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Description

[0001] This invention relates to a slidingly collapsible grate that can be validly used in the building sector for homes, offices and industrial plants, the grate being equipped with a plurality of bars slidingly mounted with respect to the frame and reciprocally coupled two by two by means of a plurality of levers.

[0002] In particular, this invention refers to a collapsible grate equipped with a plurality of bars coupled together by a plurality of levers in such a way as to combine easy switching between a n o p e n a n d a closed position, easy use and a high degree of resistance to break-in attempts.

[0003] This invention also refers to the method for producing the grate.

[0004] In the sector of collapsible grates for a substantially rectangular opening, the known grates are equipped with a box frame substantially rectangular in shape, a pair of horizontal guides which are positioned at the top and bottom of the opening to be closed and which comprise a plurality of vertical bars or posts coupled to the guides by means of sliding blocks so that the bars can slide freely from and to a closed position in the opening. Collapsible grates are usually equipped with elements resistant to transverse stress, which are normally designed to connect the bars together two by two in such a way that the grate can be switched from an open position to a closed position by moving the end bar.

[0005] It should be pointed out that, traditionally, the collapsible grate sector has always, albeit unjustly, been considered not particularly worthy of attention, since these collapsible grates are often considered to be a temporary solution or a makeshift with respect to fixed grates. Collapsible grates are therefore normally made from low-cost metal materials, with box or extruded elements or more frequently produced by pressing, and normally with a C-shaped cross-section which is easily deformed due to transverse deflection, especially if the elements are of a considerable length. The poor quality of the basic components has naturally had a negative effect on the durability of classic forms of collapsible grates, above all if they are installed, as is frequently the case, to close windows and doors of holiday homes, which may also be near to the sea. The rare opening and closing of the grates in these cases thus allows the accumulation of ferrous oxides in the parts coupled together, with the consequence that known collapsible grates are all affected by opening and closing problems due to oxidation and are very noisy when opened and closed.

[0006] The discussion on prior art will describe particularly significant grates, the structural patterns of which are still up-to-date, and it should not be surprising if these are found in very old patents, dating back to the 1920s.

[0007] For example, in the United States patent 1718649, the grate comprises a plurality of bars and a plurality of alternating connecting rods. Each connecting rod is connected to each of the two bars by means of a pair of substantially identical levers. Each connecting rod

is therefore shared by a pair of adjacent articulated quadrilaterals, whose respective frames consist of bars positioned immediately upstream and downstream of the connecting rod, and keeps the bars substantially parallel to each other and therefore vertical. It should be noted that the bars are spaced fairly widely apart, so in order to increase the resistance to break-in attempts, a plurality of reinforcement panels is foreseen, joining the bars and the connecting rods together and extending along the length of the bars. The levers that join the connecting rods to the bars are always inclined downwards and, while this makes it easier to move the grate from the open position to the closed collapsed position, it makes the opening more difficult, especially because the hinges connecting the bars to the panels also offer resistance on opening.

[0008] In this particularly obsolete embodiment, the disadvantages of the excessive force needed to open and close it and of the noisiness are particularly evident. In addition to being very heavy to operate, this type of grate therefore also requires frequent maintenance to lubricate all the hinges.

[0009] Also referring to United States patent 1877829 the bars are vertical and the ends of each one are slidingly connected to the frame. The bars are also connected to each other in pairs by at least one pair of levers, cross-hinged together and visible when the grate is open. Each of the upper ends of the levers of each cross is connected to the corresponding bar by means of a turning pair, while each of the lower ends is connected to the other corresponding bar by means of a sliding pair, and therefore in a freely sliding way. Each cross is therefore designed to close when the grate is opened, and to reinforce the grate in the event of maneuvers made transversally to the grate, for example in break-in attempts. In addition to requiring particularly accurate component performance, the presence of sliding pairs complicates the assembly operations and makes frequent maintenance and lubrication absolutely necessary. Furthermore, again according to what is described in United States patent 1877829, the grate is equipped with at least one curtain, which is connected vertically to the bars and conceals the grate externally, and with appropriate guide means for the upper and lower ends of the curtain. The curtain is fixed to the bars in a plurality of points and cannot be precisely tensioned; it is therefore loose and, after prolonged use, becomes even less taut and not very attractive.

[0010] With reference to United States patent 4006768, each bar is enclosed in a slidingly mounted longitudinal sleeve, and the sleeves arranged in succession along the sliding direction of the bars are connected together in pairs by levers. These levers are hinged from opposite sides of each sleeve so as to be inclined and constantly parallel to each other. The levers are arranged symmetrically with respect to each sleeve, and each sleeve is raised or lowered with respect to the current operating position, shifting the grate between the extended configuration, in which the bars are spaced apart with

the grate acting as a closure and obstacle to break-in attempts, and the minimum obstruction position, in which the bars are close together to allow access to the window opening. Each sleeve therefore presents a plurality of housings for the lever coupling pins and these housings are arranged in pairs on opposite sides with respect to the axis of the sleeve. In addition to considerably weakening the sleeve due to stress transversal to its axis, this construction solution naturally presents notable functioning problems due to the various types of dust that accumulate between each bar and the relative sleeve and which cause a considerable increase in friction between the parts which move during opening and closing of the grate, compromising correct functioning in a short time.

[0011] Another inventive concept in grates is described in the European patent EP 0287130, which also corresponds to the United States patent US 4816310.

[0012] According to this patent it is possible to construct a grate comprising a plurality of vertical posts made from box bodies designed to act as longitudinal guides for sliding blocks moved into end positions by cross-hinged levers which connect the posts in pairs so that the grate can be moved from a first operative position in which it presents the maximum longitudinal extension, and is designed to close an opening, and a second operative position in which the posts are moved together laterally, leaving the opening freely accessible.

[0013] In the United States patent 6412234, ensuing from the Italian patent application RN99A000005, instructions are provided for the construction of a grate that comprises a plurality of vertical uprights connected together by transverse arms which are crossed and parallel in pairs, the free ends being connected in a freely sliding way to the uprights, even though the patent focuses on the construction of uprights provided with an external cutting-proof protection. Each upright comprises a pair of vertical bars, transversally facing the movement direction of the grate and, with reference to figure 2 of the patent in question, which should be referred to for the sake of brevity, these bars are coupled by a pin, indicated by reference number 6 in figure 2 of the patent in question, which acts as a sliding block for the ends of the corresponding bars. Therefore, the structure described in US patent 6412234 also involves sliding connections between the uprights and the respective transverse connecting bars and thus the relative problems of friction in the linear motion and the consequent wear of the parts involved.

[0014] It should also be mentioned that some known collapsible grates present horizontal guides that delimit the frame at the top and bottom, divided into two C-shaped parts, each representing a side portion of the frame. One of the two C-shaped parts, normally the one with longer horizontal guides, is rigidly connected to the corresponding sides of the respective window opening, while the remaining C-shaped part, which is shorter, rotates outwards from one side of the window opening. In particular, the longitudinal extension of this part is calcu-

lated in such a way as to completely support the assembly of collapsed bars on the corresponding hinge side.

[0015] From the above description it is easy to deduce that the grate sector can be divided into two parts: a first part in which the bars are connected together by means of levers and/or connecting rods and just turning pairs, and a second part in which the bars are connected by means of levers and sliding and turning pairs. The first require less maintenance but are not very sturdy, for example as in the case of the US patent 1718649, and must be reinforced with additional parts as the bars are spaced too wide apart, the result being that the respective structure is excessively complex; the second present an excessive number of turning pairs and sliding pairs, as in the case of US patent 4006768, thus costing more at source, due to the greater cost of the sliding pairs, the greater delicacy of the structure and the greater level of maintenance required. Moreover, the presence of substantially vertical sliding pairs lowers the resistance of the grate to the application of force transversal to the plane of the grate.

[0016] Also according to the European patent EP 0557254 it is possible to construct a grate that presents a combination of turning and sliding pairs for each vertical upright. In particular, the grate comprises a series of vertical uprights, each slidably mounted on guides with a horizontal motion and connected to the two adjacent uprights by means of cross-bars. Each upright is reinforced with a cut-proof core and slidably accommodates an inner longitudinal element, and each cross-bar presents one end attached to a longitudinal element of an upright and rotating freely around a fixed axis, and the other end coupled to the body of a longitudinal element of an adjacent upright by means of a sliding block-slot coupling. Each upright therefore acts as a frame for the cross-bars that connect to an adjacent upright through its longitudinal element, and by means of the respective bars it is connected to the adjacent upright. From its description, this sliding grate is sturdy, takes up little space when collapsed, does not require recesses for installation or frequent maintenance, but the combined presence of turning and sliding pairs not only weakens the structure of the grate but also complicates its production and maintenance, making it expensive to purchase and to maintain. On the other hand, the particularity of the mechanism whereby each upright consists of two longitudinal elements, one external and one internal, makes it necessary to drill a through hole also on the external element for insertion of the connecting rod pin, to allow assembly. It is thus evident that this connecting pin is the weak part of the grate, being very easy for ill-intentioned persons to locate.

[0017] The grates described above therefore require a number of operations to be performed during assembly, for preparation of the components prior to assembly, for their assembly and for the installation of the grate.

[0018] In general, this invention refers to a collapsible sliding grate as claimed in claim 1 that can be validly

used in the building sector for homes, offices and industrial plants, the grate being equipped with a plurality of bars slidably mounted with respect to the frame and reciprocally coupled two by two by means of a plurality of levers. In particular, this invention refers to a collapsible grate equipped with a plurality of bars coupled together by a plurality of levers in such a way as to combine easy switching between an open and a closed position, easy use and a high degree of resistance to break-in and cutting attempts.

[0019] The structure of the grate according to this invention makes the preparation of the components for assembly and the installation of the grate easy and inexpensive.

[0020] The grate according to this invention thus makes it possible to minimise maintenance operations and therefore has a simple, precise and economic construction as well as being easy to install and maintain.

[0021] The grate according to this invention is designed in such a way that a protective element, such as a wind-proof curtain or fly screen, can be fitted and easily replaced at any time.

[0022] According to this invention, a grate is provided with the features described in the claims below.

[0023] This invention also refers to a method for the production of a collapsible sliding grate that can be validly used in the building sector for homes, offices and industrial plants, the grate being equipped with a plurality of bars slidably mounted with respect to the frame, individually reinforced with cut-proof protections and reciprocally coupled two by two by means of a plurality of levers. In particular, this invention refers to a method for the production of a grate that allows the various bars to be pre-assembled before installation in the guides of the frame, so as to apportion the assembly time in steps that can be carried out simultaneously by different workers. The proposed method thus makes it possible to reduce the total assembly time of the grate and consequently to minimise the costs of the grate.

[0024] According to this invention a method is provided for the production of a grate, the features of which are described in at least one of the claims below.

[0025] The invention is now described with reference to the accompanying drawings which illustrate some non-restricting embodiments, in which:

- Figure 1 is a schematic perspective view of a first embodiment of a grate according to the present invention;
- Figure 2 is an exploded enlarged-scale schematic perspective view of figure 1 with parts removed for clarity;
- Figure 3 is an exploded schematic perspective view of a variation of figure 2;
- Figure 4 shows a cross-section plan view of figure 3 as represented by the line IV-IV in figure 3;
- Figure 5 shows a variation of figure 4 with evidence of an enlarged detail;

- Figure 6 is a schematic view of a variation of figure 2 showing also a detail in partially sectioned view;
- Figure 7 is an exploded enlarged-scale view of a first detail extracted from figure 3, showing, on the left and on the top left, two further enlarged details;
- Figure 8 is an exploded enlarged-scale view of a second detail extracted from figure 3; and
- Figure 9 shows an alternative construction solution of the further enlarged details shown in figure 7.

[0026] For the sake of clarity it should be noted that, while this invention will be described with reference to the embodiments illustrated in the following description and in the drawings, it is clear that the invention is not limited to these particular embodiments but that these particular embodiments which will be described below clarify different aspects of this invention according to the following claims.

[0027] In Figure 1, the numeral 1 denotes in its entirety a collapsible grate comprising a frame 10 and an assembly 13 of first bars 14 and second bars 15 coupled to the frame 10 in a freely sliding fashion along a sliding direction 17 indicated for clarity's sake only in Figure 1. The first and second bars 14 and 15 are arranged alternately and each pair formed by a first bar 14 and a second bar 15 positioned consecutively are reciprocally connected by a plurality of first connecting levers 18, in order to form a grid 12. This grid 12 can be freely switched between a first open position, in which the first bars 14 and the second bars 15 are spaced apart, and the grid 12 presents its maximum extension in the direction 17, and a second position, in which the first bars 14 and the second bars 15 are close together to minimise the extension of the grid 12 in the direction 17. It should be noted that in the grate 1 each of the first connecting levers 18 is coupled to the respective first bar 14 and to the respective second bar 15 only by means of turning pairs 19, and that the turning pairs 19 of each first bar 14 and of each second bar 15 are respectively aligned along a respective single axis 3, parallel to the first and second bars 14 and 15. For simplicity this axis 3 is represented with reference to just one bar 14 and one bar 15 only in Figure 2.

[0028] With particular reference to Figure 2, each first bar 14 and each second bar 15 arranged in succession in the grid comprise, respectively, at least one rod 30a (also indicated as first rod) and at least one rod 30b (also indicated as second rod or connecting rod), which are coupled together by means of at least one first lever 18. It should be noted that each pair of first and second bars 14 and 15 arranged in succession, together with the first levers 18 which connect them only by turning pairs 19, can be interpreted as an articulated quadrilateral, interpreting each rod 30a as the frame of the articulated mechanism, the corresponding first levers 18 as the respective rocker levers and the corresponding rod 30b as a connecting rod. If, as in Figure 2, the first levers 18 are substantially identical, the first bars 14 and the second bars 15 will always be parallel to each other when the grid 12

is switched between an open position and any other working position, the grid 12 therefore comprises a plurality of articulated parallelograms arranged in succession and can therefore be defined overall as a structure 4 composed by articulated parallelograms.

[0029] With particular reference to Figure 1, the frame 10 is delimited at the top and bottom by two prismatic guides, 16a and 16b respectively, to which the bars 14 and 15 are coupled in a sliding fashion so that they can freely move along the direction 17, and to make the grid 12 of the grate 1 particularly sturdy and able to resist break-in attempts including those made by applying transverse force to the assembly 13 of the first and second bars 14 and 15. In particular, each guide 16a and 16b presents a track 28, and in particular the guide 16a is equipped with a concave track 28 for rollers 27 which will be described in more detail below, and the guide 16b with a convex track 28 for a sliding element, and in particular a sliding block 26, which delimits the lower part of each rod 30b of each second bar 15 at one of the two respective end portions 25, and each rod 30a of each first bar 14 at one of the two respective end portions 24. It should be noted that, in order to limit the number of reference numbers of the components of the grate 1, it was decided to assign the same number 24, both here and below, to the ends of the rods 30a of the first bars 14, and to do the same with the number 25 assigned both to the ends of the rods 30b of the second bars 15 and of the second box bodies 33. It should also be noted that a sliding block 26 also delimits the lower part of each corresponding first bar 14 at its respective end 24, and each corresponding second bar 15 at its respective end 25, and can thus also be interpreted as a stop element, and called more simply "stop".

[0030] This stop element 26, furthermore, may be used to limit or to adjust the displacement of the rods 30b in such a way that the inclination of the first levers 18 can be limited, to allow an easy displacement of the grid 12 from the first, open position to the second, closed position and viceversa.

[0031] Preferably, in the first, open position of the grid 12 the first levers 18 are inclined with respect to the rods 30a, 30b at an angle of 45° (or, equivalently, 135° if the supplementary angle is considered), whereas in the second, closed position of the grid 12 the first levers 18 lie substantially parallel to the rods 30a, 30b.

[0032] In view of what is described above, the grid 12 presents the particularity that, while the rods 30a are constantly coupled with the guide 16a and the guide 16b, since they form the frame of an articulated parallelogram, the rods 30b of each bar 15 are designed to translate longitudinally under the thrust of the respective first levers 18 when the grate is switched from and to its open position, being connecting rods of an articulated parallelogram. In this case but not only, due to the particular arrangement of the first levers 18, the rods 30b of each bar 15 are therefore translated upwards when the grate 1 is operated starting from the respective open position. Each

free rod 30b is therefore designed to alternately engage or release the respective track 28, which in this case but not only, belongs to the lower guide 16b of the frame 10. In the event, in fact, that the first levers 18 are inverted then every connecting rod 30b would be driven upwards moving the grate 1 towards the respective open position, but this would neither add to nor detract from the scope of this description, in view of what was initially stated.

[0033] The grate 1 is therefore particularly easy to operate, since the friction with the guides 16a and 16b is certainly less than it would be if both ends 25 of all the second bars 15 presented the respective sliding block 26 constantly engaged in the respective track 28; on the other hand, the grate 1 is able to perform its function as an obstacle to break-ins only when it is blocked in the completely open position. Thus, in a particularly brilliant way, the grate 1 presents its grid 12 with the sliding blocks 26 of the second bars 15 coupled with the respective track 28 only when it is used to effectively resist break-in attempts.

[0034] In addition, and with particular reference to Figure 2, at least one of the first bars 14 comprises a first elongated box body 32, which externally delimits the corresponding first bar 14, to fully contain the respective turning pairs 19 and to conceal them from view, so that they are not immediately accessible, and also to protect them from atmospheric agents so as to preserve correct functioning over time; at least one of the second bars 15 comprises a second elongated box body 33 which externally delimits the corresponding second bar to fully contain the respective turning pairs 19 for the same reasons given above with reference to the first box body 32. Both the first and second box bodies 32 and 33 are naturally associated with the rods 30a and 30b also to increase the resistance to attempts to cut the respective first and second bars 14 and 15.

[0035] For the sake of clarity, each turning pair 19 associated with a first or a second bar 14/15 comprises a pin 31 equipped with at least one known cross housing 31b, for simplicity illustrated only in Figure 7 (see, in particular, the enlarged details on the left and on the top left of figure 7), the cross-section of which is greater than the cross-section of the rods 30a and 30b, and is designed to accommodate a rod 30a or a rod 30b of the corresponding first bar 14 or second bar 15. In particular, in the version shown in Figure 2 the pins 31 are equipped with just one housing 31b for just one rod 30a or just one rod 30b, while in the version shown in Figure 3 there are two housings 31b for two rods 30a or for two rods 30b. Furthermore, each pin 31 is associated with at least one coupling element 71, which can be firmly connected to the corresponding pin 31 in a certain axial position to fix the pin 31 in question to each corresponding rod 30a or 30b in an axially rigid fashion by means of an axial blocking element 74, for example a known nut not shown or a grub screw as in Figure 7, designed to determine the stable and releasable connection between the pin 31 and the respective rod 30a/30b, and to precisely locate the

fulcrum of the corresponding first levers 18. A known screw, an expansion pin or welding point not illustrated are technically equivalent to the grub screw 74. With reference to figure 9, expansion pins can be inserted from only one side of the pin 31, with the advantage of having different diameters. They can be made in the form of aluminium pads. In this case, the rods 30a/30b are assembled by first inserting one rod (for example 30b) in the respective hole 31b in the pin 31 and blocking the rod with a first pin 310b inserted from the opposite side of the hole 31b. The second rod (for example 30a) is then inserted in the respective hole 31a and blocked by a second pin (310a) inserted from the same side of the pin 31 (in some cases the pins are inserted in the same way as screws or grub screws along the axis of the pin).

[0036] Each element 71 is delimited peripherically by an external element 72 associated with the corresponding inner portion of the relative first box body 32/second box body 33. For greater clarity, it is normal for this element 71 to be a nut with a square cross-section, large enough to couple by friction with two known flat opposite sides not illustrated of the first box body 32 or of the second box body 33 in order to respectively generate the transverse blocking of the first box body 32 or the second box body 33, being integral with each respective rod 14. Therefore, with reference to Figure 2, each assembly comprising a pin 31, each element 71, each element 74 and each corresponding rod 30a/30b can be interpreted as a coupling unit 34, designed to keep the first box body 32 prismatically coupled to each corresponding rod 30b. Moreover, each coupling unit 34 comprises at least one blocking element 71, axially mobile and selectively fixable to the respective pin 31 in order to rigidly connect the pin 31 to each corresponding rod 30a/30b.

[0037] With reference to Figure 7, which shows an exploded view of the version in Figure 2 in which each second bar 15 presents two rods 30b instead of just one, each second bar 15 is axially delimited at its end near the track 28 of the guide 16b by a stop 26' longitudinally coupled to the corresponding end 25, and in particular to each rod 30b. This stop 26' is designed to engage with the coupling unit 34 to axially fix the corresponding second box body 33 to the corresponding second rod 30b, allowing the movement parallel to the axis 3. Every second box body 33 presents a closed cross-section, so as to be bilaterally stable with reference to the coupling units of the corresponding rod 30b and presents at least one slot 39 longitudinally engaged by at least one of the first levers 18.

[0038] Each first box body 32 presents at least one half-casing 54/55 longitudinally shaped internally so that it can be rigidly coupled to each element 71. In the accompanying figures each first box body 32 corresponds to a half-casing 54 and a half-casing 55.

[0039] The use of the grate 1 can be easily understood from the above description and does not require further explanations. Moreover, it is easy to understand that the embodiment of the grate 1 in which each first bar 14 and

each second bar 15 are equipped with just one rod 30a/30b is fully equivalent from the functional point of view to the embodiment in which there are two rods 30a/30b, also due to the presence of the first and second box bodies 32/33. The only difference between the grates of the two embodiments is the different weight and the different ability to resist deformation caused by break-in attempts and cutting, once the first and second box bodies 32/33 have been completely cut, since it is obvious that the force required to bend/cut just one rod is less than the force necessary to bend/cut two.

[0040] From the above description it seems evident that the grate 1 is particularly interesting since it can be produced according to a method which, as will be seen, makes it possible to completely pre-assemble each second bar 15 and almost completely each first bar 14 before the installation in the guides 16a and 16b of the frame 10, so as to divide the assembly time into steps that can be carried out simultaneously by different workers. The proposed method thus makes it possible to reduce the total assembly time of the grate and consequently to minimise the costs.

[0041] With reference to the assembly step of each separate second bar 15, the method comprises the sub-steps of coupling at least one first lever 18 to each pin 31, of coupling at least one element 71 to each pin 31 at the respective housing 31b, of coupling a rod 30b to each element 71 and of axially clamping the pin 31 to the rod 30b by means of an element 74 to form a coupling unit 34, and so on until all the turning pairs 19 are complete. The method then foresees the sub-steps of longitudinally coupling in a prismatic fashion a second elongated box body 33 with the first levers 18 arranged parallel to the rods 30b, and of coupling a sliding element 26 and a connecting element 60 which slides at the respective ends 25 to axially block the second box body 33. A detailed description of the connecting element 60 is given below. Each first lever 18 is now extracted through the respective longitudinal slot 39, so as to freely swivel with respect to the pin 31, and to free the other end. The bar 15 is now complete and ready to be installed in the guides 16a and 16b.

[0042] The method foresees a similar form of production for each first bar 14, and comprises the sub-steps of coupling at least one first lever 18 to each pin 31, of coupling at least one element 71 to each pin 31 at the respective housing 31b, of coupling a rod 30a to each element 71 and of axially clamping the pin 31 to the rod 30a by means of an element 74 to form a coupling unit 34, and so on until all the turning pairs 19 are complete, similar to what is described with reference to the second bar 15, and of coupling a sliding element 26 and a connecting element 60 to each rod 30a at the respective ends 24. Therefore, in this case too the first levers 18 are free to swivel with respect to the respective pins 31.

[0043] At this point, the semifinished product for the construction of a bar 14 is ready to be prismatically coupled with at least one first box body 32, which must nec-

essarily be divided into the respective C-shaped half-casings 54 and 55, since the rods 30a are no longer longitudinally accessible due to the presence of the first levers 18. The coupling can be performed with a relative movement of the rods 30b and the half-casings 54 and 55 along the axis 3, or with a transverse movement to the axis 3 to produce a snap-fit connection. It is now possible to complete the assembly 13 of the first and second bars 14 and 15 held together in the guides 16a and 16b of the frame 10 to complete the grate.

[0044] In the grates 1 described above the upper end 25 of the connecting rods 30b of each bar 15 has no transverse support at the guide 16a when the grid 12 is in the open position, due to the particular configuration of the first levers 18, and thus, even if protected by the respective second box body 33, is transversally weaker than the corresponding portion 24 of each rod 30a.

[0045] To improve the resistance of the second bars 15, it would be necessary to proceed as in Figure 6, in which the variations of the two embodiments illustrated in Figures 2 and 3 are schematized in combination, with just one row of rods 30a and 30b and with two rows of rods 30a and 30b, and in particular the variation of the grate embodiment with just one row of rods 30b with just one rod 30b on the left in Figure 6, and the variation of the embodiment with two rows of rods 30a with the two rods 30a positioned immediately to the right of the single rod 30b in Figure 6, with the sole aim of limiting the number of Figures. Figure 6 should not, therefore be considered as representing an actual case.

[0046] In particular, the version of the grate 1 in Figure 6 shows how the upper end 25 of a rod 30b can be modified to maximize the ability of the grate 1 to resist break-in attempts by maintaining each end of each rod 30b constantly coupled with the guides 16a and 16b of the frame 10, and not just the end 25 of the corresponding second box body 33 of the relative second bar 15 to the frame 10, through the guides 16a and 16b. The end 25 of each second bar 15, positioned at the guide 16a, is equipped with a respective connecting sliding element 60 by means of which the permanent coupling is achieved of the naturally free end of the connecting rod 30b to the guide 16a in the direction 17, and forms a longitudinal stop for each second bar 15.

[0047] For each connecting rod 30b, this connecting element 60 presents a slide 62 comprising a pin 31 coupled to each rod 30b by means of a respective housing 31b, and supporting in an end axial position at least one roller 63 substantially identical to the roller 27, by means of an interposed bearing 68. The element 60 equally defines connecting means and sliding means.

[0048] The roller 63 is slidingly coupled to the concave track 28 of the guide 16a.

[0049] The element 60 also comprises at least one reduced length rod 64, coaxial to a corresponding rod 30b, and a coupling sleeve 65, with an inner longitudinal guide coaxial to the rod 64 and the rod 30b, and housing the respective free ends 66 and 67. The sleeve 65 can be

rigidly attached either to the rod 64 or to the rod 30b which it connects, or it can also be left free and resting against the turning pair 19 immediately below, according to the design choice.

[0050] If one wishes to add the additional practical feature of draught protection or of preventing access to the window opening closed by the grate 1 by flying insects, such as mosquitoes or the like, and therefore in addition to the functions already described with reference to the grate embodiment shown in Figures 1-3, a curtain or fly screen 36 can be fitted to the grate 1, as shown in Figure 5. It can be noted that this figure is a duplicate of Figure 4, which shows the cross-section of the grate 1 in Figure 3 along a plane transversal to the plane of the grid 12, and represented by the line IV-IV, and that to simplify the representation each pin 31 in Figures 4 and 5 is completely covered by the respective elements 71, and the housings 31b are illustrated by means of a solid rectangular graphic element, deliberately omitting the representation of the cross-sections of the corresponding rods 30a and 30b. In any case, referring to Figure 5, one end portion, positioned transversally to the direction 17, of at least one of the first and second box bodies 32 and 33 presents a fastening pair 37 for the curtain 36. In particular, each pair 37 comprises a longitudinal groove 38a into which an elongated body 38b snap fits longitudinally. In Figure 5 each first and second box body 32 and 33 presents a fastening pair 37 for the curtain 36, and the curtain or fly screen 36 can be selectively closed in an accordion-like fashion.

[0051] There are possible embodiments in which the first levers 18 which connect the first and second consecutive bars 14 and 15 are arranged irregularly, although this means doubling the number of pins 31 since each one will correspond to just one lever 18, and the grid 12 will therefore no longer consist of a plurality of first and second bars 14 and 15 with the respective first levers opposite each other in pairs.

[0052] There are also possible embodiments of the grate 1 in which both ends of the grid 12 comprise a bar 14 and the embodiment of the grate 1 in which the ends of the grid 12 respectively comprise a bar 14 and a bar 15. In the first case, the grate naturally presents an even number of free spaces between the intermediate bars 14 and 15, while in the second case there will be an odd number of free spaces.

Claims

1. A grate (1) comprising a first frame (10) and an assembly (13) of first and second bars (14, 15) coupled to the first frame (10) in a freely sliding fashion along a certain direction (17) and positioned alternately to each other; each first bar (14) being connected to at least one consecutive second bar (15) by a plurality of first connecting levers (18) in such a way as to form a grid (12) which can be freely switched be-

- tween a first open position, in which the first and second bars (14, 15) are spaced apart, and the grid (12) presents its maximum extension in the direction (17), and a second position of minimum longitudinal extension, in which the first and second bars (14, 15) are arranged close together in the direction (17); the first connecting levers (18) being coupled to the respective first and second bars (14, 15) exclusively by means of turning pairs (19); the turning pairs (19) of each first and second bar (14, 15) being respectively aligned with each other along a respective single axis (3), **characterised in that** the grate comprises first elongated box bodies (32) which externally delimit the first bars (14), to completely contain the turning pairs (19); second elongated box bodies (33) which externally delimit the second bars (15), being designed to contain the turning pairs (19); the first and second box bodies (32, 33) being designed to increase the resistance to cutting of the respective first and second bars (14, 15) and to protect the turning pairs (19), inside the respective first box body (32) the first bars (14) comprising at least one first rod (30a); inside the respective second box body (33) each of the second bars (15) comprising at least one second rod (30b); each turning pair (19) associated with a first bar (14) and a second bar (15) comprising a pin (31) equipped with a transverse housing (31b) respectively accommodating each first rod (30a) of the corresponding first bar (14) in a rigidly axial fashion or each second rod (30b) of the corresponding second bar (15) in a rigidly axial fashion, and **in that** each second box body (33) presents a closed cross-section so as to bilaterally accommodate the coupling means (34) of each corresponding second rod (30b); and presents at least one longitudinal slit (39) engaged by at least one of the first levers (18).
2. A grate (1) according to claim 1, **characterised in that** each first bar (14) is connected to at least one consecutive second bar (15) by a plurality of first connecting levers (18) in such a way as to maintain the first bars (14) parallel to each other and **characterised in that** the turning pairs (19) relative to each first and second bar (14, 15) are respectively aligned with each other along a respective single axis (3) substantially parallel to the first and second bars (14, 15).
 3. A grate according to claim 1 or 2, **characterised in that** in the grid (12), each first bar (14) and each second bar (15) arranged in succession respectively comprise at least one second frame and at least one connecting rod (30b) connected together by at least one first lever (18), in such a way that each first lever (18) acts as a rocker arm and that the grid (12) presents, overall, at least one articulated parallelogram structure (4).
 4. A grate according to claim 3, **characterised in that** the first frame (10) presents at least one guide (16a, 16b) for the straight-line motion parallel to the direction (17); each first bar (14) presenting at least one first end (24) coupled prismatically to a corresponding guide (16a, 16b) so as to be freely mobile along the direction (17) and designed to resist break-in attempts.
 5. A grate according to claim 3 or 4, **characterised in that** each second bar (15) presents at least one second end (25) coupled prismatically to a corresponding guide (16b, 16a) at least when, together with the grid (12), it presents the maximum extension in the direction (17) to resist break-in attempts.
 6. A grate according to claim 5, **characterised in that** the first and second bars (14, 15) are equipped at their respective first and second ends (24, 25) with sliding means (26, 60) to couple them to the guide (16b, 16b) in a freely sliding fashion.
 7. A grate according to claim 6, **characterised in that** the sliding means (26, 60) are equipped with at least a sliding block and/or a roller (27), and the guide (16a, 16b) comprises a sliding track (28) for the sliding block and/or the roller (27).
 8. A grate according to any of the foregoing claims, **characterised in that** each pin (31) is associated with coupling means (34) designed to maintain the first box body (32)/second box body (33) prismatically coupled to each corresponding first rod (30a)/second rod (30b).
 9. A grate according to claim 8, **characterised in that** the coupling means (34) comprise at least one connecting element (71) that can be clamped with respect to the pin (31) so as to rigidly connect the relative pin (31) to each corresponding first rod (30a) or, selectively, to each corresponding second rod (30b); the connecting element (71) being peripherically delimited by a prismatically shaped surface (72) in order to transversally fix the first box body (32) or, selectively, the second box body (33).
 10. A grate according to any of the foregoing claims, **characterised in that** each second bar (15) comprises longitudinal stop means (26') designed to engage with the coupling means (34) to axially fix the corresponding second box body (33) to each corresponding second rod (30b).
 11. A grate according to claim 10, **characterised in that** each first box body (32) presents at least one longitudinal portion (54, 55) shaped internally in such a way that it can be rigidly coupled to each connecting element (71) transversally to the direction (17).

12. A grate according to any of the foregoing claims from 5 to 11, **characterised in that** each of the second bars (15) presents two second end portions (25), each of which, when in use, is prismatically coupled to a corresponding guide (16b, 16a) at least when the grid (12) is in the position of maximum extension in the direction (17) to maximize the ability of the grid (12) to resist break-in attempts.
13. A grate according to claim 12, **characterised in that** at least one of the two second end portions (25) is equipped with respective connecting means (60) slidably coupled in the direction (17) to the corresponding guide (16a), to maintain the corresponding connecting rod (30b) coupled to the respective guide (16a).
14. A grate according to claim 13, **characterised in that** for each connecting rod (30b) the connecting means (60) comprise a slide (62) equipped with at least a roller (63) sliding in the guide (16a), at least a third rod (64) coaxial to a second rod (30b) and a sleeve (65) which houses the third rod (64) and the coaxial second rod (30b).
15. A grate according to any of the foregoing claims, **characterised in that** it comprises at least one curtain (36) and fastening means (37) for the curtain (36); the fastening means (37) being attached to at least two bodies chosen from between the first and second box bodies (32, 33), in such a way that each curtain (36) can be selectively pulled taut to close the first frame (10) and selectively closed in an accordion-like fashion.
16. A grate according to claim 15, **characterised in that** in each of the box bodies (32, 33), the fastening means (37) present a longitudinal groove (38a) into which each curtain (36) snap fits.
17. A grate according to claim 16, **characterised in that** the fastening means (37) comprise an elongated body (38b) which can be longitudinally installed in each groove (38a).
18. A grate according to any of the foregoing claims from 15 to 17, **characterised in that** the curtain (36) comprises a fly screen.
19. A method for the production of a grate according to any of the foregoing claims from 1 to 18; this method presenting a first step of assembling a second bar (15); the first step being **characterised in that** it comprises the sub-steps of coupling at least a first lever (18) to each one of a plurality of pins (31) in a freely rotating fashion around a longitudinal axis of each pin (31); of coupling each pin (31) to at least one connecting element (71) designed to longitudinally

and prismatically couple with a second elongated box body (33); of coupling each pin (31) equipped with the connecting elements (71) to at least one second rod (30b); of longitudinally fixing each pin (31) to each second rod (30b) by means of at least one axial clamping element (74); of coupling each element (71) with the second box body (33) by means of a respective closed cross-section; of coupling sliding means (26, 60) to the second rod (30b) at its end (25), to axially block the second box body (33); the second box body (33) presenting a longitudinal slit (39) engaged when in use by each first lever (18) which swivels with respect to the pin (31).

20. A method according to claim 19, **characterised in that** it comprises a second step of assembling a first bar (14); the second step comprising the sub-steps of coupling at least a first lever (18) to each one of a plurality of pins (31) in a freely rotating fashion around a longitudinal axis of each pin (31); of coupling each pin (31) to at least one connecting element (71), designed to prismatically couple with a first elongated box body (32, 54, 55) presenting a C-shaped cross-section to each connecting element (71); of coupling at least one first rod (30a) to each pin (31); of coupling sliding means (26, 60) to the first rod (30a) at its end (25); of coupling a second elongated box body (32, 54, 55) presenting a C-shaped cross-section to each connecting element (71), in such a way that, when in use, each first lever (18) is free to swivel with respect to the corresponding pin (31) and to completely contain at least one of the ends of the pin (31).
21. A method according to claim 20, **characterised in that** it comprises a third step of coupling each first and each second bar (14, 15) to a prismatic guide (16a, 16b) transverse to the first and second bar (14, 15) by means of the respective sliding means (26, 60).

Patentansprüche

1. Schiebegitter (1), umfassend einen ersten Rahmen (10) und eine Gruppe (13) erster und zweiter Stäbe (14, 15), gekuppelt am ersten Rahmen (10) auf eine frei gleitende Weise entlang einer gewissen Richtung (17) und positioniert abwechselnd miteinander, wobei jeder erste Stab (14) mit mindestens einem aufeinanderfolgenden zweiten Stab (15) durch eine Vielzahl erster Verbindungshebel (18) verbunden ist, sodass ein Gitternetz (12) geformt wird, das frei zwischen einer ersten offenen Position, in der die ersten und zweiten Stäbe (14, 15) voneinander beabstandet sind und das Gitternetz (12) seine maximale Ausdehnung in die Richtung (17) aufweist, und einer zweiten Position einer Mindestlängsausdeh-

- nung umgeschaltet werden kann, in der die ersten und zweiten Stäbe (14, 15) nahe aneinander in der Richtung (17) angeordnet sind, wobei die ersten Verbindungshebel (18) an den jeweiligen ersten und zweiten Stäben (14, 15) ausschließlich durch drehende Paare (19) gekuppelt sind, wobei die drehenden Paare (19) eines jeden ersten und zweiten Stabs (14, 15) jeweils zueinander entlang einer jeweiligen einzelnen Achse (3) ausgerichtet sind, **dadurch gekennzeichnet, dass** das Schiebegitter erste längliche Kastenkörper (32) umfasst, die außenseitig die ersten Stäbe (14) begrenzen, um die drehenden Paare (19) vollständig zu enthalten, wobei zweite längliche Kastenkörper (33), die außenseitig die zweiten Stäbe (15) begrenzen, ausgestaltet sind, um die drehenden Paare (19) zu enthalten, wobei die ersten und die zweiten Kastenkörper (32, 33) ausgestaltet sind, um den Schneidwiderstand der jeweiligen ersten und zweiten Stäbe (14, 15) zu erhöhen und die drehenden Paare (19) zu schützen, wobei die ersten Stäbe (14) im jeweiligen ersten Kastenkörper (32) mindestens eine erste Stange (30a) umfassen, wobei ein jeder der zweiten Stäbe (15) mindestens eine zweite Stange (30b) im jeweiligen zweiten Kastenkörper (33) umfasst, wobei ein jedes drehende Paar (19) mit einem ersten Stab (14) und einem zweiten Stab (15) assoziiert ist, umfassend einen Zapfen (31), ausgestattet mit einer quer verlaufenden Aufnahme (31b), jeweils aufnehmend eine jede erste Stange (30a) des entsprechenden ersten Stabs (14) auf steif axiale Weise oder eine jede zweite Stange (30b) des entsprechenden zweiten Stabs (15) auf eine steif axiale Weise, und dadurch, dass jeder zweite Kastenkörper (33) einen geschlossenen Querschnitt aufweist, sodass die Kupplungsmittel (34) einer jeden entsprechenden zweiten Stange (30b) beidseitig aufgenommen werden, und mindestens einen Längsschlitz (39) aufweist, in den mindestens einer der ersten Hebel (18) eingreift.
2. Schiebegitter (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** jeder erste Stab (14) mit mindestens einem aufeinanderfolgenden zweiten Stab (15) durch eine Vielzahl erster Verbindungshebel (18) verbunden ist, sodass die ersten Stäbe (14) parallel zueinander gehalten werden, und **dadurch gekennzeichnet, dass** die drehenden Paare (19) relativ zu einem jeden ersten und zweiten Stab (14, 15) jeweils zueinander entlang einer jeweiligen einzelnen Achse (3) im Wesentlichen parallel zu den ersten und zweiten Stäben (14, 15) ausgerichtet sind.
3. Schiebegitter nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das Gitternetz (12), jeder erste Stab (14) und jeder zweite Stab (15), die jeweils nacheinander angeordnet sind, mindestens einen zweiten Rahmen und mindestens eine Verbindungsstange (30b) umfassen, miteinander verbunden durch mindestens einen ersten Hebel (18), sodass jeder erste Hebel (18) als Kipparm wirkt, und dadurch, dass das Gitternetz (12) insgesamt mindestens eine gegliederte Parallelogrammstruktur (4) aufweist.
4. Schiebegitter nach Anspruch 3, **dadurch gekennzeichnet, dass** der erste Rahmen (10) mindestens eine Führung (16a, 16b) für die geradlinige Bewegung parallel zur Richtung (17) aufweist, wobei jeder Stab (14) mindestens ein erstes Ende (24) aufweist, prismatisch gekuppelt an einer entsprechenden Führung (16a, 16b), um entlang der Richtung (17) frei bewegbar zu sein, und ausgestaltet, um Einbruchversuchen zu widerstehen.
5. Schiebegitter nach Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** jeder zweite Stab (15) mindestens ein zweites Ende (25) aufweist, prismatisch gekuppelt an einer entsprechenden Führung (16b, 16a), zumindest wenn er zusammen mit dem Gitternetz (12) die maximale Ausdehnung in die Richtung (17) aufweist, um Einbruchversuchen zu widerstehen.
6. Schiebegitter nach Anspruch 5, **dadurch gekennzeichnet, dass** die ersten und zweiten Stäbe (14, 15) an ihren jeweiligen ersten und zweiten Enden (24, 25) mit Gleitmitteln (26, 60) ausgestattet sind, um sie an der Führung (16a, 16b) auf frei gleitende Weise zu kuppeln.
7. Schiebegitter nach Anspruch 6, **dadurch gekennzeichnet, dass** die Gleitmittel (26, 60) mit mindestens einem Gleitblock und/oder einer Laufrolle (27) ausgestattet sind und die Führung (16a, 16b) eine Gleitbahn (28) für den Gleitblock und/oder die Laufrolle (27) umfasst.
8. Schiebegitter nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** jeder Zapfen (31) mit Kupplungsmitteln (34) assoziiert ist, ausgestaltet, um den ersten Kastenkörper (32)/zweiten Kastenkörper (33) prismatisch gekuppelt an der entsprechenden ersten Stange (30a)/zweiten Stange (30b) beizubehalten.
9. Schiebegitter nach Anspruch 8, **dadurch gekennzeichnet, dass** die Kupplungsmittel (34) mindestens ein Verbindungselement (71) umfassen, das zum Zapfen (31) festgespannt werden kann, sodass der jeweilige Zapfen (31) mit einer jeden entsprechenden ersten Stange (30a) oder selektiv mit einer jeden entsprechenden zweiten Stange (30b) steif verbunden wird, wobei das Verbindungselement (71) umfangsseitig durch eine prismatisch geformte Oberfläche (72) begrenzt ist, um den ersten Kasten-

- körper (32) oder selektiv den zweiten Kastenkörper (33) quer zu fixieren.
10. Schiebegitter nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** jeder zweite Stab (15) längsseitige Stoppmittel (26') umfasst, die ausgestaltet sind, um mit den Kupplungsmitteln (34) in Eingriff zu gelangen und den entsprechenden zweiten Kastenkörper (33) axial an einer jeden zweiten Stange (30b) zu fixieren. 5
 11. Schiebegitter nach Anspruch 10, **dadurch gekennzeichnet, dass** jeder erste Kastenkörper (32) mindestens einen Längsabschnitt (54, 55) aufweist, der innenseitig so ausgeformt ist, dass er steif an einem jeden Verbindungselement (71) quer zur Richtung (17) gekuppelt werden kann. 10
 12. Schiebegitter nach einem der vorhergehenden Ansprüche 5 bis 11, **dadurch gekennzeichnet, dass** ein jeder der zweiten Stäbe (15) zwei zweite Endabschnitte (25) aufweist, von denen ein jeder in Verwendung prismatisch an einer entsprechenden Führung (16b, 16a) gekuppelt ist, zumindest wenn sich das Gitternetz (12) in der Position der maximalen Ausdehnung in die Richtung (17) befindet, um die Fähigkeit des Gitternetzes (12), Einbruchversuchen zu widerstehen, zu maximieren. 15 20 25
 13. Schiebegitter nach Anspruch 12, **dadurch gekennzeichnet, dass** mindestens einer der zwei zweiten Endabschnitte (25) mit jeweiligen Verbindungsmitteln (60) ausgestattet ist, verschiebbar gekuppelt in die Richtung (17) an der entsprechenden Führung (16a), um die entsprechende Verbindungsstange (30b) mit der jeweiligen Führung (16a) gekuppelt beizubehalten. 30 35
 14. Schiebegitter nach Anspruch 13, **dadurch gekennzeichnet, dass** die Verbindungsmittel (60) für jede Verbindungsstange (30b) ein Gleitstück (62) umfassen, das mit mindestens einer Laufrolle (63) ausgestattet ist, die in der Führung (16a) gleitet, mindestens eine dritte Stange (64), koaxial zu einer zweiten Stange (30b), und eine Hülse (65), die die dritte Stange (64) und die koaxiale zweite Stange (30b) aufnimmt. 40 45
 15. Schiebegitter nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** es mindestens einen Vorhang (36) und Befestigungsmittel (37) für den Vorhang (36) umfasst, wobei die Befestigungsmittel (37) an mindestens zwei Körpern angebracht sind, ausgewählt aus den ersten und zweiten Kastenkörpern (32, 33), sodass ein jeder Vorhang (36) selektiv straff gezogen werden kann, um den ersten Rahmen (10) zu schließen, und selektiv auf Ziehharmonikaweise geschlossen werden kann. 50 55
 16. Schiebegitter nach Anspruch 15, **dadurch gekennzeichnet, dass** die Befestigungsmittel (37) in einem jeden der Kastenkörper (32, 33) eine Längsnut (38a) aufweisen, in die ein jeder Vorhang (36) einschnappt.
 17. Schiebegitter nach Anspruch 16, **dadurch gekennzeichnet, dass** die Befestigungsmittel (37) einen länglichen Körper (38b) umfassen, der längsseitig in jeder Nut (38a) installiert werden kann.
 18. Schiebegitter nach einem der vorhergehenden Ansprüche 15 bis 17, **dadurch gekennzeichnet, dass** der Vorhang (36) ein Fliegenschutzgitter umfasst.
 19. Verfahren zur Herstellung eines Schiebegitters nach einem der vorhergehenden Ansprüche 1 bis 18, wobei das Verfahren einen ersten Schritt zum Zusammenbauen eines zweiten Stabs (15) aufweist, wobei der erste Schritt **dadurch gekennzeichnet ist, dass** er folgende Unterschritte umfasst: Kuppeln von mindestens einem ersten Hebel (18) an einem jeden einer Vielzahl an Zapfen (31) auf eine frei drehende Weise rund um eine Längsachse eines jeden Zapfens (31); Kuppeln eines jeden Zapfens (31) an mindestens einem Verbindungselement (71), ausgestaltet, um längsseitig und prismatisch mit einem zweiten länglichen Kastenkörper (33) gekuppelt zu werden; Kuppeln eines jeden Zapfens (31), ausgestattet mit den Verbindungselementen (71), an mindestens einer zweiten Stange (30b); längsseitiges Fixieren eines jeden Zapfens (31) an einer jeden zweiten Stange (30b) mit mindestens einem axialen Spannelement (74); Kuppeln eines jeden Elements (71) mit dem zweiten Kastenkörper (33) mittels eines jeweiligen geschlossenen Querschnitts; Kuppeln von Gleitmitteln (26, 60) an der zweiten Stange (30b) an deren Enden (25), um den zweiten Kastenkörper (33) axial zu blockieren, wobei der zweite Kastenkörper (33) einen Längsschlitz (39) aufweist, in den in Verwendung jeder erste Hebel (18) eingreift, der zum Zapfen (31) geschwenkt wird.
 20. Verfahren nach Anspruch 19, **dadurch gekennzeichnet, dass** es einen zweiten Schritt zum Zusammenbauen eines ersten Stabs (14) umfasst, wobei der zweite Schritt die folgenden Unterschritte umfasst: Kuppeln von mindestens einem ersten Hebel (18) an einem jeden einer Vielzahl an Zapfen (31) auf eine frei drehende Weise rund um eine Längsachse eines jeden Zapfens (31); Kuppeln eines jeden Zapfens (31) an mindestens einem Verbindungselement (71), ausgestaltet, um prismatisch mit einem ersten länglichen Körper (32, 54, 55), aufweisend einen C-förmigen Querschnitt, an einem jeden Verbindungselement (71) gekuppelt zu werden; Kuppeln von mindestens einer ersten Stange (30a) an einem jeden Zapfen (31); Kuppeln von Gleitmit-

teln (26, 60) an der ersten Stange (30a) an deren Enden (25); Kuppeln eines zweiten länglichen Kastenkörpers (32, 54, 55), aufweisend einen C-förmigen Querschnitt, an einem jeden Verbindungselement (71), sodass jeder erste Hebel (18) in Verwendung frei zum entsprechenden Zapfen (31) geschwenkt werden kann, und um mindestens eins der Enden des Zapfens (31) vollständig zu enthalten.

21. Verfahren nach Anspruch 20, **dadurch gekennzeichnet, dass** es einen dritten Schritt zum Kuppeln eines jeden ersten und eines jeden zweiten Stabs (14, 15) an einer prismatischen Führung (16a, 16b) umfasst, quer zum ersten und zweiten Stab (14, 15) mittels der jeweiligen Gleitmittel (26, 60).

Revendications

1. Grille (1) comprenant un premier châssis (10) et un assemblage (13) de premières et secondes barres (14, 15) accouplées au premier châssis (10) d'une façon coulissante libre le long d'une certaine direction (17) et positionnées alternativement les unes par rapport aux autres; chaque première barre (14) étant reliée à au moins une seconde barre consécutive (15) par une pluralité de premiers leviers de raccordement (18) de manière à former une claire-voie (12) pouvant librement passer d'une première position d'ouverture, dans laquelle les premières et secondes barres (14, 15) sont espacées, et la claire-voie (12) présente son extension maximum dans la direction (17), à une seconde position d'extension longitudinale minimum, dans laquelle les premières et secondes barres (14, 15) sont disposées de façon rapprochée dans la direction (17); les premiers leviers de raccordement (18) étant accouplés aux premières et secondes barres respectives (14, 15) exclusivement par le biais de paires tournantes (19); les paires tournantes (19) de chaque première et seconde barre (14, 15) étant respectivement alignées l'une à l'autre le long d'un axe unique respectif (3), **caractérisée en ce que** la grille comprend des premiers corps de boîte allongés (32) délimitant extérieurement les premières barres (14) pour contenir complètement les paires tournantes (19); des seconds corps de boîte allongés (33), délimitant extérieurement les secondes barres (15), étant conçus pour contenir les paires tournantes (19); les premiers et seconds corps de boîte (32, 33) étant conçus pour augmenter la résistance au cisaillement des premières et secondes barres respectives (14, 15) et pour protéger les paires tournantes (19), à l'intérieur du premier corps de boîte respectif (32), les premières barres (14) comprenant au moins une première tige (30a); à l'intérieur du second corps de boîte respectif (33), chacune des secondes barres (15) comprenant au moins une seconde tige (30b); chaque paire tour-

nante (19) associée à une première barre (14) et à une seconde barre (15) comprenant une cheville (31) dotée d'un logement transversal (31b) logeant respectivement chaque première tige (30a) de la première barre correspondante (14) d'une façon axiale rigide ou chaque seconde tige (30b) de la seconde barre correspondante (15) d'une façon axiale rigide, et **en ce que** chaque second corps de boîte (33) présente une section transversale fermée de manière à loger bilatéralement les moyens d'accouplement (34) de chaque seconde tige correspondante (30b); et présente au moins une fente longitudinale (39) se mettant en prise avec au moins un des premiers leviers (18).

2. Grille (1) selon la revendication 1, **caractérisée en ce que** chaque première barre (14) est reliée à au moins une seconde barre consécutive (15) par une pluralité de premiers leviers de raccordement (18) de sorte à maintenir les premières barres (14) parallèles les unes aux autres et **caractérisée en ce que** les paires tournantes (19) par rapport à chaque première et seconde barre (14, 15) sont respectivement alignées les unes par rapports aux autres le long d'un axe unique respectif (3) substantiellement parallèle aux premières et secondes barres (14, 15).
3. Grille selon la revendication 1 ou 2, **caractérisée en ce que** dans la claire-voie (12), chaque première barre (14) et chaque seconde barre (15), disposées respectivement les unes à la suite des autres, comprennent au moins un second châssis et au moins une tige de raccordement (30b) reliés ensemble par au moins un premier levier (18), de sorte que chaque premier levier (18) agit comme un bras oscillant et que la claire-voie (12) présente, globalement, au moins une structure à parallélogramme articulé (4).
4. Grille selon la revendication 3, **caractérisée en ce que** le premier châssis (10) présente au moins un guide (16a, 16b) pour le mouvement en ligne droite parallèle à la direction (17) chaque première barre (14) présentant au moins une première extrémité (24) accouplée de façon prismatique à un guide correspondant (16a, 16b) de sorte à être librement mobile le long de la direction (17) et conçu pour résister à des tentatives d'effraction.
5. Grille selon la revendication 3 ou 4, **caractérisée en ce que** chaque seconde barre (15) présente au moins une seconde extrémité (25) accouplée de façon prismatique à un guide correspondant (16b, 16a) au moins lorsque, avec la grille (12), elle présente l'extension maximum dans la direction (17) pour résister à des tentatives d'effraction.
6. Grille selon la revendication 5, **caractérisée en ce que** les première et seconde barres (14, 15) sont

équipées, à leurs première et seconde extrémités respectives (24, 25), de moyens coulissants (26, 60) pour les accoupler au guide (16a, 16b) d'une façon coulissante libre.

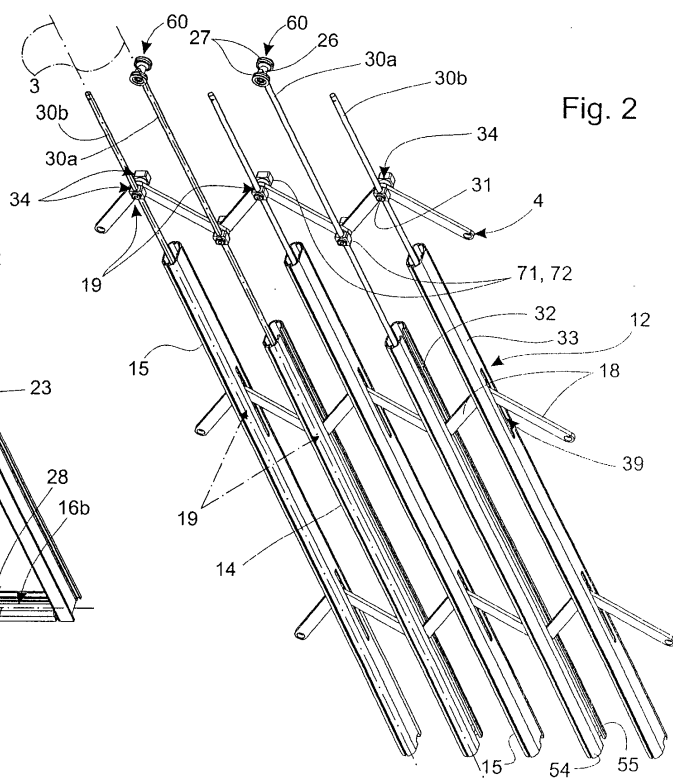
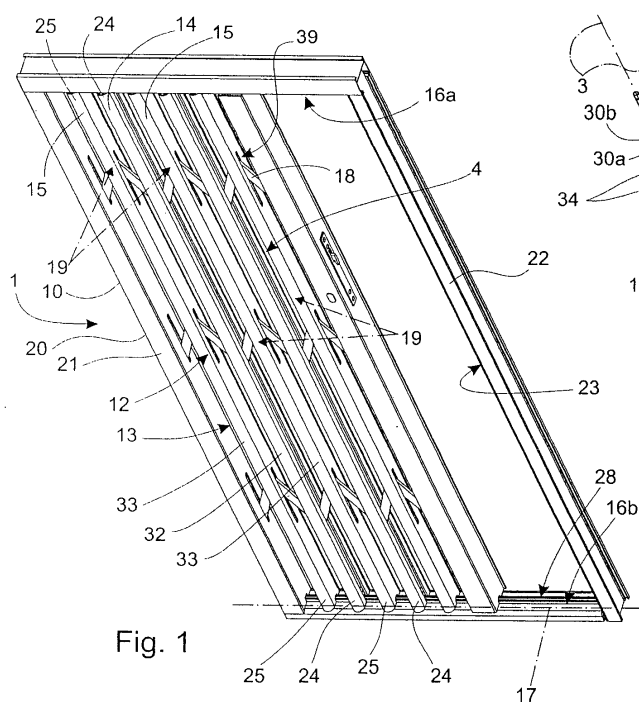
7. Grille selon la revendication 6, **caractérisée en ce que** les moyens coulissants (26, 60) sont équipés d'au moins un bloc coulissant et/ou un rouleau (27), et le guide (16a, 16b) comprend un rail coulissant (28) pour le bloc coulissant et/ou le rouleau (27).
8. Grille selon l'une quelconque des revendications précédentes, **caractérisée en ce que** chaque cheville (31) est associée aux moyens d'accouplement (34) conçus pour maintenir le premier corps de boîte (32)/second corps de boîte (33) de façon prismatique accouplés à chaque première tige (30a)/seconde tige (30b) correspondante.
9. Grille selon la revendication 8, **caractérisée en ce que** les moyens d'accouplement (34) comprennent au moins un élément de raccordement (71) pouvant être serré par rapport à la cheville (31) de sorte à relier fermement la cheville correspondante (31) à chaque première tige correspondante (30a) ou, sélectivement, à chaque seconde tige correspondante (30b) ; l'élément de raccordement (71) étant à sa périphérie délimitée par une surface en forme de prisme (72) afin de fixer transversalement le premier corps de boîte (32) ou, sélectivement, le second corps de boîte (33).
10. Grille selon l'une quelconque des revendications précédentes, **caractérisée en ce que** chaque seconde barre (15) comprend des moyens d'arrêt longitudinaux (26') conçus pour se mettre en prise avec les moyens d'accouplement (34) pour fixer axialement le second corps de boîte (33) correspondant à chaque seconde tige (30b) correspondante.
11. Grille selon la revendication 10, **caractérisée en ce que** chaque premier corps de boîte (32) présente au moins une partie longitudinale (54, 55) ayant une forme à l'intérieur pouvant être accouplée fermement à chaque élément de raccordement (71) transversalement à la direction (17).
12. Grille selon l'une quelconque des revendications précédentes de 5 à 11, **caractérisée en ce que** chacune des secondes barres (15) présente deux secondes parties terminales (25), dont chacune, en fonctionnement, est accouplée de façon prismatique à un guide correspondant (16b, 16a) au moins lorsque la claire-voie (12) se trouve dans la position d'extension maximum dans la direction (17) pour maximiser la capacité de la claire-voie (12) à résister aux tentatives d'effraction.

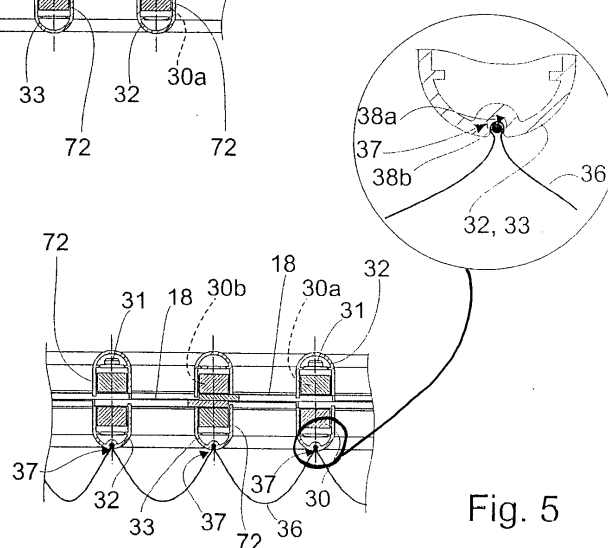
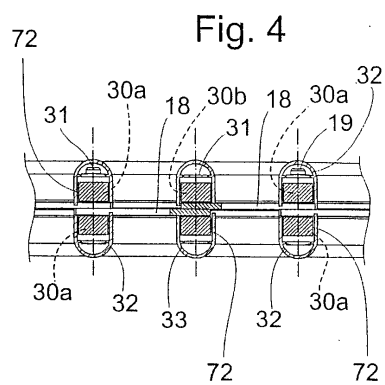
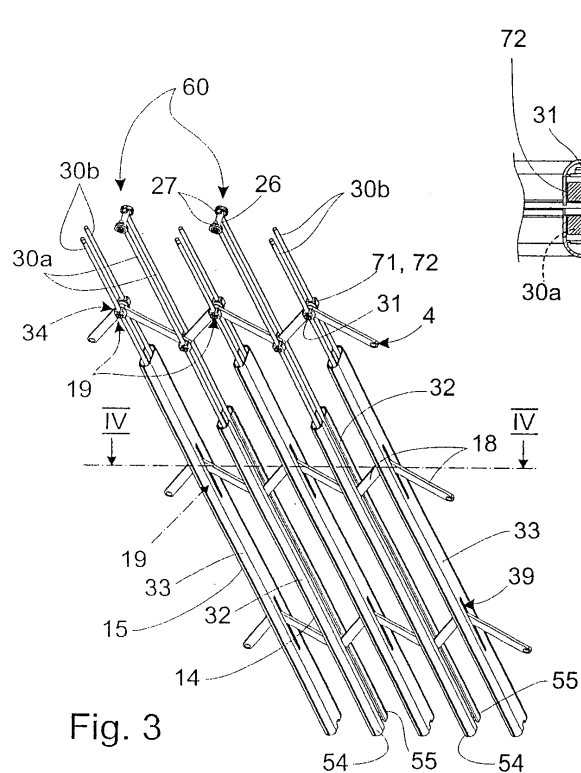
13. Grille selon la revendication 12, **caractérisée en ce qu'au moins** une des deux secondes parties terminales (25) est équipée de moyens de raccordement respectifs (60) accouplés de façon coulissante dans la direction (17) par rapport au guide correspondant (16a), pour maintenir la tige de raccordement correspondante (30b) accouplée au guide respectif (16a).
14. Grille selon la revendication 13, **caractérisée en ce que** pour chaque tige de raccordement (30b), les moyens de raccordement (60) comprennent un coulisseau (62) équipé d'au moins un rouleau (63) coulissant dans le guide (16a), au moins une troisième tige (64) coaxiale à une seconde tige (30b) et un manchon (65) logeant la troisième tige (64) et la seconde tige coaxiale (30b).
15. Grille selon l'une quelconque des revendications précédentes, **caractérisée en ce qu'elle** comprend au moins un rideau (36) et des moyens de fixation (37) pour le rideau (36) ; les moyens de fixation (37) étant attachés à au moins deux corps choisis entre les premier et second corps de boîte (32, 33), de sorte que chaque rideau (36) peut être sélectivement tiré tendu pour fermer le premier châssis (10) et, sélectivement, fermé en accordéon.
16. Grille selon la revendication 15, **caractérisée en ce que** dans chacun des corps de boîte (32, 33), les moyens de fixation (37) présentent une rainure longitudinale (38a) dans laquelle chaque rideau (36) se monte par encliquetage.
17. Grille selon la revendication 16, **caractérisée en ce que** les moyens de fixation (37) comprennent un corps allongé (38b) pouvant être installé longitudinalement dans chaque rainure (38a).
18. Grille selon l'une quelconque des revendications précédentes de 15 à 17, **caractérisée en ce que** le rideau (36) comprend une moustiquaire.
19. Procédé de fabrication d'une grille selon l'une quelconque des revendications de 1 à 18 ; ce procédé présentant une première étape consistant à assembler une seconde barre (15) ; la première étape étant **caractérisée en ce qu'elle** comprend les sous-étapes consistant à accoupler au moins un premier levier (18) à chacune d'une pluralité de chevilles (31) d'une façon rotative libre autour d'un axe longitudinal de chaque cheville (31) ; à accoupler chaque cheville (31) à au moins un élément de raccordement (71) conçu pour longitudinalement et de façon prismatique s'accoupler à un second corps de boîte allongé (33) ; à accoupler chaque cheville (31) équipée d'éléments de raccordement (71) à au moins une seconde tige (30b) ; à fixer longitudinalement chaque che-

ville (31) à chaque seconde tige (30b) au moyen d'au moins un élément de serrage axial (74) ; à accoupler chaque élément (71) au second corps de boîte (33) au moyen d'une section transversale fermée respective; à accoupler les moyens de coulissement (26, 60) à la seconde tige (30b) à son extrémité (25), pour bloquer axialement le second corps de boîte (33) ; le second corps de boîte (33) présentant une fente longitudinale (39) mise en prise, en fonctionnement, avec chaque premier levier (18) pivotant par rapport à la cheville (31). 5 10

20. Procédé selon la revendication 19, **caractérisé en ce qu'il** comprend une seconde étape consistant à assembler une première barre (14) ; la seconde étape comprenant les sous-étapes consistant à accoupler au moins un premier levier (18) à chacune d'une pluralité de chevilles (31) d'une façon rotative libre autour d'un axe longitudinal de chaque cheville (31) ; à accoupler chaque cheville (31) à au moins un élément de raccordement (71), conçu pour s'accoupler de façon prismatique à un premier corps de boîte allongé (32, 54, 55), présentant une section transversale en « C », à chaque élément de raccordement (71) ; à accoupler au moins une première tige (30a) à chaque cheville (31) ; à accoupler les moyens de coulissement (26, 60) à la première tige (30a) à son extrémité (25) ; à accoupler un second corps de boîte allongé (32, 54, 55), présentant une section transversale en « C », à chaque élément de raccordement (71), de manière à ce que, en fonctionnement, chaque premier levier (18) soit libre de pivoter par rapport à la cheville correspondante (31) et pour contenir complètement au moins une des extrémités de la cheville (31). 15 20 25 30 35

21. Procédé selon la revendication 20, **caractérisé en ce qu'il** comprend une troisième étape consistant à accoupler chaque première et chaque seconde barre (14, 15) à un guide prismatique (16a, 16b) transversal aux première et seconde barres (14, 15) par le biais des moyens de coulissement (26, 60) respectifs. 40 45 50 55





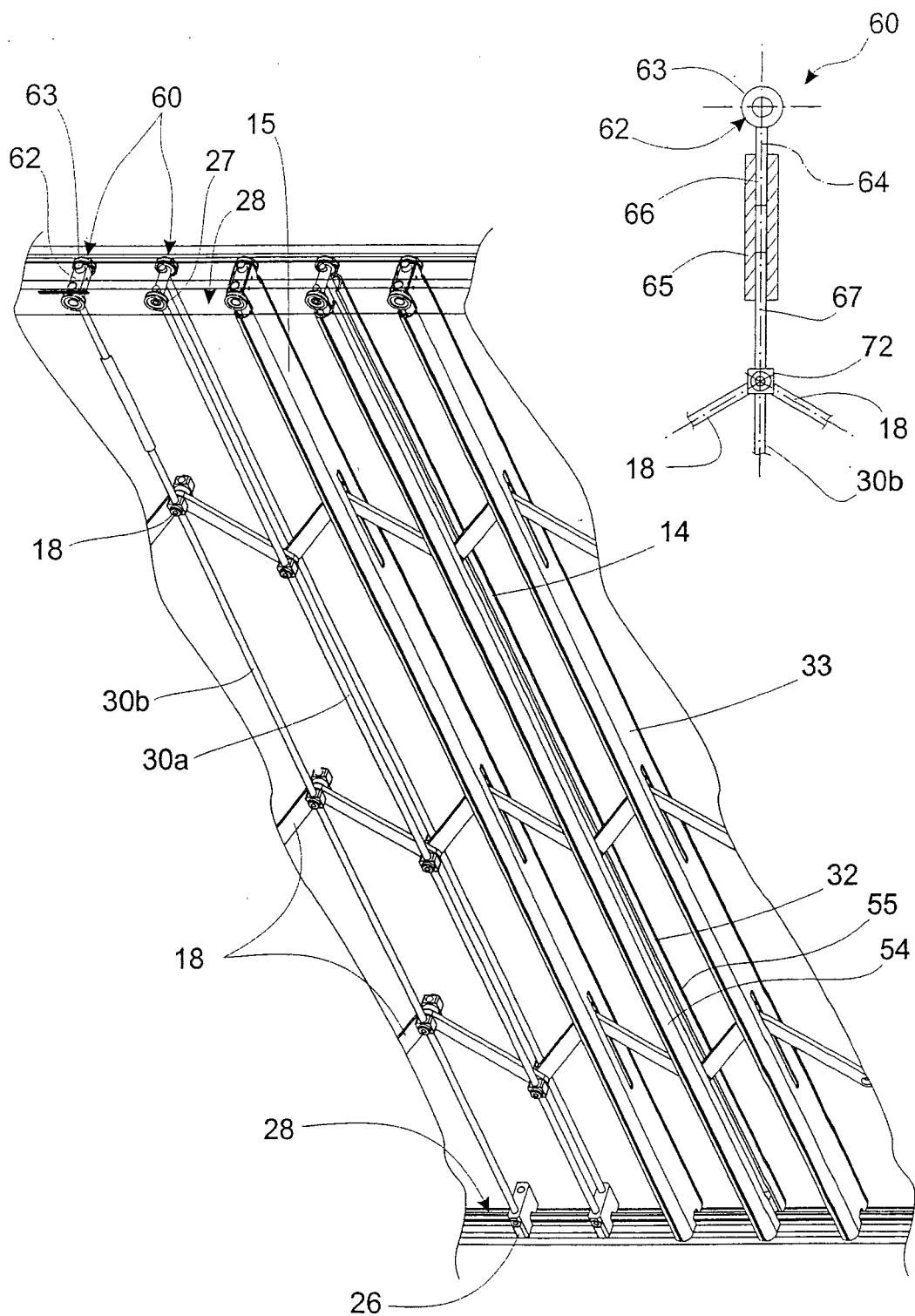
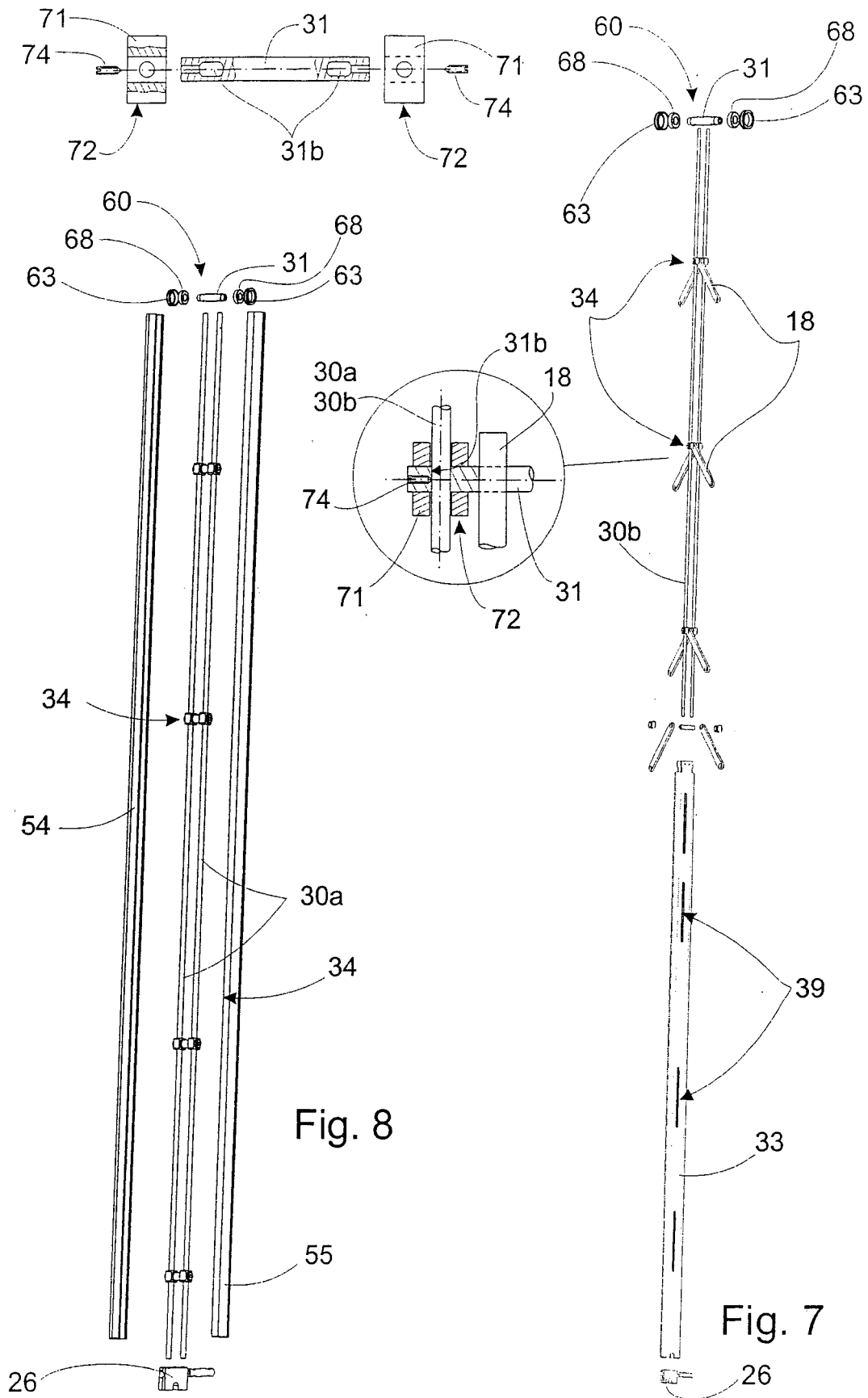


Fig. 6



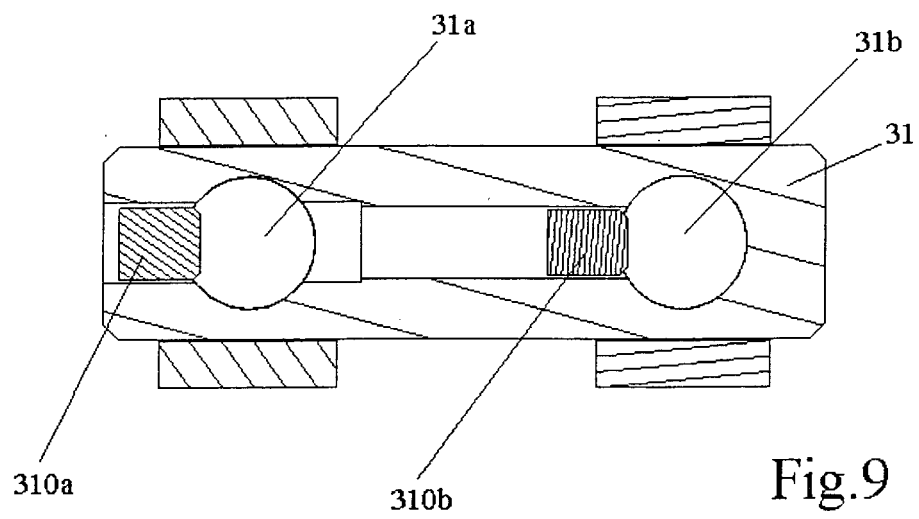


Fig.9

REFERENCES CITED IN THE DESCRIPTION

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