15) is fixed by means of a spring (18). The tilting arm (15) comprises a shaped limiter (17) of the extreme position. The limiter (17) of the extreme position is in the form of a catch of the tilting arm (15), resting on the edge (11) of the horizontal body (1) arm (4).



**Fig. 7**

## Description

**[0001]** The present invention relates to an sliding door upper guide. The invention is particularly suitable for furniture sliding door systems.

**[0002]** A guide is a member guiding and stabilising the track of a sliding door. A sliding door contains one or more sliding leaves. The term door leaf should be understood as a board which can be slid, covering or uncovering access to a room in a civil structure, or to the inside of furniture. The main task of an upper guide usually containing two rollers is to stabilise the track of a door leaf in a plane perpendicular to the plane of the sliding door leaf. Upper guide rollers cooperate with the interior of an upper rail guiding a door leaf. Typically, an upper guide is not intended to hold the weight of a door leaf. The weight of a door leaf is usually carried by a bottom carriage cooperating with a bottom support rail, or in other embodiments, by an upper carriage by means of which a door leaf is hung with its weight on an upper support rail. Therefore, the upper guide of the present invention protects a sliding door leaf from transverse vibrations.

**[0003]** There are a number of known design solutions of an upper guide of a sliding door. Sliding door leaves are mounted in an upper guideline and a bottom guideline extending parallel to each other, where the guidelines are double, which makes that an inner leaf and an outer leaf of the door pass each other during opening and closing. Guidelines have the shape of sections with a cross-section similar to a channel section.

**[0004]** An upper horizontal edge of a sliding door is guided in the described guideline which guiding channel is intended for cooperation with an upper guide of one door leaf. A guide stabilises a sliding door leaf.

**[0005]** In these known solutions an sliding door upper guide usually comprises a flat perpendicular to the main plane of a door leaf, containing at least one roller on a vertical rotation axis. A flat is fixed on an upper edge of a door leaf. In a number of known solutions of this type, a known guide comprises two rollers with vertical rotation axes. The spacing of the rollers, with vertical rotation axes, corresponds to the width of a guiding channel of an upper guideline of a sliding door leaf. The rollers cooperate with internal vertical surfaces of the guideline walls and when the door is slid they prevent tilting of a door leaf. However, permanently fixed rollers, to be able to freely move on said guideline tracks, must have a proper clearance between the rollers tracks and the cooperating guideline walls. In some cases this clearance causes an undesirable effect of wobbling of a sliding door. When sliding a door synchronous vibrations of a door leaf may occur with amplitude equal to the size of the clearance between a guide roller and an internal surface of a guiding track.

**[0006]** A known solution of a guide with two rollers, one of which is pressed to one of the guideline tracks is described in international application specification WO 99/63190. In this known solution a guide comprises a

housing fixed on an upper edge in which a vertical axle is arranged on which one roller contacting one of the inner walls of an upper guideline is pivotally mounted. The upper guide, according to this known solution, comprises, arranged in the housing, a resilient vertical torsion member containing a vertical torsion elongated bar. The lower end of the bar is attached to the housing. Extending from the axle, resiliently moved horizontal arm, fixed with one end to an upper end of the resilient elongated bar, and a vertical another axle adjacent to the other end of the arm, contains another roller mounted rotatably on another axle. Said another roller contacts the opposite inner wall of the guideline.

**[0007]** In another solution known from US patent specification No. US 5,349,783, a twin wheel guide for a sliding door leaf is disclosed. A support assembly for a sliding door leaf, according to this known solution, includes an elongated track with an inverted U-shaped cross-section. An upper wheel guide rides in this track. A wheel guide includes a mounting member and a body member of inverted L-shaped configuration. The vertical wall of the body member is secured to a door leaf, whereas the horizontal wall is secured to the upper edge of the sliding door leaf and extends horizontally above the door. A pair of wheels is rotatably mounted on the horizontal wall. Peripheral portions of both wheels extend beyond the contour of the opposite extreme edges of the horizontal wall. The axes of the wheels are oriented on an imaginary line extending at an angle of at least 30° to the main axis of the horizontal wall of the guide. Circumferential edges of the wheels rotatably contact the inner vertical walls of the track.

**[0008]** Another known solution of a sliding door guide is disclosed in US patent specification No. US 4,722,150. According to this known solution, a guide comprises a slider guiding the upper edge of a sliding door leaf in an upper guide channel. The slider comprises spaced cheeks between which extends a rib from one side which connects the cheeks on one side. On the other side of the cheeks there is a flexible tongue mounted between the cheeks which free edge is pressed to contact with the other inner wall of the guide channel. In another embodiment the upper guide has a pair of wheels whose rims cooperate with inner walls of the upper guide channel of the sliding door leaf. The wheels have a conical section, whereas one of the wheels is inverted to the other. The circumferential rim of one wheel is at a higher elevation than the circumferential rim of the other wheel. Both wheels are made of a material that is to some extent flexible and susceptible to pressure. In the embodiment, substantially conical wheels are inverted relative to each other.

**[0009]** The object of the invention is described in claim 1 and in the subsequent claims.

**[0010]** According to the invention, an sliding door upper guide comprises a body in the form of an angle section. A vertical arm of the body is fixed to a vertical plane of a sliding door leaf, whereas a horizontal arm of the body

rests with its inner surface on an upper edge of the sliding door leaf. The horizontal arm can be additionally fixed to the surface of an upper edge of the sliding door leaf. To said horizontal body arm of the guide two rollers on vertical rotation axes are attached. The contour of the outer circumference of the first roller extends beyond the edge of contact of the body arms from one side of the edge of the door leaf, and the contour of the outer circumference of the second roller extends beyond the opposite edge of the horizontal body arm from the other side of the edge of the sliding door leaf. As a result of the extension of both rollers, the rollers cooperate with the interior of the rail in the upper guideline, and not upper parts of the surface of the sliding door leaf.

**[0011]** The solution according to the invention is characterised in that the rotation axis of at least one roller is fixed to the horizontal body arm by means of an arm tiltingly fixed on its own axis to the horizontal body arm. An extreme arrangement of said tilting arm is fixed by a spring.

**[0012]** The spring in the solution according to the invention is preferably mounted on the axis of the tilting arm. One catch of said spring is coupled with the horizontal arm of the guide body, whereas the other catch of the spring is coupled with said tilting arm. The term coupling in this patent specification should be understood as resting the end spring member referred to as a catch on the edge of the member or threading the catch through an opening in the member or connecting the catch with the respective member in a different way.

**[0013]** In a preferred embodiment of the solution according to the invention, one spring catch rests on the edge of the horizontal body arm, and the other spring catch rests on the edge of the tilting arm.

**[0014]** Another advantageous feature of the solution according to the invention is a circumferential extrusion in the horizontal body arm around the clamping of the tilting arm axis.

**[0015]** As another preferred embodiment of the invention a similar circumferential extrusion is proposed in the horizontal body arm around the clamping of the first roller axis.

**[0016]** The solution of the upper guide according to the invention makes it possible to obtain constant tension of the rollers adjacent with their circumference to inner walls of the upper guideline rail. This makes it possible to obtain complete stabilisation in a direction perpendicular to the surface of a sliding door leaf when the leaf moves. At the same time, owing to the proposed solution an additional effect is obtained involving preventing the uncontrolled tilting of the roller when the guide is pulled out from the interior of rail in the upper guideline. This makes that it is easier to put the leaf with the upper guide in the interior of the rail in the upper guideline after finishing maintenance or repair work. In addition, the manufacturing cost of the upper guide is reduced.

**[0017]** The object of the invention is shown in an embodiment in the accompanying drawings where subse-

quent figures show:

- Fig. 1 - a view of the guide perpendicular to the axes of the rollers.
- Fig. 2 - a view of the guide consistent with the direction of the axes of the rollers.
- Fig. 3 - an E-E section of the guide shown in Fig. 2.
- Fig. 4 - a view of the guide inside an upper guideline of a sliding door leaf from the bottom, in a direction consistent with a direction of the axes of the rollers.
- Fig. 5 - a view, according to Fig. 4, in a direction perpendicular to the axes of the rollers.
- Fig. 6 - a perspective view of the guide.
- Fig. 7 - a view of the guide, according to Fig. 6, shown with scattered parts.

**[0018]** An sliding door upper guide comprises a body 1 in the form of an angle section. The body 1 is shown in Fig. 7. A vertical arm 2 of the body 1 is fixed in a known manner to a vertical plane of a sliding door leaf 23. In this embodiment the vertical arm 2 of the body 1 is fixed by means of screws using openings 3 shown in Fig. 1 and Fig. 7.

**[0019]** A horizontal arm 3 of the body 1 rests with its inner surface on an upper edge of the sliding door leaf. The horizontal arm 3 can be additionally fixed to the surface of the upper edge of the sliding door leaf 23 with a screw using an opening 5. The said horizontal body 1 arm 4 of the guide two rollers 6, 7 on vertical rotation axes 8, 9 are attached. This is shown in Fig. 7. The contour of the outer circumference of the first roller 6 extends beyond the edge of contact of the body 1 arms 10 from one side of the edge of the door leaf 23, whereas the contour of the outer circumference of the second roller 7 extends beyond the opposite edge 11 of the horizontal body 1 arm 4 from the other side of the edge of the sliding door leaf 23. As a result of the extension of both rollers 6, 7 beyond the edges 10, 11 of the horizontal body 1 arm 4, the rollers 6, 7 cooperate with the interior of the upper guideline 12 rail 13, and not upper parts of the surface of the sliding door leaf 23. This is shown in Fig. 4 and Fig. 5. These figures show the upper guideline 12 stabilising the upper edge of the sliding door leaf 23. In the embodiment shown in the accompanying figures, the upper guideline 12 in Fig. 4 and Fig. 5 comprises in one body two parallel inner guideline rails 13, 14. The figures show the upper guide, according to the invention, of one sliding door leaf 23 in the guideline rail 13, while the other guideline rail 14 is free and can carry the upper guide of the other sliding door leaf. This is shown in Fig. 5. In other embodiments the upper guideline 12 can contain only one guideline rail 13 or more than two guideline rails for more than two sliding door leaves.

**[0020]** The rollers 6, 7 are mounted in the upper guide of the invention on vertical axes 8, 9. The rotation axis 8 of the roller 6 is mounted in the horizontal body 1 arm 4, near the edge of contact of the vertical arm 2 with the

horizontal arm 4, near one end of the guide body 1.

[0021] However, the rotation axis 9 of the second roller 7 is fixed to the horizontal body arm 4 by means of a tilting arm 15. The tilting arm 15 containing on a free end the axis 9 with the roller 7, is mounted on its own axis 16 to the horizontal arm 4 near the other end of the guide body 1. This is shown in Fig. 1, Fig. 2, Fig. 4, Fig. 6 and Fig. 7. In other embodiments the spacing of these rollers with respect to the horizontal body 1 arm 4 can be different.

[0022] The tilting roller 7 arm 15 comprises a shaped limiter 17 of the extreme position of said tilting arm 15. In the embodiment shown in the accompanying figures, particularly in Fig. 6 and Fig. 7, the limiter 17 of the extreme position of the tilting arm 15 has the form of a catch cooperating with the edge 11 of the horizontal body 1 arm 4. The limiter 17 prevents the arm 15 from full rotation under the pressure of a spring 18, when the sliding door leaf 23 together with the guide of the invention is removed from the interior of the upper guideline 12 rail 13.

[0023] Said tilting arm 15 is extremely tilted under the pressure of a spring 18.

[0024] The spring 18 in this embodiment of the guide of the invention is mounted on a tilting roller 7 arm 15 axis 16 between the arm 15 and the horizontal body 1 arm 4 of the guide. Under the pressure of the spring 18 the tilting arm 15 with the roller 7 is extremely tilted, limited by the limiter 17. In order for the spring 18 to fulfil its role, one catch 19 of said spring 18 in this embodiment rests on the edge 11 of the horizontal body 1 arm 4 of the guide. On the other end of the spring 18 the other catch 20 is formed in this embodiment which is in the form of a straight end section of the spring 18. This is shown in Fig. 7. As shown in this figure, the tilting arm 15 at the base has a formed offset 21 under which during installation of the guide the other catch 20 is fixed in the form of a straight end section of the spring 18. This is also shown in Fig. 1. Initial tension of both catches 19, 20 during installation of the guide makes it possible to obtain constant tension of the tilting arm 15.

[0025] In the upper guide of the invention, before inserting it to the upper guideline 12 rail 13, the outer distance between the rollers 6, 7 defined in Fig. 2 as  $a_1$  is bigger than the distance defined in Fig. 4 as  $a_2$  between side walls of the upper guideline 12 rail 13. After inserting the upper guide mounted on the upper edge of the sliding door leaf 23 to the guideline 12 rail 13, said distance  $a_1$  is decreased to the distance  $a_2$  by tilting the tilting arm 15, and the tension of the spring 18 is increased, which leads to full stabilisation of the upper edge of the sliding door leaf 23. This is shown in drawings Fig. 4 and Fig. 5.

[0026] The accompanying Fig. 4, Fig. 6 and Fig. 7 show that in this embodiment, around the tilting arm 15 axis 16 and around the roller 6 axis 8, circumferential extrusions 22 are profiled in the horizontal body 1 arm 4 of the guide.

#### List of designations in the figures

#### [0027]

1. Body.
2. Vertical body arm.
3. Opening in vertical body arm.
4. Horizontal body arm.
5. Opening in horizontal body arm.
6. First roller.
7. Second roller.
8. First roller axis.
9. Second roller axis.
10. Edge of contact of body arms.
11. Opposite edge of horizontal body arm.
12. Upper guideline.
13. Guideline rail.
14. Guideline rail.
15. Tilting roller arm.
16. Tilting roller arm axis.
17. Tilting roller arm limiter.
18. Spring.
19. Spring catch.
20. Spring catch.
21. Offset
22. Circumferential extrusion.
23. Sliding door leaf.

#### 30 Claims

1. Sliding door upper guide comprising a body in the form of an angle section, where a vertical arm of the body is fixed to a vertical plane of a sliding door leaf, whereas a horizontal arm of the body rests on an upper edge of the sliding door leaf, whereas to the horizontal body arm two rollers on vertical rotation axes are attached, where the contour of the outer circumference of the first roller extends beyond the edge of contact of the body arms, whereas the contour of the outer circumference of the second roller extends beyond the opposite edge of the horizontal body arm, **characterised in that** the vertical rotation axis (9) of at least one roller (7) is fixed to the horizontal body (1) arm (4) by means of a tilting arm (15) fixed on its own axis (16) to the horizontal body (1) arm (4), where an extreme arrangement of the tilting arm (15) is fixed by means of a spring (18).
2. Sliding door upper guide, according to claim 1, **characterised in that** the tilting arm (15) comprises a shaped limiter (17) of the extreme position.
3. Sliding door upper guide, according to claim 2, **characterised in that** the limiter (17) of the extreme position is in the form of a catch of the tilting arm (15), resting on the edge of the horizontal body (1) arm (4).

4. Sliding door upper guide, according to claim 1, **characterised in that** the spring (18) is mounted on the axis (16) of the tilting arm (15), where one spring (18) catch (19) is coupled with the horizontal body (1) arm (4), and the other spring (18) catch (20) is coupled with the tilting arm (15). 5
5. Sliding door upper guide, according to claim 4, **characterised in that** one spring (18) catch (19) rests on the edge of the horizontal body (1) arm (4), whereas the other spring (18) catch (20) is fixed in an offset (21) under the tilting arm (15). 10
6. Sliding door upper guide, according to one of the claims from 1 to 5, **characterised in that** around the tilting arm (15) axis (16), in the horizontal body (1) arm (4) there is a circumferential extrusion (22). 15
7. Sliding door upper guide, according to one of the claims from 1 to 6, **characterised in that** around the first roller (6) axis (8), in the horizontal body (1) arm (4) there is a circumferential extrusion (22). 20

25

30

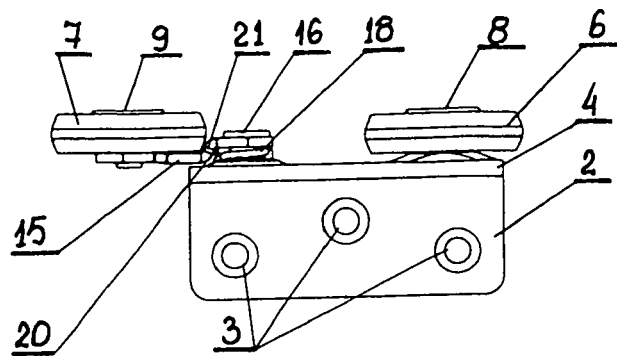
35

40

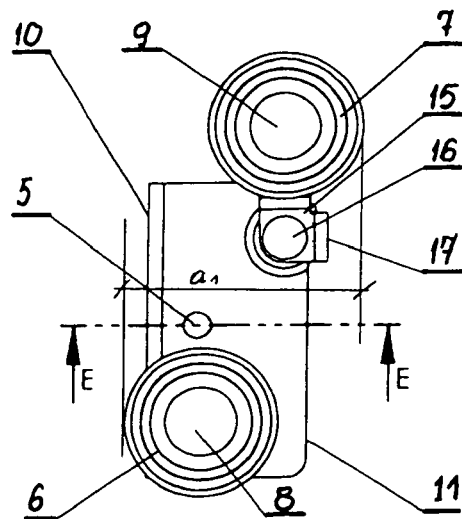
45

50

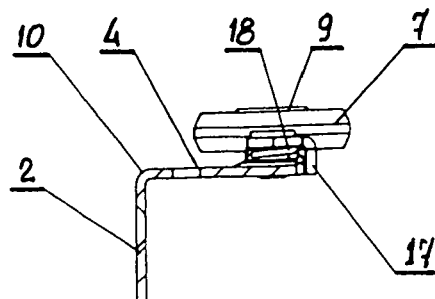
55



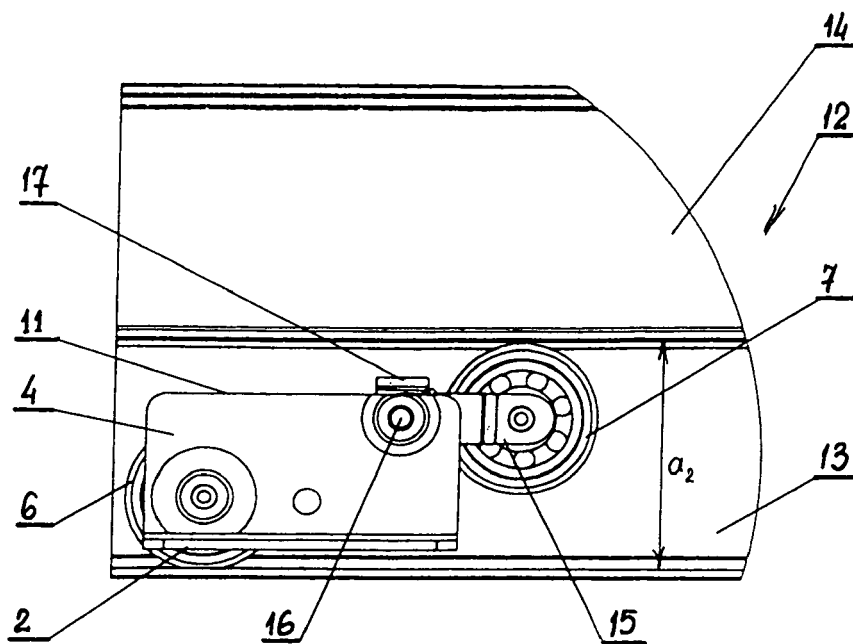
**Fig. 1**



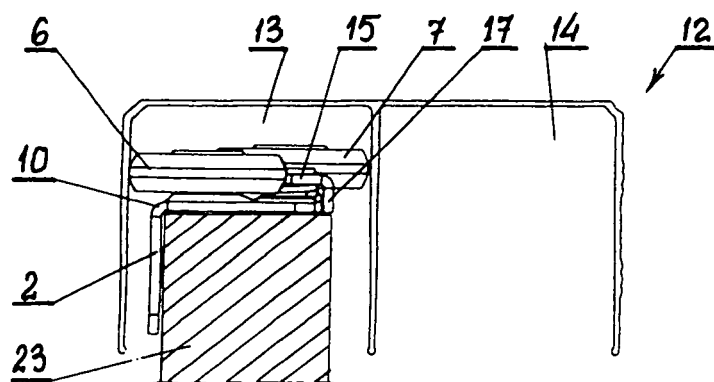
**Fig. 2**



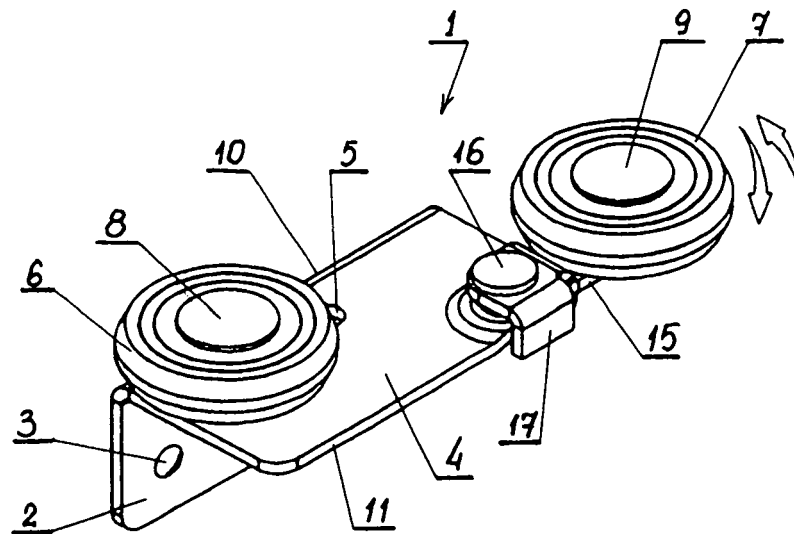
**Fig. 3**



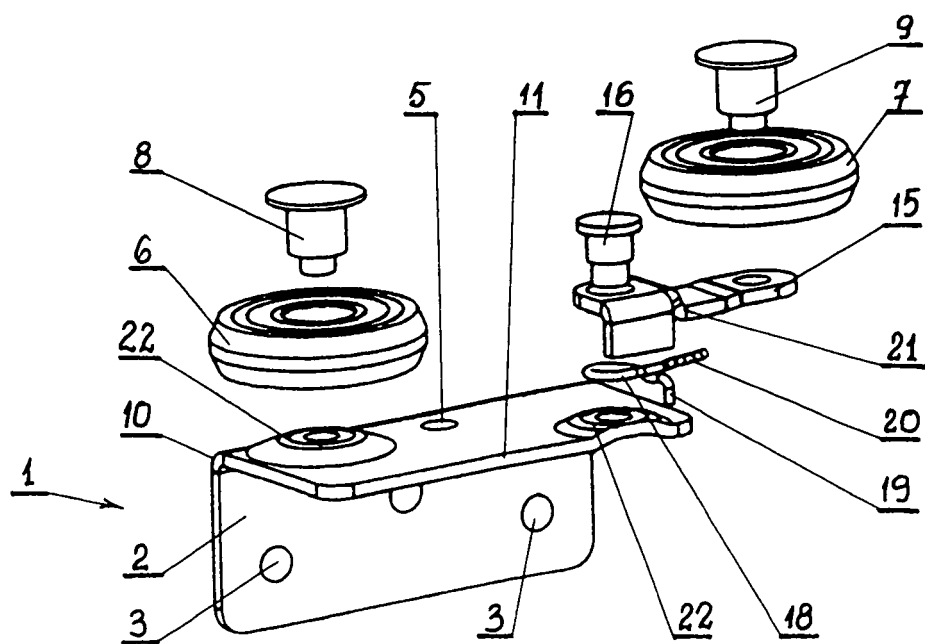
**Fig. 4**



**Fig. 5**



**Fig. 6**



**Fig. 7**



## EUROPEAN SEARCH REPORT

Application Number  
EP 14 46 0012

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 2 650 387 A (FOSS DONALD D)<br>1 September 1953 (1953-09-01)                                                                        | 1,6,7                                            | INV.<br>E05D15/06                       |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | * column 2, line 48 - column 4, line 2 *<br>* figures 1-3 *                                                                            | 2-5                                              |                                         |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | DE 10 2006 054924 A1 (DAIMLER AG [DE])<br>29 May 2008 (2008-05-29)                                                                     | 1                                                |                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | * paragraphs [0006], [0020], [0023] *<br>* figures 1,3 *                                                                               | 2-7                                              |                                         |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | DE 736 966 C (FRITZ BERGMANN)<br>2 July 1943 (1943-07-02)<br>* the whole document *                                                    | 2,3                                              |                                         |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | GB 659 625 A (BECKETT LAYCOCK & WATKINSON)<br>24 October 1951 (1951-10-24)<br>* page 2, line 63 - page 2, line 39 *<br>* figures 3,4 * | 4,5                                              |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                        |                                                  | TECHNICAL FIELDS SEARCHED (IPC)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                        |                                                  | E05D<br>E05F                            |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                        |                                                  |                                         |
| Place of search<br>The Hague                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                        | Date of completion of the search<br>18 June 2014 | Examiner<br>Klemke, Beate               |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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/>&amp; : member of the same patent family, corresponding document</p> |                                                                                                                                        |                                                  |                                         |

 1  
EPO FORM 1503 03.82 (P04C01)

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

EP 14 46 0012

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.

18-06-2014

10

| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|----|---------------------|----------------------------|---------------------|
| US 2650387                                | A  | 01-09-1953          | NONE                       |                     |
| -----                                     |    |                     |                            |                     |
| DE 102006054924                           | A1 | 29-05-2008          | NONE                       |                     |
| -----                                     |    |                     |                            |                     |
| DE 736966                                 | C  | 02-07-1943          | NONE                       |                     |
| -----                                     |    |                     |                            |                     |
| GB 659625                                 | A  | 24-10-1951          | NONE                       |                     |
| -----                                     |    |                     |                            |                     |

15

20

25

30

35

40

45

50

55

EPO FORM P0459

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

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- WO 9963190 A [0006]
- US 5349783 A [0007]
- US 4722150 A [0008]