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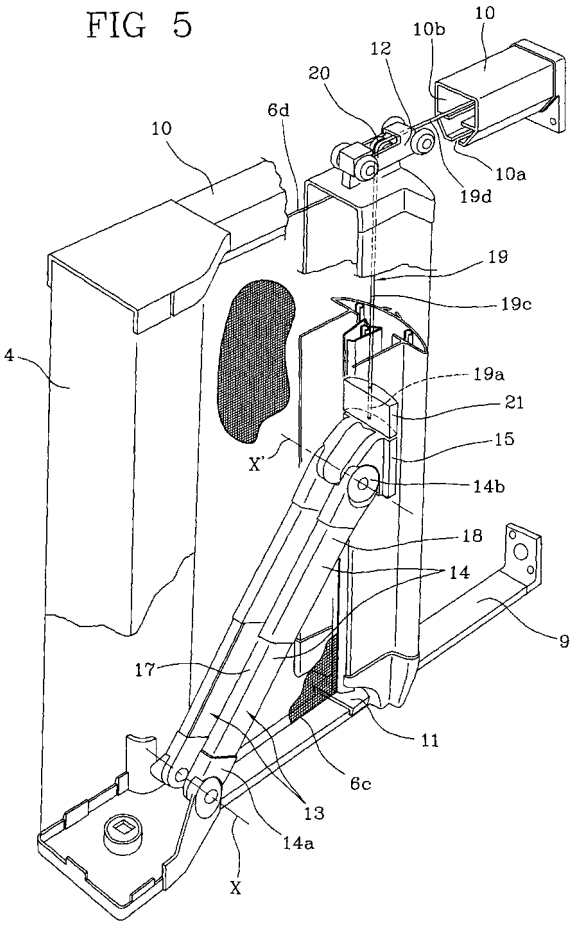
(54) Shielding device

(57) A first and a second supporting elements (4, 5) are movable away from and close to each other to unfold and draw back a shielding cloth (6). A protection structure (13) operates along at least one side edge (6c) of the cloth (6), which protection structure comprises a pair of movable bars (14) formed with telescopic portions hinged between the first supporting element (4) and a runner (15) movable along the second supporting element (5). The protection structure (13) is movable by mutual approaching of the supporting elements (4, 5) from a first operating condition at which it is parallelly drawn close to and along the side edge (6c) and a second operating condition at which it is disposed parallelly between the supporting elements (4, 5).

FIG 5



EP 1 707 734 A1

Description

[0001] The present invention relates to a shielding device, of the type comprising the features set out in the preamble of claim 1.

[0002] In more detail, the invention particularly refers to mosquito nets, shading curtains, decorative panels or similar devices to be installed on windows, French windows or other types of frames in rooms for house or business use.

[0003] The shielding devices of the above described type essentially comprise a shielding cloth or sheet which is engaged between a first and a second supporting elements along two of the respectively opposite sides thereof. One of the supporting elements is adapted to be fastened along one side of the window, French window or other opening on which the device is to be installed. The other supporting element is movable away from and close to the fixed supporting element, to selectively bring the shielding cloth between a use condition at which it is unfolded and spread out on the opening area and a rest condition at which it is rolled up or compacted close to the fixed supporting element to clear the passage through the opening on which the shielding device is installed.

[0004] The opposite ends of the movable supporting element are normally guided between the wings of two guide elements consisting of U-shaped section members or channel irons, also performing a containment action of the opposite edges of the shielding cloth which extend in the movement direction, to obstruct passage of light, insects or the like close to the edges themselves.

[0005] The presence of these guide elements however can cause trouble, with reference to devices installed on French windows for example, where the lower guide element emerging from the floor plane is in the way of persons and objects also when the shielding cloth is in its rest condition.

[0006] To obviate the above problems, use of flexible guide structures has already been suggested, which structures each have one end fastened to one of the supporting elements and the opposite end slidably guided inside the other supporting element. These flexible guide structures, either made up of strips of metal or plastic material such as described in Patent EP-753642 or patent US-6318418 for example, or consisting of rigid modules that are rotatably linked one after the other such as described in document EP-A-999335 or EP-1333148, lend themselves to be pulled out and inserted into one of the supporting elements, concurrently with unfolding and compacting of the shielding cloth as a result of mutual moving close and away of the supporting element.

[0007] When the shielding cloth is in an operating condition, the flexible guide structure is pulled out of the supporting elements and extends horizontally between the latter along the lower side of the opening so as to hold the corresponding lower edge of the cloth. Therefore the presence of the flexible guide enables elimination or great size reduction of the fixed guide element set along the lower side of the opening to guide sliding of the movable supporting element. On the contrary, when the cloth is stowed in the rest condition, the flexible guide structure extends inside one of the supporting elements, so that it does not hinder passage through the opening on which the shielding device is installed.

[0008] The Applicant has however found that also the shielding devices provided with said flexible guides give rise to some drawbacks.

[0009] In fact it is difficult to obtain an efficient barrier to the entry of light, insects or others in the unfolded condition of the cloth and particular manufacturing expedients are required to succeed in closing the gaps between the individual modules consecutively articulated on each other.

[0010] In addition, laying of dust and debris between the movable parts of the flexible guides tends to make sliding of same increasingly harder and more difficult with jamming phenomena and even with full movement blocking; there are also risks of damages due to the greater forces consequently transmitted to obtain translation between the rest condition and use condition.

[0011] The Applicant has also noticed that the present flexible guides greatly condition the size features of the shielding device, installation of which is only made possible on openings having determined size ratios between the sides. In particular, the present shielding devices cannot be installed on openings in which the sides engaged by the supporting elements have a smaller extension than those along which sliding takes place during the unfolding and folding or compacting steps of the shielding cloth.

[0012] In addition, specific construction expedients are required for the present flexible guides when combined with shielding devices in which folding up of the cloth to the rest condition takes place through winding of the cloth itself on a roller housed in one of the supporting elements.

[0013] In accordance with the present invention, the Applicant has sensed that most of the above described problems can be brilliantly overcome by using, instead of the known guide structures, a protection structure obtainable in the form of a bar terminally hinged to one of the supporting elements, so that it lends itself to be selectively positioned between an operating condition at which it extends perpendicularly between the supporting elements to contain the corresponding side of the unfolded cloth, and a rest condition at which it is disposed parallel between the supporting elements moved close to each other.

[0014] In more detail, it is an aim of the present invention to provide a shielding device comprising the features set out in the characterising portion of claim 1 and/or of the subsequent claims.

[0015] Further features and advantages will become more apparent from the detailed description of a preferred but not exclusive embodiment of a shielding device 1 in accordance with the present invention. This description will be set out hereinafter with reference to the ac-

companying drawings, given by way of non-limiting example and in which:

- Fig. 1 is a diagrammatic elevation view of a shielding device 1 in accordance with the present invention, with the respective shielding cloth 7 unfolded in an operating condition;
- Fig. 2 shows the device in Fig. 1 with the shielding cloth 6 in an intermediate condition between the operating and rest conditions;
- Fig. 3 shows the device in Fig. 1 with the shielding cloth 6 in a rest condition;
- Fig. 4 is a perspective view of the shielding device 1 in the rest condition seen in Fig. 3;
- Fig. 5 is a fragmentary perspective view partly in phantom of the shielding device 1 in the intermediate condition seen in Fig. 2;
- Fig. 6 is a fragmentary section view of the device taken along line VI-VI in Fig. 2;
- Fig. 7 is a fragmentary section view of the device taken along line VII-VII in Fig. 3;
- Fig. 8 shows a structural detail of the device sectioned along line VIII-VIII in Fig. 1.

[0016] With reference to the drawings, a shielding device in accordance with the present invention has been generally identified by reference numeral 1.

[0017] In the embodiment described, the shielding device 1 is installed on the opening 2 of a French window to perform the function of a mosquito net, i.e. to prevent passage of flies, mosquitos and other insects or small animals through the opening itself.

[0018] To this aim, the shielding device 1 comprises a bearing structure 3 having a first supporting element 4 consisting of at least one metal section member for example, to be fastened to one side, a first vertical side 2a for example, of the opening 2 on which the shielding device itself is to be installed.

[0019] Combined with the first supporting element 4 is a second supporting element 5 also made in the form of a metal section member and movable relative to the first supporting element 4 in the lying plane of the opening with which the shielding device 1 is associated.

[0020] In engagement between the first and second supporting elements 4 and 5 is a shielding cloth or sheet 6, made in the form of a net of synthetic material for example, with meshes the sizes of which are included, just as an indication, between 0.3 mm and 2 mm, or in any case are adapted to offer an efficient barrier to passage of small insects such as ants and mosquitos, while at the same time ensuring an efficient permeability to air.

[0021] The shielding cloth 6 has a first and a second mutually opposing end edges 6a, 6b in engagement with the first and second supporting elements 4, 5 respectively of the bearing structure 3. In the embodiment shown, the second end edge 6b is rigidly fastened to an anchoring element 7 integrated into the second supporting element 5, while the first end edge 6a is engaged with a winding roller 8 operatively disposed within the first supporting element 4 and submitted to the action of spring means (not shown) that is loaded during the unfolding step of cloth 6 to cause automatic re-winding of the cloth on the roller itself, in case of need.

[0022] Not excluded however is the possibility of using, instead of the winding roller 8, a shielding cloth 6 of the pleated type designed to be concertina-wise spread out and compacted.

[0023] The second supporting element 5 can be translated away from and close to the first supporting element 4 to move the shielding cloth 6 between a use condition at which it is unfolded and spread out in the lying plane of opening 2, as shown in Fig. 1, and a rest condition at which it is gathered close to the fixed supporting element 4, as shown in Fig. 7.

[0024] The bearing structure 3 further comprises a first and a second guide elements 9, 10 extending along one lower horizontal side 2b and one upper horizontal side 2c of opening 2, respectively, parallel to respective opposite side edges 6c, 6d of the shielding cloth 6 unfolded in the use condition. Preferably, at least the first guide element 9 positioned along the lower horizontal side 2b of opening 2, has a substantially rectangular and flattened section, the major side of which is substantially perpendicular to the lying plane of the shielding cloth 6 in an unfolded condition. In more detail, as clearly shown in Fig. 8, the first guide element 9 preferably has a substantially T-shaped cross section to engage the second supporting element 5 at a slider 11 (Fig. 5) carried by a lower end of the supporting element itself and interacting with undercut seats defined at respective projecting wings 9b.

[0025] Preferably, the second guide element 10 in turn has a substantially rectangular cross-section outline with a longitudinal cut 10a on its lower side, which cut is passed through by the upper side edge 6d of the shielding cloth. A longitudinal slide seat 10b is defined within the second guide element, and an upper end of the second supporting element 5, preferably provided with a carriage 12, is slidably housed along said longitudinal slide seat.

[0026] Further associated with the shielding device 1 is at least one substantially rod-shaped protection structure 13 terminally linked to the first and second supporting elements 4, 5.

[0027] In the example herein described a single protection structure 13 is provided which is disposed close to the lower horizontal side of opening 2 carrying the first guide element 9 of flattened conformation.

[0028] However, use of an auxiliary protection structure similar to the protection structure 13 may be also provided, which auxiliary protection structure 13 is set along the upper horizontal side 2c of opening 2, possibly in combination with a second guide element 10 of flattened rectangular conformation and similar to the first guide element 9.

[0029] Should device 1 be installed on a common window, the first supporting element 4 incorporating the pos-

sible winding roller 8 can be fastened to the upper horizontal side of opening 2 to enable spreading out of cloth 6 in a vertical direction, while the protection structure/structures 13 can be disposed along the first and/or second vertical side 2a, 2d of the opening itself.

[0030] The protection structure 13 comprises at least one movable bar 14 having a first end 14a hinged on the lower end of the first supporting element 4 in turn fastened to the first vertical side 2a of opening 2. A second end 14b of the movable bar 14 is in turn secured to the second supporting element 5, preferably through hinging on a runner 15 slidably guided along the second supporting element itself.

[0031] In a preferential embodiment, the protection structure comprises a pair of movable bars 14 disposed parallel alongside each other and on respectively opposite sides of the shielding cloth 6. Defined between the movable bars 14 is a through space or gap 16 passed through by the shielding cloth 6. The movable bars 14 are secured to the first supporting element 4 in a first common hinging axis X and have the respective second ends 14b secured to the runner 15 around a second common hinging axis X'.

[0032] Following mutual moving close of the supporting elements 4, 5, the protection structure 13 carries out a translation in a plane parallel to the extension plane of the shielding cloth 6, from a first operating condition, shown in Fig. 1, occurring when the second supporting element 5 is positioned against the second vertical side 2d of opening 2, to a second operating condition occurring in the position of maximum mutual approaching of the supporting elements 4, 5.

[0033] In the first operating condition the protection structure 13 is in parallel side by side relationship along the corresponding lower side edge 6c of the shielding cloth 6 extending between the supporting elements at the lower side 2b of opening 2. As shown in Fig. 7, under this operating condition the movable bars 14 are adjacent to the respective side edges of the first guide element 9 fastened to the lower horizontal side of opening 2, and jut out at the inside of opening 2 with respect to the guide element itself. In this manner, the movable bars 14 perform an efficient protection and containment action of the corresponding lower side edge 6c of cloth 6 within the gap 16, hindering passage of insects between the lower edge of the cloth itself and the lower guide element 9.

[0034] In the second operating condition, the protection structure 13 on the contrary is oriented parallel to the supporting elements 4, 5 and preferably interposed between the latter in mutual side by side relationship. In more detail, as clearly shown in Fig. 7, in the second operating condition the protection structure 13 is fully or partly concealed in a holding seat 13a defined in the second supporting element 5 and/or in the first supporting element 4.

[0035] Preferably, each of the movable bars 14 has a first longitudinal portion 17 and a second longitudinal portion 18 in telescopic engagement with each other with possibility of sliding in a longitudinal direction. In this manner, the distance between the first and second ends 14a, 14b of the movable bars 14 can advantageously vary during translation between the first and second operating conditions. In more detail, the longitudinal portions 17, 18 of the movable bars 14 slide towards each other so as to progressively reduce the length of the protection structure 13 on passing from the first extended operating condition along the corresponding side of opening 2, to the second operating condition of parallelism between the supporting elements 4, 5 disposed adjacent to each other. Thus an advantageous containment of the longitudinal extension of the protection structure 13 in the second operating position can be achieved, so that the device 1 can also adapt itself to installation on openings the horizontal sides of which, or in any case the sides parallel to the sliding direction of cloth 6, have a greater extension than the two other sides of opening 2.

[0036] As an alternative to the above description, both the first and second ends 14a, 14b of each movable bar 14 can be pivotally mounted to the respective supporting elements 4, 5 according to fixed hinging axes, while the first and second longitudinal portions 17, 18 are hinged to each other at a median point of the overall length of the respective movable bar 14. In this case, mutual approaching of the supporting elements 4, 5 starting from the extended condition of cloth 6 gives rise to progressive folding of the movable bars 14 at the median point of mutual hinging between the first and second portions 17, 18 until an orientation substantially parallel to the mutually approached supporting elements is reached in the second operating condition.

[0037] In the preferential embodiment shown in the attached drawings, use of at least one synchronisation cable 19 is further provided, which cable 19 has a first end 19a fastened to the runner 15 carrying the second ends 14b of the movable bars 14, and a second end 19b fastened with respect to the first supporting element 4. The synchronisation cable 19 has a first section 19c extending within the second supporting element 5 and a second section 19d extending along the second guide element 10 located on the side opposite to the movable protection structure 13. Passage between the first and second sections 19c, 19d of cable 19 takes place at a transmission element 20 carried by an end of the second supporting element 5. Therefore the first section 19c of the synchronisation cable 19 extends from runner 15, i.e. from the second ends 14b of the movable bars 14, until the transmission element 20, while the second section 19d extends from the transmission element 20 away from the first supporting element 4, until a fastening point located close to the end of the second guide element 10.

[0038] During shifting of the second supporting element 5 towards the first supporting element 4, the second section 19d of the synchronisation cable 19 transmits a pulling action to the second section 19c, through the transmission element 20, which action is able to promote lifting of the second ends 14b of the movable bars 14

from the corresponding lower horizontal side of opening 2. Thus displacement of the movable protection structure 13 from the first operating condition to the second operating condition in synchronism with mutual approaching of the first and second supporting elements 4, 5 is ensured, in a complete absence of mechanical jammings.

[0039] The telescopic engagement between the first and second longitudinal portions 17, 18 of each movable bar 14 causes the synchronisation cable 19, in the passage steps between the first and second operating conditions, to be constantaly maintained tightly stretched by the weight of the protection structure 13 itself, possibly with the aid of a counter-weight 21 that in addition compensates for the action exerted by the spring means on roller 8, thus facilitating displacement of the second supporting element 5 to the second vertical side 2d of opening 2.

[0040] During mutual approaching of the supporting elements 4, 5, sliding of the second ends of the movable bars 14 along the second supporting element 5 is correlated with progressive shortening of the first section 19c of cable 19, irrespective of the reduction in the distance intervening between the first and second supporting elements 5.

[0041] The present invention achieves the intended purposes.

[0042] In fact, in the shielding device in reference there is none of the drawbacks correlated with use of the flexible guides in accordance with the known art. In particular, the protection structure 13 obtained from a pair of bars, each of which is possibly formed with sections telescopically sliding on each other is adapted to ensure an efficient containment of the cloth edge with an improved obstruction effect on the passage of insects. The construction and structure simplicity of the movable bars 14 in addition makes the protection structure 13 less subject to laying of dust and debris, and substantially exempt from malfunctions and/or jammings caused by accumulation of dirt, also as a result of a prolonged use.

[0043] In addition, the invention offers a greater versatility of use of the shielding device 1 that is also suitable for installation on French windows having a large horizontal extension, even larger than the vertical extension.

Claims

1. A shielding device (1) comprising:

- a bearing structure (3) comprising at least one first and one second supporting elements (4, 5) disposed parallel and movable away from and close to each other at right angles to their longitudinal extension;
- one shielding cloth or sheet (6) having a first and a second end edges (6a, 6b) in engagement with the first and second supporting elements (4, 5) respectively so that said cloth is unfolded or spread out in a plane parallel to said supporting elements following mutual moving apart of the latter;
- at least one protection structure (13) movable upon mutual approaching of the supporting elements (4, 5) from a first operating condition at which said protection structure is disposed parallelly close to and along a side edge (6c) of the shielding cloth (6) extending between the supporting elements themselves, to a second operating condition at which it is disposed parallel to said supporting elements (4, 5),

characterised in that said protection structure (13) comprises at least one movable bar (14) having a first end (14a) hinged to one end of the first supporting element (4) and a second end (14b) operatively secured to the second supporting element (5) to cause translation between the first and second operating conditions through angular rotations substantially in a plane parallel to the unfolding plane of the shielding cloth (6).

2. A device as claimed in claim 1, wherein said protection structure (13) comprises a pair of movable bars (14) disposed parallel close to each other and on respectively opposite sides of the shielding cloth (6), between said pair of movable bars (14) a through space or gap (16) being defined which is passed through by the shielding cloth (6).

3. A device as claimed in claim 2, wherein in the operating condition the side edge (6c) of the shielding cloth (6) is contained within said gap (16).

4. A device as claimed in claim 1, wherein the second end (14b) of said at least one movable bar (14) is slidably guided along the second supporting element (5).

5. A device as claimed in claim 1, wherein the second end (14b) of the movable bar (14) is hinged to a runner (15) slidably guided along the second supporting element (5).

6. A device as claimed in claim 1, wherein said at least one movable bar (14) comprises a first and a second longitudinal portions (17, 18) slidably in engagement with each other in their longitudinal extension, to enable variations in the distance between the ends (14a, 14b) of the bar itself during translation between the first and second operating conditions.

7. A device as claimed in claim 6, further comprising at least one synchronisation cable (19) having a first end (19a) secured to the second end (14b) of said at least one movable bar (14) and a second end (14b) that is fixed relative to the first supporting element (4).

8. A device as claimed in claim 7, wherein the synchronisation cable (19) has a first section (19c) extending between the movable bar (14) and a transmission element (20) carried by one end of the second supporting element (5), and a second section (19d) extending from said transmission element (20) to a point that is fixed relative to the first supporting element (4).

9. A device as claimed in claim 8, wherein the second section (19d) extends from the transmission element (20) away from the first supporting element (4), to transmit a pulling action to the first section (19c) concurrently with mutual approaching of the supporting elements (4, 5) .

10. A device as claimed in claim 1, wherein said at least one movable bar (14) comprises a first and a second longitudinal portions (17, 18) rotatably hinged on each other, to enable variations in the distance between the ends (14a, 14b) of the bar itself during translation between the first and second operating conditions.

11. A device as claimed in claim 1, wherein the second end (14b) of said at least one movable bar (14) is hinged to the second supporting element (5).

12. A device as claimed in claim 1, wherein in the second operating condition the protection structure (13) is at least partly concealed in a holding seat (13a) defined in at least one of said first and second supporting elements (5).

13. A device as claimed in claim 1, comprising two of said protection structures (13) operating on respectively opposing side edges (6c, 6d) of the shielding cloth (6).

14. A device as claimed in claim 1, further comprising a gathering roller (8) rotatably carried by one of said first and second supporting elements (4, 5) which engages an end edge of the shielding cloth (6) and is drivable in rotation to determine rolling up of the shielding cloth concurrently with mutual approaching of the supporting elements (4, 5).

15. A device as claimed in claim 1, wherein said bearing structure (3) further comprises at least one first guide element (9) extending between the first and second supporting elements (4, 5) along a respective side edge (6c) of the shielding cloth (6), said guide element (9) having a substantially flattened rectangular section, with major sides substantially perpendicular to the lying plane of the shielding cloth (6) extended between the first and second supporting elements 4, 5).

16. A device as claimed in claims 2 and 14, wherein in the operating condition the movable bars are disposed close to respective opposite side edges of the first guide element (9) and jut out relative to the guide element itself.

17. A device as claimed in claim 1, wherein said bearing structure (3) further comprises at least one second guide element (10) extending between the first and second supporting elements (4, 5) along a respective side edge (6d) of the shielding cloth (6), said second guide element (9) having a longitudinal slide seat (10b) along which one end of the second supporting element (5) is slidably housed.

FIG 3

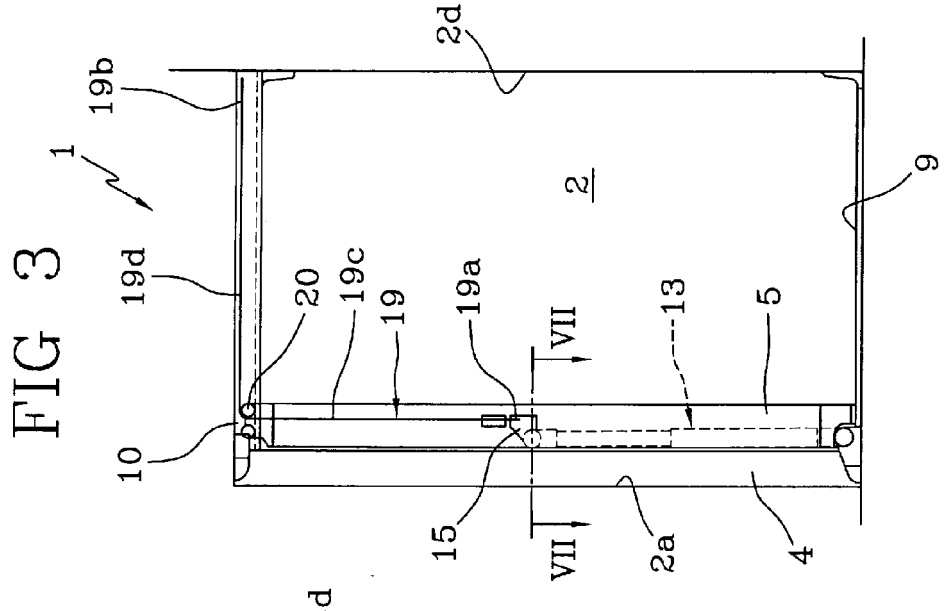


FIG 2

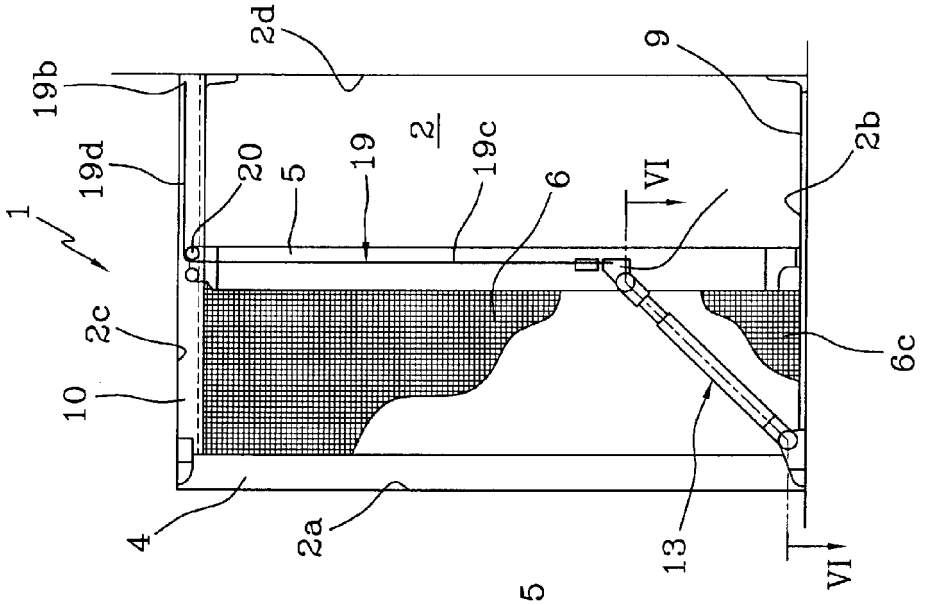


FIG 1

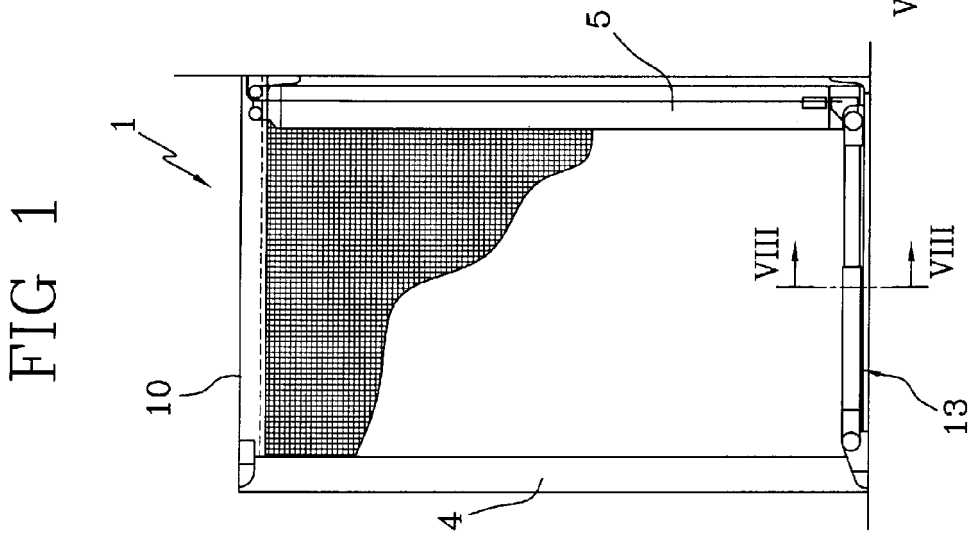


FIG 4

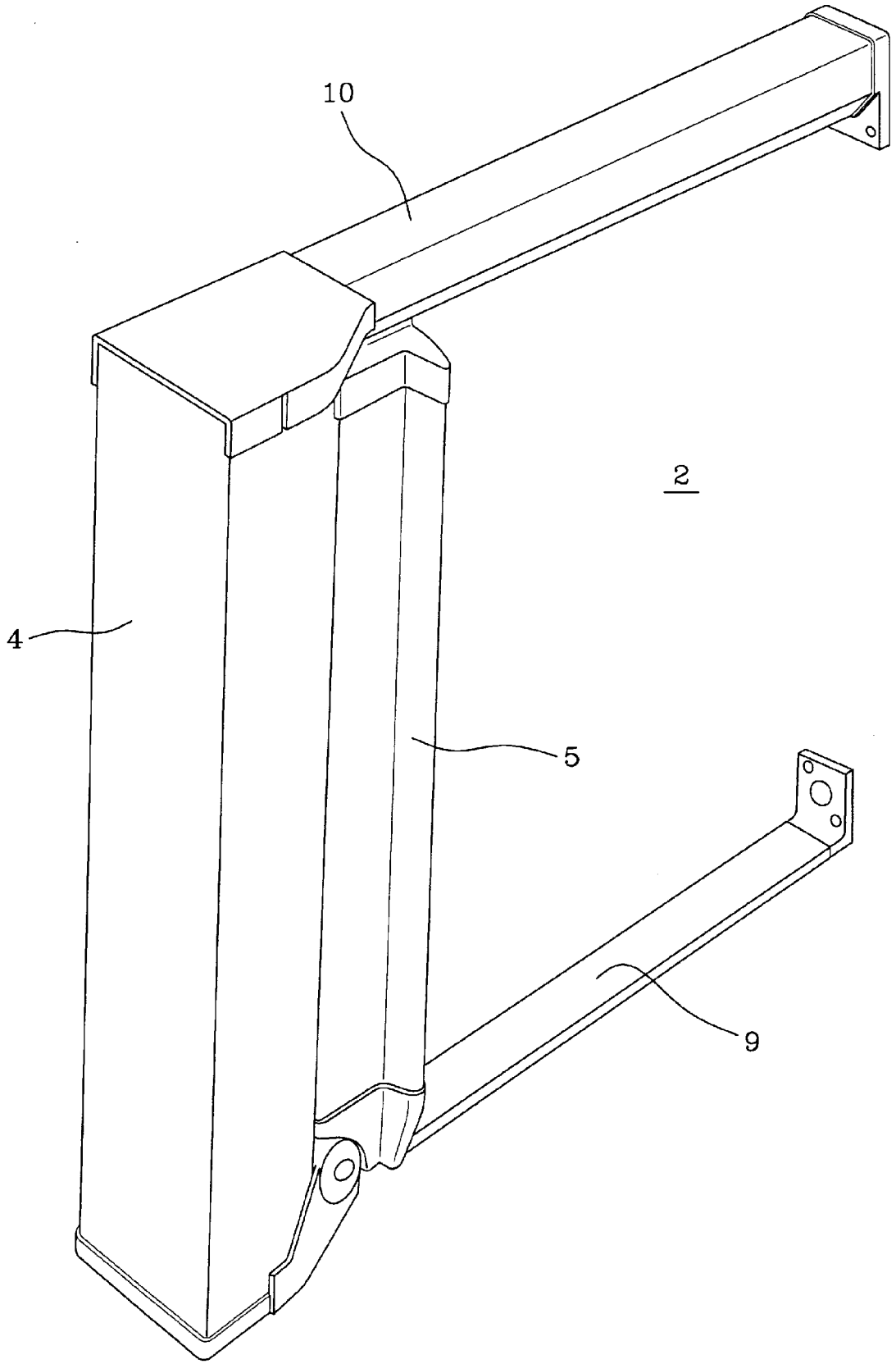


FIG 5

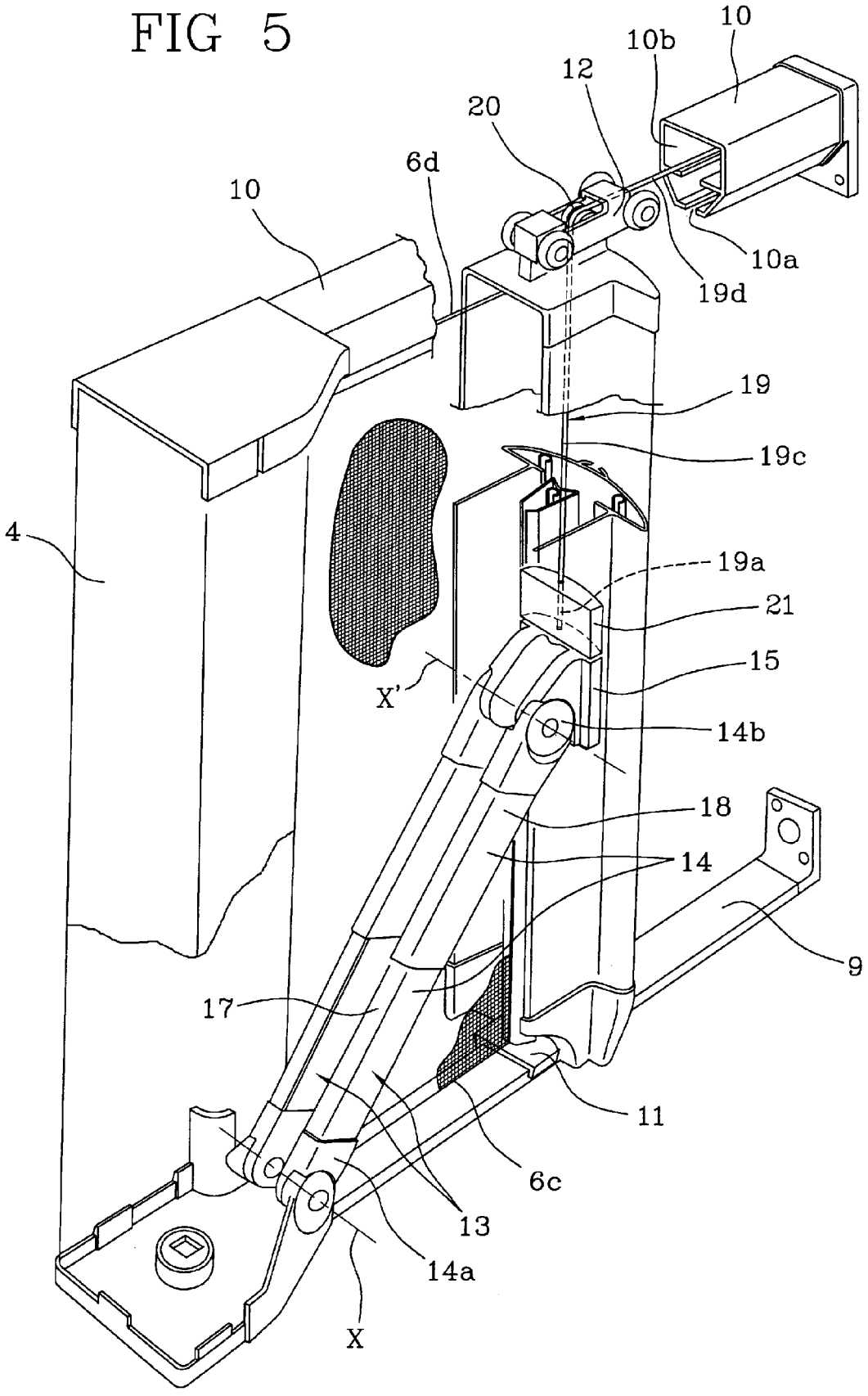

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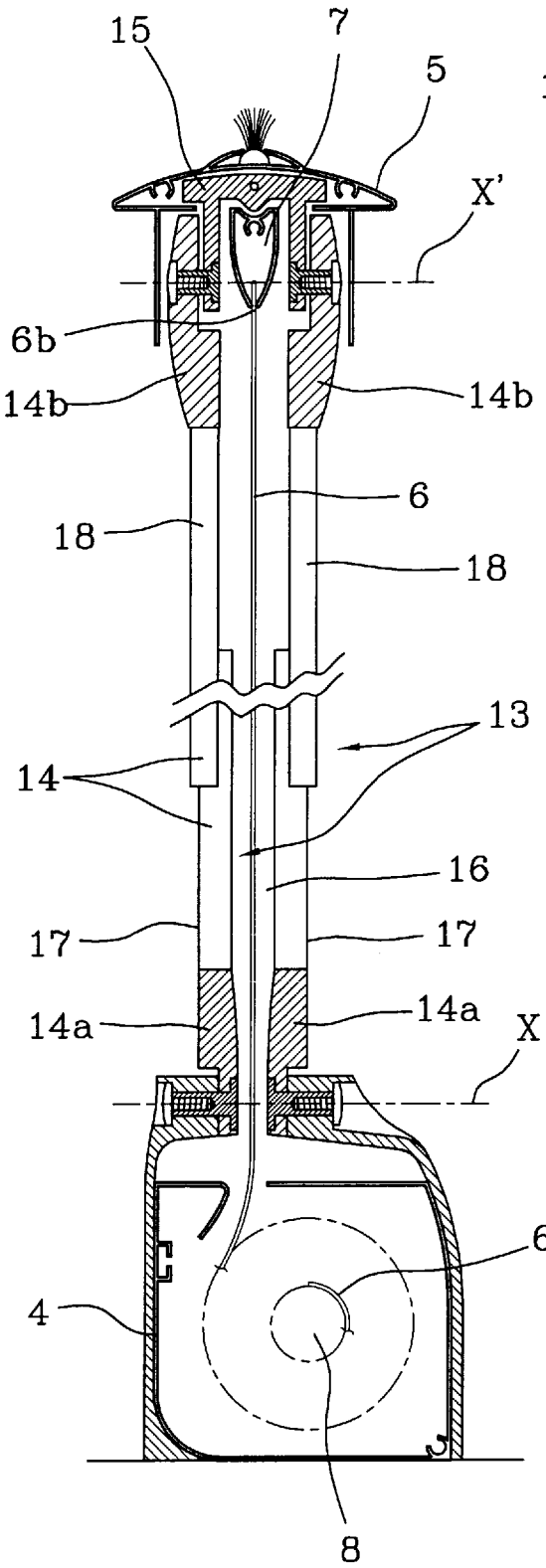
FIG 6



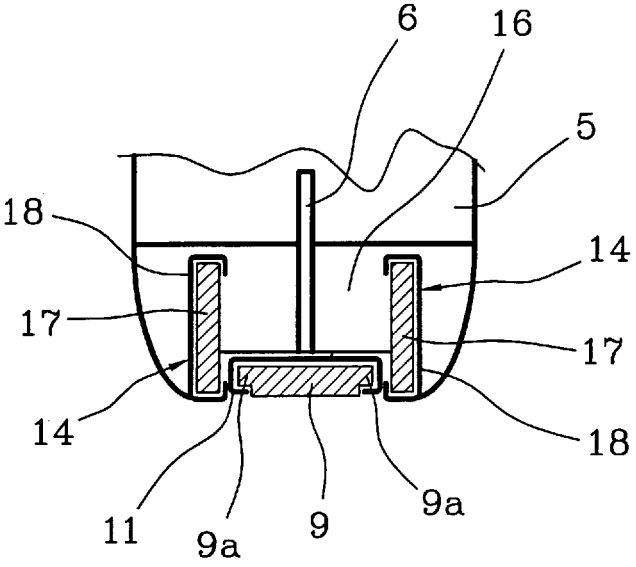
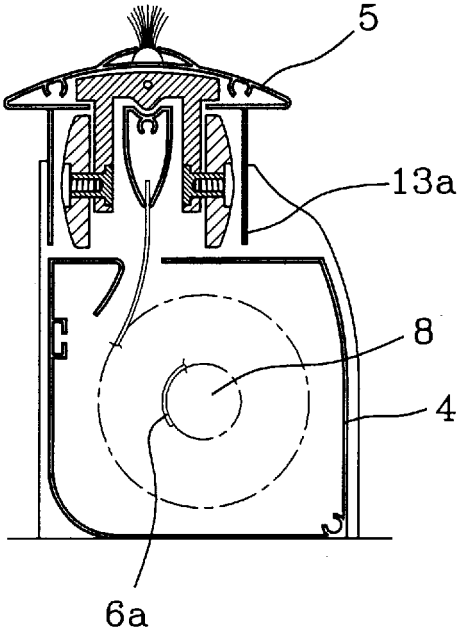


FIG 8

FIG 7



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EUROPEAN SEARCH REPORT

Application Number
EP 06 10 1293

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
D,A	EP 0 753 642 A (METACO INC) 15 January 1997 (1997-01-15) * the whole document * -----	1	INV. E06B9/40 ADD. E06B9/54
A	DE 39 36 410 A1 (SCHMID, MAX, 8882 LAUINGEN, DE; SCHMID, MAX, 89415 LAUINGEN) 8 May 1991 (1991-05-08) * figures 1,6,8 * -----	1	
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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	8 May 2006	Knerr, G

CATEGORY OF CITED DOCUMENTS

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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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