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(54) **ANTI-MOSQUITO PLEATED NET SYSTEM**

GEFALTETES MOSKITONETZSYSTEM

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Description

[0001] The invention belongs to the field of mechanics with regard to anti-mosquito net systems that are used for horizontal door sliding.

[0002] According to today's state of the art, two kinds of mosquito net (screen) are used in those systems: the stretched net that is rolled and unrolled and the pleated (plisse) net that is folded and unfolded.

[0003] The present invention refers to anti-mosquito systems with a pleated (plisse) net.

[0004] The anti-mosquito systems are always consisted of the following accessories: one vertical restraint box that is screwed on one of the two vertical door frames, one lateral fixed guide screwed on the opposite vertical door frame, one vertical sliding box which moves between the restraint box and the lateral fixed guide and in a position parallel to them, by folding and unfolding the net, and two articulated guides, the upper and the lower, that are built-in and consist part of the entire system. The entire system is a folded frame that has the restraint box and the sliding box as its two vertical sides and the two articulated guides, up and down, as its two horizontal sides. Those articulated guides are formerly used as guides in several applications (see indicatively IGUS' DE3806400 guides for electrical cables).

[0005] According to today's state of the art, the anti-mosquito systems with a pleated net and articulated guides work in principle as follows: at the beginning the articulated guides are placed inside the restraint box but they may also be placed inside the sliding box or in both of them at the same time. The net is folded in pleats (pleated) between the two vertical boxes, the restraint and the sliding ones.

[0006] As the user pulls the sliding box in order to unfold the anti-mosquito net, the two articulated guides, due to their joints, are retracted by articulation and get out of the upper and the lower opening of the restraint box, taking an horizontal position at the upper and the lower door frame opening. At the same time, the pleated net is unfolded. When the user makes the opposite movement, that is to bring the sliding box back to its original folded position, the two articulated guides, due to their joints, are retracted again by articulation and re-enter the restraint box, one from its upper opening and the other from its lower opening, taking again a vertical position inside the sliding or the restraint box. At the same time, the pleated net is folded.

[0007] During the above-mentioned function, the pleated net is folded and unfolded in its pleats supported by short ropes which cross it over horizontally, longwise. One of the ends of those ropes is fixed on the sliding box, whereas the other end of the ropes is fixed on the ends of the articulated guides that are inside the restraint box. The short ropes placed horizontally and in equal distances from each other are useful in keeping the pleated net straight in its position, when it is unfolded. They are also useful for its refolding in its pleats.

[0008] Apart from the short ropes that cross over the pleated net, most of the today's systems use another additional short rope which connects one end of the upper articulated guide with one end of the lower articulated guide. Both of those ends are either inside the restraint box or the sliding box (indicative examples EP 0999335 A1, and ZL 03230224.x-2615313 and ZL 2005 2 0046661.4-2833068). Thus, the movement of one of the articulated guides leads to the movement of the other, since their ends are connected.

[0009] In order to place anti-mosquito systems with articulated guides and a pleated net at an opening (frame), the height measurements of the specific opening are required to be taken. The restraint and the sliding boxes, as well as the lateral guide, are always ordered in the exact height of the specific openings. When the anti-mosquito systems are prepared, they are delivered set to be placed, mounted as a folding closed frame. That is, the restraint box and the sliding box are in the specific measurements of the opening ordered for, the net is in its position between them and the two articulated guides (upper and lower) are placed inside the box. In other words, it is about a prepared frame which is screwed on the specific opening ordered for. The same applies of course to the vertical lateral guide which is also delivered in the specific height ordered for so as to be screwed on the opposite vertical door opening.

[0010] For the placement the restraint box is screwed on one of the vertical frames and the vertical lateral guide on the opposite vertical frame that is in a parallel position to the restraint box. The sliding box is parallel and moves between them; that is parallel to the restraint box and the lateral guide. It is the box that moves, goes and return by opening and closing at the same time the net.

[0011] The technical problems that the today's above-described state of the art presents are the following:

If the frame's measurements are not taken properly, and more specifically the height measurements of the restraint box, the sliding box and the lateral guide, the entire anti-mosquito system is useless, and thus the measurements must be retaken and a new system must be ordered from the outset. It is entirely replaced because, what regards the placement, the system is a unified technical element, a prepared frame of four sides which is manufactured in the specific measurements of the order. The upper and the lower sides are pleated due to the articulated guides, but its vertical jambs which concern the height of the opening, are of fixed and not variable length. The anti-mosquito system that was cut and mounted in wrong height measurements is not repaired and there is not any possibility to be replaced by an accessory of which the anti-mosquito net system consists. If the height of the vertical lateral and that of the two boxes were wrongly measured, then only a mistake in the order of ± 1 mm accepts an excuse.

[0012] A second technical problem that the today's state of the art presents is that, when the mosquito net is folded and the two articulated sliding guides revert and enter the fixed restraint box, one from the upper opening and the other from the lower opening, the two guides slide (in some systems) one over the other or one inside the other, or (in some other systems) they slide inside metal skeletons, with a result to create huge noise, embarrassing for the user. That noise is due to the fact that, in many systems, the two ends of the articulated guides, one from the first and one from the second, which are inside the box fastened together by the short rope, are pulled by the short rope in a direction out of a straight way. That opposite moment that the attraction from the short rope exerts on their ends causes the guides' friction either between them or against metal skeletons and because of that it creates noise.

[0013] Finally, a third technical problem apart from the noise is that the two guides, when they meet each other and terminate, sometimes hook each other and thus they get blocked. In order to unblock them, the user has to pull the articulated guides out of the sliding box by using force. By a repeated blocking, the guides' ends are damaged and they need to be replaced.

[0014] The problems of friction and of noise are not solved by Patents No EP 1903175 A2, EP 1653038 A1 and WO 2007/148756 A1 because the short ropes exert an attraction on the guides with a direction out of a straight way, one towards the other, and because of that, the guides rub up against the lateral walls and annoying noise is created or the guides, as they enter each other, create friction and thus noise is caused. At this point, the problem of guides' blocking and of their damage is encountered at the same time.

[0015] The technical problem of the noise is also presented by Patent No EP 0999335 B1 where the two articulated guides each have one of their two ends fixed on the restraint box, whereas their two free ends are connected to each other, or (according to another application of the same invention) the two articulated guides do not have their end fixed but they are connected to each other, both, by short ropes at points of their two ends. The noise is due to the fact that the short ropes exert attraction on the articulated guides with a direction out of a straight way and because of that the articulated guides rub up against the profiles' lateral walls.

[0016] In EP 1 959 090 A1 and also in above mentioned EP 1 653 038 A1 an anti-mosquito pleated net system with articulated guides is described, consisting of a restraint box that bears on its upper end a terminal accessory and on its lower end a basic fixing protrusion of lower articulated guide and a sliding box that bears on its upper end a basic fixing protrusion of upper articulated guide and on its lower end a terminal accessory. An upper articulated guide gets in and out only of the restraint box and a lower articulated guide, parallel to it, that gets in and out only of the sliding box in a motion with opposite direction to each other. An upper rope crosses the net

within the height of the upper end terminal accessory and upper end basic fixing protrusion of upper articulated guide.

[0017] However, the technical problem of the wrong height measurements is not also solved by the today's state of the art according to the above. The reason is that in all above-mentioned cases, the ends of the articulated guides are connected to each other with short ropes by their manufacturer and thus the product comes out of the manufacturing factory in particular measurements and its cutting and mounting in its placement room are not possible because the short ropes will be cut away.

[0018] The only proposed solution by the today's state of the art is the pending Greek Patent grant application of the present applicant, under No. GR 20100100552, where an additional accessory is used for the solution of that technical problem. That is the height regulator, an accessory not used by the present invention.

[0019] The present invention solves the three above technical problems that refer to the wrong taking of measurements, to the noise and to the guides' blocking and is applied to anti-mosquito systems that have a pleated net.

[0020] In brief, the invention uses two articulated guides, one at its upper and the other at its lower part, as the today's state of the art does. However, it presents an innovative point; the two guides move one towards the other in the opposite direction. More particularly, one of the ends of the lower articulated guide is permanently fixed on the lower end of the constraint guide, whereas the other end gets in and out of the sliding guide.

[0021] At the same time, the upper articulated guide is placed right opposite; one of its ends is permanently fixed on the upper end of the sliding guide, whereas the other end gets in and out of the restraint guide.

[0022] Another innovative point of the present invention is the following: According to the today's state of the art, in all existing anti-mosquito systems the short ropes all start from the restraint box and terminate with their terminations fixed on the sliding box, or even the opposite; that is the short ropes all start from the sliding box and terminate with their terminations fixed on the restraint box.

[0023] On the contrary, in the present invention are used two sets of short ropes which start one set opposite to the other, cross over the pleated net horizontally, each set with the opposite direction from the other and the ends of each set of short ropes terminate fixed as two separate sets, each one on the articulated guide that is opposite to it. That is they start from the first articulated guide and terminate on the other.

[0024] A first advantage of the present invention is that it solves the technical problem caused when the order of the anti-mosquito system comes from the factory in wrong measurements, bigger in height from the opening at which the system will be placed, a problem often arisen. Thanks to its technical characteristic that the upper part of the internal mechanism of the system has and

more particularly the capacity that the upper articulated guide has to become independent and to be detached from the two boxes, and given the fact that short ropes to fix the system are not used, the two boxes (but also the lateral rail) can be cut right away in the placement room in the particular metres of the opening. As a result, the user can count and cut the restraint and the sliding boxes (with the net) in the proper measurements right away in the placement room. Afterwards, he mounts on the spot the upper articulated guide, he closes the top (cap) of the restraint box and screws the system on the door openings.

[0025] The solution of that problem is maximized as the production factory can produce directly prepared pre-manufactured mosquito net systems (kit) in specific height categories of the two boxes (restraint and sliding ones) and of the lateral guide, for example "kit with a boxes and rail height from 1900 to 2200 mm", "kit with height from 2201 to 2500 mm" and "kit with height from 2501 to 2800 mm". In contrary to all systems of the today's state of the art, according to the invention and thanks to the technical characteristic that the upper part of the internal mechanism of the system has so as the upper articulated guide to become independent and to be detached from the two boxes, the kits leave the production factory without the accessories of the upper articulated guide and those of the upper box cap being mounted on them and without a danger the product being dismantled because of that, as the lower articulated guide fixed on its position is sufficient to assure the system's cohesion. Those accessories will be mounted later by the user himself in the placement room. Thus, for example, if two door openings of 2000 mm and 2100 mm height each separately are to be covered, the user will choose two same "kits with height from 1900 to 2200 mm" and will cut the boxes and the lateral guide at any point of the length between 1900 mm to 2200 mm and hereupon at 2000 mm for one opening and at 2100 mm for the other right away in the placement room. This is accomplished thanks to the technical autonomy capacity according to the invention, that the upper part of the internal mechanism of the system presents to become independent and to be detached from the two boxes without the internal mechanism of the system being destroyed. Thus, according to the invention the entire mechanism of the mosquito net becomes autonomous below the horizontal line along which the first short rope cross over the pleated mosquito net at the upper part of the system and 4-5 mm above the short rope it is defined as the minimum kit's cutting point, that in the particular example are the 1900 mm (that is 1900 mm + 4-5 mm minimum cutting point). Thus, the user cuts on the spot in the placement room the boxes in the proper measurements between the maximum and the minimum points. If he cuts them high, he has to cut them even more. If he cuts them short, he has to cut a similar new kit and after that he adds the upper articulated guide and the cap and screws the system on the door openings. The time saving

accomplished in this way is priceless, as the user buys prepared kits and he does not need to wait either the order execution of specific measurements or the new corrective order of systems in particular measurements.

[0026] A second advantage of the present invention is that it abolishes the use of a rope that fastens together and connects the ends of the two articulated guides. The pleated systems of the today's art do not work if the ends of the two guides are not connected together -in a way- by a short rope. On the contrary, in the present invention the two guides work completely autonomously and separately from each other and thus their ends do not need to be connected. As a result, the reduction of the production cost and the friction obliteration of the system's accessories and moreover the obliteration of the produced noise during the working are accomplished. However, especially, the absence of a rope that fastens together and connects the ends of the two articulated guides makes the independence of the upper articulated guide possible and as a result makes possible the system's cutting right away in the placement room.

[0027] Furthermore, in order to connect the two ends of the articulated guides in the existing art, the use of a rope requires a short rope of length equal to the net's height X2 (due to pulleys' existence, upper and lower, around of which the short rope moves) or X4 if a second similar system is used face to face with the opposite side of the door opening. The abolition of the use of such a rope from the present invention causes a steep reduction in the cost of raw materials.

[0028] In that way, the present invention solves the noise and the blocking problem, as the two guides neither meet each other nor slide inside the same guide. There are not also used short ropes in order to fasten the end of one articulated guide to the other's end. In the present invention, when one of the two articulated guides enters the restraint box, the other enters the sliding box. The two articulated guides move in opposite direction and they do not meet each other. Thus, there are not friction powers which cause the noise and the blocking.

[0029] By taking extremely advantage of the internal part of the restraint and also of the sliding box, the present anti-mosquito system can cover in width an opening that is shorter or even equal to the box height (restraint or sliding). The today's systems do not have that capacity, since inside the sliding box (or restraint one) the ends of the two articulated guide meet each other and thus the box length is divided in two and is occupied by the two articulated guides that enter it at the same time, one from the upper part and the other from the lower part. For that reason, the systems can cover an opening of width shorter or even equal to the half of the box height (sliding or restraint). To cover an opening of width bigger from the half of the box height, they have to use a second similar system face to face from the opposite side of the door opening.

[0030] Due to the fact that in the present system the two articulated guides do not enter inside the same box

but at the same time one enters the restraint box and the other enters the sliding box, it is not required another technical characteristic that the today's state of the art requires (as EP 0999335 A1) according to which half of the protrusions of the articulated guides -till the middle of their length- have a direction opposite to the other half, whereas the protrusion lying right in the middle of the length is useful as a kind of break for the entire guide. The present invention uses two articulated guides on which all protrusions have the same direction and it does not provide a middle protrusion-break. In addition, it uses articulated guides of shorter length than the above systems of the today's art do. Articulated guides of shorter length mean guides with fewer pieces of "articulations"; that is lower cost of raw materials. Thus, for all the above reasons, the present invention has a lower cost production.

[0031] Finally, the time saving provided by the purchase of an autonomous kit, avoiding thus the delivering wait of the order of specific measurements, consist an additional advantage of the present system.

[0032] The thirteen (13) Drawings that accompany the invention illustrate, in brief, the following:

Drawing 1 pictures the anti-mosquito system with a pleated net, with the two articulated guides lying at the end of the net's unfolding course, parallel to each other in horizontal position (upper and lower) and the pleated net completely unfolded and the short ropes tightened, completely unrolled.

Drawing 2 pictures the same technical accessories as Drawing 1 does, with the two articulated guides (upper and lower) in motion lying in the middle of the net's unfolding course and the pleated net partially unfolded. As the restraint box moves and is leaded to the opposite door opening, the short ropes unroll. It pictures also in enlargement the two basic fixing protrusions of the two articulated guides: the basic protrusion of the upper guide fixed on the upper end of the restraint box and the basic protrusion of the lower guide fixed on the lower end of the restraint box.

Drawing 3 pictures the same technical accessories as Drawings 1 and 2 do, with the two articulated guides in starting position, vertical and parallel to each other, one inside the sliding box and the other inside the restraint box and the net completely folded. It pictures also in enlargement the fixing point of the bundle of ropes at the ends of the upper and the lower articulated guide.

Drawing 4 pictures:

in horizontal section A-A with an upward view the profile of the sliding box and the manner in which the basic fixing protrusion of the upper

articulated guide is fixed on it,
in horizontal section B-B with an upward view the profile of the restraint box and the manner in which the upper terminal accessory is fixed on it,
in horizontal section C-C with a downward view the profile of the sliding box and the manner in which the lower terminal accessory is fixed on it and
in horizontal section D-D with a downward view the profile of the restraint box and the manner in which the basic fixing protrusion of the lower articulated guide is fixed on it.

Drawing 5 pictures in horizontal section the restraint box (figure 5a) and the sliding box (figure 5b).

Drawings 6 to 13 picture the mounting procedure of the system's accessories, as made by the user-fitter in the placement room. Specifically: Drawing 6 pictures the first step of the mounting and particularly the main body of the system, the pleated net folded and the bundle of a set of ropes connected to the last protrusions of the upper articulated guide (figure 6a). It pictures also a part of the upper articulated guide with the basic fixing protrusion connected to the end of the articulated guide (figure 6b).

It pictures also the cap of the upper terminal accessory of the restraint guide (figure 6c).

The bin pictured by Drawing 6 means that the upper part of the main body of the system consisted of the restraint and the sliding guides and part of the pleated net being cut away are dust and are thrown away.

Drawing 7 pictures the second step of the system's mounting where the basic fixing protrusion of the upper articulated guide (figure 7b) is screwed on the main body of the system and on the upper part of the sliding box (figure 7a). It pictures also the cap of the upper terminal accessory of the restraint guide (figure 7c).

Drawing 8 pictures the third step of the system's mounting where the lower articulated guide is detached from the basic fixing protrusion that bears on its end, fixed on the lower end of the restraint box (figure 8a).

It pictures also the cap of the upper terminal accessory of the restraint guide (figure 8b).

Drawing 9 pictures the fourth step of the system's mounting and particularly the end of the upper articulated guide enters the restraint box and afterwards the upper terminal accessory of the restraint guide is screwed on the upper end of the restraint box (figure 9a).

It pictures also the cap of the upper terminal accessory of the restraint guide (figure 9b).

Drawing 10 pictures the fifth step of the system's mounting and particularly: the upper articulated guide is connected to the part of the guide that has already entered the restraint box and the lower articulated guide is connected to the basic fixing protrusion lying at the lower end of the restraint box (figure 10a).

It pictures also the cap of the upper terminal accessory of the restraint guide (figure 10b).

Drawing 11 pictures the sixth and last step of the system's mounting where the cap is screwed on the terminal accessory of the restraint guide.

Drawing 12 pictures the final product in closed position with the folded net, set to be placed at the door opening.

Drawing 13 pictures another implementing example of the present invention where the two boxes, the restraint and the sliding ones, meet, each, the profile of the other. Thus, on each box will be adjusted the technical accessories which in the present description are adjusted on the other.

[0033] An example implementing the present invention follows with a detailed description and reference to the attached figures.

[0034] As articulated guides can be used the guides used by the systems of the today's art, as, indicatively, those referred by Patents ZL 03230224.x-2615313 and ZL 2005 2 0046661.4 - 2833068.

[0035] As depicted in drawings 1, 2 and 3, the anti-mosquito system has two boxes, the restraint box (1) and the sliding one (2) which are in a vertical and parallel position to each other. In and out of the boxes (1 and 2) get the two articulated guides, the upper (3) and the lower (4), starting one from the restraint box and the other from the sliding box, in a motion with opposite direction. Particularly, in and out of the restraint box (1) gets the upper articulated guide (3) with one of its end from the upper opening, whereas its second end is fixed by the basic fixing protrusion (5) on the upper end of the sliding box (2).

[0036] In a similar way, but right opposite, in and out of the sliding box (2) gets the lower articulated guide (4) with one of its end from the lower opening, whereas its second end is fixed by the basic fixing protrusion (6) on the lower end of the restraint box (1).

[0037] Between the two boxes (1 and 2), the pleated net (7) is folded and unfolded in its pleats.

[0038] The net (7) is crossed over, horizontally and longwise, by two sets of restraint short ropes (8) (set 1a, 3a, 5a and set 2a, 4a, 6a), placed in equal distances from each other. As set is defined the group of short ropes that have as common starting point the same box, either the restraint (1) or the sliding one (2).

[0039] The short ropes cross over the net (7) horizontally and alternately; that is the first short rope (1a) be-

longs to the first set, the next one (2a) belongs to the second set, right next (3a) belongs again to the first set, right next (4a) belongs again to the second set, etc.

[0040] Thus, hereupon, one set has its short ropes all to start from the sliding box (2) and its termination to terminate inside the restraint box (1) fixed on the end of the articulated guide (3). On the contrary, the other set has its short ropes all to start from the restraint box (1) and its termination to terminate inside the sliding box (2) fixed on the end of the other articulated guide (4). The alternate placement of the ropes provides an ultimate stability and a normal course what regards net's folding and unfolding. The system works however in a similar way even if the short ropes of the two sets are not placed alternately but in continuity, that is first the short ropes of the first set and afterwards the short ropes of the second set.

[0041] The two sets may not have an equal number of ropes.

[0042] As depicted in drawings 1, 2 and 3, the short ropes of the first set (1a, 3a, 5a) are fixed at their one end on the sliding box (4). They cross over the pleated net (7) longwise, horizontally and in equal distances from each other and terminate in meeting each other. First the lower (1a) meets the following one (3a) in a common point (9) and afterwards both together (1a and 3a) meet the next short rope (5a) in a common point (10) on the restraint box (1) by forming a bundle (11). The end of the bundle (11) enters the upper terminal accessory (17) and supported by an upper pulley (15) it passes through and is fixed on the last two protrusions (20) of the upper articulated guide (3).

[0043] Exactly in the same way, the short ropes of the second set (2a, 4a, 6a) are fixed at their one end on the restraint box (1). They cross over the pleated net (7) longwise, horizontally and in equal distances from each other and terminate in meeting each other. The upper (6a) meets the following one (4a) in a common point (12) and then both together (6a and 4a) meet the next short rope (2a) in a common point (13) on the sliding box (2) by forming a bundle (14). The end of the bundle (14) enters the lower terminal accessory (18) and supported by a lower pulley (16) it is fixed on the last two protrusions (21) of the lower articulated guide (4) (drawings 1, 2, 3). Thus, in brief, the short ropes of the first set (1a, 3a, 5a) start from the sliding box (2) and their ends terminate on the end of the upper articulated guide (3) inside the restraint box (1) and on the contrary, the short ropes of the second set (2a, 4a, 6a) start from the restraint box (1) and their ends terminate on the end of the lower articulated guide (4) inside the sliding box (2).

[0044] As the net (7) is folded, both the articulated guides (3 and 4) are in vertical position, parallel to each other. The end (20) of the upper articulated guide (3) lies at the lower part of the restraint box (1), whereas at the same time, the end (21) of the lower articulated guide (4) lies at the upper part of the sliding box (2) (drawing 3).

[0045] As the net unfolds, both the articulated guides

are in horizontal position, parallel to each other. The end (20) of the upper articulated guide (3) lies at the upper part of the restraint box (1), whereas at the same time the end (21) of the lower articulated guide (4) lies at the lower part of the sliding box (2) (drawing 1). The two ends are in a diagonal position to each other. The two pulleys, the upper (15) and the lower (16) are placed as follows: the upper (15) at the upper end of the restraint box (1) and the lower (16) pulley at the lower end of the sliding box (2). The two bundles of the ropes (11 and 14) move up and down inside the two boxes (1 and 2) supported by the two pulleys (15 and 16).

[0046] In that manner in which the short ropes and the bundles of their ends (11 and 14) work and are fixed on the articulated guides (3 and 4), as the two articulated guides (3 and 4) move, enter and get out of the restraint (1) and the sliding box (2), they make the short ropes move, the pleated net is folded and unfolded (7) and so the system works.

[0047] Main technical characteristic of the present system is that the end (20) of the upper articulated guide (3) on which bundle (11) of the first set (1a, 3a, 5a) is fixed, is diagonally opposite to the end (21) of the lower articulated guide (4) on which bundle (14) of the second set (2a, 4a, 6a) is fixed (drawing 1).

[0048] In addition, main technical characteristic of the present system is that one pulley (15) inside the restraint box (1) lies always at the upper end next to the terminal accessory (17) and to diagonally opposite point in comparison with the other pulley (16) which lies inside the sliding box (2) always at the lower end next to the terminal accessory (18) (drawing 1).

[0049] Moreover, main technical characteristic of the present system is that one of the terminal accessories (17) of the restraint box (1) lies always at the diametrically opposite angle of the frame in comparison with the terminal accessory (18) of the sliding box (2). Thus, when the restraint box (1) has on its upper end the terminal accessory (17), the sliding box (2) has the terminal accessory (18) on its lower end and vice versa.

[0050] Finally, main technical characteristic of the present system is that the basic fixing protrusion (5) of the sliding box (2) lies always on a diametrically opposite end in comparison with the basic fixing protrusion (6) of the restraint box (1). Thus, when the restraint box (1) has on its lower end the basic fixing protrusion (6), the sliding box (2) has on its upper end the basic fixing protrusion (5) and vice versa.

[0051] In other words, the two boxes bear the same accessories in a reverse position (upside-down).

[0052] As depicted in drawings 4 and 5 which picture the sections of the profiles of the restraint box (1) and the sliding box (2), the two terminal accessories (17, 18) and the two basic fixing protrusions (5 and 6) are fixed on the ends of the restraint (1) and the sliding box (2) by screwing. The screwing is made directly on the aluminium profiles (1, 2) on specific receptions (19) (drawing 4, drawing 5 figure 5a and figure 5b). Especially what re-

gards the upper terminal accessory (17) and the upper basic fixing protrusion (5) on the upper ends of the two boxes (1 and 2) respectively, their fixing by screwing provides independence to the upper part of the systems, as -in comparison with the today's state of the art- it enables the kit's user to cut the two boxes in whatever height he desires and afterwards to screw and mount the system in the placement room as presented in details right below.

[0053] As depicted in Drawing 6, the first step of the mounting is made as follows: as the placement begins, the main body of the system consists of the restraint box (1) and the sliding box (2) with the pleated net (7) folded between them. The upper articulated guide (3) lies out of the two boxes (1, 2) put out of joint in two parts, where the first part bears on its end the basic fixing protrusion (5), whereas the other part has its bundle's end (11) fixed on the last protrusions (20). That bundle (11) is formed by the short ropes of the first set (1a, 3a, 5a) which have their starting points in the sliding box (2), they get out under the point at which the fitter will cut the system and enter as a unified bundle (11) and they are -by their manufacturer- steadily fixed on the last two protrusions (20) of the upper articulated guide (3), passing through the upper terminal accessory (17) of the restraint guide (1), which at this stage is detached from the restraint box (figure 6a).

[0054] In addition, at this stage, the cap (22) of the upper terminal accessory (17) of the restraint guide (1) is detached (figure 6c).

[0055] The user cuts and throws away as useless the upper part of the entire main body of the system; that is the two boxes (restraint (1) and sliding (2) ones) and part of the pleated net (7). The body is cut always 4-5mm above the maximum short rope that is the last horizontal short rope from the second set (6a). The 4-5 mm point above the short rope (6a) is defined as the minimum kit's cutting point, an indication that the body bears from its manufacturer. The fitter can cut the body in whatever height between the two points (minimum and maximum) that the body bears.

[0056] As depicted in Drawing 7, at the following step of the mounting, the upper part of the main body of the system has been cut and thrown away. That part exceeds the opening's height that is about to be covered and thus the system has got its final height according to the opening's height which it is about to cover. Afterwards, the basic fixing protrusion (5) of the upper articulated guide (3) is screwed on the upper end of the sliding box (2). The restraint box (1) moves down at the lower basic fixing protrusion (6) and it is screwed on it.

[0057] As depicted in Drawing 8, at the following step of the mounting, the user unfolds the pleated net (7) and detach ("dislocate") the lower articulated guide (4) from the basic fixing protrusion (6) that bears on its end which is fixed on the lower end of the restraint box (1).

[0058] As depicted in Drawing 9, at the following step of the mounting, the upper articulated guide which has the bundle (11) of its set of ropes (1a, 3a, 5a) fixed on

the two last protrusions (20), enters the restraint box (1) and afterwards the upper terminal accessory (17) is screwed on the upper end of the restraint box (1).

[0059] As depicted in Drawing 10, the upper articulated guide (3) is mounted by articulation with the part of the guide that has already entered the restraint box (1) and the lower articulated guide (4) is mounted by articulation with the basic fixing protrusion (6) which lies on the lower end of the restraint box (1).

[0060] As depicted in Drawing 11, at the upper end of the restraint box (1), the cap (22) of the upper terminal accessory (17) of the restraint box (1) is screwed on the terminal accessory (17). The system opens and closes with the net folded (figure 12) and unfolded (figure 1) and it is set to be placed at the opening that is about to cover.

[0061] Another way of implementing the present invention is presented by Drawing 13 and is the change of the profiles presented by drawings 4 and 5: the restraint box (figure 5b) takes the profile of the sliding box (figure 5a) and the sliding box (drawing 5a) takes the profile of the restraint box (figure 5b). In that case, and given the fact that those accessories require a particular profile in order to work, the upper articulated guide (3) gets in and out only of the sliding box (2) and the lower articulated guide (4), parallel to the upper one, gets in and out only of the restraint box (1). At the same time, all the accessories which according to the previous detailed description start from the restraint box (1) or terminate in it or are placed on it or get in and out of it, will start or terminate or be placed on the respective points in the sliding box (2) and the opposite what regards the accessories of the sliding box (2).

[0062] The facility that the present system provides by measuring, cutting and placing directly in the placement room under the kit form according to the above, of course does not prohibit and exclude by any means its traditional use and placement. That is the product will be ordered in specific measurements in the manufacturing factory, it will be completely prepared and mounted in the factory and afterwards it will be delivered to the placement room set to be placed in the traditional way and not under the kit form.

[0063] The invention applies to all anti-mosquito pleated nets.

Claims

1. Anti-mosquito pleated net system with articulated guides consisting of:

i) a restraint box (1) that bears on its upper end a terminal accessory (17) and on its lower end a basic fixing protrusion (6) of lower articulated guide (4) and a sliding box (2) that bears on its upper end a basic fixing protrusion (5) of upper articulated guide (3) and on its lower end a terminal accessory (18);

ii) an upper articulated guide (3) that gets in and out only of the restraint box (1) and a lower articulated guide (4), parallel to it, that gets in and out only of the sliding box (2), in a motion with opposite direction to each other,

characterized by

iii) two sets of short ropes (1a, 3a, 5a and 2a, 4a, 6a), the short ropes of the first set (1a, 3a, 5a) are fixed at their one end on the sliding box (2) and at their second end they terminate in meeting each other in common bundle (11) fixed on the last protrusions (20) of the upper articulated guide (3) inside the restraint box (1), the short ropes of the second set (2a, 4a, 6a) are fixed at their one end on the restraint box (1) and at their second end they terminate in meeting each other in common bundle (14) fixed on the last protrusions (21) of the lower articulated guide (4) inside the sliding box (2) where the two sets cross over the net (7) with opposite direction to each other;

iv) upper articulated guide (3), upper end terminal accessory (17) and upper end basic fixing protrusion (5) are being detachable from upper ends of restraint box (1) and sliding box (2) at least 4-5 mm above the first short rope (6a) crossing over the pleated mosquito net (7).

2. Anti-mosquito net system according to claim 1 which is **characterised by** the fact that the short ropes of both sets (1a, 3a, 5a and 2a, 4a, 6a) cross over horizontally and longwise the pleated net (7), placed one short rope from its set alternately, in equal distances from each other or placed each set in continuity to the other in equal distances from each other.
3. Anti-mosquito net system according to claims 1 and 2 which is **characterised by** the fact that the ends of the short ropes of the first set (1a, 3a, 5a) fixed on the sliding box (2) meet each other, first the lower (1a) meets the following one (3a) in a common point (9) and afterwards both together (1a and 3a) meet the next short rope (5a) in a common point (10) on the restraint box (1) and form a bundle (11), whereas those of the second set (2a, 4a, 6a) fixed on the restraint box (1) meet each other, first the upper (6a) meets the following one (4a) in a common point (12) and afterwards both together (6a and 4a) meet the next short rope (2a) in a common point (13) on the sliding box (2) and form a bundle (14).
4. Anti-mosquito net system according to claims 1, 2 and 3 which is **characterised by** the fact that the end of the bundle (11) of the short ropes of the first set (1a, 3a, 5a) enters the upper terminal accessory (17) and supported by an upper pulley (15) passes

through and is fixed on the last two protrusions (20) of the upper articulated guide (3), inside the restraint box (1) at the end of which, on the terminal accessory (17), is screwed a cap (22), whereas the end of the bundle (14) from the short ropes of the second set (2a, 4a, 6a) enters the lower terminal accessory (18) and supported by a lower pulley (16) passes through and is fixed on the last two protrusions (21) of the lower articulated guide (4) inside the sliding box (2), with an upper pulley (15) next to the terminal accessory (17) and with a lower pulley (16) next to the terminal accessory (18), with the fixing points (20 and 21) lying always at points diagonally opposite to each other.

5. Anti-mosquito net system according to claims 1 - 4 which is **characterised by** the fact that the restraint box (1) can take the profile of the sliding box (2) and the sliding box (2) can take the profile of the restraint box (1), thus, the upper articulated guide (3) gets in and out only of the sliding box (2) and the lower articulated guide (4), parallel to the upper one (3), gets in and out only of the restraint box (1), in a motion with opposite direction to each other and by the fact that hereupon all the accessories which according to claims 1 - 4 are placed in the restraint (1) and sliding box (2), each take the exact same position in the opposite box.

Patentansprüche

1. Plissiertes Insektenschutznetz-System mit Laufwerken bestehend aus:

- i) einem Einspannrahmen (1), der an seinem oberen Ende ein Terminal-Zubehörteil (17) und an seinem unteren Ende eine Ausbuchtung (6) zur Befestigung des unteren Basis-Laufwerks (4) trägt, sowie einem Schieberahmen (2), der an seinem oberen Ende eine Ausbuchtung (5) zur Befestigung des oberen Basis-Laufwerks (3) und an seinem unteren Ende ein Terminal-Zubehörteil (18) trägt;
- ii) einem oberen Laufwerk (3), das aus dem Einspannrahmen (1) hinein- und herausführt, und einem unteren Laufwerk (4), parallel zu ihm verlaufend, das nur aus dem Schieberahmen (2) hinein- und herausführt, und zwar in jeweils entgegengesetzter Bewegungsrichtung;

gekennzeichnet durch

- iii) zwei Sets von kurzen Seilen (1a, 3a, 5a und 2a, 4a, 6a), wobei die kurzen Seile des ersten Sets (1a, 3a, 5a) an ihrem einen Ende an dem Schieberahmen (2) befestigt sind und sie mit ihrem anderen Ende in einem gemeinsamen Bündel (11) zusammenlaufen, das an den beiden letzten Ausbuchtungen (20) des oberen Laufwerks (3) im Einspannrahmen (1) befestigt ist, und die kurzen Seile des zweiten Sets (2a, 4a, 6a) an ihrem einen Ende an dem Einspannrahmen (1) befestigt sind und sie mit ihrem anderen Ende in einem gemeinsamen Bündel (14) zusammenlaufen, das an den letzten Ausbuchtungen (21) des unteren Laufwerks (4) im Schieberahmen (2) befestigt ist, wobei die beiden Sets jeweils in entgegengesetzter Bewegungsrichtung quer über das Netz (7) verlaufen;

del (11) zusammenlaufen, das an den beiden letzten Ausbuchtungen (20) des oberen Laufwerks (3) im Einspannrahmen (1) befestigt ist, und die kurzen Seile des zweiten Sets (2a, 4a, 6a) an ihrem einen Ende an dem Einspannrahmen (1) befestigt sind und sie mit ihrem anderen Ende in einem gemeinsamen Bündel (14) zusammenlaufen, das an den letzten Ausbuchtungen (21) des unteren Laufwerks (4) im Schieberahmen (2) befestigt ist, wobei die beiden Sets jeweils in entgegengesetzter Bewegungsrichtung quer über das Netz (7) verlaufen;

iv) und dadurch, dass das obere Laufwerk (3), das Terminal-Zubehörteil am oberen Ende (17) und die Befestigungsausbuchtung am oberen Ende (5) von den oberen Enden des Einspannrahmens (1) und des Schieberahmens (2) mindestens 4-5 mm über dem ersten kurzen Seil (6a), das über das plissierte Insektenschutznetz (7) verläuft, herausnehmbar sind.

2. Insektenschutznetz-System gemäß Anspruch 1, das **dadurch gekennzeichnet** ist, dass die kurzen Seile der beiden Sets (1a, 3a, 5a und 2a, 4a, 6a) horizontal und längs über das plissierte Netz (7) verlaufen, wobei ein kurzes Seil von seinem Set abwechselnd in gleichen Abständen voneinander, oder jedes Set in Kontinuität zu dem andern in gleichen Abständen voneinander verlaufend angeordnet sind.

3. Insektenschutznetz-System gemäß der Ansprüche 1 und 2, das **dadurch gekennzeichnet** ist, dass die Seilenden der kurzen Seile des ersten Sets (1a, 3a, 5a), die auf dem Schieberahmen (2) befestigt sind, wie folgt aufeinander treffen: zuerst trifft das untere (1a) auf das darauf folgende (3a) an einem gemeinsamen Punkt (9), und danach treffen beide zusammen (1a und 3a) auf das nächste kurze Seil (5a) an einem gemeinsamen Punkt (10) auf dem Einspannrahmen (1) und bilden ein Bündel (11), wohingegen diejenigen des zweiten Sets (2a, 4a, 6a), die auf dem Einspannrahmen (1) befestigt sind, wie folgt aufeinander treffen: zuerst trifft das obere (6a) auf das darauf folgende (4a) an einem gemeinsamen Punkt (12) und danach treffen beide zusammen (6a und 4a) auf das nächste kurze Seil (2a) an einem gemeinsamen Punkt (13) auf dem Schieberahmen (2) und sie bilden ein Bündel (14).

4. Insektenschutznetz-System gemäß der Ansprüche 1, 2 und 3, das **dadurch gekennzeichnet** ist, dass das Ende des Bündels (11) der kurzen Seile des ersten Sets (1a, 3a, 5a) in das Terminal-Zubehörteil (17) einmündet und, unterstützt durch eine obere Seilrolle (15), durch dieses hindurch läuft und an den letzten beiden Ausbuchtungen (20) des oberen Laufwerks (3) in dem Einspannrahmen (1) befestigt ist,

an dessen Ende, auf dem Terminal-Zubehörteil (17), eine Verschlusskappe (22) aufgeschraubt ist, wohingegen das Ende des Bündels (14) der kurzen Seile des zweiten Sets (2a, 4a, 6a) in das untere Terminal-Zubehörteil (18) einmündet und, unterstützt durch eine untere Seilrolle (16), durch dieses hindurch läuft und an den beiden letzten Ausbuchtungen (21) des unteren Laufwerks (4) im Schieberahmen (2) durch eine obere Seilrolle (15) nächst dem Terminal-Zubehörteil (17) und durch eine untere Seilrolle (16) nächst dem Terminal-Zubehörteil (18) befestigt ist, wobei die Einspannstellen (20 und 21) immer an diagonal gegenüberliegenden Punkten liegen.

5. Insektenschutznetz-System gemäß der Ansprüche 1-4, das **dadurch gekennzeichnet** ist, dass der Einspannrahmen (1) das Profil des Schieberahmens (2) und der Schieberahmen (2) das Profil der Einspannrahmens (1) aufnehmen können, so dass das obere Laufwerk (3) nur in und aus dem Schieberahmen (2) und das untere Laufwerk (4), parallel zum oberen Laufwerk (3), nur in und aus dem Einspannrahmen (1) führt, und zwar in jeweils entgegengesetzter Bewegungsrichtung, sowie dadurch, dass hierauf alle Zubehörteile, die gemäß der Ansprüche 1-4 auf dem Einspannrahmen (1) und dem Schieberahmen (2) angebracht sind, ein jedes genau dieselbe Position in dem jeweils anderen Rahmen einnehmen kann.

Revendications

1. Système de moustiquaire avec un filet plié avec des guides articulés comprenant:

- i) une boîte de retenue (1) qui porte sur son extrémité supérieure un accessoire de finition (17) et sur son extrémité inférieure une saillie de fixation de base (6) du guide articulé inférieur (4) ainsi qu' une boîte à glissières (2) qui porte sur son extrémité supérieure une saillie de fixation de base (5) du guide articulé supérieur (3) et sur son extrémité inférieure un accessoire de finition (18),
- ii) un guide articulé supérieur (3) qui entre et sort seulement de la boîte de retenue (1) et un guide articulé inférieur (4), parallèle à lui, qui entre et sort seulement de la boîte à glissières (2) en mouvement de sens contraire entre eux,

caractérisé par

- iii) deux ensembles de cordes courtes (1a, 3a, 5a et 2a, 4a, 6a): les cordes courtes du premier ensemble (1a, 3a, 5a) sont fixées sur la boîte à glissières (2) à une extrémité et à l'autre elles se rencontrent à un faisceau commun (11) qui

est fixé sur les dernières saillies (20) du guide articulé supérieur (3) dans la boîte de retenue (1) et les cordes du deuxième ensemble (2a, 4a, 6a) sont fixées sur la boîte de retenue (1) à une extrémité et à l'autre elles se rencontrent à un faisceau commun (14) qui est fixé sur les dernières saillies (21) du guide articulé inférieur (4) dans la boîte à glissières (2), où les deux ensembles traversent en long le filet (7) en sens contraire entre eux,

iv) le guide articulé supérieur (3), l'accessoire de finition (17) de l'extrémité supérieure et la saillie de fixation de base (5) de l'extrémité supérieure sont détachables des extrémités supérieures de la boîte de retenue (1) et de la boîte à glissières (2) au moins 4-5 mm au dessus de la première corde (6a) qui traverse en long le filet plié (7).

2. Système de moustiquaire avec un filet, selon la revendication 1, caractérisé du fait que les cordes de deux ensembles (1a, 3a, 5a et 2a, 4a, 6a) traversent horizontalement et en long le filet plié (7), une corde de chaque ensemble étant fixée alternativement, aux distances égales entre eux, ou un ensemble suite à l'autre étant fixé aux distances égales entre eux.
3. Système de moustiquaire avec un filet, selon les revendications 1 et 2, caractérisé du fait que aux cordes du premier ensemble (1a, 3a, 5a) une extrémité est fixée sur la boîte à glissières (2), leurs extrémités se rencontrent, d'abord la corde inférieure (1a) rencontre la suivante (3a) sur un point commun (9) et après tous les deux (1a et 3a) rencontrent la corde suivante (5a) sur un point commun (10) à la boîte de retenue (1) et forment un faisceau (11), tandis que aux cordes du deuxième ensemble (2a, 4a, 6a) une extrémité est fixée sur la boîte de retenue (1), leurs extrémités se rencontrent, d'abord la corde supérieure (6a) rencontre la suivante (4a) sur un point commun (12) et après tous les deux (6a et 4a) rencontrent la corde suivante (2a) sur un point commun (13) à la boîte à glissières (2) et forment un faisceau (14).
4. Système de moustiquaire avec un filet, selon les revendications 1, 2 et 3, caractérisé du fait que l'extrémité du faisceau (11) de cordes du premier ensemble (1a, 3a, 5a) entre dans l'accessoire de finition supérieur (17) et par une poulie supérieure (15) passe et se fixe sur les deux dernières saillies (20) du guide articulé supérieur (3) dans la boîte de retenue (1), sur l'extrémité de laquelle à l'accessoire de finition (17) un couvercle (22) est vissé, tandis que l'extrémité du faisceau (14) de cordes du deuxième ensemble (2a, 4a, 6a) entre dans l'accessoire de finition inférieur (18) et par une poulie inférieure (16) passe et se fixe sur les deux dernières saillies (21)

du guide articulé inférieur (4) dans la boîte à glissières (2), avec une poulie supérieure (15) près de l'accessoire de finition (17) et une poulie inférieure (16) près de l'accessoire de finition (18), les points de fixation (20 et 21) étant toujours aux points diagonalement contraires entre eux. 5

5. Système de moustiquaire avec un filet, selon les revendications 1-4, caractérisé du fait que la boîte de retenue (1) peut former une boîte à glissières (2) et la boîte à glissières (2) peut former une boîte de retenue (1), ainsi, le guide articulé supérieur (3) entre et sort seulement de la boîte à glissières (2) et le guide articulé inférieur (4), parallèle à lui (3), entre et sort seulement de la boîte de retenue (1), en mouvement de sens contraire entre eux et du fait que dans ce cas chacun des accessoires fixés selon les revendications 1-4 sur les boîtes de retenue (1) et à glissières (2) prend exactement la même position à la boîte contraire. 10 15 20

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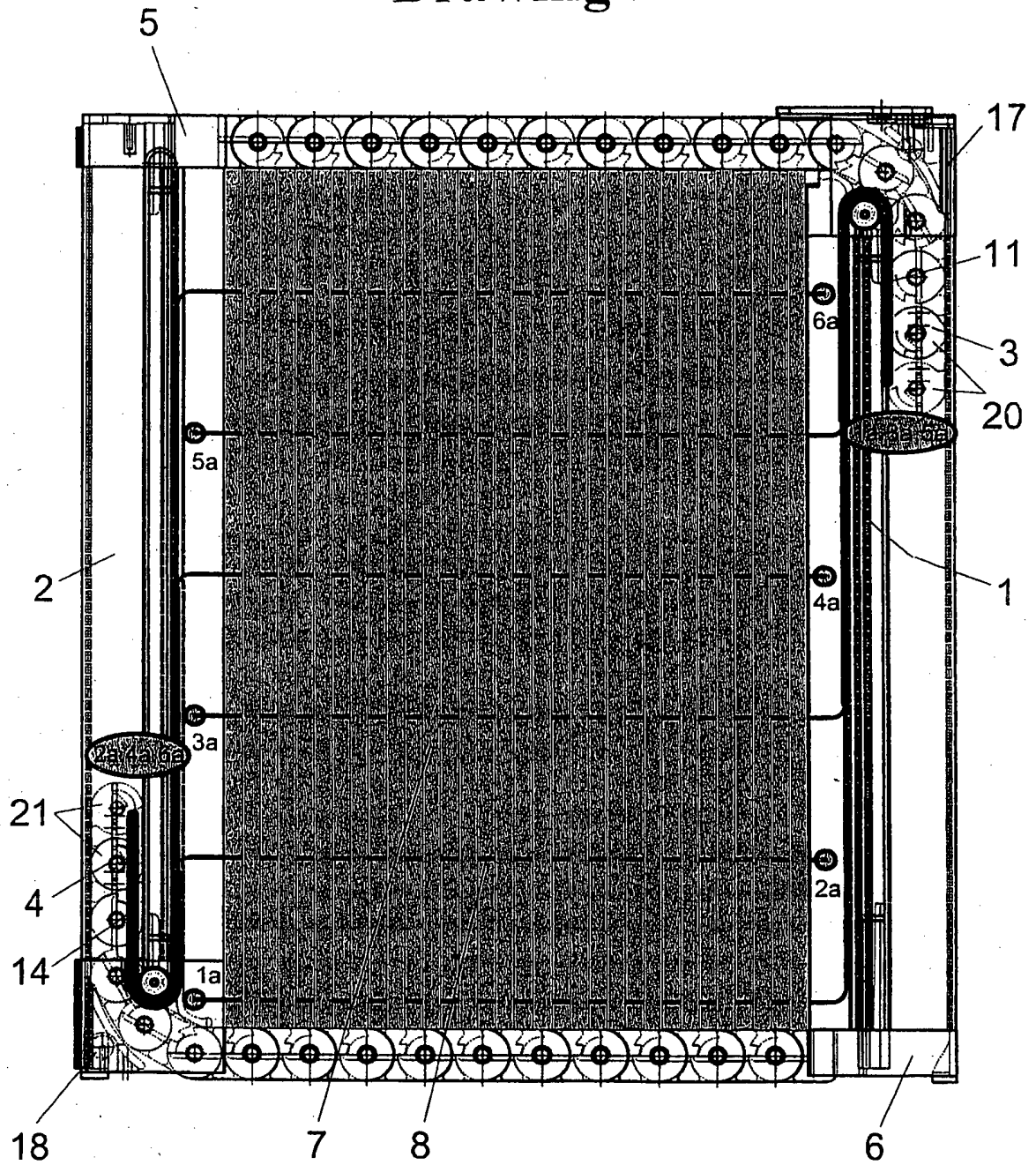
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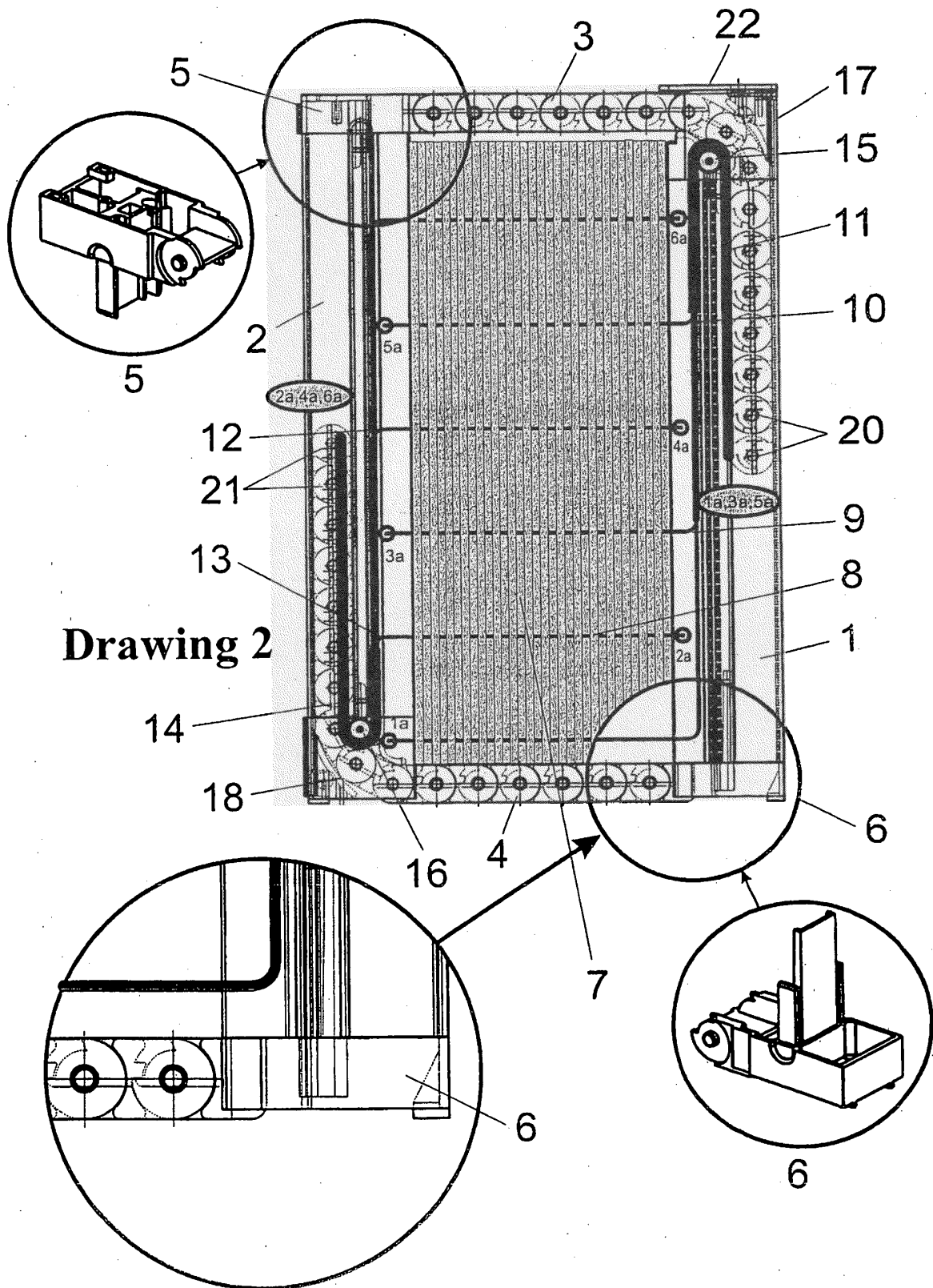
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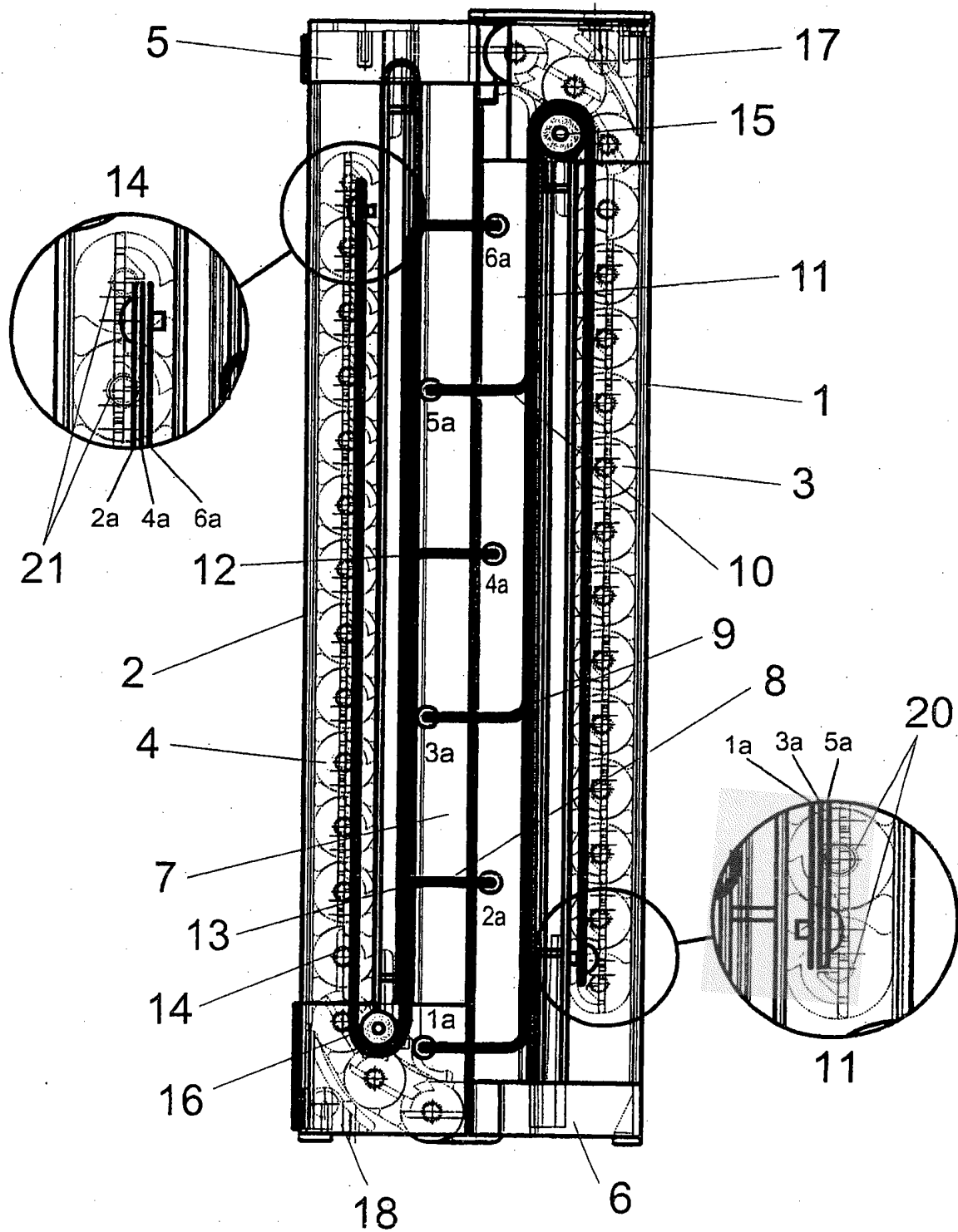
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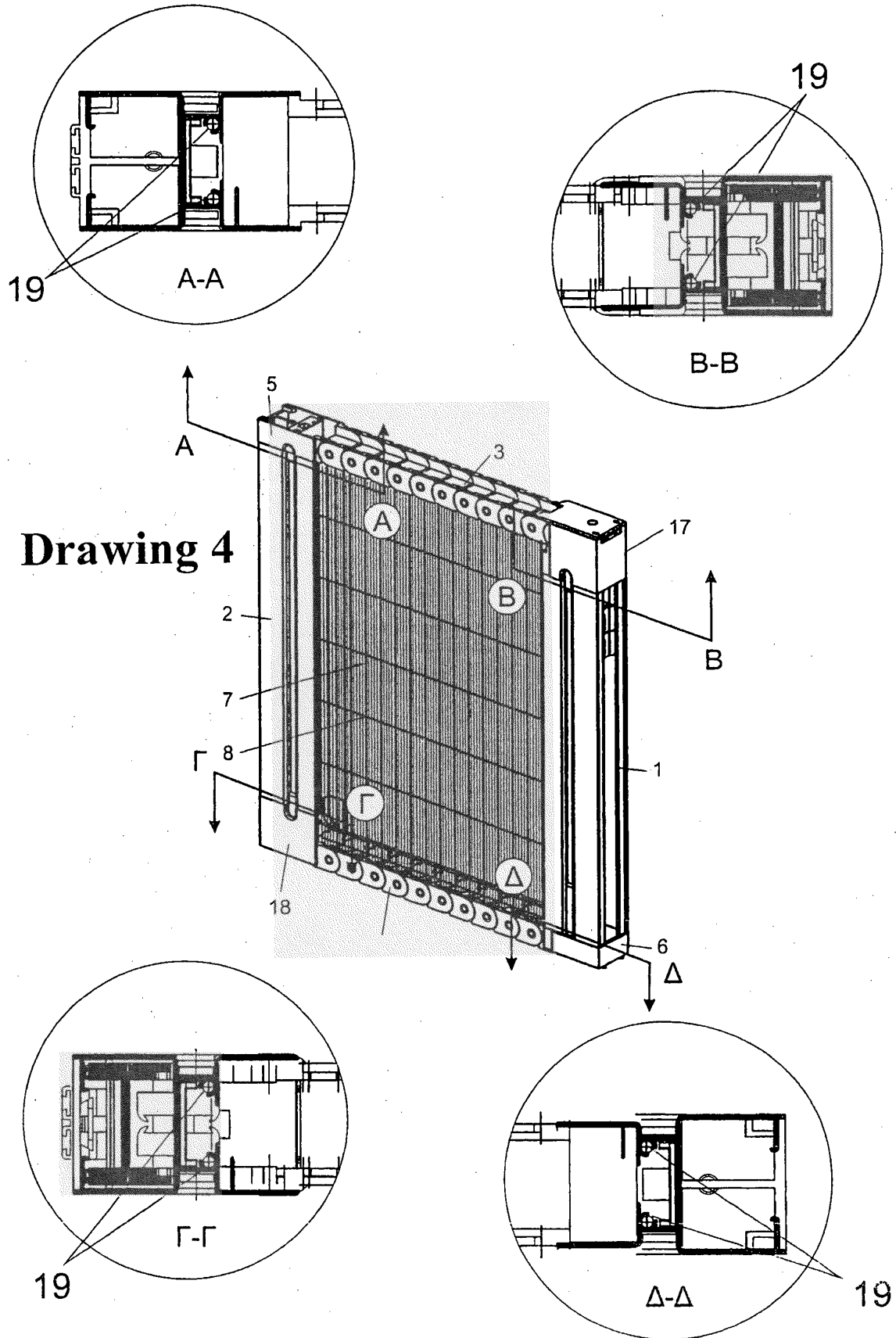
Drawing 1





Drawing 3





Drawing 5

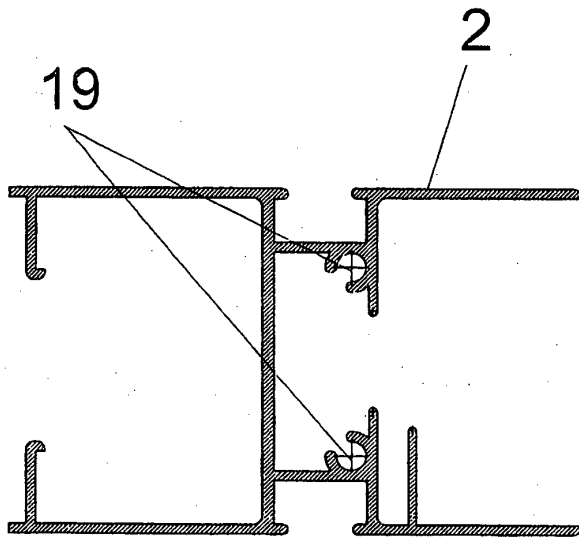


Fig. 5a

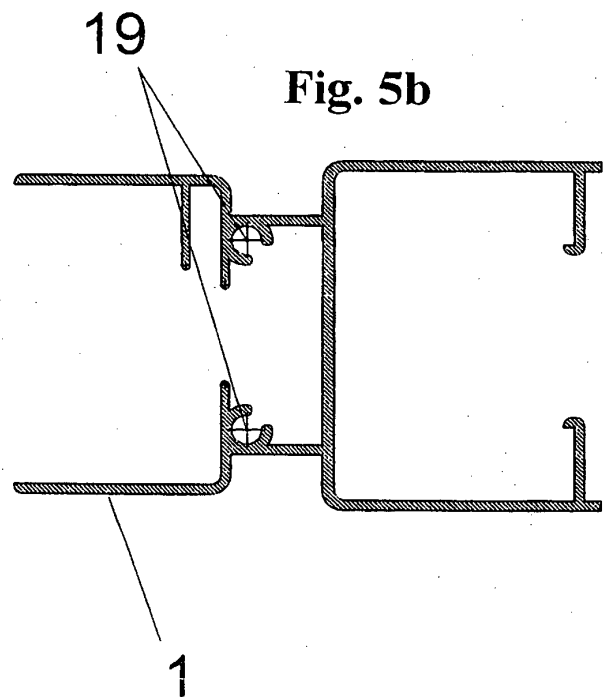
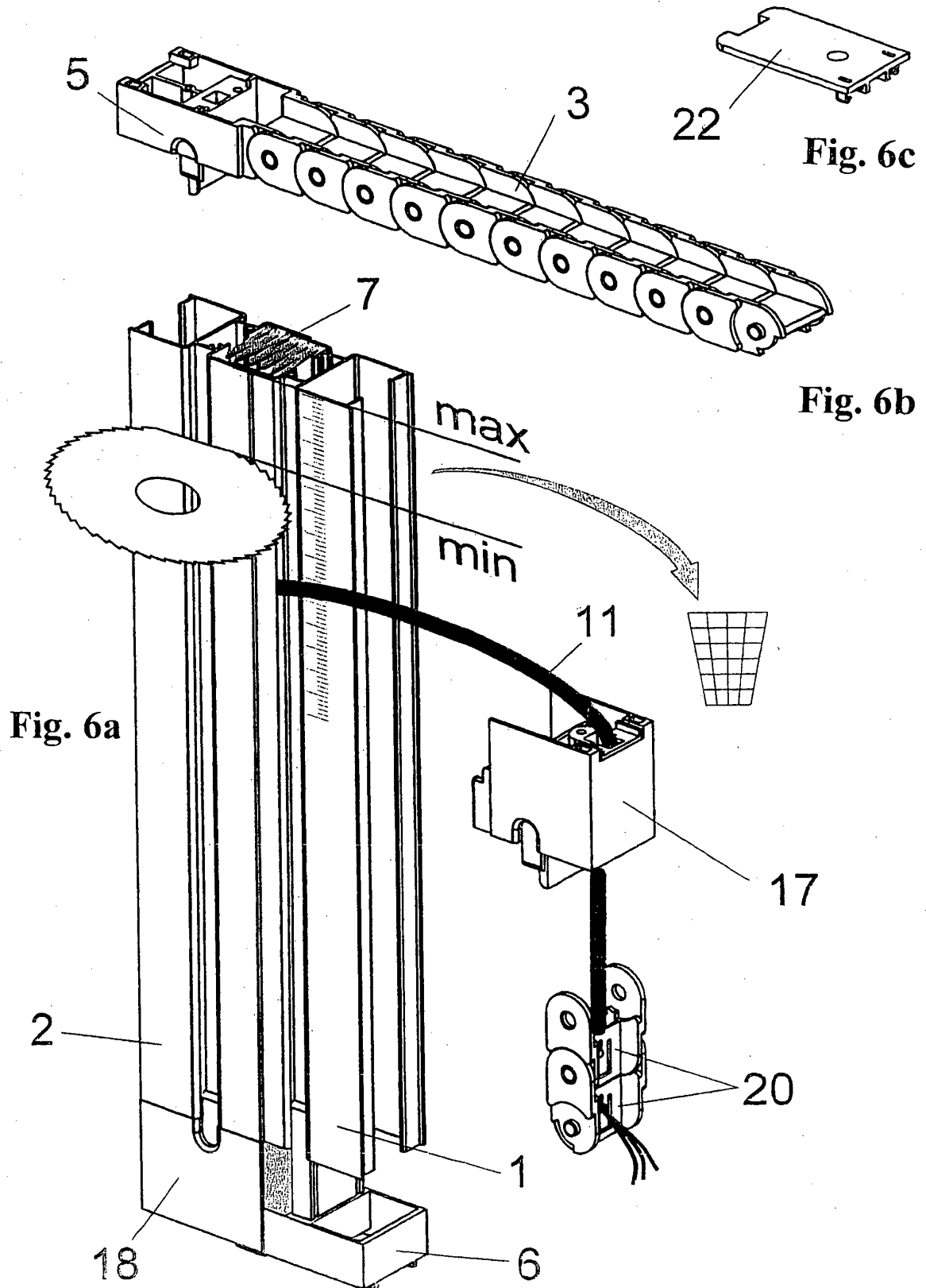
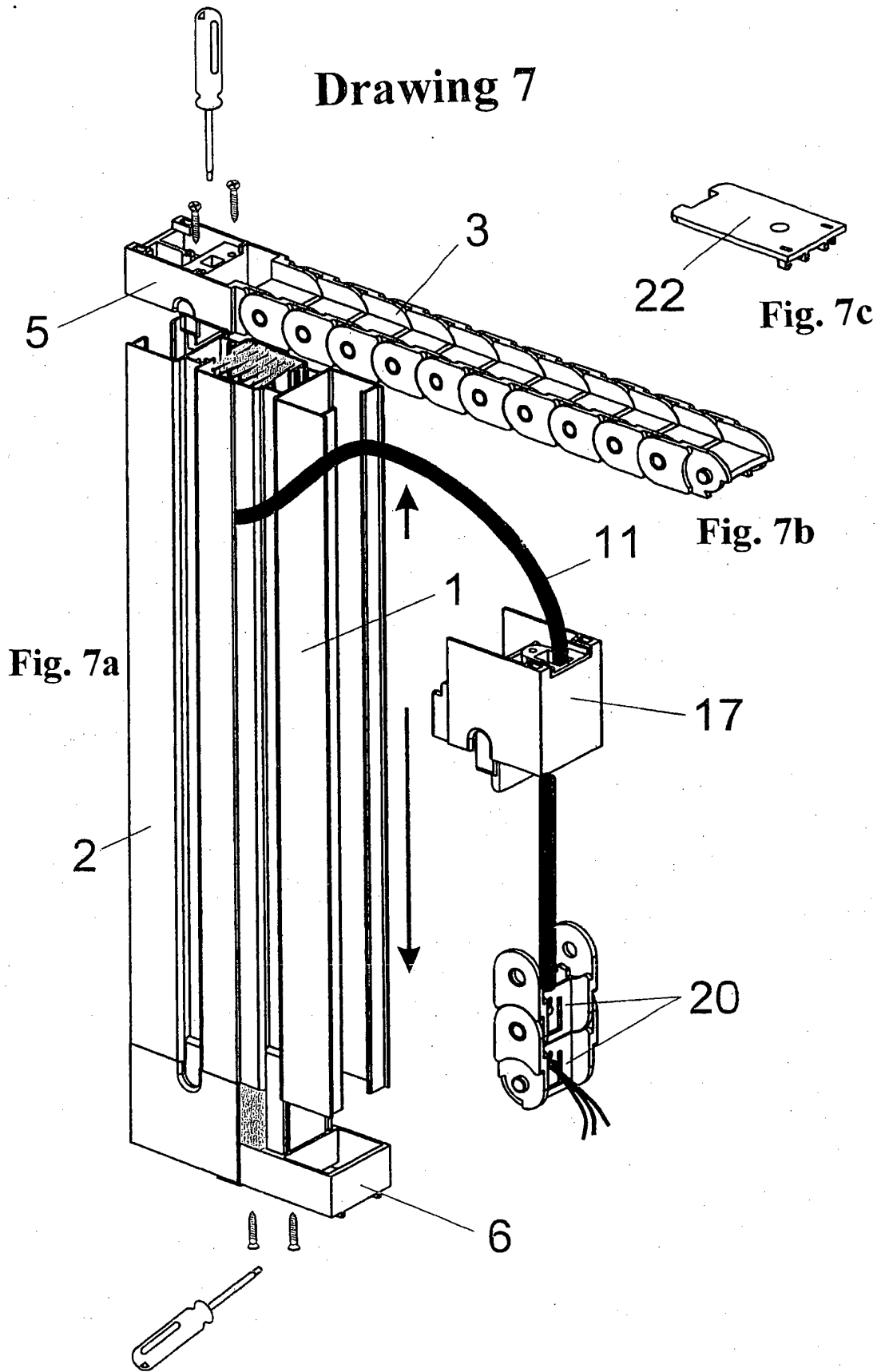


Fig. 5b

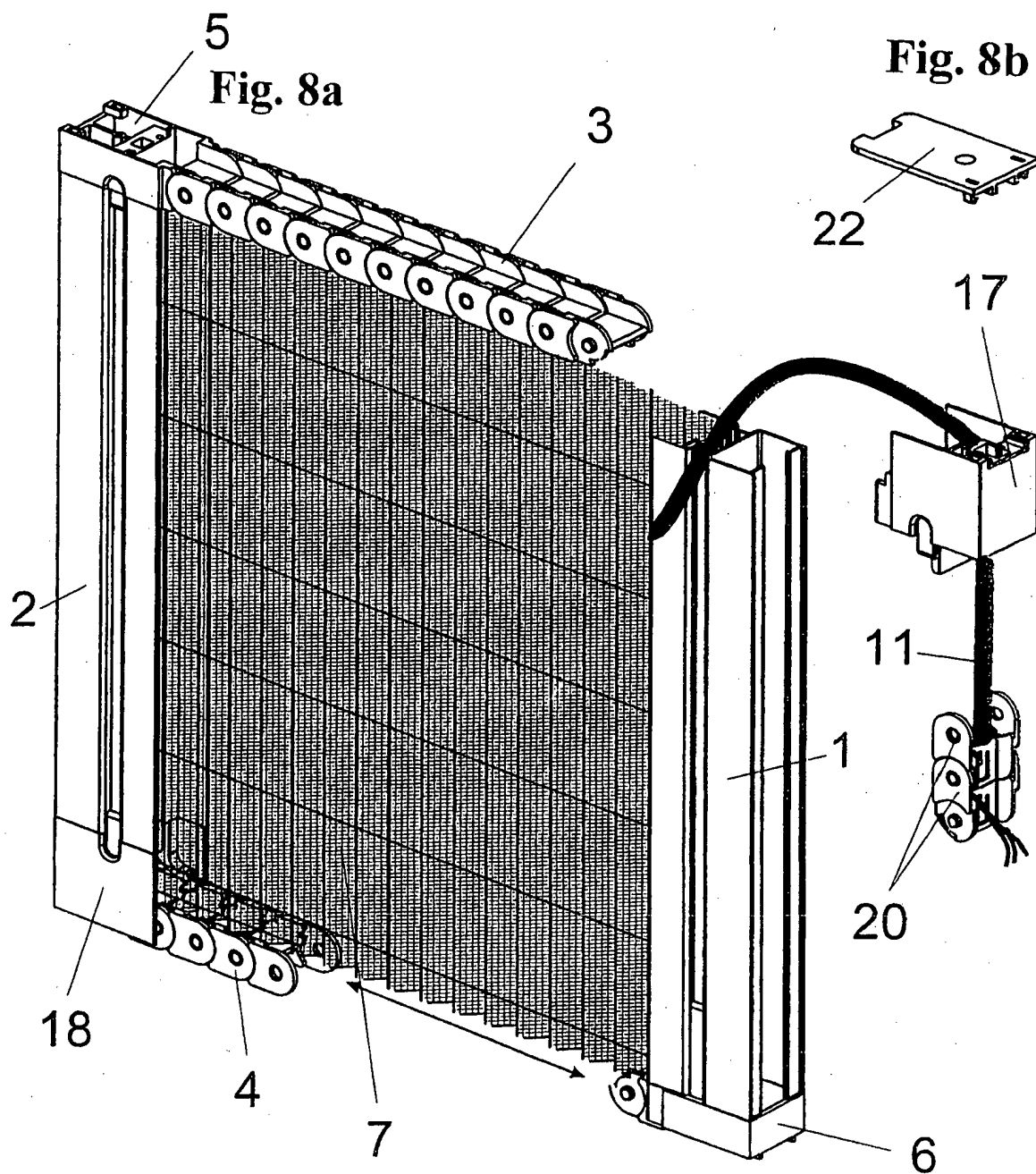
Drawing 6



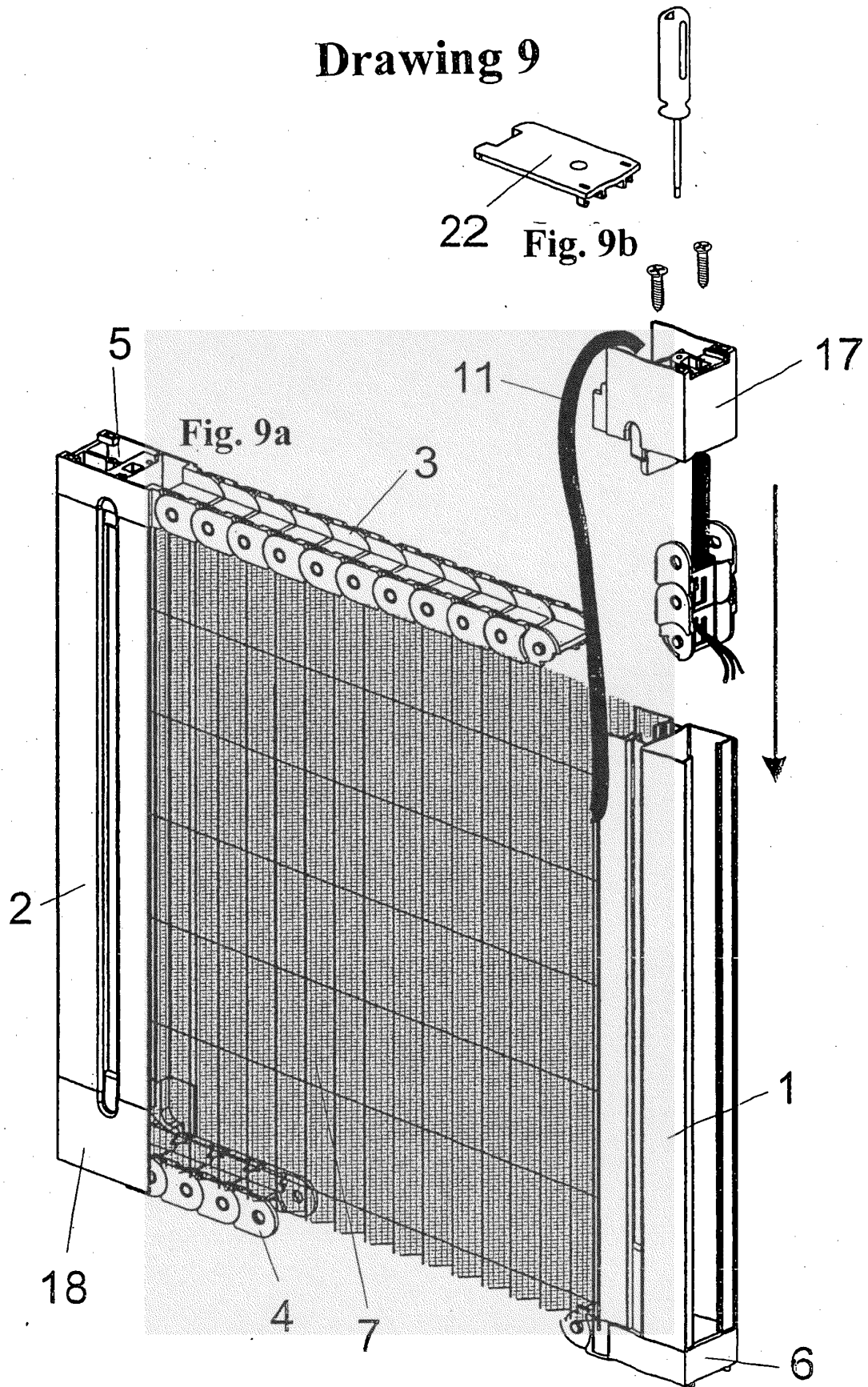
Drawing 7



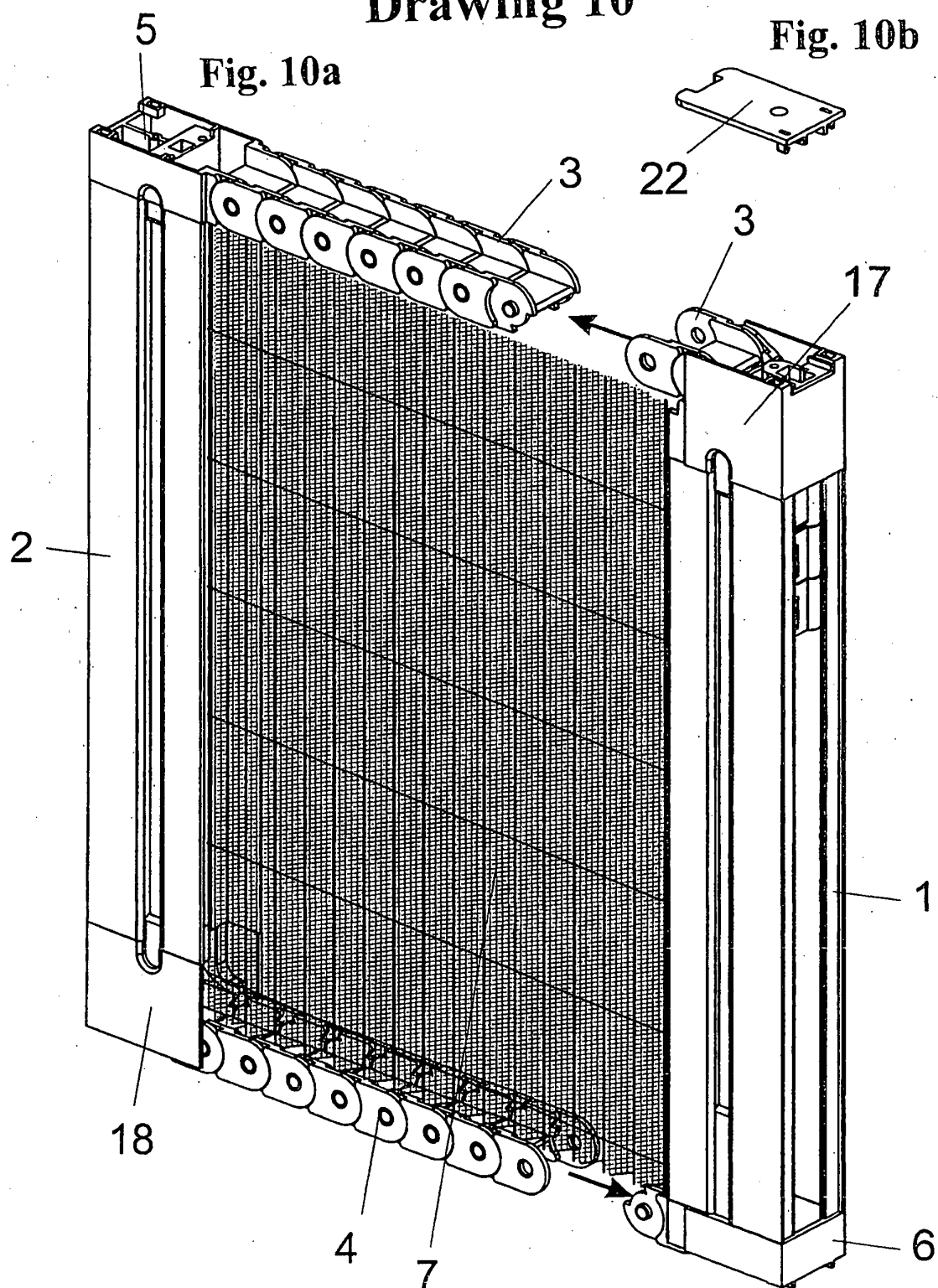
Drawing 8



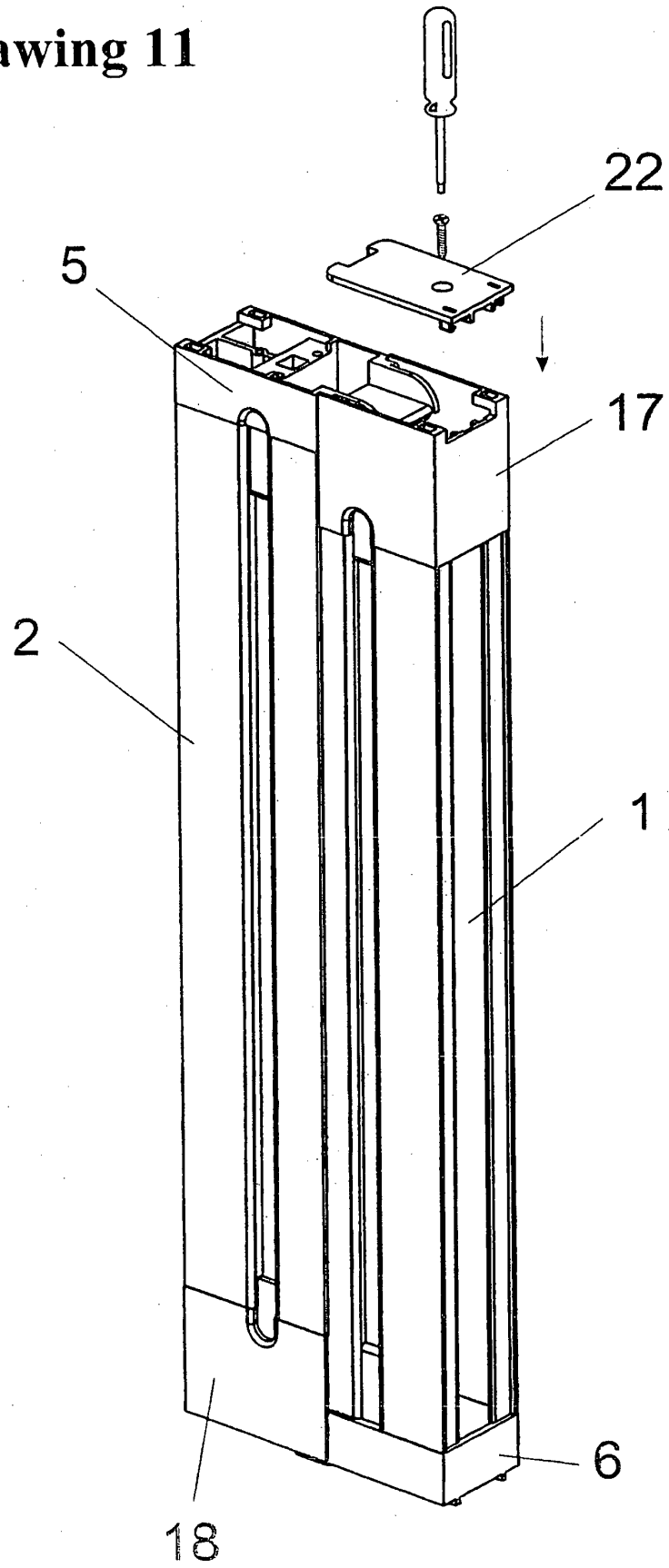
Drawing 9



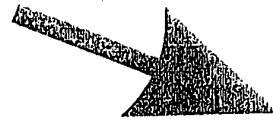
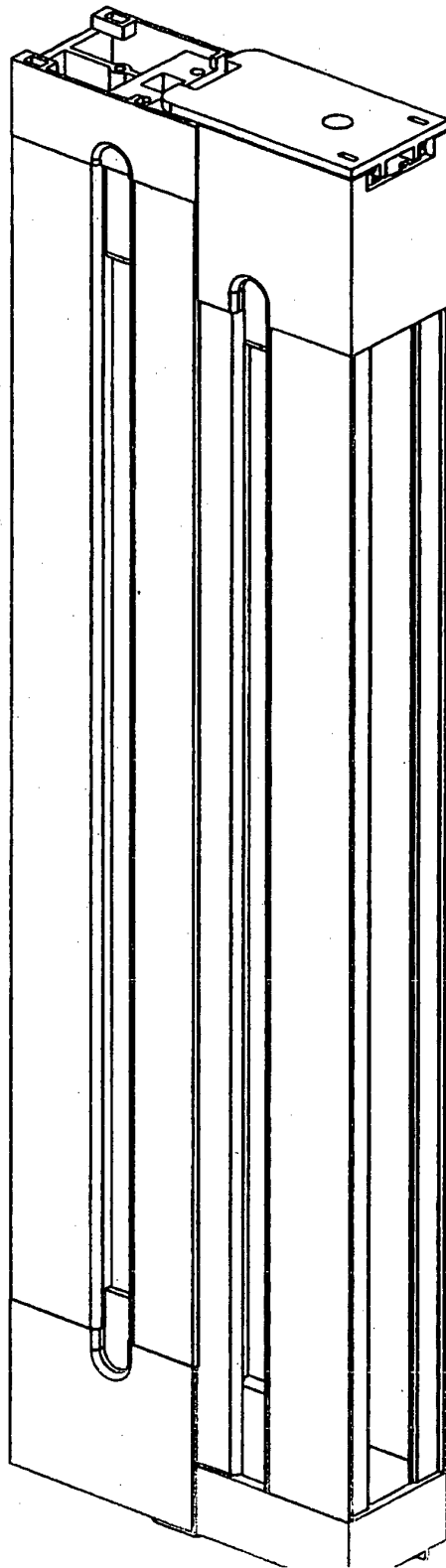
Drawing 10

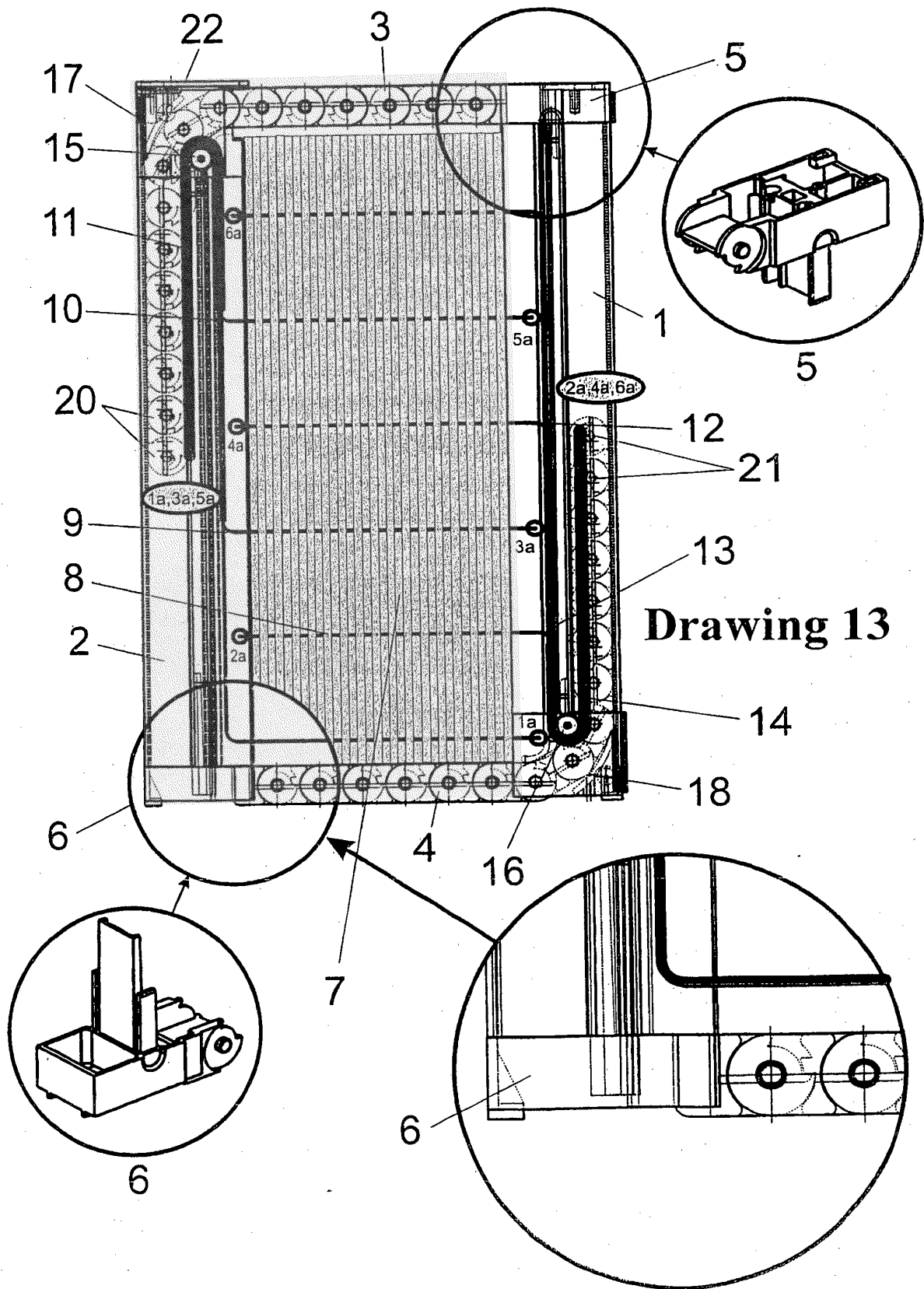


Drawing 11



Drawing 12





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