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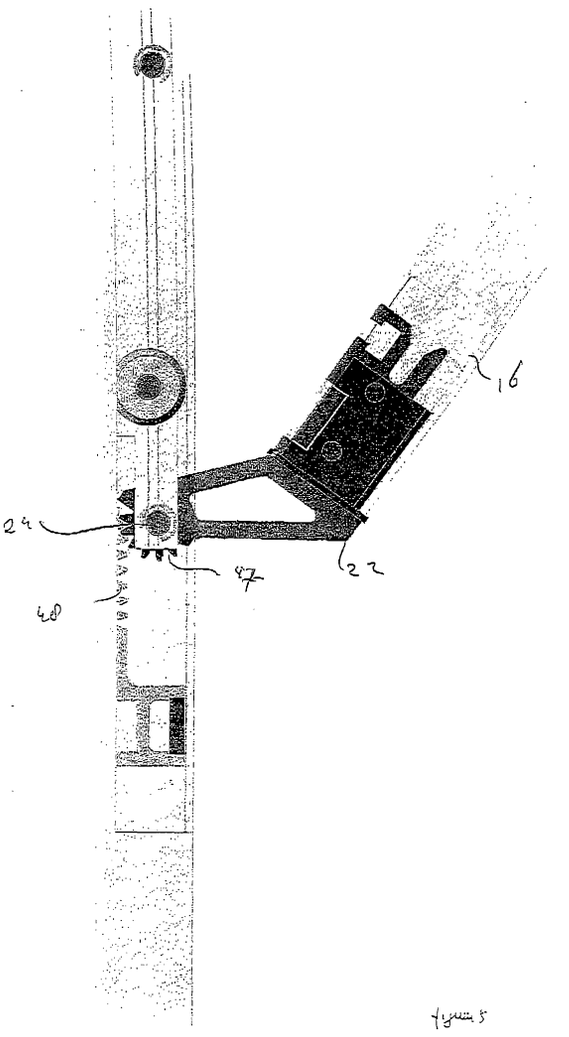
(54) Arm device for a drop arm blind and drop arm blind provided with such arm devices

(57) The arm device for an extension arm blind is provided with a basic profile, a transport profile and an extension arm, the transport profile being connected to the basic profile so as to be movable in the longitudinal direction of the basic profile for moving the transport profile up and down relative to the basic profile. Adjacent a first end of the extension arm, the extension arm is connected to the transport profile so as to be rotatablearound a first rotation axis extending at least substantially perpendicularly to the longitudinal direction of the basic profile, between a first, raised position and a second, lowered position. The extension arm and the basic profile are each provided with toothings which mesh so that, as soon as the toothings mesh upon downwards movement of the transport profile, the extension arm starts to rotate around the first rotation axis in the direction from the first raised position of the extension arm to the second lowered position of the extension arm.



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Description

[0001] The invention relates to an arm device for an extension arm blind provided with a basic profile, a transport profile and an extension arm, the transport profile being movably connected to the basic profile in the longitudinal direction of the basic profile for moving the transport profile up and down relative to the basic profile, the extension arm, adjacent a first end of the extension arm, being rotatably connected to the transport profile for rotation around a first rotation axis, extending at least substantially perpendicularly to the longitudinal direction of the basic profile, between a first, raised position and a second, lowered position, the arm device being further provided with locking means which, in the lowered position, block the upward movement of the transport profile relative to the basic profile.

[0002] Such an arm device is known per se from Dutch patent 10 047 64. With the known arm device, in the lowered position, the upward movement of the transport profile relative to the basic profile is blocked in that in the lowered position, a projection of the extension arm reaches under a cam of the basic profile. The drawback of such locking means is that when moving the extension arm from the raised position to the lowered position, the risk is present that the projection moves against an upstanding sidewall of the cam, instead of moving under the cam. The extension arm then cannot reach the lowered position and the cam may be damaged. This problem can occur, for instance, when the extension arm, upon downward movement of the extension arm, has already left its raised position somewhat.

[0003] The invention contemplates finding a solution to the stated problem. To this end, the arm device according to the invention is characterized in that the extension arm at its first end, and the basic profile at an extreme, lowest position where the extension arm is in a condition of use of the blind, are each provided with toothings which mesh such that, as soon as the toothings mesh upon downward movement of the transport profile, the extension arm starts to rotate around the first rotation axis in the direction from the first, raised position of the extension arm to the second, lowered position of the extension arm, while in the lowered position, the toothings form the above-mentioned locking means.

[0004] When the above-mentioned toothings mesh when the extension arm has already rotated slightly from the raised position to the folded-out position, the extension arm can rotate further to the folded-out position while the transport profile moves further downwards. Therefore, the transport profile moving downwards cannot be blocked by an extension arm which, for whatever reason, is not completely in the raised position when the transport profile moves downwards and almost reaches its lowest point.

[0005] Further, it applies in particular that, through the toothing of the extension arm, the transport profile is locked in the basic profile in the second, lowered position so that upward movement of the transport profile along the basic profile is blocked.

[0006] Preferably, it applies that the extension arm, at the end face of the extension arm, is provided with a first toothing. This first toothing extends around the first rotation axis, preferably in a curved manner. For instance, an inside of the basic profile located opposite the end face of the extension arm can then be provided with a second toothing. Preferably, this toothing extends parallel to a longitudinal direction of the basic profile.

[0007] Preferably, it further holds that the device is further provided with a support arm which, near a first end, is connected to the transport profile so as to be rotatable around a second rotation axis, and which, near a second end located opposite the first end, is connected to the extension arm so as to be slideable in the longitudinal direction of the extension arm. This spring ensures that the folded-out position of the extension arm is a stable position towards which the entire construction of the arm device tends to move.

[0008] The invention also relates to an extension arm blind provided with at least two arm devices according to the invention. In particular, the extension arm blind is further provided with a cloth connected, at a first side, to a winding member and connected at a second side located opposite the first side, to a hauling post, while the arm devices slope downwards from positions located adjacent the ends of the winding member and while the two ends of the extension arms are connected to the hauling post.

[0009] The winding member can be operated both by hand and by means of a motor. In particular, the upper sides of the respective transport profiles are connected to a rod-shaped guide, the cloth extending between the guide and the basic profiles. When the extension arm blind is in the folded-out position and the cloth is wound up with the aid of the winding member, first, the extension arm will move to its raised position. When, hereupon, the cloth is wound up further, it pulls up the transport profile and the folded extension arm until the transport profile, relative to the basic profile, has taken up a highest position and is completely raised. When, subsequently, the cloth is unwound again from the highest position, first, the transport profile will drop to a lowest position relative to the basic profile. The extension arm then remains in its folded position until the transport profile reaches the lowest position. In the lowest position, upon further unwinding of the cloth, the extension arm will move to its folded-out position, while the toothings mesh. In the lowered position, the toothings ensure that the transport profile cannot be moved upwards from the lowest position.

[0010] The invention will now be further elucidated with reference to the drawing. In the drawing:

Fig. 1 shows an extension arm blind which is provided with two arm devices in accordance with the invention in a first, raised position;

Fig. 2 shows the extension arm blind according to Fig. 1 in a second, lowered position;
Fig. 3 shows, in transparent view, a side view of the arm device of the extension arm blind according to Fig. 1 in the first position;
Fig. 4 shows the arm device according to Fig. 3 in an intermediate position located between the first position and the second position;
Fig. 5 shows a detail of Fig. 4;
Fig. 6 shows a cross section along the line VI-VI of Fig. 1; and
Fig. 7 shows a cross section along the line VII-VII of Fig. 6.

[0011] In Fig. 1, with reference numeral 1, an extension arm blind in accordance with the invention is shown, which is provided with two identical arm devices 2, 2' in accordance with the invention. As is best shown in Fig. 2, the extension arm blind is provided with a cloth 4 connected at a first side to a winding member 6, and connected at a second side, located opposite the first side, to a hauling post 8. The winding member 6 is located in a housing 10. In Fig. 1, the cloth is completely wound up and the extension arm blind is raised, while in Fig. 2, the cloth is unwound and the extension arm blind is lowered.

[0012] The arm devices 2, 2' will now be further elucidated with reference to Figs. 3 - 7. The arm device is provided with a basic profile 12 which can be fastened, for instance, to the wall of a house. The arm device is further provided with a transport profile 14 and an extension arm 16. The basic profile 12 is of tubular design, while the transport profile 14 is slideable in a space 18 enclosed by the basic profile.

[0013] More in particular, the basic profile 12 (see Fig. 6) has a substantially rectangular cross section and is further provided with a slot 20 extending in the longitudinal direction of the basic profile, which slot gives access to the space 18 enclosed by the basic profile. The slot 20 is located at a side of the basic profile situated opposite the side of the basic profile which, in use, will be fastened to the wall of a house. In the lowered position, the extension arm 16 reaches from the space 18 enclosed by the basic profile 12 outside the basic profile 12.

[0014] Adjacent a first end 22, the extension arm 16 is connected to the transport profile 14 for rotation around a first rotation axis, extending at least substantially perpendicularly to the longitudinal direction of the basic profile 12, between a first, raised position (Fig. 3) and a second, lowered position.

[0015] The extension arm 16 is also substantially tubular and comprises a slot 26 extending in the longitudinal direction of the extension arm, which slot gives access to a space 28 enclosed by the extension arm (see Fig. 7). The device is further provided with a support arm 30 which is connected adjacent a first end 32 to the transport profile 14, for rotation around a second rotation axis 34. Adjacent a second end 36, located opposite the first end 32, the support arm 30 is slideably received in the space 18 enclosed by the extension arm 16. Therefore, the support arm 30 reaches from the space 28 enclosed by the extension arm, through the slot 26 outside the extension arm. The first and second rotation axes then run parallel. The transport profile 14 is also of tubular design and is provided with a slot 38 extending in the longitudinal direction of the transport profile, which slot gives access to a space 40 enclosed by the transport profile, while in the raised position (Fig. 3), the support arm 30 extends at least substantially in the space 40 enclosed by the transport profile 14.

[0016] The arm device is further provided with a spring 42 extending in the space 28 of the arm profile 16. Near a first end 44, the spring is connected to the earlier-mentioned second end 36 of the support arm 40. The spring is further connected, near a second end 46, to the extension arm 16. The spring is tensioned such that it applies a force to the second end 36 of the support arm 30 in the direction of the first end 22 of the extension arm 16.

[0017] At an end face of the extension arm 16 adjacent its first end 22, the extension arm is provided with a first toothing 47. This toothing extends in a curved manner around the first rotation axis 24.

[0018] At an inner side of the basic profile located opposite the end face of the extension arm, the basic profile is provided with a second toothing 48. This second toothing 48 runs parallel to a longitudinal direction of the basic profile.

[0019] All this means that the extension arm at its first end 22, and the basic profile at an extreme, low position where the extension arm is in the condition of use of the screen (see Fig. 2) are each provided with toothings which mesh as soon as the toothings start to come into contact with each other when the transport profile moves downward. Upon further downward movement of the transport profile, the extension arm then starts to rotate around the first rotation axis 24 in a direction of rotation from the first, raised position of the extension arm (Fig. 3) to the second, lowered position of the extension arm (Fig. 2).

[0020] Generally, when the toothing 47 reaches the toothing 48, the extension arm will still be in the completely raised position. However when, for whatever reason, the extension arm is in an intermediate position, for instance as shown in Fig. 4, and when the first toothing 47 starts to mesh with the second toothing 48, upon further downward movement of the transport profile, the extension arm will rotate further around the first rotation axis 24 to the folded-out position.

[0021] The extension arm is locked by the toothing in the second, folded-out position so that upward movement of the transport profile 14 in the basic profile 12 is blocked when the extension arm is located in the second, folded-out position.

[0022] Between the upper sides 54 of the transport

profiles 14 of the arm devices 2, 2', a rod-shaped guide 56 (see Fig. 2) is mounted, the cloth 4 extending between the guide and the basic profiles.

[0023] The operation of the device is as follows. In the lowered position, as shown in Fig. 2, the cloth 4 extends from the winding member 6 as far as the rod-shaped guide 56 in an at least substantially vertical direction. From the rod-shaped guide 56 to the hauling post 8, the cloth slopes downwards. The spring 42 ensures that the extension arm 16 is pressed down. The support arm 30 ensures that the extension arm 16 cannot fold further downward. The toothings ensure that the transport profile cannot move upwards due to, for instance, wind. When it is desired to raise the extension arm blind, the cloth is wound up with the aid of the winding member 6. To this end, the winding member 6 can be driven by hand or by motor. When winding up the cloth, first, the extension arm 16 will start to rotate around the rotation axis 24, such that the hauling post 8 moves upwards. Due to the toothings 47, 48, the first side 22 of the extension arm will remain almost at its lowest, extreme position. The transport profile too will only move up a little due to the toothings 47, 48 being in rotating rolling mesh with each other. When winding up the cloth 4 in this manner, the spring 42 will be tensioned and the second end 36 of the support arm 30 will move in the direction of the hauling post 8. Thus, the extension arm 16 in its entirety is moved from a horizontal position (the folded-out position) to a vertical position. Via the slot 20, the support arm 30 will then, at least virtually completely, be manoeuvred into the inner space 40 of the transport profile 14. The result is that when the extension arm 16 is vertically directed (the raised position), the support arm 30 extends at least virtually in its entirety within the transport profile 14. In its turn, the transport profile 14 is located in the inside space 18 of the basic profile. The packet of profiles thus formed consists of only two profiles stacked on top of each other (see also Fig. 3). In the above-described vertical position of the extension arm 16, the toothings 47, 48 no longer mesh. When presently the cloth is wound up further with the aid of the winding member 6, the now vertically directed support arm 30, the extension arm 16 as well as the vertically directed transport profile 14 will be transported vertically upwards as a whole. For this transport, the transport profile 14 can for instance be provided with wheels 58 also situated within the basic profile. Thus, the transport profile 14 is transported to an upper extreme position, which position is shown in Figs. 1 and 3. For this position too, it holds that the total packet of profiles stacked on top of each other consists of only two profiles, i.e. the basic profile 12 and the extension arm 16, sincethe support arm 30 and the transport profile 14 are both located within the contours of the basic profile 12.

[0024] When the extension arm blind is to be lowered again from the position shown in Fig. 1, the cloth 4 is unwound from the winding member 6. As a result, the packet of vertical profiles, consisting of the transport profile 14, the extension arm 16 and the support arm 30 will first move downwards until these profiles reach the above-mentioned first, lowest position. When subsequentlythe cloth is unwound further, the extension arm 16 will rotate downwards around the first rotation axis 24. The toothings 47, 48 will then mesh again, so that the blind, as shown in Fig. 2, again assumes the lowered position.

[0025] For completeness' sake it is noted that the invention is not limited in any manner to the exemplary embodiment described hereinabove. For instance, the various profiles described can, instead of a rectangular cross section, also have other cross sections, such as, for instance, a circular cross section. Also, an extension arm blind can be assembled with three or more arm devices.

[0026] Instead of the wheels 58, also non-rotating, smooth, for instance plastic, parts can be used which slide well along a smooth, aluminium surface of the profiles. Also, instead of a spring 42 which is extended in the raised position, a spring can be used which is compressed in the raised position. In that case, the end 46 of the spring is to be connected, for instance, to the hauling post 8. The spring can also be omitted.

[0027] Such variants are all understood to fall within the framework of the invention.

Claims

1. An arm device for an extension arm blind, provided with a basic profile, a transport profile and an extension arm, the transport profile being connected to the basic profile so as to be moveable in the longitudinal direction of the basic profile for moving the transport profile up and down relative to the basic profile, the extension arm adjacent a first end of the extension arm being rotatably connected to the transport profile for rotation around a first rotation axis extending at least substantially perpendicularly to the longitudinal direction of the basic profile, between a first, raised position and a second lowered position, the arm device being further provided with locking means which, in the lowered position, block the upward movement of the transport profile relative to the basic profile, **characterized in that** the extension arm at its first end, and the basic profile at an extreme, lowest position where the extension arm is in a condition of use of the blind, are each provided with toothings which mesh so that, as soon as the toothings mesh upon downward movement of the transport profile, the extension arm starts to rotate around the first rotation axis in the direction from the first, raised position of the extension arm to the second, lowered position of the extension arm, while the toothings, in the lowered position, form said locking means.

2. An arm device according to any one of the preceding claims, **characterized in that** the extension arm, at an end face of the extension arm, is provided with a first toothing.

3. An arm device according to claim 2, **characterized in that** the first toothing extends around the first rotation axis in a curved manner.

4. An arm device according to any one of the preceding claims, **characterized in that** an inner side of the basic profile, located opposite the end face of the extension arm, is provided with a second toothing.

5. An arm device according to claim 4, **characterized in that** the second toothing extends parallel to a longitudinal direction of the basic profile.

6. An arm device according to any one of the preceding claims, **characterized in that** the device is further provided with a support arm which, adjacent a first end, is rotatably connected to the transport profile around a second rotation axis and which, adjacent a second end located opposite the first end, is connected with the extension arm so as to be slideable in the longitudinal direction of the extension arm.

7. An arm device according to claim 6, **characterized in that** the second rotation axis is above the first rotation axis.

8. An arm device according to claim 7, **characterized in that** the first and second rotation axes run at least substantially parallel to each other.

9. An arm device according to any one of the preceding claims 6 - 8, **characterized in that** the device is further provided with a spring extending along the longitudinal direction of the extension arm and which, adjacent a first end, is connected to the second end of the support arm, and which adjacent a second end is connected to the extension arm, such that the spring applies a force to the second end of the support arm in the direction of the first end of the extension arm.

10. An extension arm blind provided with at least two arm devices according to any one of the preceding claims.

11. An extension arm blind according to claim 10, **characterized in that** the blind is further provided with a cloth which, at a first side, is connected to a winding member and, at a second side located opposite the first side, is connected to a hauling post, while the arm devices respectively slope downwards, from positions which are located adjacent the ends of the winding member, while the second ends of the extension arms are connected to the hauling post.

12. An extension arm blind according to claim 11, **characterized in that** the upper sides of the respective transport profiles are connected to a rod-shaped guide, while the cloth extends between the guide and the basic profiles.

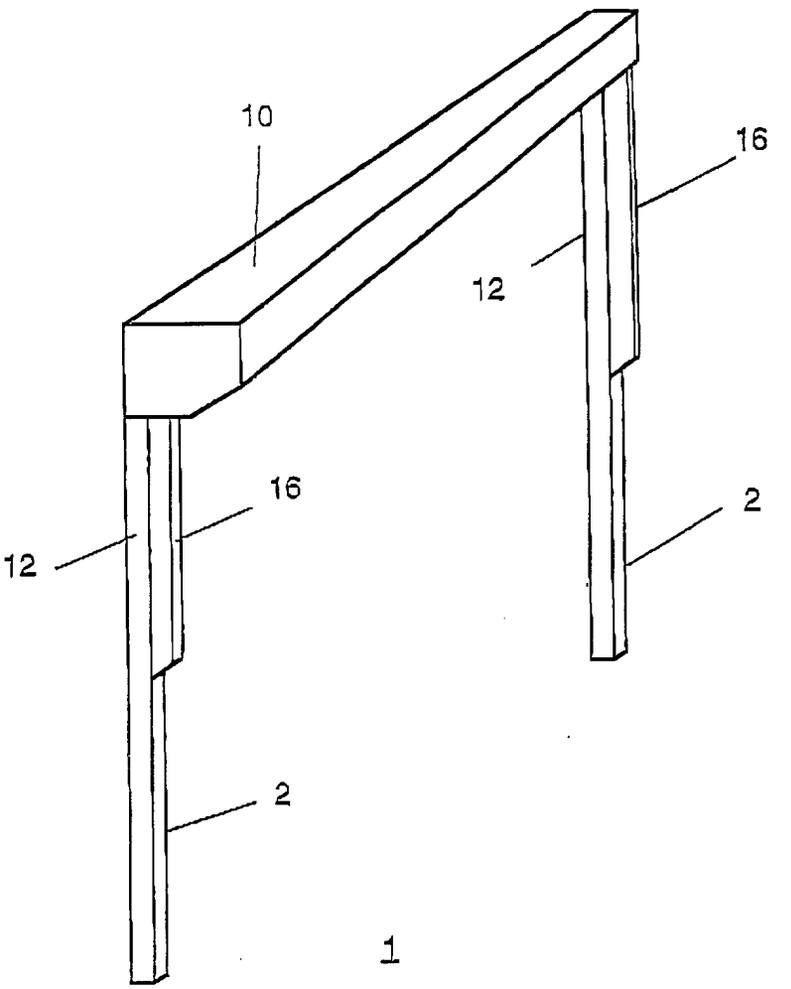

FIG. 1

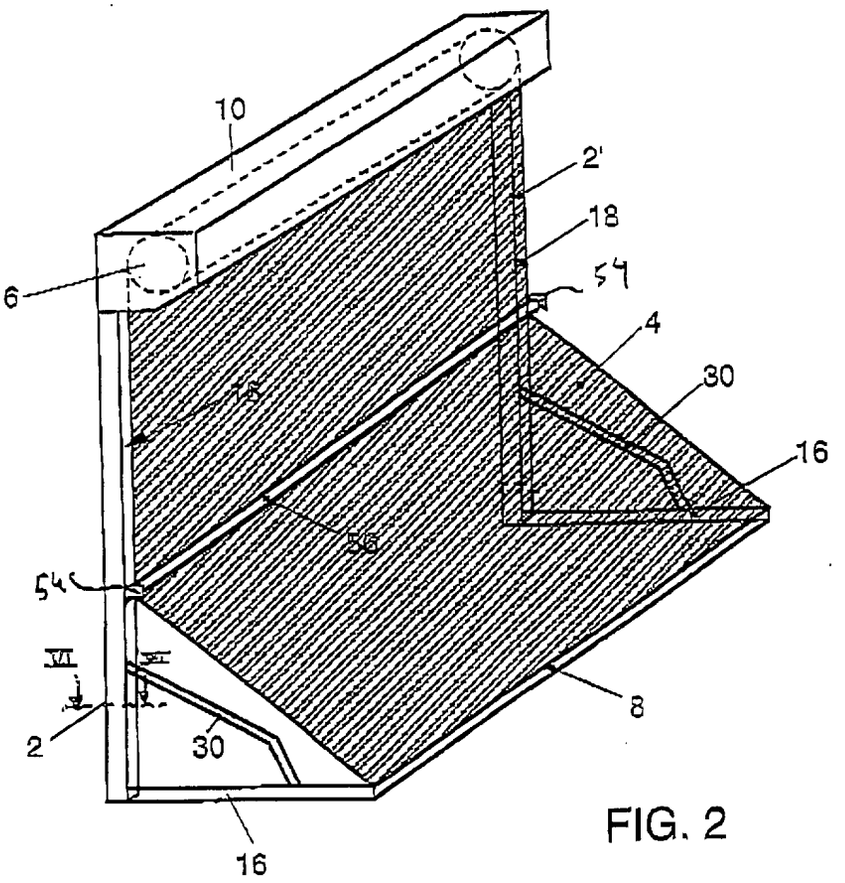

FIG. 2

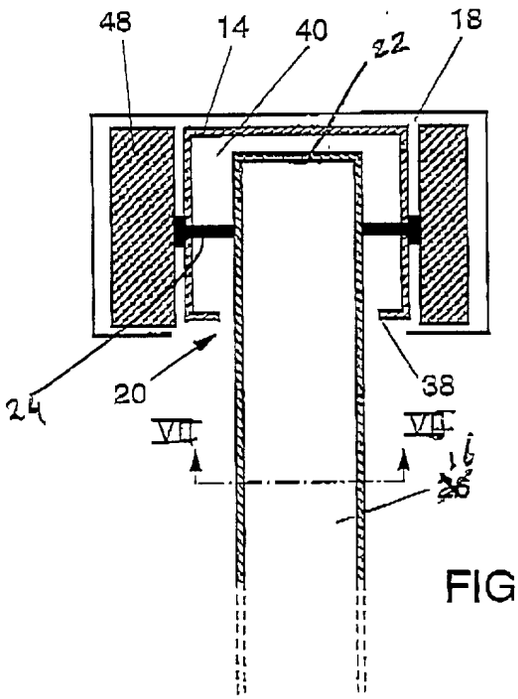

FIG. 6

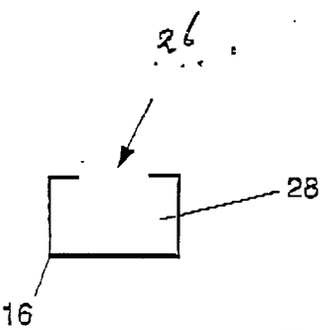

FIG. 7

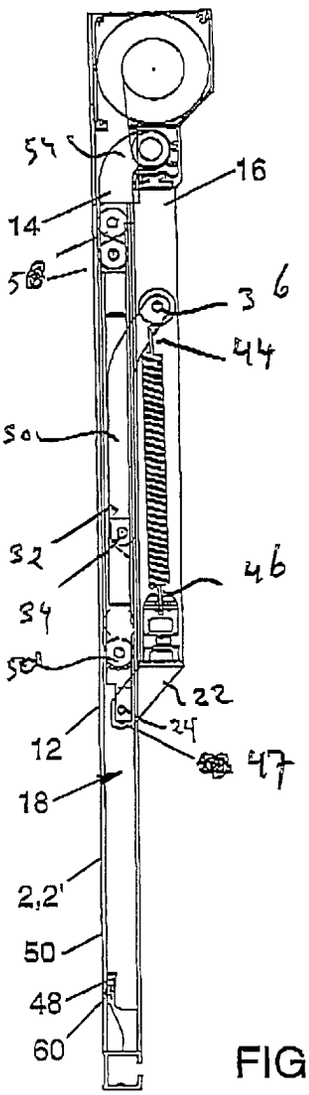

FIG. 3

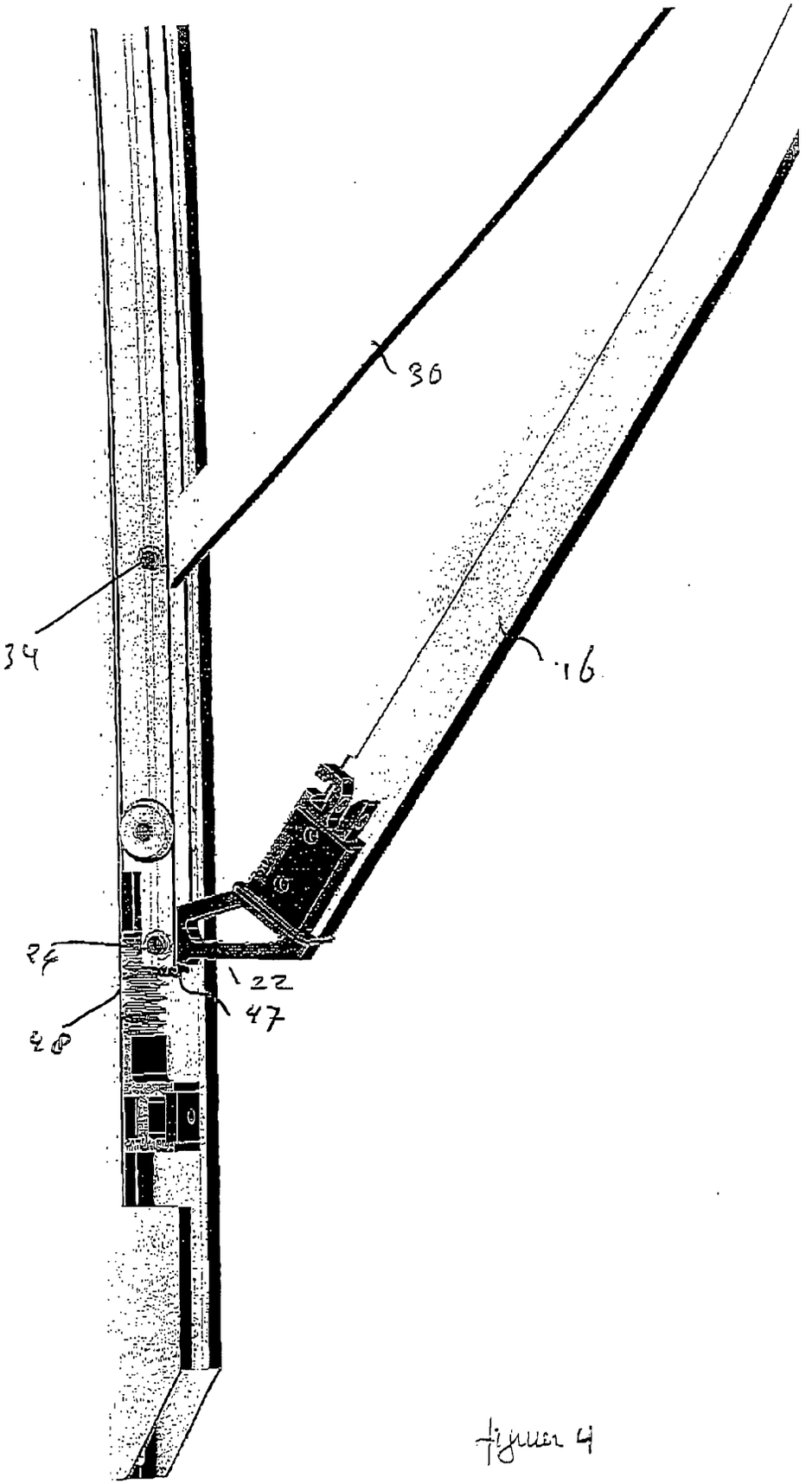

Figure 4

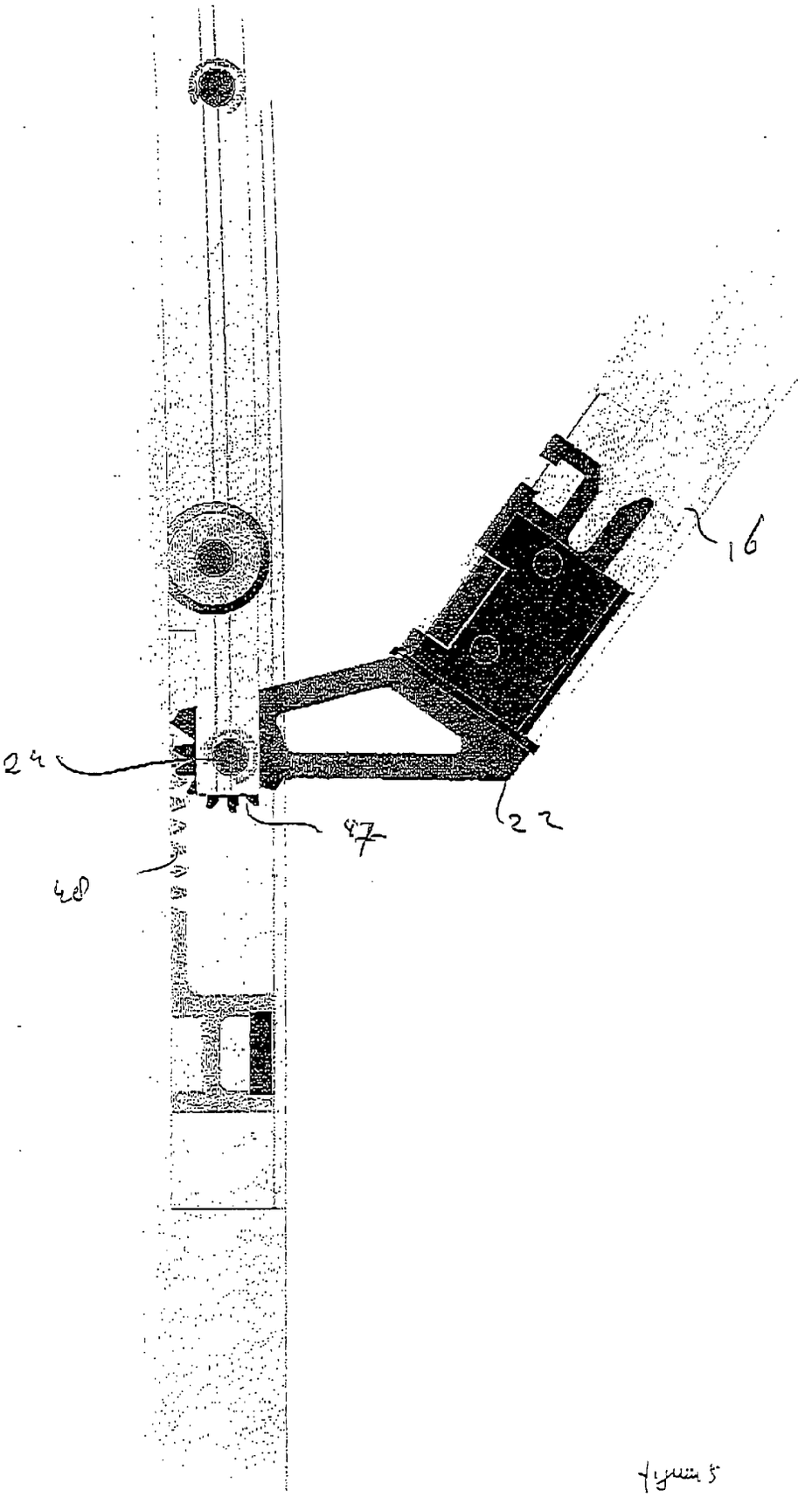

Figure 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 07 9721

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 607 676 A (CLAUSS ULRICH) 26 August 1986 (1986-08-26) * column 4, line 3 - line 24 * * column 5, line 3 - line 13 * * column 5, line 54 - line 63 * * column 6, line 20 - line 27 * * figure 6 *	1-5, 10-12	E04F10/06 E06B9/92
Y		6-9	
D,Y	NL 1 004 764 C (ALUMINIUM VERKOOP ZUID B V) 15 June 1998 (1998-06-15) * page 5, line 27 - line 37 * * figure 4 *	6-9	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

E04F
E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	5 February 2003	Geivaerts, D

CATEGORY OF CITED DOCUMENTS

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