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(54) Tensioning device for tensioning cords of a screen, and screen provided with this tensioning device

(57) The invention relates to a tensioning device for tensioning a cord of a screen, such as a window covering, wherein the screen comprises at least one rail (R) and wherein the tensioning device comprises at least one tension spring (2) and at least one limiting element for limiting the extension of the at least one tension spring (2), and wherein the tensioning device comprises two co-acting housing parts (3, 4), wherein a first outer end (2-A) and a second outer end (2-B) of the tension spring (2) are connected to respectively the first (3) housing part and the second housing part (4), wherein the first housing part (3) comprises first cord engaging means (5) for engaging the cord and the housing parts (3, 4) are slidable apart counter to the action of the spring (2) force of the at least one tension spring (2), and each limiting element comprises two co-acting limiting element parts, wherein each housing part (3, 4) comprises one of the limiting element parts of each limiting element and the limiting element parts are configured to limit the movement of the housing parts (3,4) .

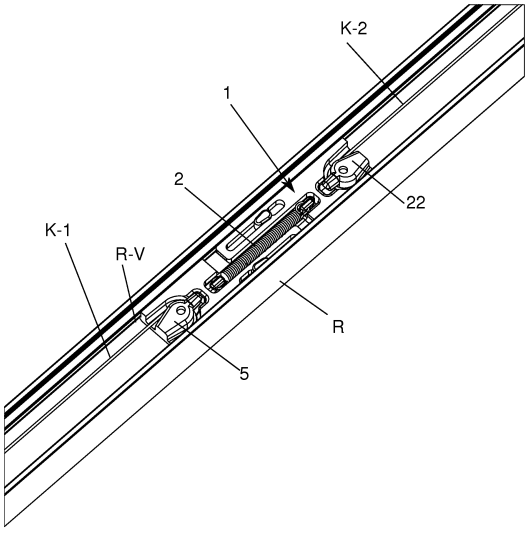

FIG. 4

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Description

[0001] The invention relates to a tensioning device for tensioning a first cord of a screen, such as a window covering, wherein the screen comprises at least one rail provided with a profile and wherein the tensioning device comprises at least one tension spring and at least one limiting element for limiting the extension of the at least one tension spring, and wherein the tensioning device comprises two co-acting housing parts, wherein a first outer end and a second outer end of the tension spring are connected to respectively the first housing part and the second housing part, wherein the first housing part comprises first cord engaging means for engaging the cord and the housing parts are slidable apart counter to the action of the spring force of the at least one tension spring, and each limiting element comprises two co-acting limiting element parts, wherein each housing part comprises one of the limiting element parts of each limiting element and the limiting element parts are configured to limit the movement of the housing parts.

[0002] A tensioning device according to the preamble is known in the field. The known tensioning device was published in 2013 in the brochure "Absolute pleated blind" of applicant, page 19, article number PLC20-17, "Tension spring". The known tensioning device has the drawback that the tensioning device is not suitable for tensioning two cords on either side of the tensioning device. The two housing parts co-act by being coupled to each other.

[0003] A tensioning device which is suitable for this purpose is described in the European patent EP 1526245. This other tensioning device has the drawback however that the tension spring comprises the limiting element, whereby the known tensioning device cannot make use of a standard tension spring. In the tensioning device according to EP 1526245 the cords have to be tied directly to the tension spring with integrated limiting element.

[0004] Because the tension spring comprises the limiting element, the limiting element may break off at the connection to the tension spring in the case of repeated use thereof.

[0005] It has additionally been found in practice that mounting of the other known tensioning device is time-consuming.

[0006] The invention has for its object to provide a tensioning device which is suitable for tensioning two cords on either side of the tensioning device and which does not have the above stated drawbacks.

[0007] The invention provides for this purpose a tensioning device according to the preamble characterized in that the second housing part comprises second cord engaging means for engaging a second cord.

[0008] The tensioning device according to the invention need not be fixed but can be mounted in freely movable manner in the screen, whereby cord length difference can be easily corrected. The tensioning device is hereby very suitable for application in screens intended for the DIY market, since the necessary attachment of the cords of the screen can take place less precisely.

[0009] Both housing parts are preferably configured to be received slidably in the at least one rail of the screen. Because both housing parts are slidably received, the inventive tensioning device can move freely in the rail.

[0010] In order to realize the slidable reception in economic manner the two housing parts are preferably provided on either side with a peripheral edge which is configured for co-action with the profile of the rail.

[0011] In the tensioning device according to the invention a first outer end and a second outer end of the tension spring are preferably connected to respectively the first housing part and the second housing part. Through these measures the pulling force of the tension spring is transmitted directly to the housing parts.

[0012] In a preferred embodiment of the tensioning device according to the invention the first limiting element part and the second limiting element part comprise a first slot and a first cam, wherein the first slot and the first cam are configured for co-action. The first slot runs here in longitudinal direction of the tensioning device. During sliding of the two housing parts relative to each other the first cam slides in the first slot. Through said measures the extension of the tension spring is thus limited by the position of the first slot on the housing parts and the length of the first slot.

[0013] In this preferred embodiment each limiting element is controllable during operation via an open side of the rail, whereby both housing parts can be coupled and uncoupled when the inventive tensioning device is placed in the rail.

[0014] In the preferred embodiment of the tensioning device according to the invention the first housing part preferably comprises a first protrusion in which the first slot is arranged, and the second housing part a first protrusion on which the first cam is arranged. The first protrusions of the two housing parts point toward each other here, wherein parts thereof are adjacent and/or overlapping. The length of the tensioning device can remain limited as a result of these measures.

[0015] In a sturdy embodiment of the preferred embodiment of the tensioning device according to the invention the first limiting element part and the second limiting element part preferably comprise a second slot and a second cam, wherein the second slot and the second cam are configured for co-action. Just as in the case of the first slot, the second slot also runs here in longitudinal direction of the tensioning device. During sliding of the two housing parts relative to each other the second cam slides in the second slot. In the same way as in the case of the first slot and first cam, the extension of the tension spring is limited as a result of these measures by the position of the second slot on the housing parts and the length of the second slot.

[0016] In the preferred embodiment of the tensioning device according to the invention it is recommended here

that the first housing part also comprises a second protrusion on which the second cam is arranged, and that the second housing part comprises a second protrusion in which the second slot is arranged.

[0017] For application of the inventive tensioning device in a rail of the screen the tensioning device according to the invention can preferably be applied in a screen with at least one rail, and at least one housing part is configured here to be received and to slide in the at least one rail. The at least one housing part is preferably configured here for co-action with the at least one rail such that, after being received in the at least one rail, the at least one housing part can slide only in longitudinal direction of the rail.

[0018] The inventive tensioning device preferably comprises two limiting elements which are the same and arranged mirror-symmetrically in the first and second housing parts. The engaging forces of the two limiting parts are hereby distributed in balanced manner.

[0019] For economic reasons and in order to prevent confusion during assembly of the screen, the first and the second housing part are identical in the tensioning device according to the invention.

[0020] The first and the second housing part are here preferably manufactured from one material, in particular from plastic, using known forming techniques such as injection moulding.

[0021] The height of the inventive tensioning device is preferably such that it is possible during operation of the screen, after placing of the tensioning device in the rail, for other cords which are not connected to the tensioning device to pass over the tensioning device.

[0022] Depending on the type of screen, other resilient properties can be imparted to the tensioning device by applying a different spring, by increasing the stroke length of the spring or by applying a plurality of springs.

[0023] The invention also relates to a screen provided with one or more tensioning devices according to the invention. The invention relates particularly to a screen comprising at least one rail in which one or more tensioning devices according to the invention are slidably received.

[0024] The invention will be further elucidated with reference to the following figures, in which:

Figure 1 shows an isometric view of the known tensioning device;

Figure 2 shows an isometric view of the preferred embodiment of the tensioning device according to the invention;

Figure 3 shows an exploded view of the tensioning device according to Figure 2;

Figure 4 shows an isometric view of the preferred embodiment of the tensioning device according to Figure 2 applied in a rail of a screen, wherein the cords of the screen are slightly tensioned by the tensioning device;

Figure 5 shows an isometric view of the preferred embodiment of the tensioning device according to Figure 2 applied in a rail of a screen, wherein the cords of the screen are tensioned by the tensioning device; and

Figure 6 shows schematically a cord diagram for a screen with two rails, wherein both rails are provided with the inventive tensioning device.

[0025] The same components are designated in different figures with the same numerals.

[0026] Figure 1 shows an isometric view of the known tensioning device B. Tensioning device B comprises one tension spring B-2. The limiting element for limiting the extension of tension spring B-2 is arranged on the two co-acting housing parts B-3; B-4. Only housing part B-3 comprises the first means B-5 for engaging a cord K-1 (not drawn) of a screen. Housing parts B-3; B-4 are slidable relative to each other counter to the action of the spring force of tension spring B-2. A first outer end and a second outer end of tension spring B-2 are connected to respectively first housing part B-3 and second housing part B-4. Tensioning device B is mountable by means of connecting part B-6 in a hole intended for the purpose in a rail of the screen.

[0027] Figure 2 shows an isometric view of the preferred embodiment of tensioning device 1 according to the invention. Tensioning device 1 comprises one tension spring 2. The limiting element for limiting the extension of tension spring 2 is arranged on the two co-acting housing parts 3; 4. The two housing parts 3; 4 comprise first 5 and second cord engaging means 22 for engaging a cord K-1; K-2 of a screen. In the shown preferred embodiment the cord engaging means 5 and 22 are each configured as re-routing member for the respective cord.

[0028] Housing parts 3; 4 are slidable relative to each other counter to the action of the spring force of tension spring 2. A first outer end 2-A and a second outer end 2-B of tension spring 2 are connected to respectively the first housing part 3 and second housing part 4.

[0029] Figure 3 shows an exploded view of tensioning device 1 according to Figure 2. It is noted that housing parts 3; 4 are of identical form. On housing part 3 the limiting elements are formed by a first slot 6 on protrusion 8 and a second cam 11 on protrusion 12. On housing part 4 the limiting elements are formed by a second slot 10 on protrusion 13 and a first cam 7 on protrusion 9. For mounting of spring 2 on tensioning device 1 the first cam 7 and second cam 11 can be arranged in respectively first slot 6 and second slot 10 via openings 19; 20, which are each arranged on an outer end of slots 6; 10. Both cams 7; 11 are provided with a peripheral edge which confines first cam 7 in first slot 6 and confines second cam 11 in second slot 10. It will be apparent to the skilled person that cams 7; 11 and slots 6; 10 limit the movement of housing parts 3; 4 and thereby function as limiting element for spring 2.

[0030] First housing part 3 is provided with a peripheral edge 16; 18. Second housing part 4 is also provided with

a peripheral edge 17 and a peripheral edge on the opposite side. These peripheral edges are intended for co-action with a recess in a rail of a screen. Tensioning device 1 can hereby be slid, preferably in assembled state (Figure 2), via a side of the rail into the rail. Rail R forms a guide for housing parts 3, 4.

[0031] Metal inserts 21 can be pushed into first housing part 3 and second housing part 4 via an underside of first housing part 3 and second housing part 4 for the purpose of strengthening the first 5 and second cord engaging means 22 for engaging a cord K-1; K-2 of a screen.

[0032] Figure 4 shows an isometric view of the preferred embodiment of tensioning device 1 according to Figure 2 applied in a rail R of a screen, wherein cords K-1; K-2 of the screen are slightly tensioned by tensioning device 1. Tensioning device 1 is pushed in assembled state via a side of rail R into the rail, wherein the peripheral edges of tensioning device 1 engage on a recess R-V in rail R. Tensioning device 1 can hereby slide only in the longitudinal direction of rail R. Cords K-1; K-2 are connected to tensioning device 1 by means of first 5 and second cord engaging means 22. Cords K-1; K-2 are not tensioned and spring 2 of tensioning device 1 is consequently not loaded.

[0033] Figure 5 shows an isometric view of the preferred embodiment of tensioning device 1 according to Figure 2 applied in a rail R of a screen, wherein cords K-1; K-2 of the screen are tensioned by tensioning device 1. Cords K-1; K-2 are maximally tensioned by tensioning device 1. The extension of spring 2 is limited in this situation by cams 7; 11 which lie against an outer end of slots 6; 10. By applying tensioning device 1 the spring 2 can be tensioned to only a determined extent. This maximum tension is determined solely by slots 6; 10 and cams 7; 11.

[0034] Figure 6 shows schematically a cord diagram for a screen with two rails R-1; R-2, wherein both rails R-1; R-2 are provided with the inventive tensioning device 1. Cords K-1 and K-2 are connected here to the upper tensioning device 1. Cords K-3 and K-4 are connected here to the lower tensioning device 1. By way of clarification all cords are shown thicker. Both the lower and the upper tensioning device 1 can move freely in rail R-1; R-2.

[0035] The invention is of course not limited to the described and shown preferred embodiment, but extends to any embodiment falling within the scope of protection as defined in the claims and as seen in the light of the foregoing description and accompanying drawings.

[0036] The tensioning device according to the invention is expressly not limited to application in screens with rails, but can also be applied in screens without rails.

Claims

1. Tensioning device (1) for tensioning a first cord (K-1; K-3) of a screen, such as a window covering, wherein the screen comprises at least one rail (R) provided with a profile and wherein the tensioning device comprises at least one tension spring (2) and at least one limiting element for limiting the extension of the at least one tension spring (2), and wherein the tensioning device (1) comprises two co-acting housing parts (3; 4), wherein a first outer end (2-A) and a second outer end (2-B) of the tension spring (2) are connected to respectively the first housing part (3) and the second housing part (4), wherein the first housing part (3) comprises first cord engaging means (5) for engaging the cord (2) and the housing parts (3; 4) are slidable apart counter to the action of the spring force of the at least one tension spring (2), and each limiting element comprises two co-acting limiting element parts, wherein each housing part (3; 4) comprises one of the limiting element parts of each limiting element and the limiting element parts are configured to limit the movement of the housing parts (3; 4), **characterized in that** the second housing part comprises second cord engaging means (22) for engaging a second cord (K-2; K-4).

2. Tensioning device (1) as claimed in claim 1, wherein both housing parts (3; 4) are configured to be received slidably in the at least one rail (R) of the screen.

3. Tensioning device (1) as claimed in claim 2, wherein both housing parts (3; 4) are provided on either side with a peripheral edge (16, 17, 18) which is configured for co-action with the profile of the rail (R).

4. Tensioning device (1) as claimed in claim 1, 2 or 3, wherein the first limiting element part and the second limiting element part comprise a first slot (6) and a first cam (7), wherein the first cam (7) is slidable in the first slot (6).

5. Tensioning device (1) as claimed in claim 4, wherein the first housing part (3) comprises a first protrusion (8) in which the first slot (6) is arranged, and the second housing part (4) comprises a second protrusion (9) on which the first cam (7) is arranged.

6. Tensioning device (1) as claimed in claim 4 or 5, wherein the first limiting element part and the second limiting element part comprise a second slot (10) and a second cam (11), wherein the second cam (11) is slidable in the second slot (10).

7. Tensioning device (1) as claimed in claim 4, 5 or 6, wherein the first housing part (3) comprises a second protrusion (2) on which the second cam (11) is arranged, and the second housing part (4) comprises a second protrusion (13) in which the second slot (10) is arranged.

8. Tensioning device (1) as claimed in any of the foregoing claims, wherein the tensioning device (1) comprises two limiting elements which are the same and arranged mirror-symmetrically in the first (3) and second housing part (4).

9. Tensioning device (1) as claimed in any of the claims 3 to 8, wherein the first (3) and the second housing part (4) are identical.

10. Tensioning device (1) as claimed in any of the foregoing claims, wherein both the first (3) and the second housing part (4) are manufactured from one material.

11. Tensioning device (1) as claimed in claim 10, wherein the first (3) and the second housing part (4) are manufactured using injection moulding.

12. Screen provided with one or more tensioning devices as claimed in any of the foregoing claims.

13. Screen comprising at least one rail (R) in which one or more tensioning devices as claimed in any of the foregoing claims 1-12 are slidably received.

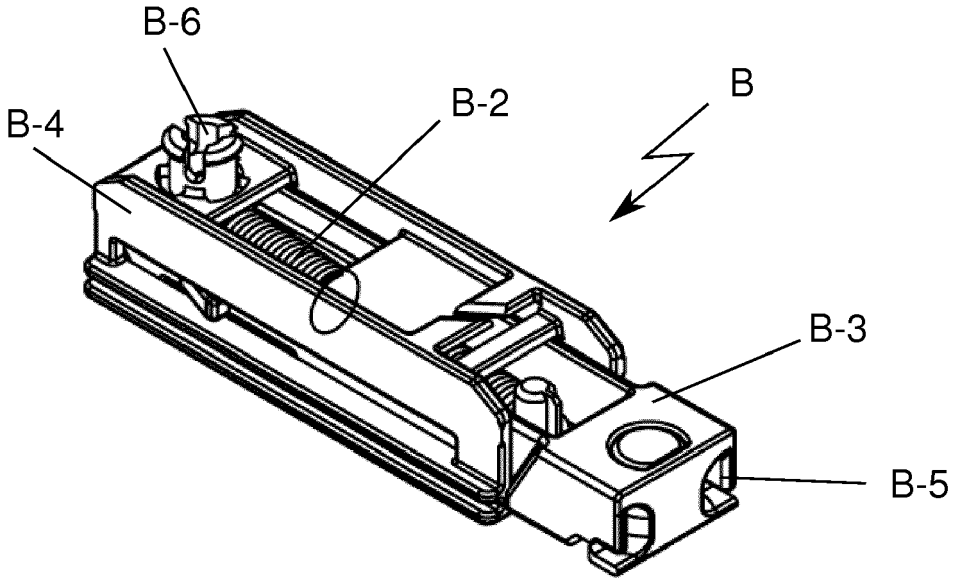

FIG. 1

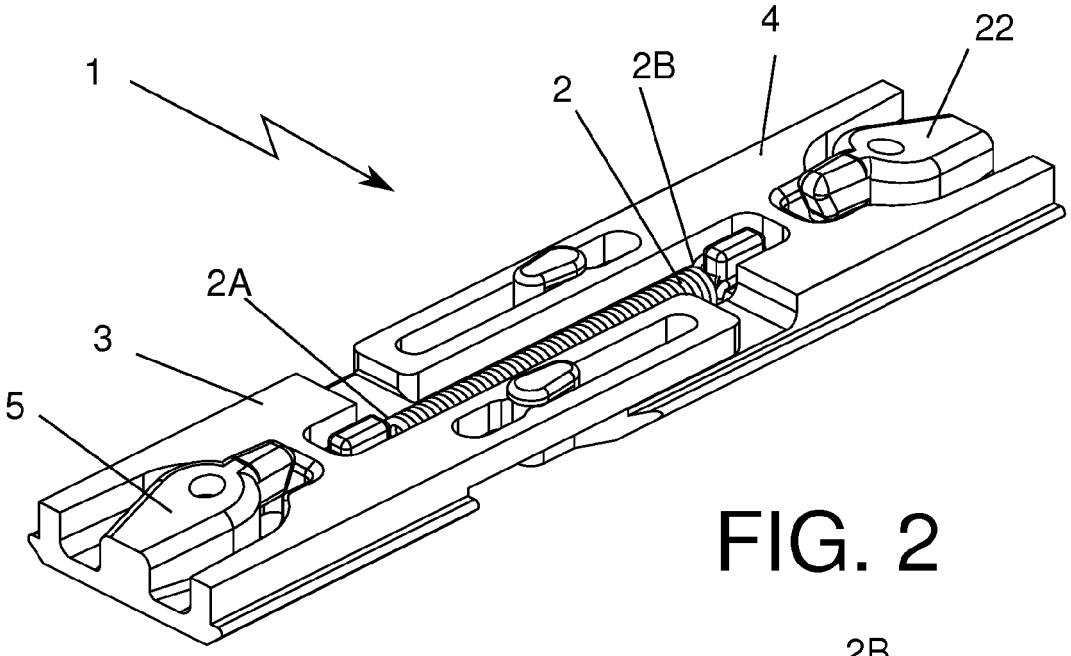
1
2
2B
4
22
2A
3
5

FIG. 2

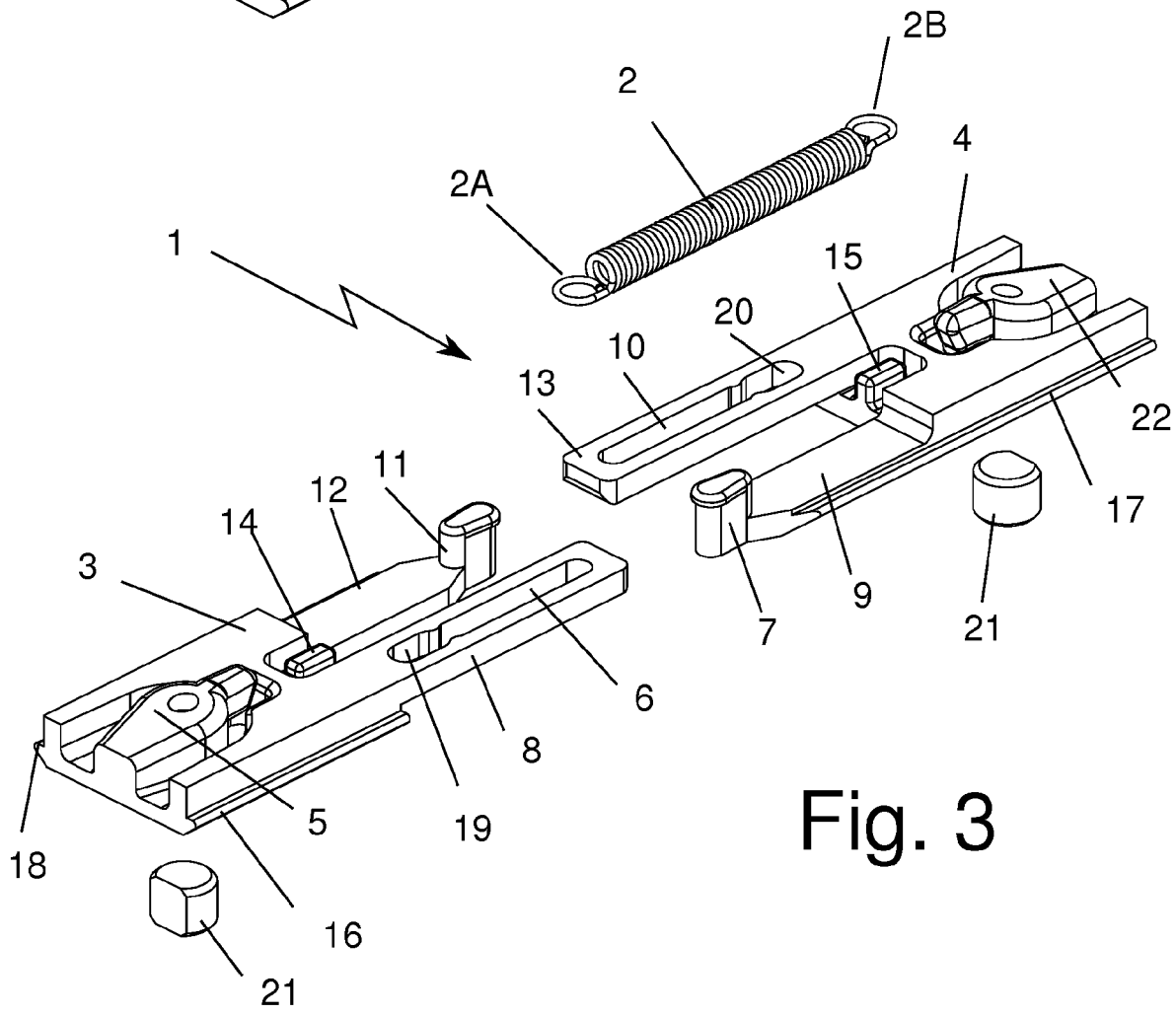
2B
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Fig. 3

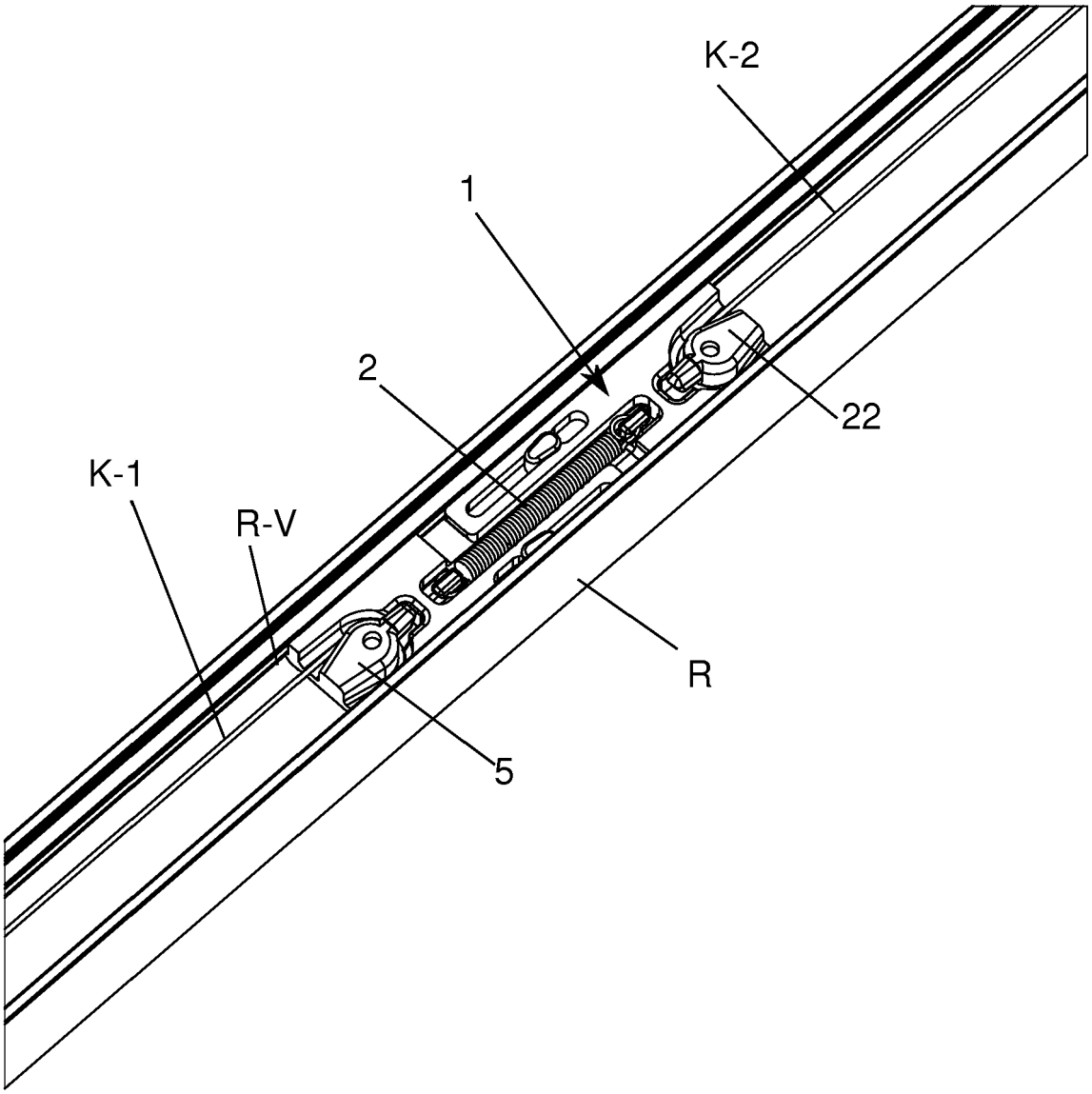

FIG. 4

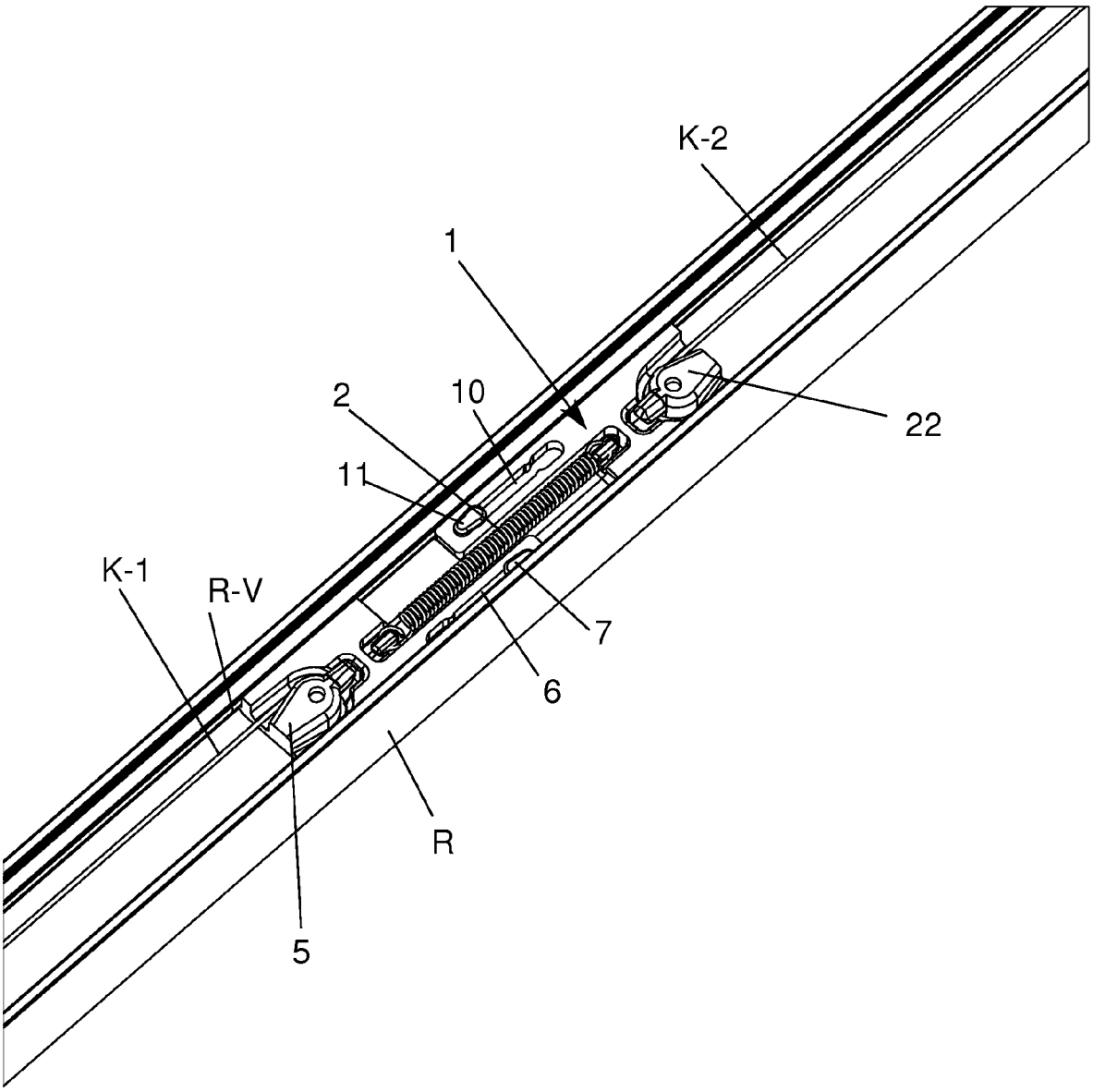

FIG. 5

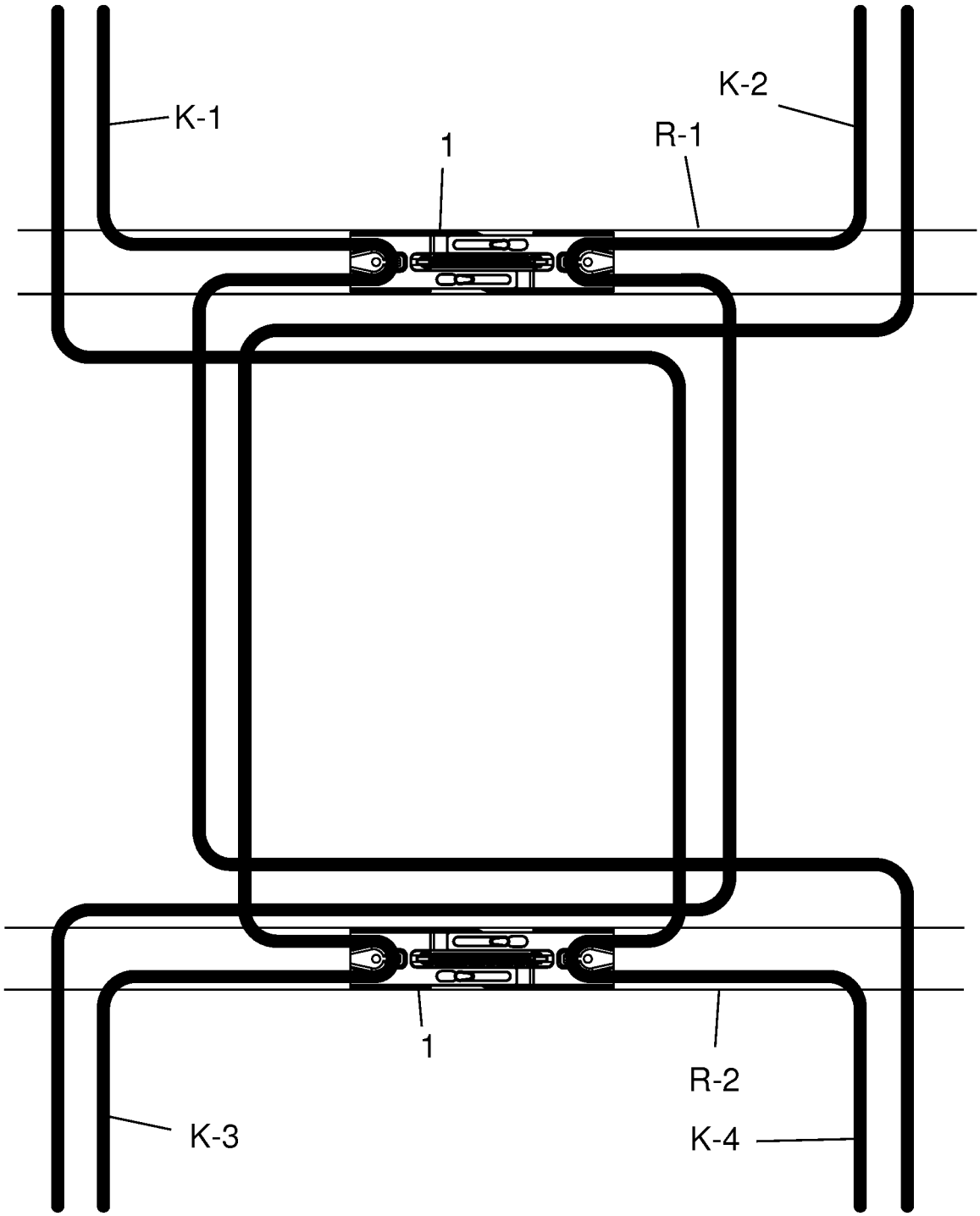

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 15 15 7704

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	EP 1 526 245 A1 (HUNTER DOUGLAS IND BV [NL]) 27 April 2005 (2005-04-27) * paragraph [0012] - paragraph [0015]; figures * -----	1,12,13	INV. E06B9/327 ADD. E06B9/322

TECHNICAL FIELDS SEARCHED (IPC)

E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 July 2015	Peschel, Gerhard

CATEGORY OF CITED DOCUMENTS

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02-07-2015

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

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