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(54) A rolling mosquito net for frames provided with foldaway guides

(57) A rolling mosquito net for frames provided with foldaway guides, characterized in that it includes in combination: a mosquito net (12) that can be self-rolled into a suitable lateral, vertically disposed rolling-shutter box (1), and is provided with a stationary upper guide means (4) and a movable lower guide means (11) able to be folded away into a control bar handle (10) operated by the user during the mosquito net rolling step and to project outside of such control bar handle during the mosquito net unrolling step, thus ensuring a correct positioning of the unrolled mosquito net (12) and to reduce the overall dimensions of the guide means when the mosquito net is in its rolled position within box (1). Said foldaway guide means consists essentially of a chain (11) with an end hinged to a stationary support (7) integral with a housing seat (IS) placed at the lower end of the box.

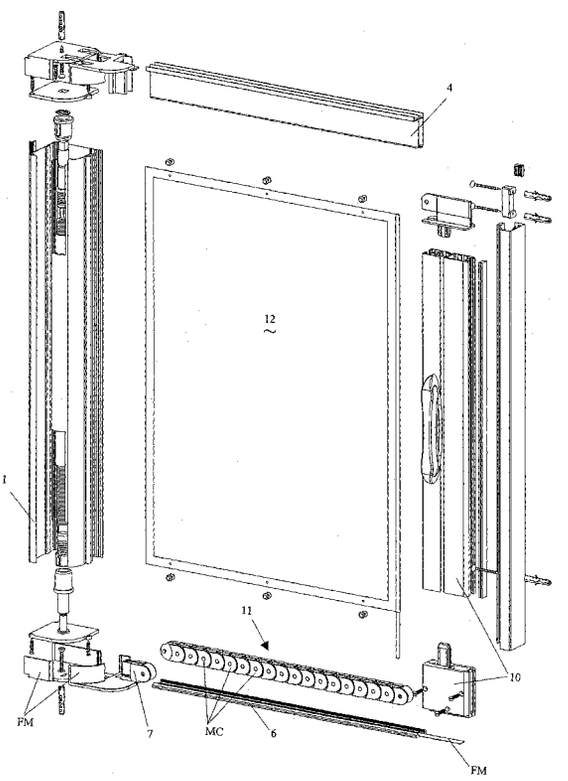

FIG. 11

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Description

[0001] The present invention relates to frames and particularly a rolling mosquito net provided with guides that are folded away upon opening the mosquito net (rolled in the rolling-shutter box) when the same is not in use.

[0002] The currently known rolling mosquito nets are characterized by left and right or upper and lower side guides according to whether the mosquito net is of the vertically or horizontally sliding type. At any rate, however, such upright or transversal guides are stationary with respect to the frame so that they are a useless encumbrance as well as a reduction of the opening of the window or French window, thus obstructing the way especially through the latter.

[0003] Another drawback of the prior art is that such stationary guides are aesthetically unpleasant.

[0004] The main object of the present invention is to overcome the above-mentioned problems by providing a rolling mosquito net provided with guide means that extends when the mosquito net is being used and are folded away when the same is not in use, thus eliminating parts that can obstruct or hinder the way through the opening of the frame.

[0005] This has been accomplished according to the invention by providing a mosquito net that can be self-rolled into a suitable rolling-shutter box, and it is provided with a stationary upper guide means and a movable lower guide means able to be folded away into a control bar handle operated by the user during the mosquito net rolling step and to project outside of such control bar handle during the mosquito net unrolling step, thus ensuring a correct positioning of the unrolled mosquito net.

[0006] A better understanding of the invention will result from the following detailed description with reference to the accompanying drawings that show only by way of a not limiting example two preferred embodiments.

[0007] In the drawings:

Figure 1 is an exploded view of the mosquito net according to the invention;

Figure 2 is a vertical section of the mosquito net of Fig. 1 installed in a frame, in fully unrolled position;

Figure 3 is a section along the plane B-B of Fig. 2;

Figure 4 is an axonometric projection view of the mosquito net of Fig. 2 in which the foldaway chain is shown;

Figure 5 is an elevation view of the mosquito net placed on a frame, in a fully rolled position in the rolling-shutter box;

Figure 6 is an axonometric projection view showing the fully rolled mosquito net of Fig. 5;

Figures 7A-7C are top, side, and bottom views of a link of the foldaway chain, respectively;

Figures 7D-7E are cross section and axonometric projection views of a chain link, respectively;

Figure 8 is an axonometric projection view showing the detail of the peripheral "buttons" of the mosquito net sliding within the foldaway chain which is hollow to allow such sliding;

Figure 9 is an axonometric projection view of only the foldaway chain;

Figure 10 is a section view similar to Fig. 2 showing the unrolled mosquito net with the buttons inside the chain on the lower side;

Figure 11 is an exploded view of a second embodiment of the invention, as a whole;

Figure 12 is an axonometric projection view of a detail relative to the elastic snap-blocking system of the chain at the lower end of the bar handle;

Figure 13 is a vertical cross section view of the lower end of the bar handle of Fig. 12;

Figure 14 is a vertical cross section of the lower end of the bar handle under fully assembled condition;

Figure 15 is an axonometric projection view showing the lower end of the rolling-shutter box together with the first portion of the lower guide section bar and the fastening link of the chain;

Figure 16 is an elevation front view of a chain link positioned on the corresponding lower guide section bar; and

Figures 17A, 17B and 17C are back, front, forward axonometric projection views of two chain links provided with magnets.

[0008] Mosquito nets with vertically disposed side box, a stationary upper guide means and lower foldaway guide means are described below. Such mosquito nets slide in the horizontal direction even if the invention can be applied without modifications to mosquito nets that are rolled/unrolled in the vertical direction.

[0009] With reference to figures 1 to 10, the mosquito net according to the present invention includes essentially: a box 1 in which the mosquito net 12 is rolled, two (upper and lower) housing seats IS for the mosquito net placed at both ends of the box, a stationary upper guide 4 connected to the upper housing seat IS, a bar handle

10 which is in slidable connection with such foldaway guide means consisting essentially of a chain 11 having an end which is hinged to a support 7 integral with the lower housing seat, as well as a fitting section bar 8 of the bar handle 10 which is secured to the side of the frame opposite to box 1 so as to block the bar handle in the (unrolled) position of use of the mosquito net.

[0010] As can be easily inferred from the figures, during the unrolling motion of the self-rolling mosquito net 12, chain 11 comes out of bar handle 10 (which moves away from box 1) and lies down at the lower side of the frame on a stationary section bar 6 with small thickness which is a fixed seat preventing any crosswise shift of chain 11 which guides mosquito net 12 from the lower side. Thus chain 11 does not undergo any shift orthogonal to the plane of mosquito net 12 that is then free from the so-called "sail effect" which, as known, takes place in the presence of wind.

[0011] To this end, it should be appreciated that according to a peculiar feature of the invention, the upper edge of the mosquito net 12 slides in the stationary upper guide 4, and its lower edge slides in the chain 11, the links of which are hollow and provided with an upper longitudinal slot 11A to allow such sliding (figs. 7A-7E and 9).

[0012] In the first embodiment described, the mosquito net 12 is preferably provided with a peripheral semirigid rubber or plastic edge or frame 12A which is able to keep taut the mosquito net and to avoid the formation of wrinkles (fig. 8) during the sliding and when the mosquito net is in the unrolled position. To this purpose, "buttons" 15 secured to the peripheral edge 12A are located at the upper and lower sides of the mosquito net and are able to slide in the stationary upper guide 4 and the hollow chain 11, respectively, thus preventing the mosquito net from being released therefrom.

[0013] In figure 2 there is shown the lower portion of the bar handle 10 carrying an angle member 13 which guides the links of chain 11 from the vertical position (rolled mosquito net) to the horizontal position (unrolled mosquito net) and vice versa. Such guide angle member 13 is connected to seat 14 for chain 11 inside bar handle 10 (fig. 3). The peripheral edge 12A is blocked with its vertical side in a suitable housing arranged in bar handle 10.

[0014] Advantageously, as shown in figures 5 and 6, when the mosquito net is completely rolled in its box 1, the opening of the frame is much more free than the frames on which the current rolling mosquito nets are installed.

[0015] In the described embodiments such box 1 is provided with a spring rolling system 2 of the known type as well as end supports 5 for its fastening to the frame in which the relative upper and lower housing seats IS are fitted. Supports 5 are closed by suitable plugs 3 also acting as seats for the ends of the self-rolling roller.

[0016] At last, bar handle 10 is fastened to the fitting section bar 8 preferably by a magnetic band arranged both inside the fitting section bar and the bar handle.

[0017] It is to be noted that the invention is particularly (even if not exclusively) useful in those case in which the frames are installed in places frequented by handicapped on wheelchair. In fact the stationary lower section bar 6 having rounded edges and a thickness of preferably about 3 mm does not hamper the wheels of the wheelchairs. The guides or the section bars which are usually provided in the current mosquito nets are instead an obstacle to the free transit of a wheelchair, thus limiting any free movement of the handicapped.

[0018] In case the frame has a very large opening so that it is advisable to arrange two mosquito nets of the type described above opposing to each other, the fitting section bar 8 is of course missing because in this case the two bar handles 10 are bound to each other.

[0019] As an alternative to the magnetic member mentioned above, it is also possible to provide mechanical fitting means of the known type.

[0020] Although the mosquito net described above fully achieves the predetermined purposes, it should be noted that in case of gusts of wind the foldaway chain described above can sometime be raised accidentally due to the so-called "sail effect" of the mosquito net as the above-mentioned thin guide section bar 6 arranged on the floor as described above, even if it prevents the side movements of the chain, does not hinder the movements having also a vertical component which is caused, for example, by the lifting of the chain from the floor just because of the "sail effect".

[0021] Moreover, the first embodiment of the invention described above has no intermediate opening positions: in other words, the mosquito net can be only installed in a completely rolled or completely unrolled position, which can be difficult in case of very large frames in which two self-rolling mosquito nets opposing to each other are provided. In such case, to pass across the opening of the frame it is necessary at least to re-wind a portion of the mosquito net by one hand and to retain the other portion of the mosquito net by the other hand which otherwise would tend to re-wind suddenly because of the lack of the reciprocal connection of the two portions of the mosquito nets with possible damages.

[0022] A second embodiment of the invention shown in figures 11 to 17C provides further blocking means of the chain in the direction perpendicular to the chain laying plane as well as means to keep the mosquito net also in a partially unrolled position.

[0023] In particular, this second embodiment includes a mosquito net of the type described above which is further provided with:

- magnetic means to connect the links of the chain to the lower guide section bar;
- elastic snap connection means to retain automatically the mosquito net in a partially unrolled position; and
- slidable fitting means to guide and to retain the ends

of the operating bar handle in its seat.

[0024] The latter is able to prevent that the lower end of the bar handle sliding along the lower guide section bar comes out of such section bar which is necessarily very thin in order not to be an obstacle to people, even handicapped on wheelchairs, passing across the opening of the frame on which the mosquito net in installed.

[0025] With reference to figures 11 to 17C, according to a first peculiar feature of such second embodiment of the invention, the foldaway chain 11 is provided with magnetic means M able to co-operate with a stationary guide section bar 6 on the floor with small thickness which is either of ferromagnetic material or provides a longitudinal strip FM of such material so that the magnets M of chain 11 can be magnetically attracted thereby.

[0026] Thus, according to the invention, links MC of chain 11 retaining mosquito net 12 are kept in their positions not only according to a horizontal direction crosswise to the chain but also according to the vertical direction.

[0027] Such magnets M are arranged in all or some links MC of chain 11 and are located adjacent to the lower wall thereof which is parallel to the guide section bar 6.

[0028] Furthermore, the embodiment described provides that the guide section bar 6 has a dovetail-shaped cross section able to co-operate with the lower end 10' of the bar handle 10 in order to avoid that accidental "derailments" of the bar handle take place during the mosquito net opening or closure. The lower end 10' of the bar handle has of course a shape conjugated to the guide section bar 6.

[0029] It is however evident that such variation of the lower guide section bar can also be applied as such to the first embodiment taking care that the lower hand of the bar handle has the features described above.

[0030] Finally, according to a further feature of the invention, a preferably wedge-shaped member EC which is automatically snap-fitted between two adjacent links MC is arranged in the already described angle guide member 13 to block the chain in any intermediate position between the complete opening or closure of the mosquito net with the same "pitch" as the chain.

[0031] Advantageously, in order to move the bar handle 10 by unrolling or re-winding mosquito net 12, the user should only "overcome" the resistance of such blocking member EC between two adjoining links that is kept in such position by suitably yielding elastic means.

[0032] In other words, in order to unroll or re-wind the mosquito net 12, it is necessary to move the bar handle 10 to overcome the resistance of such snap-fitting member EC which is pressed between two adjoining links MC by a preferably helical spring S and has generally the shape of a truncated pyramid so that because of the movement of the bar handle the fitting member EC engaged between links MC interferes with its inclined walls against the bevelled edge of the lower wall I of one link, thus generating a thrust tending to move it away from the chain against the elastic thrust of spring S.

[0033] It should be appreciated that in the second embodiment described magnets M are distributed along chain 11 and not on the guide section bar 6 so as to avoid the excessive accumulation of dirt and metal particles that could be attracted by magnets M. In fact, if the latter would be placed in the stationary guide section bar 6 on the floor, they would quickly give rise to the obstruction of the same unless frequent cleaning are made.

[0034] Finally, the stationary support 7 is preferably shaped as a half link of the chain to guarantee the maximum fluidity and smoothness of the movement of extraction from and re-insertion of the chain into the bar handle.

[0035] The present invention has been described according to two preferred embodiments, however, it should be understood that several modifications and/or variations can be made without departing from the scope of the claims.

Claims

1. A rolling mosquito net for frames provided with foldaway guides, **characterized in that** it includes in combination: a mosquito net (12) that can be self-rolled into a suitable lateral, vertically disposed rolling-shutter box (1), and is provided with a stationary upper guide means (4) and a movable lower guide means (11) able to be folded away into a control bar handle (10) operated by the user during the mosquito net rolling step and to project outside of such control bar handle during the mosquito net unrolling step, thus ensuring a correct positioning of the unrolled mosquito net (12) and to reduce the overall dimensions of the guide means when the mosquito net is in its rolled position within box (1).

2. The rolling mosquito net of the preceding claim, **characterized in that** said foldaway guide means consists essentially of a chain (11) with an end hinged to a stationary support (7) integral with a housing seat (IS) placed at the lower end of the box.

3. The rolling mosquito net of the preceding claim, **characterized in that** during the unrolling motion of the self-rolling mosquito net (12), chain (11) comes out of bar handle (10) which moves away from box (1) and lies down at the lower side of the frame on a suitable stationary section bar (6) with small thickness which is a fixed seat preventing any crosswise shift of chain (11) which guides mosquito net (12) from the lower side, thus obtaining that chain (11) does not undergo any shift orthogonal to

the plane of mosquito net (12) that is then free from the so-called "sail effect".

4. The rolling mosquito net according to any claim from 2 on, **characterized in that** the upper edge of the mosquito net 12 slides in the stationary upper guide 4, and its lower edge slides in the chain 11, the links of which are hollow and provided with an upper longitudinal slot 11A to allow such sliding.

5. The rolling mosquito net of the preceding claim, **characterized in that** the mosquito net (12) is provided with a peripheral semirigid rubber or plastic edge or frame (12A) which is able to keep taut the mosquito net and to avoid the formation of wrinkles during the sliding and when the mosquito net is in the unrolled position.

6. The rolling mosquito net of the preceding claim, **characterized in that** in the lower portion of the bar handle (10) an angle member (13) is located which guides the links of chain (11) from the vertical position (rolled mosquito net) to the horizontal position (unrolled mosquito net) and vice versa, said guide angle member (13) being connected to a seat (14) for chain (11) inside bar handle (10).

7. The rolling mosquito net of claim 5 or 6, **characterized in that** buttons (15) secured to the peripheral edge (12A) are located at the upper and lower sides of the mosquito net (12) and are able to slide in the stationary upper guide (4) and the hollow chain (11), respectively, thus preventing the mosquito net from being released therefrom.

8. The rolling mosquito net of claim 5, **characterized in that** the peripheral semirigid edge (12A) of the mosquito net is blocked with its vertical side opposite to the box (1) in a suitable housing arranged in bar handle (10).

9. The rolling mosquito net of any preceding claim, **characterized in that** such box (1) is provided with a spring rolling system (2) of the known type as well as end supports (5) for its fastening to the frame in which the relative upper and lower housing seats (IS) are fitted, the supports (5) being closed by suitable plugs (3) also acting as seats for the ends of the self-rolling roller.

10. The rolling mosquito net of any preceding claim, **characterized in that** there is provided a fitting section bar (8) of the bar handle (10) which is secured to the side of the frame opposite to box (1) so as to block the bar handle in the (unrolled) position of use of the mosquito net.

11. The rolling mosquito net of the preceding claim, **characterized in that** bar handle (10) is fastened in a removable manner to the fitting section bar (8) by a magnetic band arranged both inside the fitting section bar and the bar handle.

12. The rolling mosquito net of any claims from 1 to 9, **characterized in that** said bar handle (10) is bound to a second bar handle of another specular rolling mosquito net to carry out an installation with two mirror-like opposing mosquito nets, said bar handle being provided with magnetic means co-operating with those of the second bar handle to make a reciprocal connection.

13. The rolling mosquito net according to any claim from 10 on, **characterized in that** in alternative to said magnetic means or bands, a mechanical fitting means of the known type is provided.

14. The rolling mosquito net of claim 3, **characterized in that** said lower section bar (6) has rounded edges and a thickness of about 3 mm so that any obstacle for the wheels of the wheelchairs of the handicapped or the like is avoided and a free transit to the latter also through the frames provided with said mosquito nets is allowed.

15. The rolling mosquito net of claim 1, **characterized in that** it further includes magnetic means (M) to connect said lower movable guide means to a lower guide section bar (6), elastic snap connection means to retain automatically the mosquito net in a partially unrolled position, and slidable fitting means to guide and to retain the ends of the operating bar handle in its seat.

16. The rolling mosquito net of the preceding claim, **characterized in that** said foldaway guide means consists essentially of a chain (11) having an end which is hinged to a stationary support (7) integral with the lower housing seat (IS) located at the lower end of the box.

17. The rolling mosquito net of claim 15 or 16, **characterized in that** said foldaway chain (11) is provided with magnetic means (M) able to co-operate with a stationary guide section bar (6) on the floor with small thickness which is either of ferromagnetic material or provides a longitudinal strip (FM) of such material so that the magnets (M) of chain (11) can be magnetically attracted thereby so that the links (MC) of chain (11) retaining mosquito net (12) are kept in their positions not only according to a horizontal direction crosswise to the chain but also according to the vertical direction.

18. The rolling mosquito net of the preceding claim, **characterized in that** said magnets (M) are ar-

ranged in all or some links (MC) of chain (11) and are located adjacent to the lower wall thereof which is parallel to the guide section bar (6).

19. The rolling mosquito net of claim 14 or 17, **characterized in that** said guide section bar (6) has a dovetail-shaped cross section able to co-operate with the lower end (10') of the bar handle (10) in order to avoid that accidental "derailments" of the bar handle take place during the mosquito net opening or closure, said lower end (10') of the bar handle having a shape conjugated to the guide section bar (6).

20. The rolling mosquito net of any claims from 15 to 19, **characterized in that** an angle member (13) which guides the links of chain (11) from the vertical position (rolled mosquito net) to the horizontal position (unrolled mosquito net) and vice versa is arranged in the lower portion of the bar handle (10), which angle guide member (13) is provided with a preferably wedge-shaped member (EC) which is automatically snap-fitted between two adjacent links (MC) to block the chain in any intermediate position between the complete opening or closure of the mosquito net with the same "pitch" as the chain so that in order to move the bar handle (10) by unrolling or re-winding mosquito net (12), the user should only "overcome" the resistance of such blocking member (EC) between two adjoining links that is kept in such position by suitably yielding elastic means.

21. The rolling mosquito net of the preceding claim, **characterized in that** said snap-fitting member (EC) which is pressed between two adjoining links (MC) by a preferably helical spring (S) has generally the shape of a truncated pyramid so that because of the movement of the bar handle (10) the fitting member (EC) engaged between links (MC) interferes with its inclined walls against the bevelled edge of the lower wall (I) of one link, thus generating a thrust tending to move it away from the chain against the elastic thrust of spring (S) .

22. The rolling mosquito net of the preceding claim, **characterized in that** the stationary support (7) is shaped as a half link of the chain to guarantee the maximum fluidity and smoothness of the movement of extraction from and re-insertion of the chain into the bar handle.

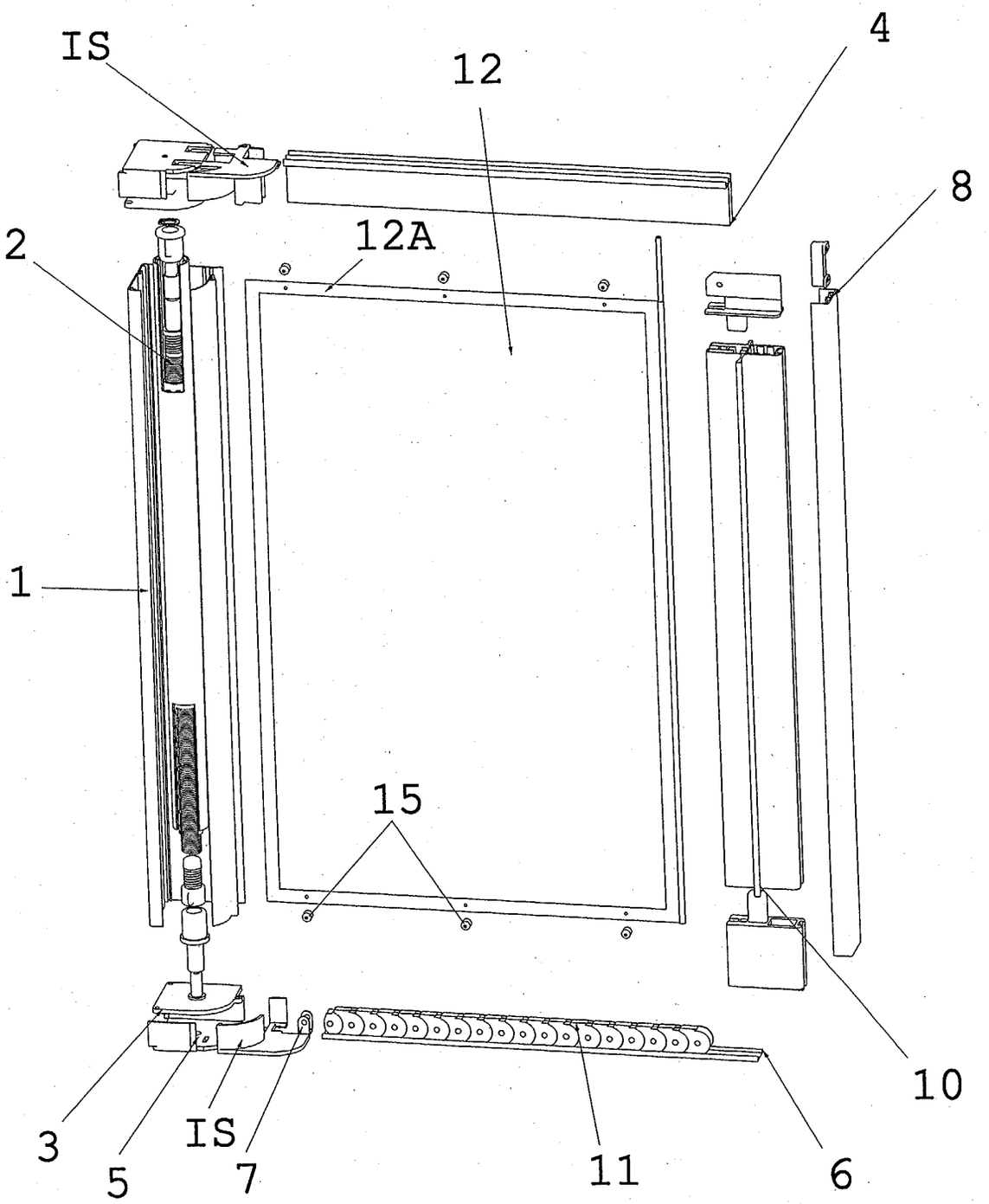

FIG. 1

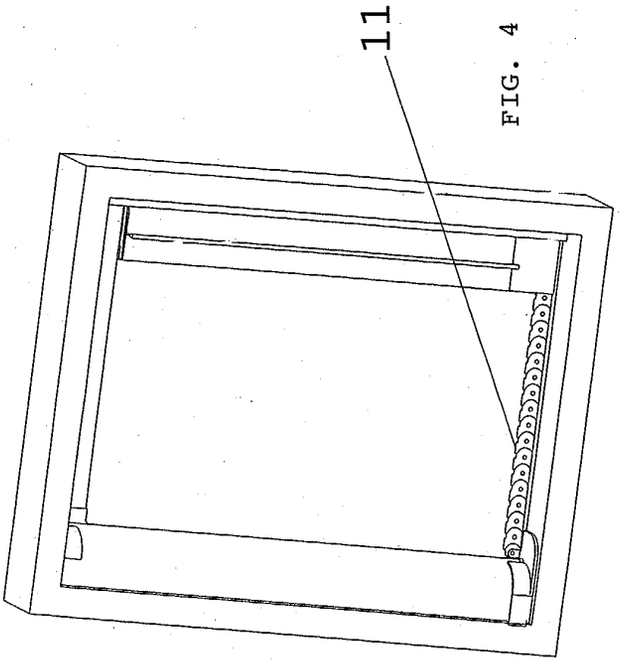

FIG. 4

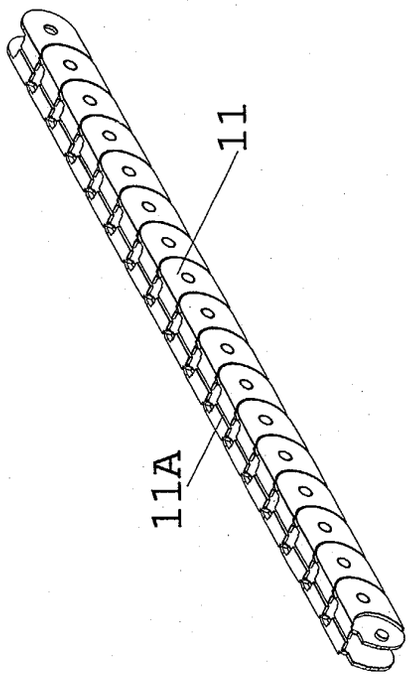

FIG. 9

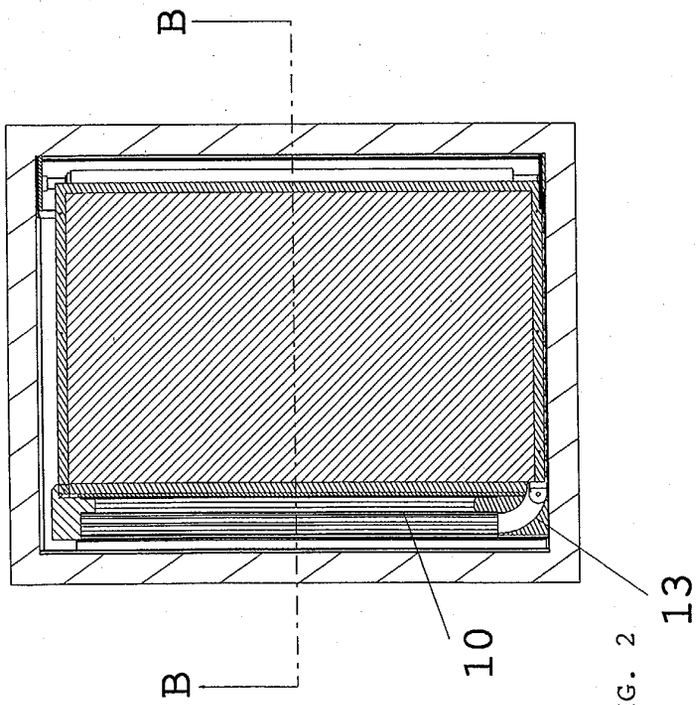

FIG. 2

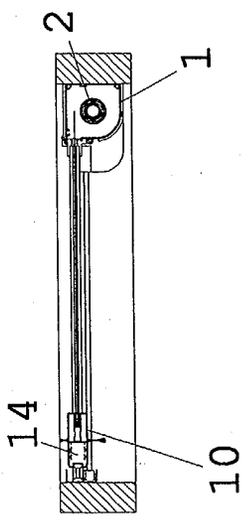

FIG. 3

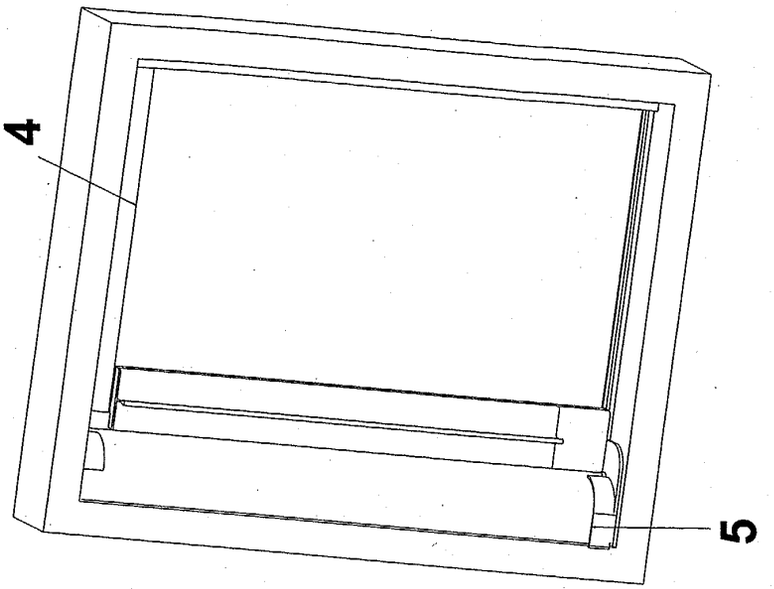

FIG. 6

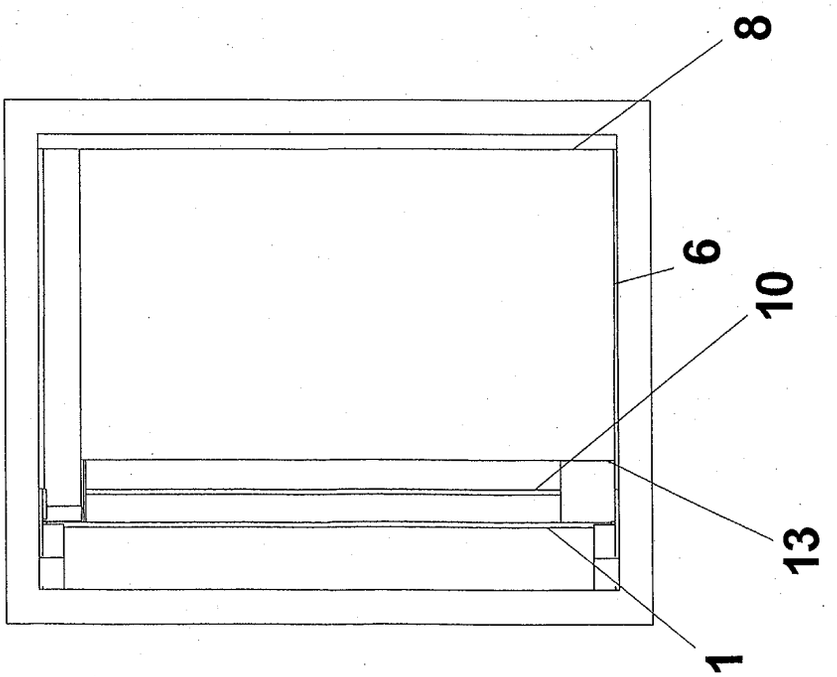

FIG. 5

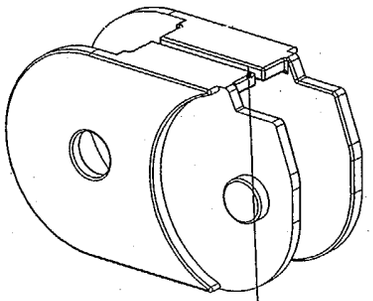

FIG. 7E

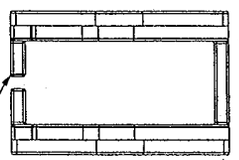

FIG. 7D

11A

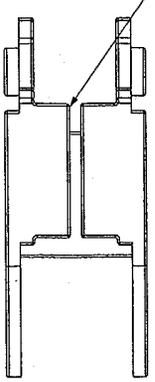

FIG. 7A

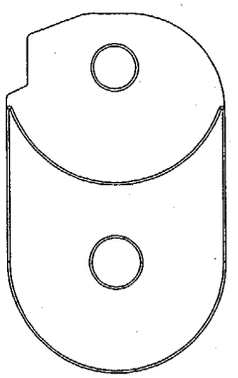

FIG. 7B

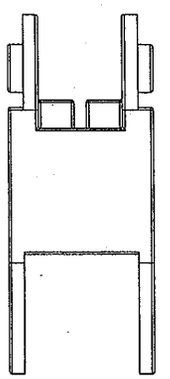

FIG. 7C

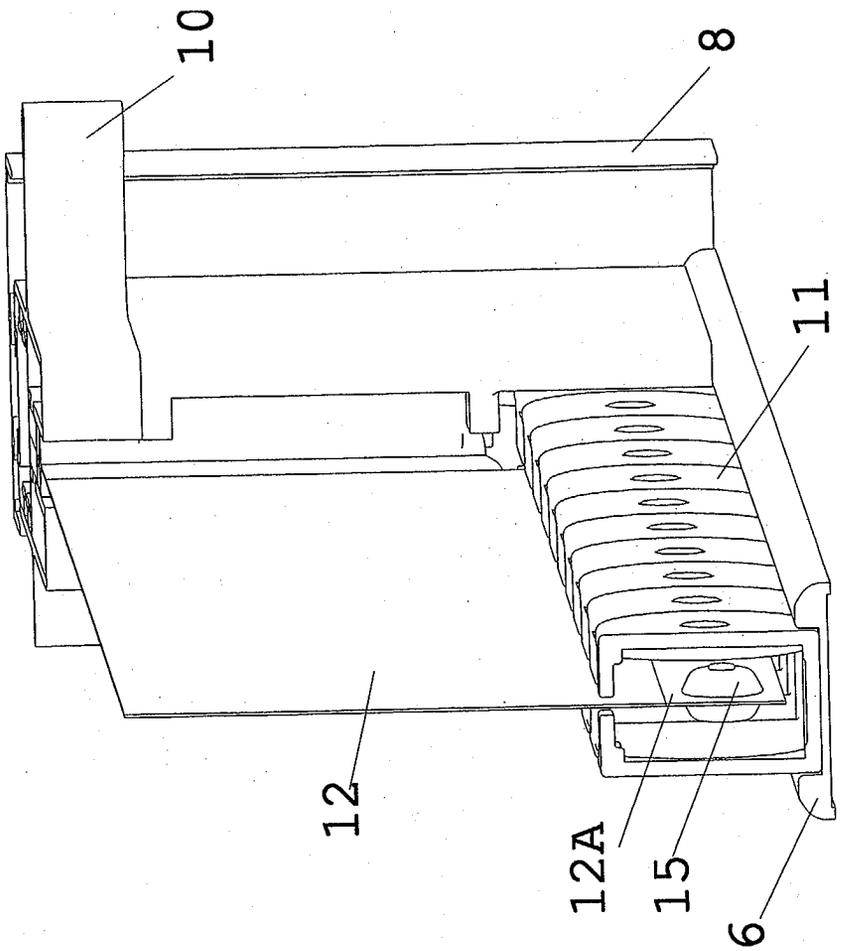

FIG. 8

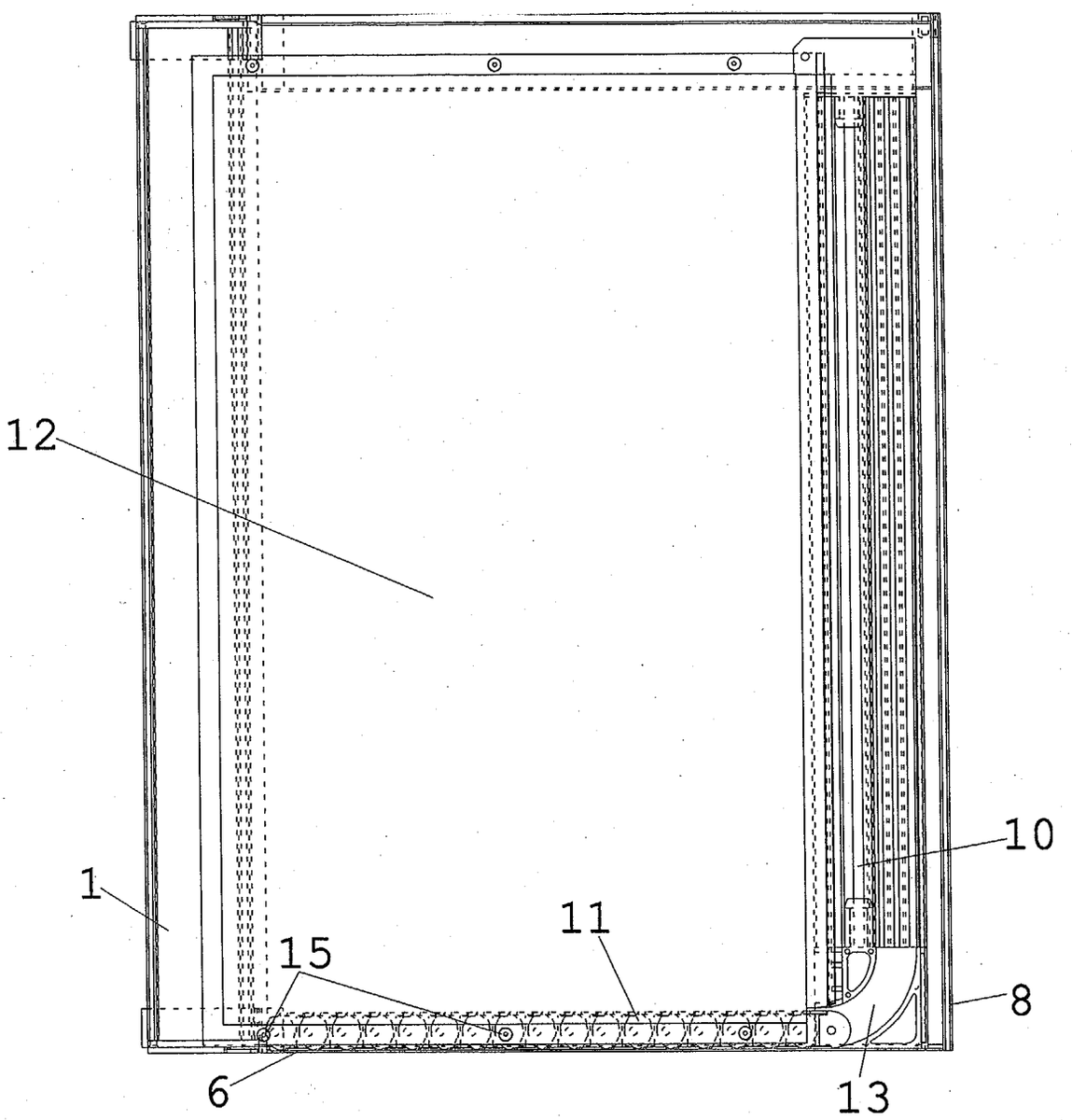

FIG. 10

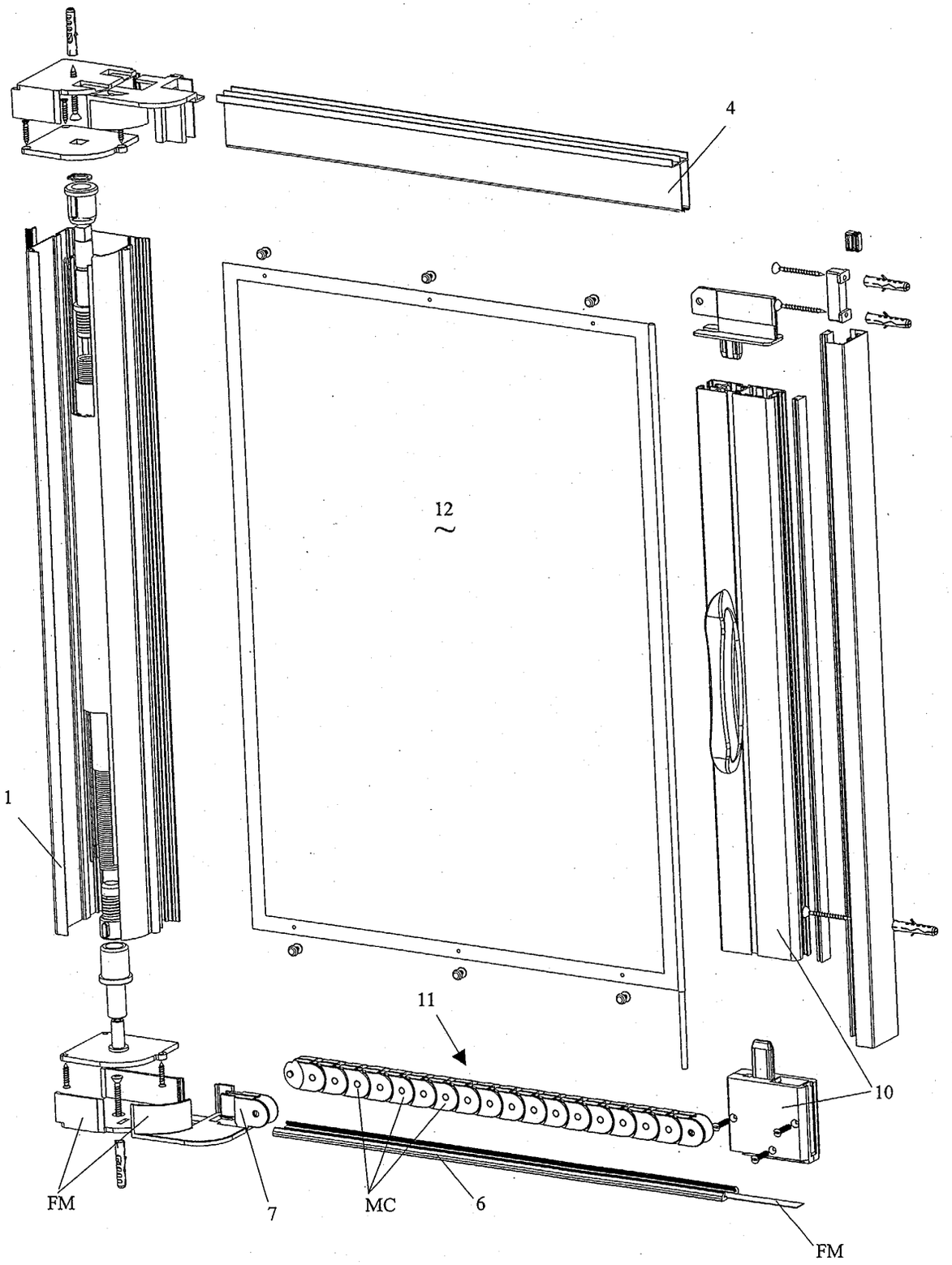

FIG. 11

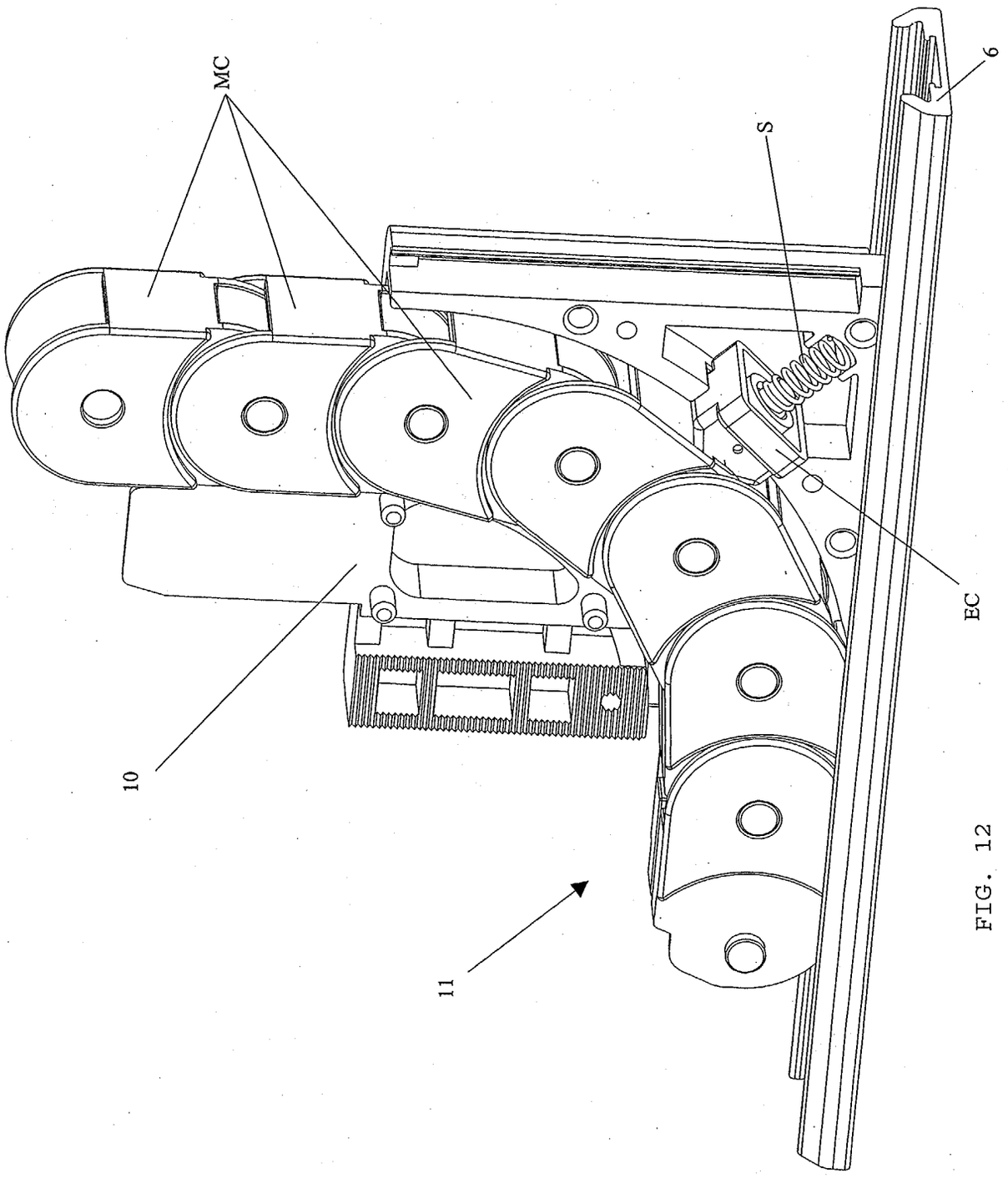

FIG. 12

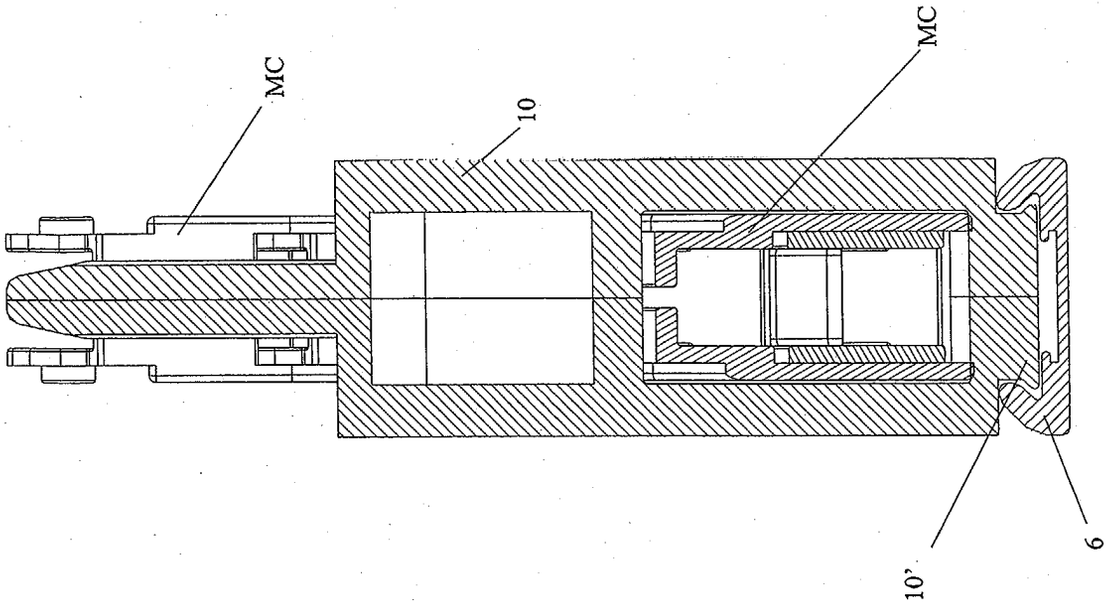

FIG. 14

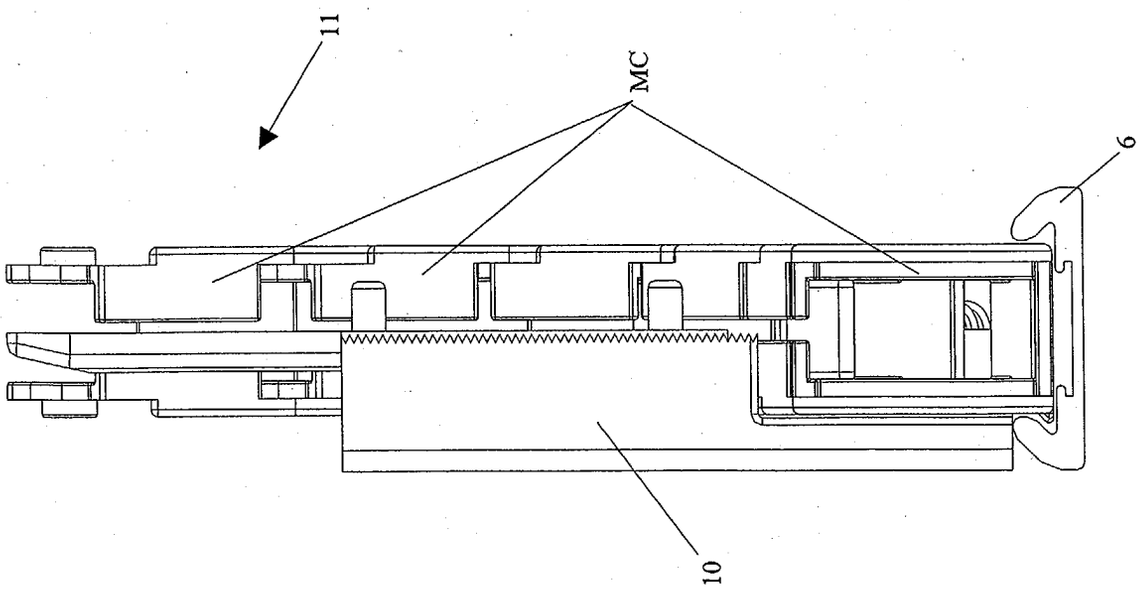

FIG. 13

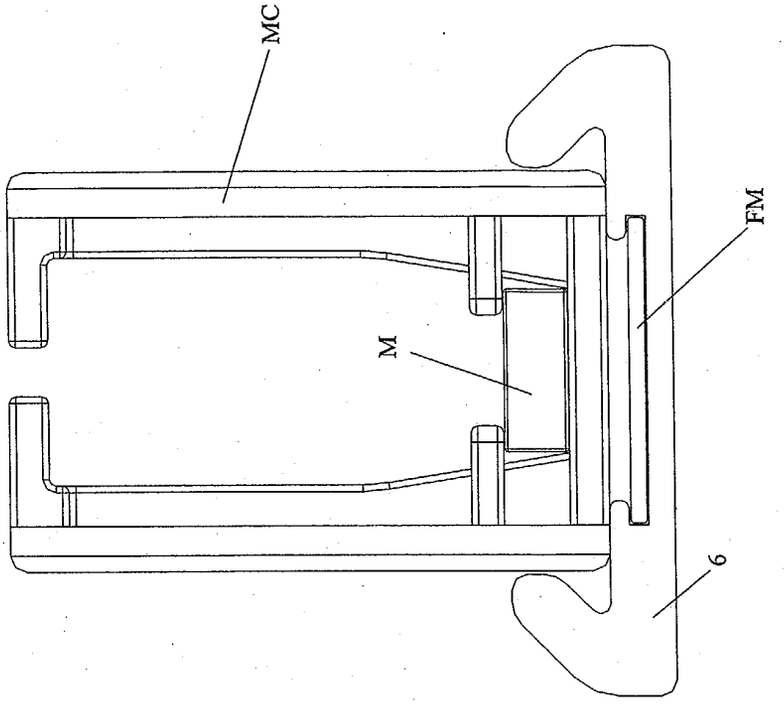

FIG. 16

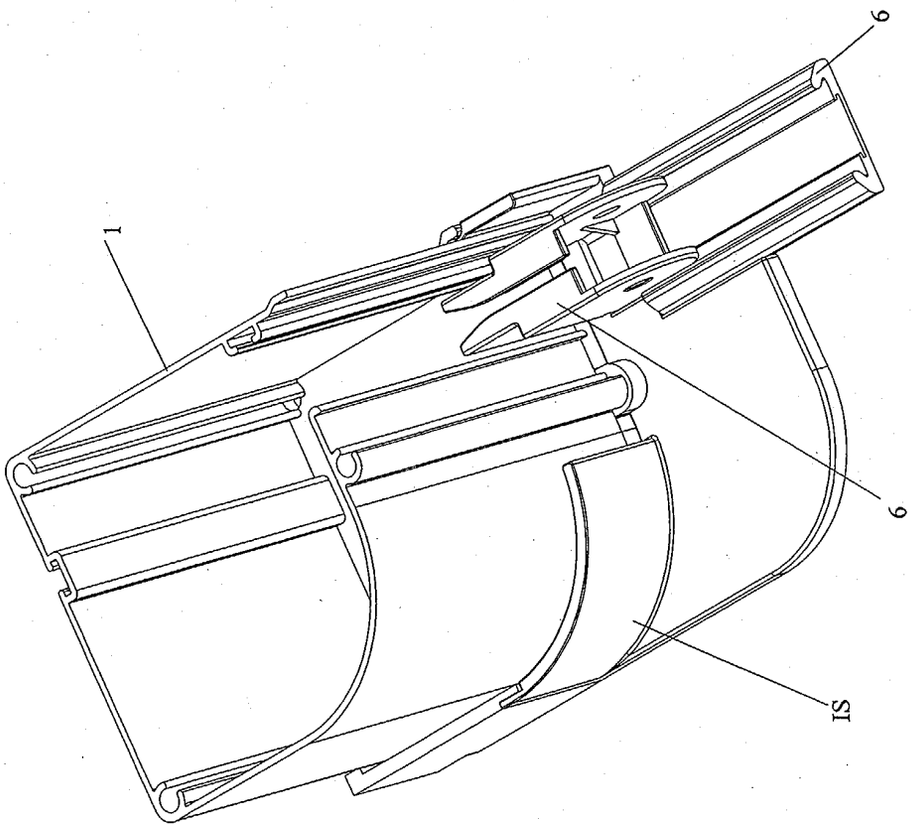

FIG. 15

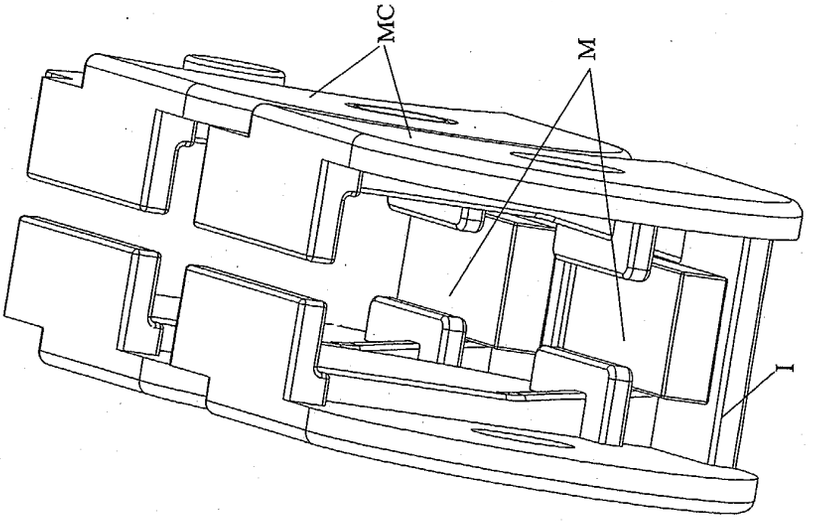

FIG. 17C

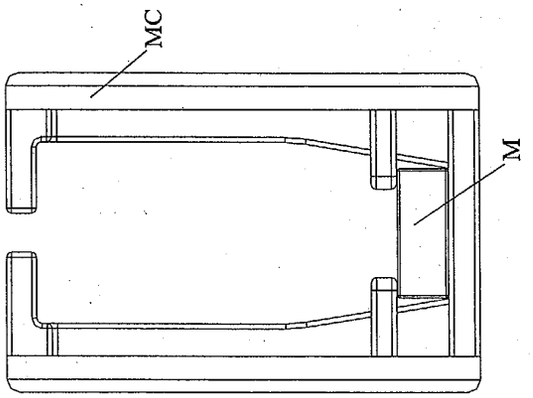

FIG. 17B

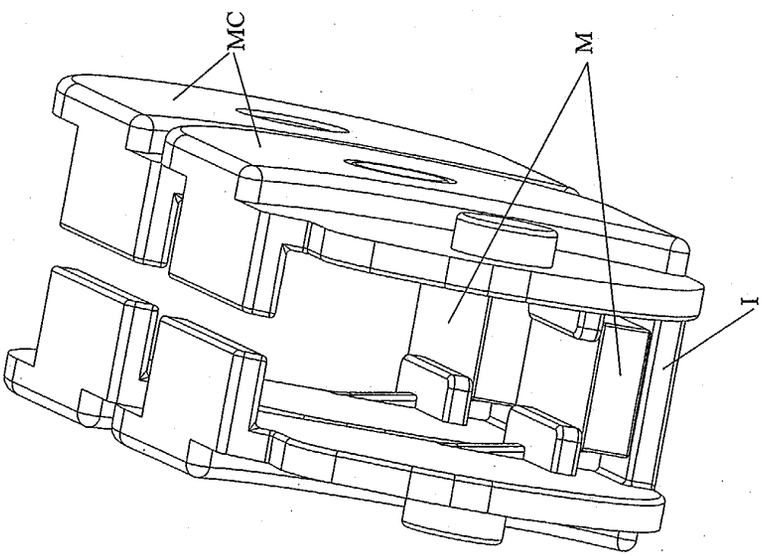

FIG. 17A