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(54) Truck component with an inner pulley

(57) The truck (15) component supporting the ropes for the pleated anti-mosquito net has a vacuum space inside with openings facing its four sides: upper (17), lower (18), back (19) and front with a hole (20) and at the back (19) side has two vertical slots (24) and two internal grooves (21) supporting therein a pulley (23), consisting of a cylinder (33) with elliptical surface and cylindrical lateral walls (32), rotating around an horizontal axis (22). There is sufficient space for the running and free movement of all ropes through the truck (15), both between the pulley and the hole (20), as well as between the pulley and the vertical slots (24).

The invention is applicable to anti-mosquito pleated net systems with horizontal movement, running along a fixed horizontal rail that is permanently bolted to the floor or with an articulated guide.

Drawing 1

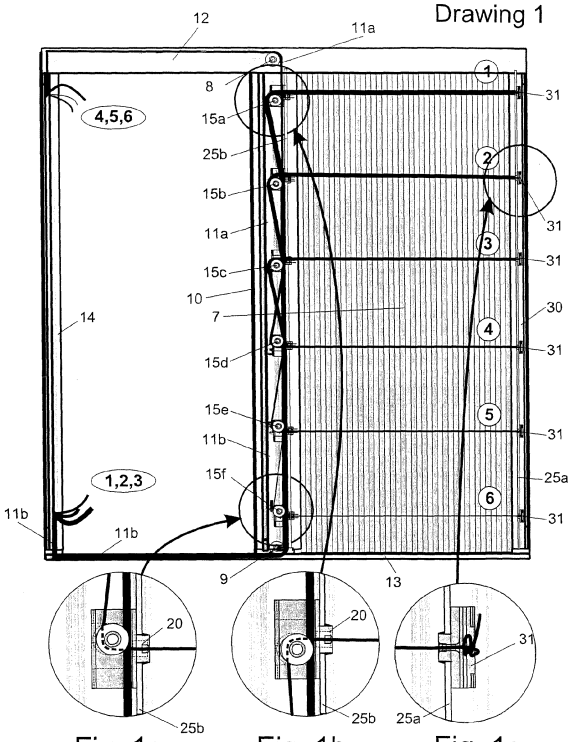

Fig. 1a Fig. 1b Fig. 1c

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Description

[0001] The invention pertains to the field of mechanics for anti-mosquito net systems with horizontal door movement.

[0002] In the present state of the art, these systems use two types of net (mosquito net): The plain cloth that is wrapped and unwrapped and the pleated net that is folded and unfolded. The pleated net is folded and unfolded in either fixed horizontal rails permanently screwed into the upper and lower part of the frame, or within an articulated rail that enters and exits the box system, together with the net.

[0003] In systems using pleated net, the net is folded into pleats between two vertical boxes, the restraint box and the sliding box.

[0004] The whole system resembles to a frame, the two vertical sides of which serve as the restraint box and the sliding box. The restraint box is screwed into one vertical frame. Simultaneously, a fixed side rail is screwed into the opposite vertical frame. The sliding box moves parallel between the restraint box and the fixed side rail. Two fixed rails, screwed into the upper and lower opening of the frame, respectively, serve as the two horizontal sides. The sliding box moves between the two II-shaped aluminum horizontal rails, upper and lower, with lateral walls 4 mm high. This way, the net is folded and unfolded within the horizontal rails. As the user pulls the sliding box, the pleated net is simultaneously unfolded; whereas the user makes the opposite movement, i.e. by leading the sliding box back to its original position, the pleated net is folded.

[0005] Instead of fixed horizontal upper and lower rails, the system may use two articulated rails, inside the restraint and sliding boxes. As the user pulls the sliding box to unfold the mosquito net, the two articulated rails, bend and come out of the upper and lower opening of the restraint box, taking a horizontal position at the upper and lower opening of the frame. As the mosquito net unfolds, its upper and lower finishing is always in the articulated rails. When, on the contrary, the user wants to fold the net and put it back in its original place inside the vertical restraint box, the user pushes the sliding box towards the original position and simultaneously pushes both articulated rails, which bend at their joints and return inside the restraint box, at their original position.

[0006] This present invention is applicable to pleated anti-mosquito nets, both to those that function with a fixed horizontal rail permanently bolted to the floor, and to those that function with an articulated rail.

[0007] During the operation of the anti-mosquito system, the pleated net folds and unfolds the pleats, aided by ropes which run horizontally lengthwise. The ropes, placed horizontally and equally spaced, stretch and hold the net also stretched, in its place when unfolded. They also help the net to refold on the pleats. All edges of the ropes, on the side of the restraint box, are fastened by trucks on the plastic axis. The ropes run the net horizontally and longwise and pass through similar trucks with a hole, which are also mounted on a plastic axis. Then the whole system "plastic axis - net - ropes - plastic axis" as an autonomous accessory of the mosquito net, slides into the two vertical rails, and more specifically, the plastic axis with the fixed ends of the ropes at the trucks slides into the restraint box, which is screwed firmly in the side frame.

[0008] On the contrary, the opposite plastic axis, that is, the one with the edges of the rope passing through the holes of the trucks, slides in the sliding box, which moves between the restraint box and the vertical fixed side rail. After passing through the trucks, the ropes make two groups of equal number of ropes, the upper and the lower group:

The ropes that pass through the upper part of the net consist of the upper group of ropes. The ends of the ropes cross downwards the sliding box and then make a single bundle that crosses horizontally the lower horizontal fixed rail, ending and fixed to the lower end of the box of the fixed side rail.

The ropes that pass through the lower part of the net consist of the bottom group of ropes. The ends of the ropes cross upwards the sliding box and then make a single bundle that crosses horizontally the upper horizontal fixed rail, ending and fixed to the upper end of the box of the fixed side rail.

[0009] At this point, there is a technical problem with each rope that passes through the hole of the truck: the continuous opening and closing of the net, by folding and unfolding, causes the continuous friction of the ropes on the inner lateral walls of the hole of the plastic trucks, thus cutting the rope. This destroys the mosquito net, as without ropes the folding and unfolding of the net is no longer possible; thereby, the ropes and the net need to be replaced.

[0010] Such technical problems may occur in all anti-mosquito net systems that use trucks, for example, at the systems that are presented at EP 1653038 A1, EP 2157274 A2, EP 1959090 and JP 8-199948.

[0011] The present invention is a truck, with a pulley rotating around an axis just at the height of the center of the hole, through which the rope passes, and with lateral walls of such thickness that the ropes do not come into contact with the inner walls of the trucks, thus preventing friction. Therefore, the technical problem causing the cut of the rope is solved. The advantage of this invention is that the ropes are not cut because of ordinary use and thus the lifetime of the product is multiplied, i.e. of the entire anti-mosquito net system.

[0012] The attached 10 drawings accompanying the invention show, in short, the following:

Drawing 1 illustrates the anti-mosquito system with a pleated net moving through a channel of an upper

and lower horizontal fixed rail, whereas the rope bundles pass in front of the pulleys and in detail it shows a truck with a pulley through which a rope of the lower group passes upwards (Figure 1a), a truck with a pulley through which the rope of the upper group of ropes passes downwards (Figure 1b) and a truck of the present state of the art, that is, without pulley, with the end of the rope fastened to it (Figure 1c).

Drawing 2 illustrates the mode of use of the invention, when the anti-mosquito system with pleated net moves with upper and lower articulated guides, and illustrates in detail a truck with a pulley, through which the rope of the lower group passes upwards (Figure 2a), a truck with a pulley through which the rope of the upper group passes downwards (Figure 2b), with the rope bundles passing in front of the pulleys and a truck with pulley, with the end of the rope fastened to it (Figure 2c).

Drawing 3 illustrates the accessories inside the truck with a pulley (Figure 3a), front view of the truck (Figure 3b), lateral view (Figure 3c), top view (Figure 3d) and lateral perspective drawing (Figure 3e).

Drawing 4 illustrates the direction of the movement of the pulley and the ropes of the upper and lower group while the pleated net is unfolded.

Drawing 5 illustrates the mode that ropes of the upper and lower group pass through the trucks and their direction while the net is unfolded.

Drawing 6 illustrates the direction of the movement of the pulley and of the ropes of the upper and lower group while the pleated net is folded.

Drawing 7 illustrates the mode that ropes of the upper and lower group pass through the trucks and their direction while the pleated net is folded.

Drawing 8 illustrates the mode that the ropes pass through the trucks when the invention is implemented, according to Drawings 1 and 2, and more particularly, the mode that the bundle of ropes pass through the truck and in front of the pulley, as well as the rope around the pulley, in front view (Figure 8a), lateral view (Figure 8b), top view (Figure 8c) and perspective view (Figure 8d).

Drawing 9 illustrates an alternative mode for the use of the invention where the bundles pass behind the pulleys and in detail, and a truck with a pulley though which a rope from the lower group passes upwards (Figure 9a), a truck with a pulley though which a rope from the upper rope group passes downwards (Figure 9b) and a truck of the present state of the art, that is, without a pulley, with the edge of the rope fixed thereon (Figure 9c).

Drawing 10 illustrates the front view of the alternative use, illustrated by Figure 9, and more specifically, the mode that the rope bundle passes through the truck and behind the pulley, and the mode that the rope passes around the pulley, front view (Figure 10a), lateral view (Figure 10b), top view (Figure 10c), and the truck in a perspective view (Figure 10d).

[0013] An example of how this invention is implemented follows, with a detailed description and reference to the attached drawings.

[0014] As shown in Drawings 1, 2, 4, 6, ropes, used for the folding and unfolding of the net, run horizontally and at equal distances the pleated net (7). These ropes are separated into two groups: the upper group with three ropes (1, 2, 3) and the lower group with an equal number of ropes (4, 5, 6). In this example, both groups have an equal number of ropes. At another implementation of this invention, however, the ropes of the two groups may be not of equal number, but they will be always in a horizontal position.

[0015] As shown in Drawing 1, the ropes are fixed reversely, that is, the lower group at the upper space and the upper group at the lower space, and more particularly:

The- three ropes from the lower group (4, 5, 6) run the net (7) horizontally and then join in one bundle (11a) that runs the sliding box (10) vertically upwards around the pulley (8) that is located at the upper end of the sliding box (10). Then the bundle (11a), consisting of the three ropes (4, 5, 6) runs inside and horizontally the upper horizontal rail (12) and is fixed at a point of the upper part of the vertical fixed lateral rail (14).

Similarly, the three ropes of the upper group (1, 2, 3) run the net (7) horizontally and then join in one unified bundle (11b) that runs the sliding box (10) vertically downwards turns around the pulley (9) inside the lower fixed horizontal rail (13). Then the unified bundle (11b), consisting of the three ropes (1, 2, 3) runs inside and horizontally the lower horizontal rail (13) and is fixed at a point of the lower part of the vertical fixed lateral rail (14).

[0016] As shown in Drawings 3 and 8, illustrating the truck with pulley (figure 3a), front view (3b and 8a), lateral view (3c and 8b), top view (3d and 8c) and lateral perspective view (3e and 8d), the truck (15) has an inner vacuum chamber with facing openings at its four sides: up (17), down (18), back (19) and in front with a hole (20) and at the rear (19) side it has two vertical slots (24). It also has two internal grooves (21) to support the pulley (23) inside them. The pulley (23) consists of a cylinder (33) with elliptical surface, with the smallest diameter in the middle of its length and with cylindrical lateral walls (32). The pulley (23) rotates around the horizontal axis

(22) and is located in such a position providing sufficient space to allow the passage and the free movement of all the ropes through the truck (15), both from the front side thereof, that is, between the pulley and the hole (20), and the rear side thereof, that is, between the pulley and the vertical slots (24).

[0017] As shown in Figures 3a, 3d, 8b, 8c and 8d, the cylinder (33) of the pulley (23) has cylindrical walls (32) the cross-section of which has a diameter larger than the diameter of any cross-section of the elliptical cylinder (33), so that the bundles from the ropes (11a and 11b) move continuously between the lateral cylindrical walls (32) of the cylinder (33) of the pulley (23) and not slide thereof. Moreover, the lateral cylindrical walls (32) of the cylinder (33) of the pulley (23) have such a thickness that the internal distance between the surfaces of the walls (32) to be less than the length inside the opening of the top (17) and bottom (18) side of the truck (figures 3d and 8c). Consequently and as the cylinder (33) of the pulley has an elliptical form with the smaller diameter in the middle of its length, the bundles of the ropes (11a and 11b) move continuously between the lateral cylindrical walls (32) of the cylinder of the pulley (23) and in the middle of the cylinder where the part with the smallest diameter is. Thus, the ropes never come into contact with the lateral walls of the top (17) and bottom (18) opening of the truck (15), or the inner walls of the holes (20) through which the trucks pass, and consequently do not fray and do not wear.

[0018] Each truck (15) has at the back (19) side vertical slots (24) from which the ropes (1, 2, 3, 4, 5, 6) pass inside the truck. The slots have an opening smaller than the thickness of the ropes, so that the ropes pass inside the truck after pressure when the anti-mosquito system is made and afterwards during the use of the system and not get out of the truck.

[0019] Drawing 8 illustrates in detail the mode by which the rope passes (1) around the pulley (23) (Figure 8a), and the mode that the bundle of the ropes (4, 5, 6, bundle 11 a) pass inside the truck; front view (figure 8a), lateral view (figure 8b), top view (figure 8c) and perspective view (figure 8d).

[0020] All trucks (15a, 15b, 15c, 15d, 15e, 15f) are fixed on a plastic support axis (25b) inside the sliding box (10) (Drawing 1, figures 1a, 1b and Drawings 5 and 7).

[0021] As illustrated in Drawings 1,3, 5, 7 and 8, the ropes of the lower group (4, 5, 6) have their end fixed at a simple starting truck (31), a truck of the present state of the art (figure 1c), on a plastic support axis (25a) inside the restraint box (30).

[0022] As illustrated in Drawings 1, 4, 5, 6 and 7, the rope (6) that runs over the net (7) at the lower part thereof, runs horizontally the net (7), passes through the hole (20) of the truck (15f), enters the truck and passes around the pulley (23) of the truck and from the bottom side thereof, upwards. The pulley (23) is located at such a height in relation to the hole (20), so that the rope (6) by passing through the hole (20) and around the pulley (23) from the bottom side thereof, to remain aligned (figure 1a) and without coming into contact with the inner walls of the hole (20). At the same time, the walls (32) of the pulley prevent the rope (6) to come into contact with the walls of the top (17) and bottom (18) opening of the truck (15f) (Drawings 4 and 6). Then the rope (6) after passing around the pulley (23) gets out of the top opening (17) of the truck (15f) and enters into the above truck (15e) from the bottom opening (18), gets out of the top opening (17), then enters into the next truck (15d) above from the bottom opening (18) and exits from the top opening (17), and so on it passes thus vertically from all the openings (18 & 17) of all the following trucks above (15c, 15b, 15a) towards the fixed upper horizontal rail (12).

[0023] In exactly the same manner, the next rope (5) of the lower group runs horizontally the net (7), passes through the hole (20) of the truck (15e), enters into the truck and passes around the pulley (23) of the truck and from the bottom side thereof, upwards. The pulley (23) is located at such a height in relation to the hole (20), so that the rope passing through the hole (20) and around the pulley (23) from the bottom side thereof, to remain aligned and without coming into contact with the inner walls of the hole (20). At the same time, the walls (32) of the pulley prevent the rope (5) to come into contact with the walls of the top (17) and bottom (18) opening of the truck (15e) (Drawings 4 - 7). Then the rope (5), as the previous rope (6), after passing around the pulley (23) gets out of the top opening (17) of the truck (15e) and enters into the above truck (15d) from the bottom opening (18), gets out of the top opening (17), and so on it passes thus vertically from all the openings (18 & 17) of all the following trucks above (15c, 15b, 15a) towards the fixed upper horizontal rail (12).

[0024] Similarly, the next rope (4) of the lower group that runs horizontally the net (7), passes through the hole (20) of the truck (15d), enters into the truck and passes around the pulley (23) of the truck and from the bottom side thereof, upwards. The pulley (23) is located at such a height in relation to the hole (20), so that the rope passing through the hole (20) and around the pulley (23) from the bottom side thereof, to remain aligned and without coming into contact with the inner walls of the hole (20). At the same time, the walls (32) of the pulley prevent the rope (4) to come into contact with the walls of the top (17) and bottom (18) opening of the truck (15d) (Drawings 4 - 7). Then the rope (4), as the other two ropes (5, 6), after passing around the pulley (23) gets out of the top opening (17) of the truck (15d) enters, through the bottom opening (18) into the above truck (15c). Then the rope (4) passes vertically, in the same manner, from the openings (18 & 17) of all the following trucks above (15b, 15a) towards the fixed upper horizontal rail (12).

[0025] All three ropes (6, 5, 4) of the lower group end as a vertical single bundle (11a) to the pulley (8) at the top end of the sliding box (10) (figures 1, 3, 8a, 8b, 8c and 8d), twine around the box, run along the top horizontal rail (12) and are fixed at a point located at the above

part of the fixed vertical lateral rail (14).

[0026] In this way, as illustrated in Drawings 5 and 7, the bundle (11a) of the ropes of the upper group (4, 5, 6) passes vertically from the openings (17 and 18) of the trucks (15c, 15b, 15e) and from the side between the pulley (23) and the hole (20), towards the upper horizontal rail (12). The bundle continuously moves between the lateral cylindrical walls (32) of the cylinder (33) of the pulley (23) and comes into contact only with the pulleys (23) of the trucks (Drawings 5 and 7) from the front side of the pulley, that is, the side between the pulley (23) and the hole (20). Due to the walls (32) of the pulley cylinders (33), the ropes do not come into contact, and thus do not wear, either the walls of the hole (20) when entering the trucks, or the walls of the openings (17) and (18) of the trucks when moving during the folding and unfolding of the net. Moreover, because of the walls (32) of the pulley cylinders (33), the ropes do not come into contact with the ropes (1, 2, 3) of the upper group that pass around the pulleys (23) of these trucks (15a, 15b, 15c). Consequently, the ropes do not wear.

[0027] The upper group of ropes (1, 2, 3) functions in the same way and conversely.

[0028] Specifically, as illustrated in Drawings 1, 3, 5, 7 and 8, the ropes of the upper group (1, 2, 3) have their end fixed with a simple starting truck (31) (figure 1c), a truck of the present state of the art, on a plastic support axis (25a) inside the restraint box (30), in the same way that the ropes of the lower group (4, 5, 6) are fixed, as described above.

[0029] As illustrated in Drawings 1, 4, 5, 6 and 7, rope (1) that runs over the net (7) at the upper part thereof, runs horizontally the net (7), passes through the hole (20) of the truck (15a), enters the truck and passes around the pulley (23) of the truck and from the top side thereof, downwards. The pulley (23) is located at such a height in relation to the hole (20), so that the rope (1) by passing through the hole (20) and around the pulley (23) from the top side thereof, remains, aligned (figure 1b) and without coming into contact with the inner walls of the hole (20).

[0030] At the same time, the walls (32) of the pulley prevent the rope (1) to come into contact with the walls of the top (17) and bottom (18) opening of the truck (15a) (Drawings 4 and 6). Then the rope (1) after passing around the pulley (23) gets out of the bottom opening (18) of the truck (15a) and enters into the lower truck (15b) from the top opening (17), gets out of the bottom opening (18), then enters into the next truck (15c) below from the top opening (17) and exits from the bottom opening (18), and so on it passes thus vertically from all the openings (17 & 18) of all the next trucks below (15d, 15e, 15f) towards the fixed lower horizontal rail (13).

[0031] In exactly the same way, the next rope (2) of the upper group runs over the net (7), passes through the hole (20) of the truck (15b), enters the truck and passes around the pulley (23) of the truck and from the top side thereof, downwards. The pulley (23) is located at such a height in relation to the hole (20), so that the rope by passing through the hole (20) and around the pulley (23) from the top side thereof, remains aligned and without coming into contact with the inner walls of the hole (20). At the same time, the walls (32) of the pulley prevent the rope (2) to come into contact with the walls of the top (17) and bottom (18) opening of the truck (15b) (Drawings 4 - 7). Then the rope (2), same way as the previous rope (1), after passing around the pulley (23) gets out of the bottom opening (18) of the truck (15b) and enters into the lower truck (15c) from the top opening (17), and so on it passes thus vertically from all the openings (17 & 18) of all the next trucks below (15d, 15e, 15f) towards the fixed lower horizontal rail (13).

[0032] Similarly, the next rope (3) of the upper group that runs horizontally the net (7), passes through the hole (20) of the truck (15c), enters into the truck and passes around the pulley (23) of the truck and from the top side thereof, downwards. The pulley (23) is located at such a height in relation to the hole (20), so that the rope, by passing through the hole (20) and around the pulley (23) from the top side thereof, remains aligned and without coming into contact with the inner walls of the hole (20). At the same time, the walls (32) of the pulley prevent the rope (4) to come into contact with the walls of the top (17) and bottom (18) opening of the truck (15c) (Drawings 4 - 7). Then the rope (3), the same way as the other two ropes (2, 1), after passing around the pulley (23) gets out of the bottom opening (18) of the truck (15c) enters into the top opening (17) of the next truck below (15d). Then the rope (3) passes vertically, in the same manner, from the openings (17 & 18) of all the following trucks downwards (15e, 15f) towards the fixed lower horizontal rail (13).

[0033] All three ropes (1, 2, 3) of the upper group end as a vertical single bundle (11b) to the pulley (9) at the bottom end of the sliding box (10) (figures 8a, 8b, 8c and 8d), twine around the box, run along the bottom horizontal rail (13) and are fixed at a point located at the bottom part of the fixed vertical lateral rail (14) (Drawing 1).

[0034] In this way, as illustrated in Drawings 5 and 7, the bundle (11b) of the ropes of the upper group (1, 2, 3) passes vertically from the openings (17 and 18) of the trucks (15d, 15e, 15f) and from the side between the pulley (23) and the hole (20), towards the lower horizontal rail (13). The bundle continuously moves between the lateral cylindrical walls (32) of the cylinder (33) of the pulley (23) and comes into contact only with the pulleys (23) of the trucks (Drawings 5 and 7) from the front side of the pulley, that is, the side between the pulley (23) and the holes (20). Due to the walls (32) of the pulley cylinders (33), the ropes do not come into contact, and thus do not wear, either the walls of the hole (20) when entering the trucks, or the walls of the openings (17) and (18) of the trucks when moving during the folding and unfolding of the net. Moreover, because of the walls (32) of the pulley cylinders (33), the ropes do not come into contact with the ropes (4, 5, 6) of the lower group that pass around the pulleys (23) of these trucks (15d, 15e, 15f). Conse-

quently, the ropes do not wear.

[0035] Drawings 4 and 5 illustrate the direction of the pulley (23) and rope movement when the net is unfolded. Drawings 6 and 7 illustrate the direction of the pulley (23) and the rope movement when the net is folded.

[0036] Thereby, when the net (7) unfolds (Drawings 4 and 5), the sliding box (10) moves towards the fixed vertical lateral rail (14). This movement makes ropes of the lower group (4, 5, 6) rotate around the pulleys (23) of the respective trucks (15d, 15e, 15f), counter-clockwise, whereas the ropes of the upper group (1, 2, 3) rotate around the pulleys (23) of the respective trucks (15a, 15b, 15c), clockwise, and thus the net (7) is unfolded without fray and wear of the ropes, due to the truck pulleys (23).

[0037] On the contrary, when the net (7) folds (Drawings 6 and 7), the sliding box (10) moves towards the restraint box (30). This movement makes the ropes of the lower group (4, 5, 6) to rotate around the pulleys (23) of the respective trucks (15d, 15e, 15f), clockwise, whereas the ropes of the upper group (1, 2, 3) rotate around the pulleys (23) of the respective trucks (15a, 15b, 15c), counter-clockwise, and thus the net (7) is folded without fray and wear of the ropes, due to the truck pulleys (23).

[0038] An alternative implementation of the invention is illustrated in Drawings 9 and 10; the invention is the same and functions in exactly the same way when the bundles (11a) and (11b) of the ropes pass from the back side of the pulley, that is, the side where the slots (24) of the truck (15) are located and not the front side of the pulley, that is, the side between the pulley and the opening (20).

[0039] Another alternative implementation of the invention is illustrated in Drawing 2, when the anti-mosquito system, has, instead of the two fixed horizontal upper (12) and lower (13) rail, an upper (26) and lower (27) articulated rail (Drawing 2); in this case, the ropes do not run along the horizontal rails (26 & 27) and are not fastened on the vertical fixed lateral rail (14). In this case, the ropes run along the net (7) horizontally, in equal distances between them and alternatively, forming two sets (set 1, 3, 5 and set 2, 4, 6). The ropes of the first set (1,3,5) have the axis (25b) at the end of the net (7) as a common starting point, inside the sliding box (10) ending and fastened on the upper (28) end of the upper (26) articulated rail, whereas the ropes of the second set (2,4,6) have as a common starting point the axis (25a) at the end of the net (7) inside the restraint box (30) ending and fastened on the lower (29) end of the lower (27) articulated rail. In this case, at the points at which the ropes begin (1, 2, 3, 4, 5, 6), starting trucks (31) are used for their fastening, of the present state of the art, and these trucks are located alternately on the two axes, the axis (25b) inside the sliding box (10) and the box (25a) inside the restraint box (30). Then each rope runs horizontally the net (7) and the other end passes through the truck that has a pulley (15), according to the present invention, and these trucks are also placed alternately on the two axes, the axis (25b) inside the sliding box (10) and the axis (25a) inside the restraint box (30), unlike the starting trucks (31). These kind of anti-mosquito systems require the free movement of the ropes, at the side of restraint box (30), as well at the sliding box (10). This free movement is maximized because of the trucks (15) of this invention, which eliminate the friction of the ropes and facilitate the opening and closing of the mosquito net.

[0040] The present invention is implemented on anti-mosquito systems that have a pleated net and move horizontally, that either function with a fixed horizontal rail that is permanently bolted on the floor, or with an articulated rail.

Claims

1. Truck component for the support of the ropes of a pleated anti-mosquito net, with a void chamber and openings facing the four sides thereof, upper (17) opening, lower (18) opening, front opening with hole (20) and back opening (19) with two vertical slots (24) at the upper and lower part thereof, that is **characterized by** the elements inside the truck:

   i) two internal grooves (21) for the support of the pulley (23) and
   ii) a pulley (23) consisting of a cylinder (33) with an elliptical surface and cylindrical lateral walls (32) that rotates around an axis (22) fitted on the grooves (21).

2. Truck component for the support of the ropes of the pleated anti-mosquito net, pursuant to claim 1, which is **characterized by** the fact that the pulley (23) with the axis (22) is placed horizontally at the two internal grooves (21) of the truck (15).

3. Truck component for the support of the ropes of the anti-mosquito net, pursuant to claims 1-2, which is **characterized by** the fact that the cross-section of the cylindrical lateral walls (32) of the elliptical cylinder (33) of the pulley (23) has a diameter larger than the diameter of any cross-section of the cylinder (33), so that the rope bundles (11a and 11b) move continuously inside the void inside the truck (15) and between the cylindrical lateral walls (32), without getting out of them (32), and the cylindrical lateral walls (32) have such a thickness that the internal distance between the surfaces of the walls (32) is less than the length inside the opening of the upper (17) and lower (18) side of the truck, so that the ropes move inside the openings (17 and 18) of the trucks (15a-15f) without coming into contact with the inside part of the walls of the openings (17 and 18).

4. Truck component for the support of the ropes of the pleated anti-mosquito net, pursuant to claims 1-3,

characterized by the fact that the pulley (23) is placed inside the truck (15) at such a position that its axis (22) is vertical to the rope (1-6) entering the truck and at such a height that the rope passes through the center of the hole (20) of the truck (15) and continues twining the elliptical cylinder (33) in the mid-length thereof, where the diameter is the smallest, remaining at an horizontal position and without coming into contact with the lateral walls of the hole (20), from the center of which it enters the truck (15).

5. Truck component for the support of the ropes of the pleated anti-mosquito net, pursuant to claims 1-4, **characterized by** the fact that the pulley (23) is inside the truck (15) at such a position that provides sufficient space allowing the free passing and free movement of all ropes inside the truck (15) from the upper (17) and lower (18) openings, as the user may choose, either in front of the pulley, that is, the side between the pulley (23) and the hole (20), or behind the pulley, that is, from the side between the pulley (23) and the vertical slots (24), without the rope coming into contact with the walls of the openings (17) and (18) of the trucks (15a-15f) when they move while the net is folded and unfolded.

Drawing 1

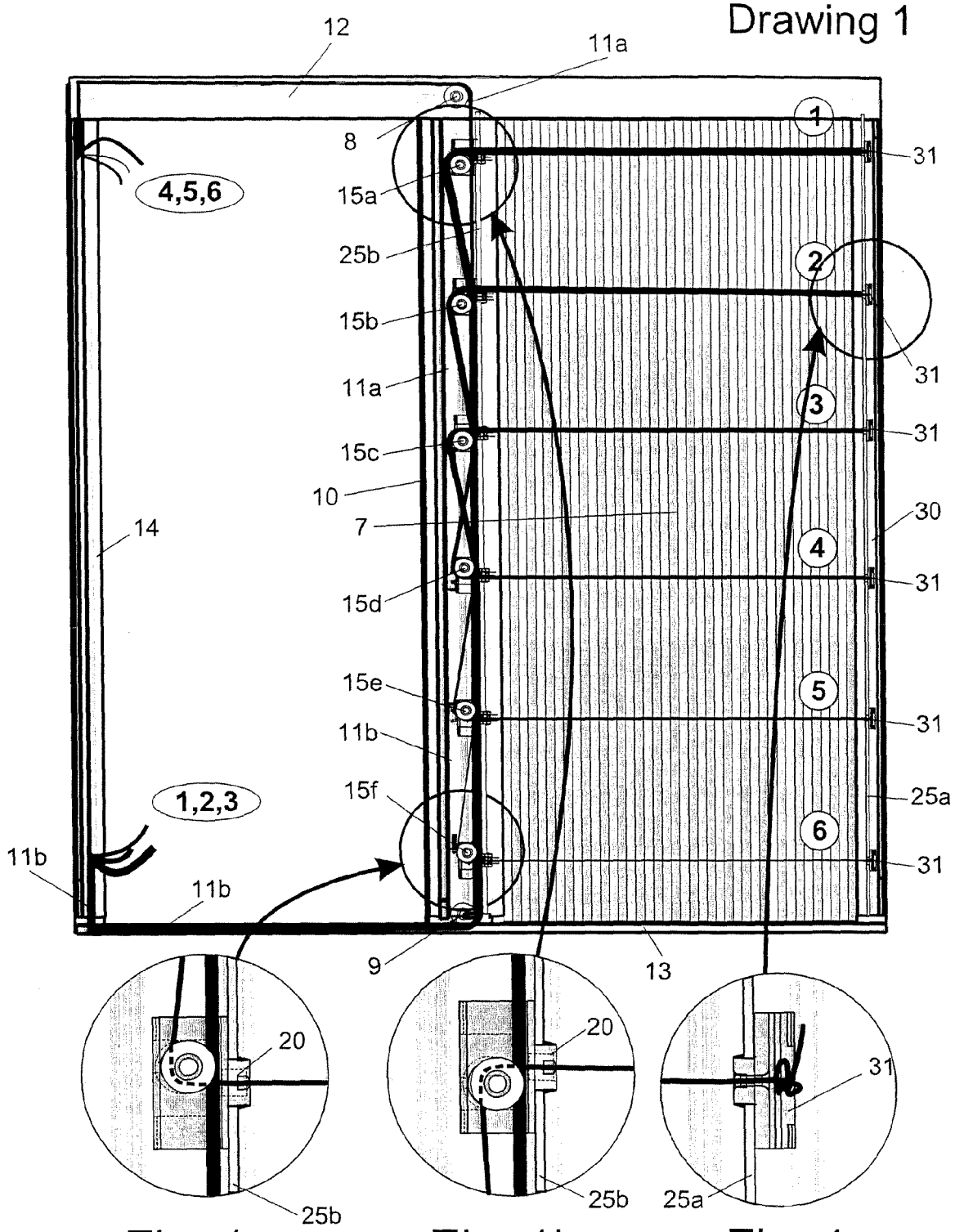


Fig. 1a Fig. 1b Fig. 1c

Drawing 2

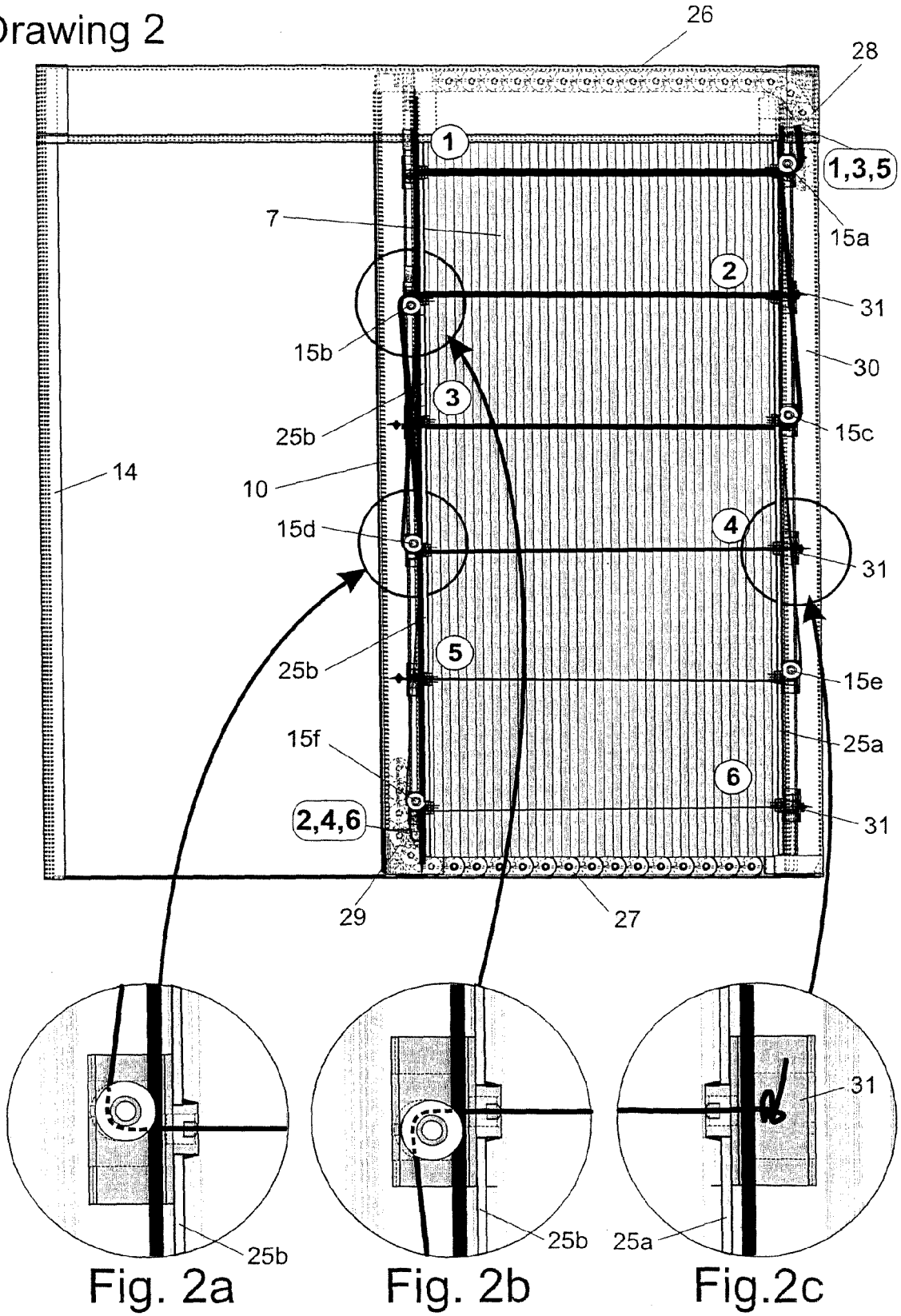


Fig. 2a Fig. 2b Fig.2c

Drawing 3

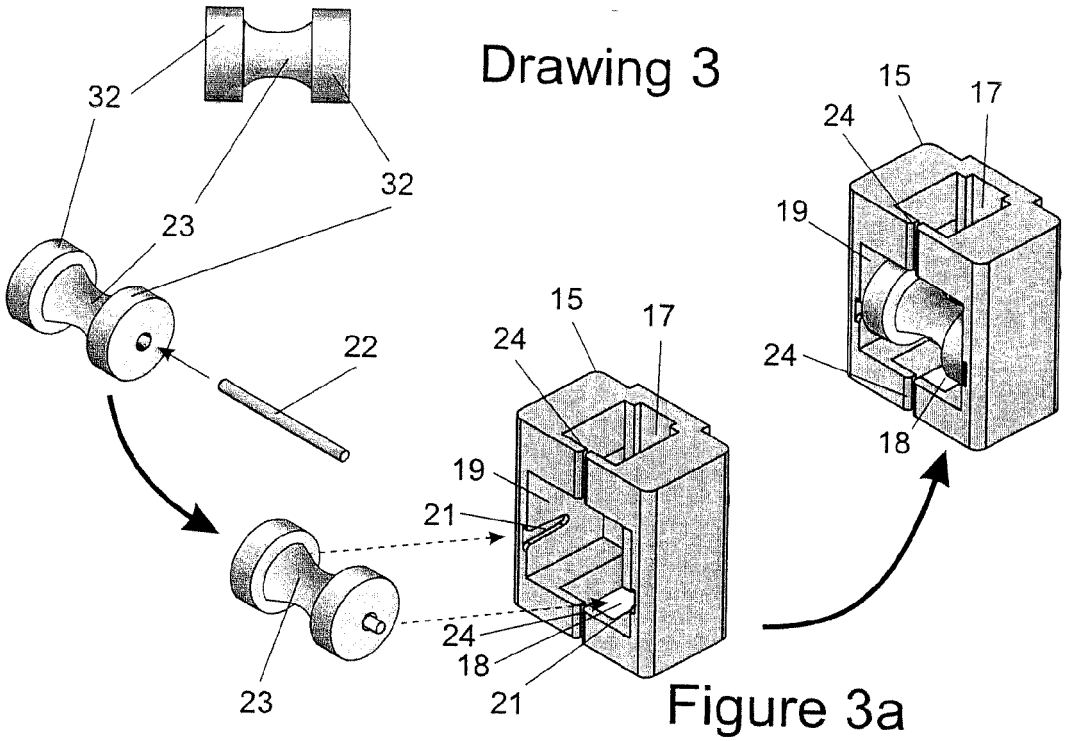


Figure 3a

Figure 3b

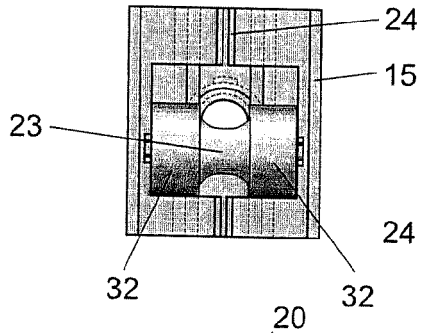
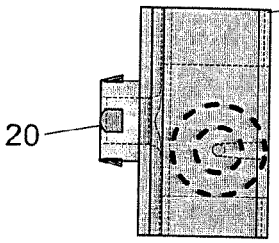


Figure 3c



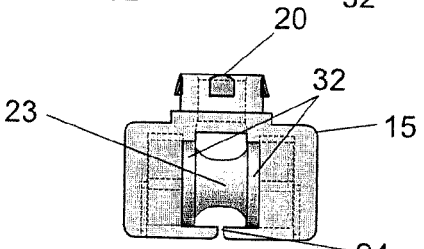


Figure 3d

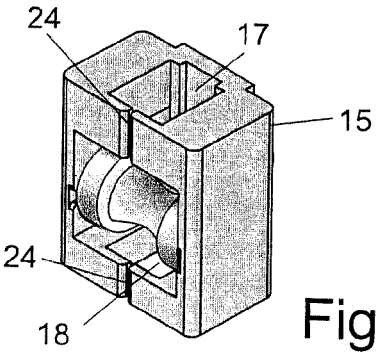
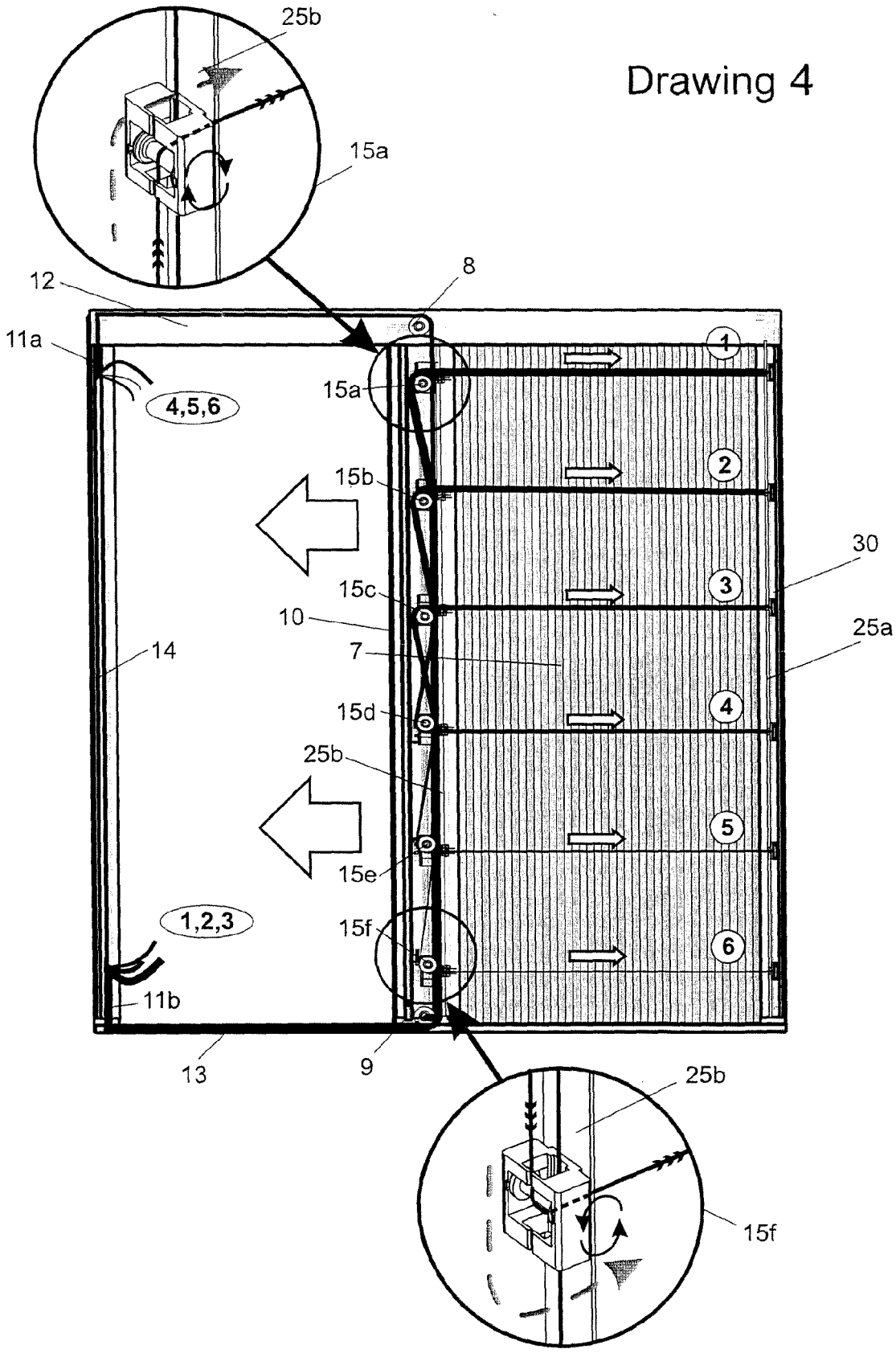
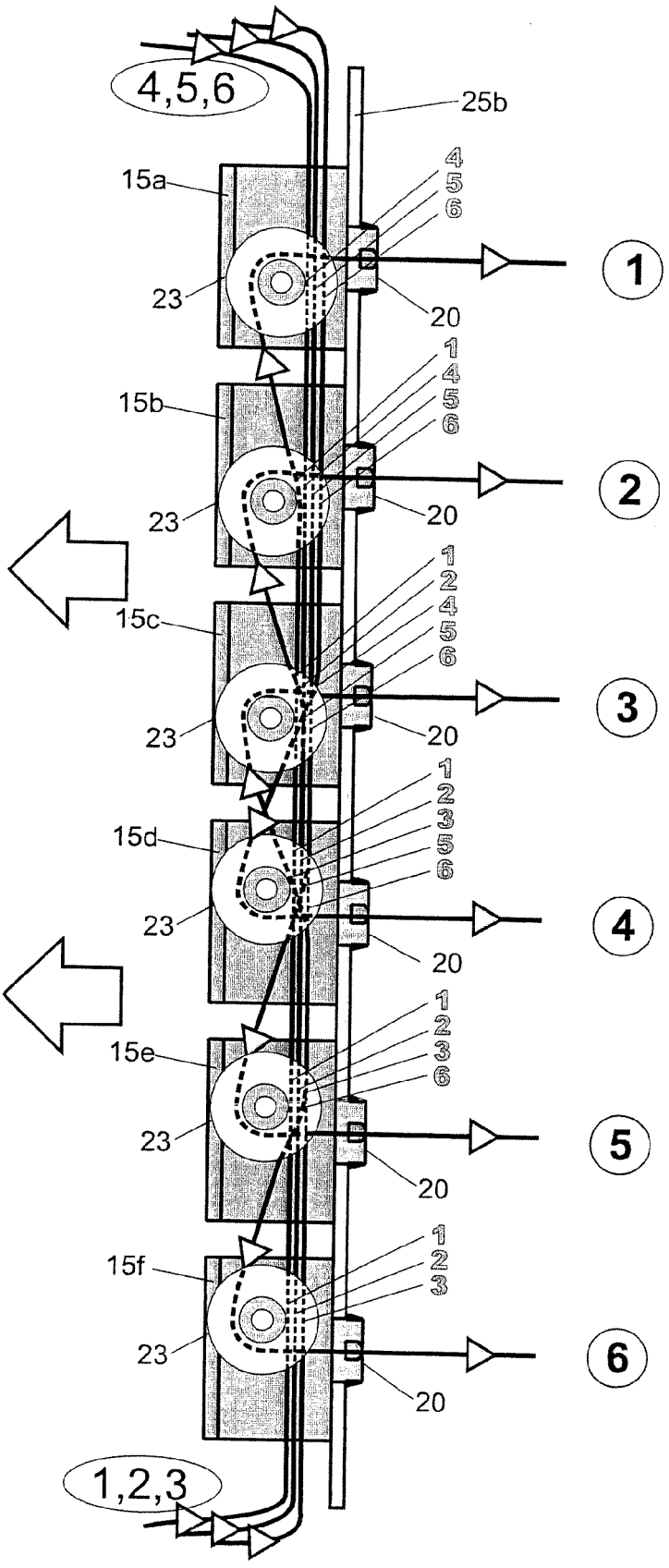


Figure 3e

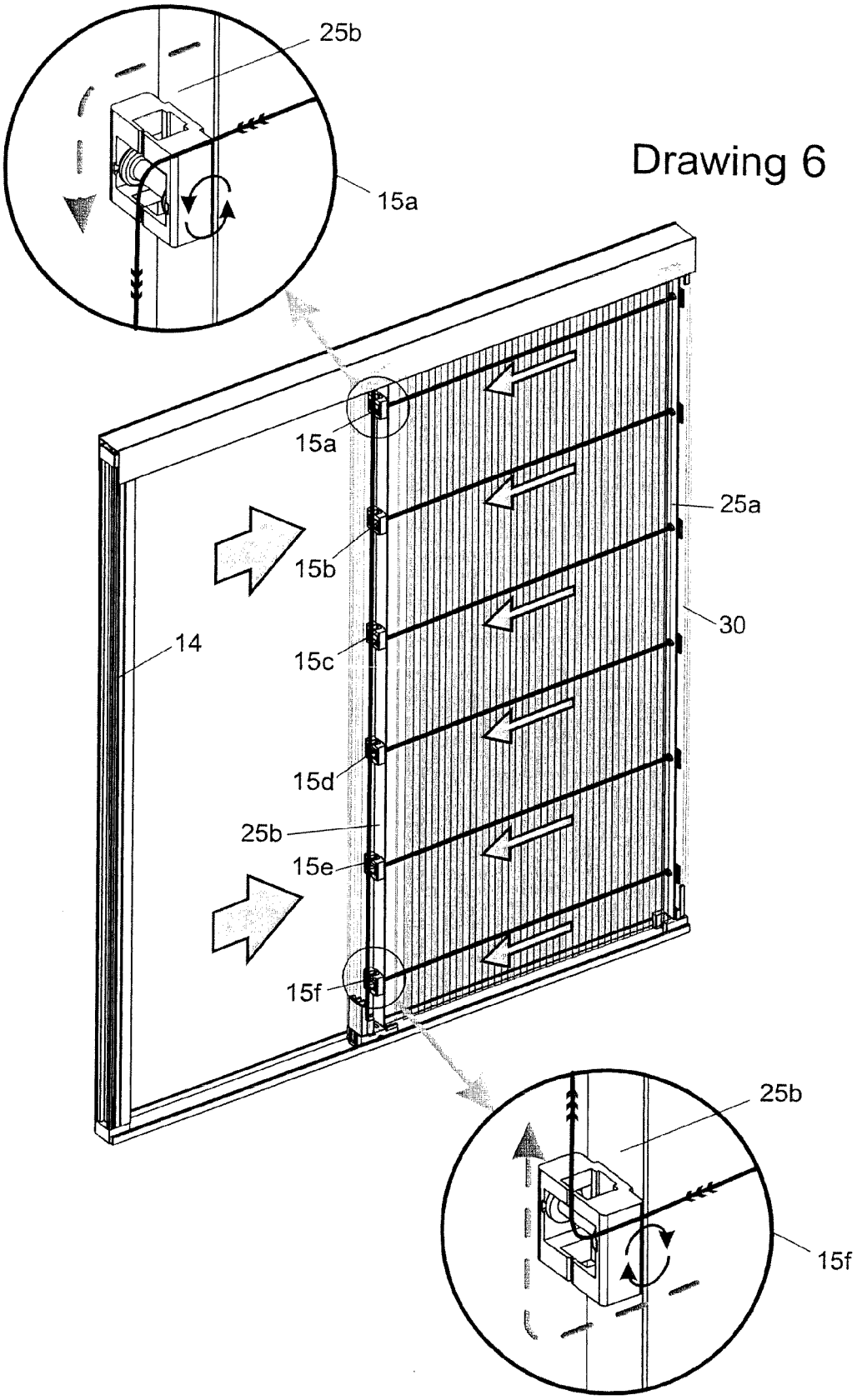
Drawing 4


25b
15a
12
8
11a
4,5,6
15a
1
2
15b
30
3
15c
10
25a
14
7
4
15d
25b
5
15e
1,2,3
15f
6
11b
13
9
25b
15f

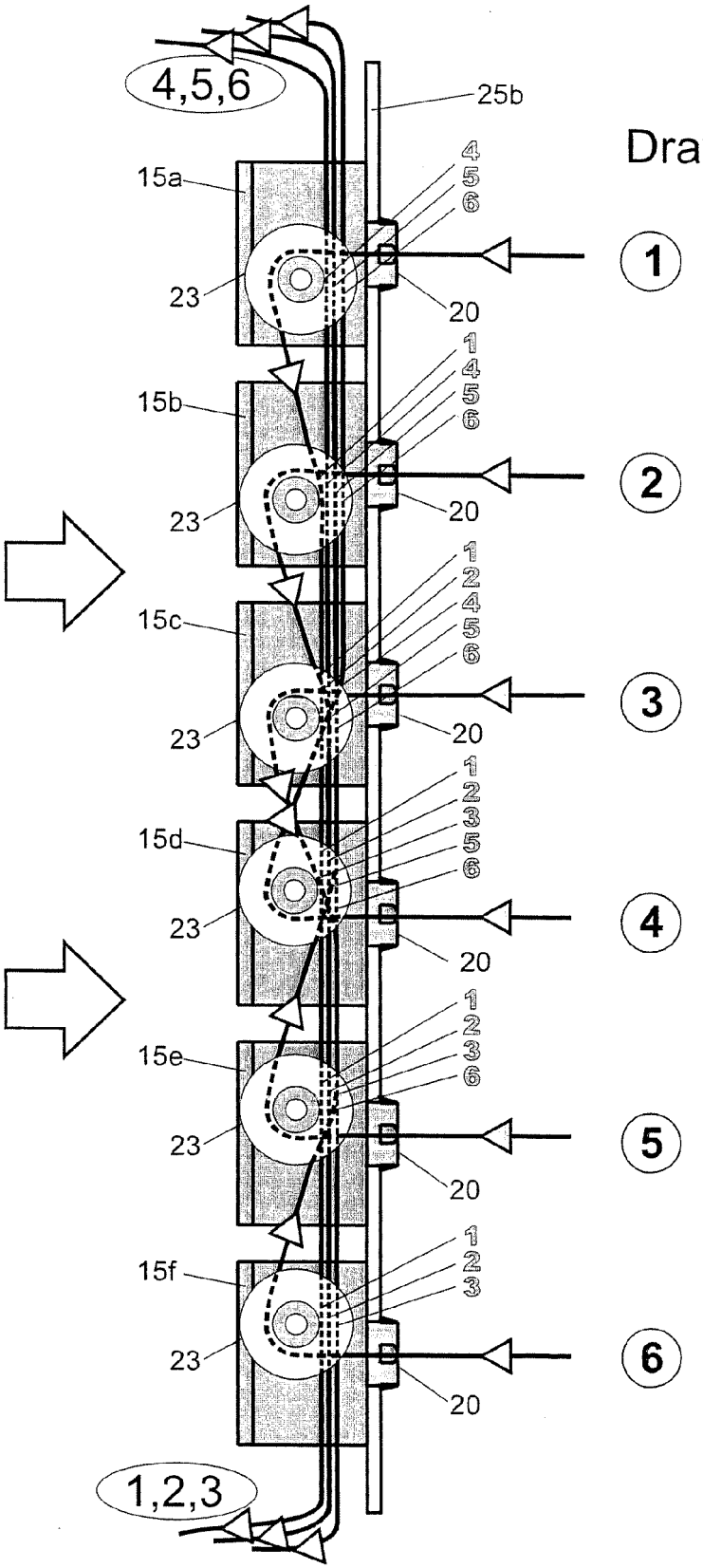


Drawing 5

Drawing 6



Drawing 7



Drawing 8

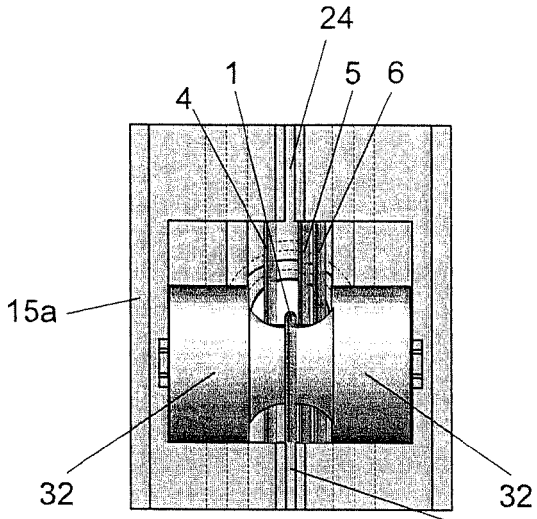


Figure 8a

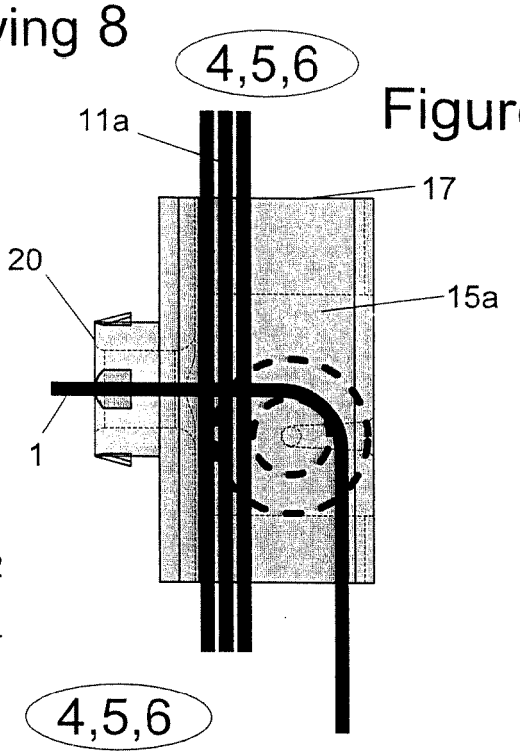


Figure 8b

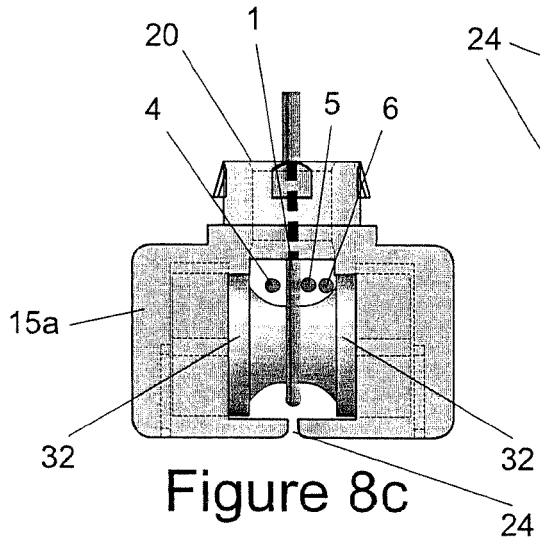


Figure 8c

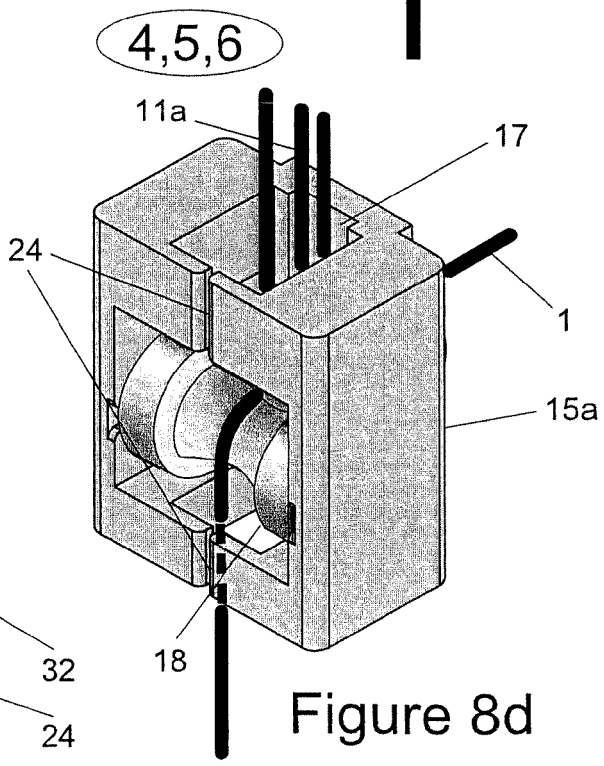


Figure 8d

Drawing 9

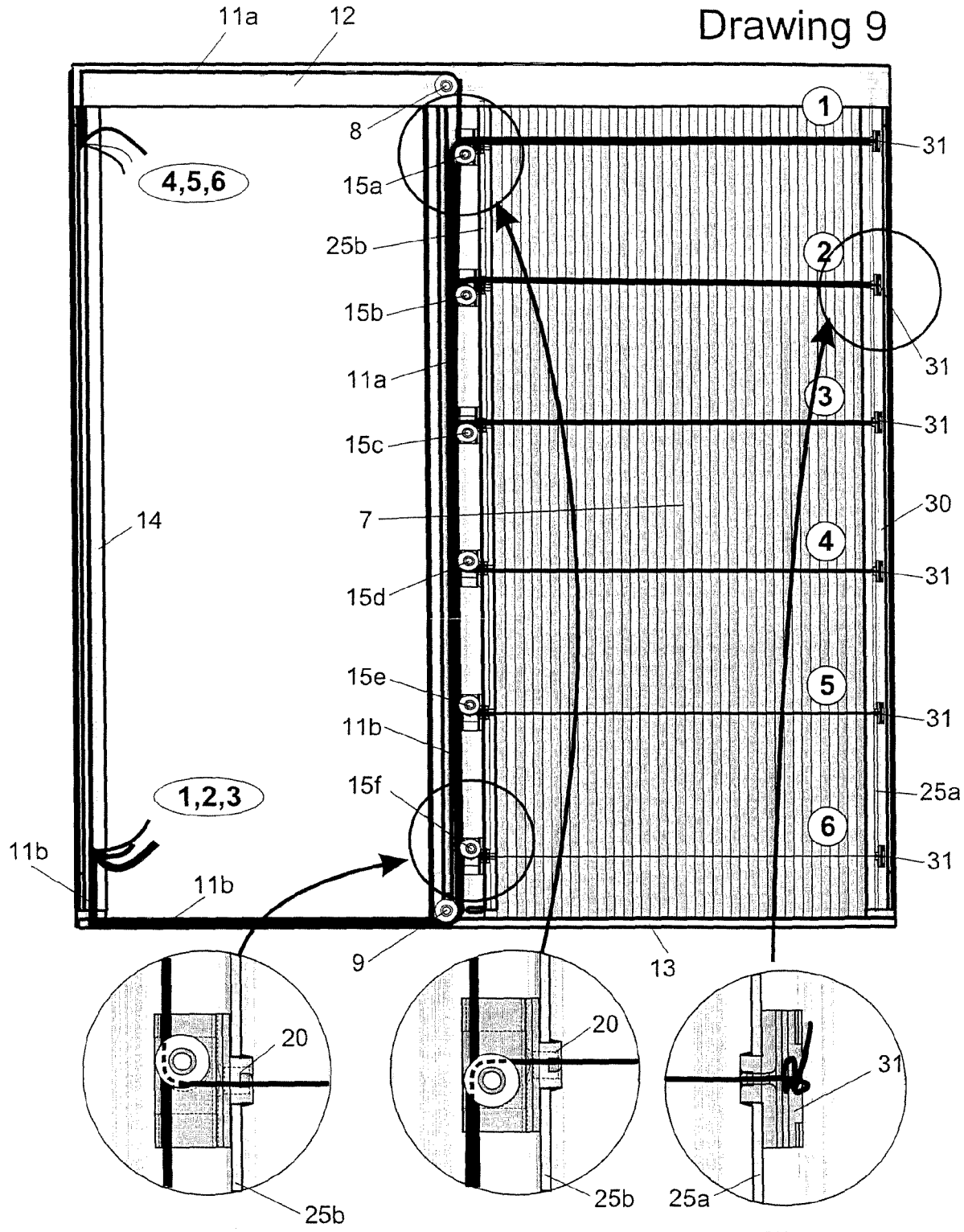


Fig. 9a Fig. 9b Fig. 9c

Drawing 10

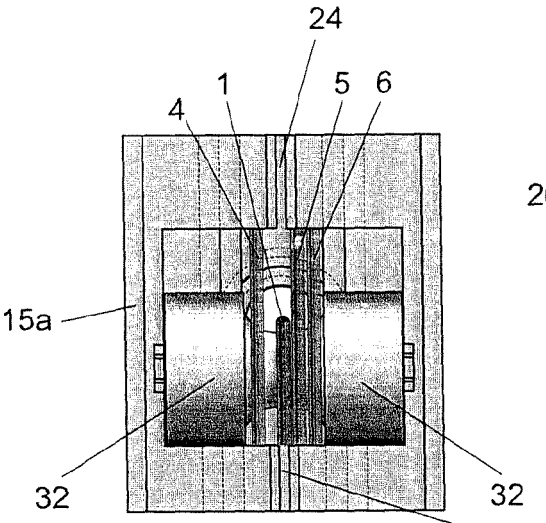


Figure 10a

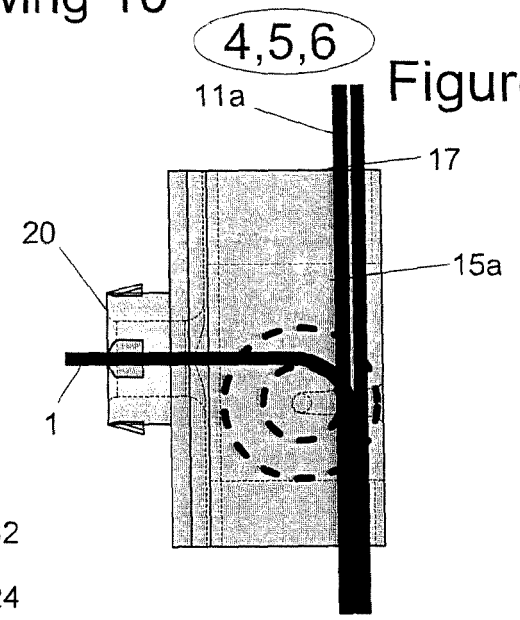


Figure 10b

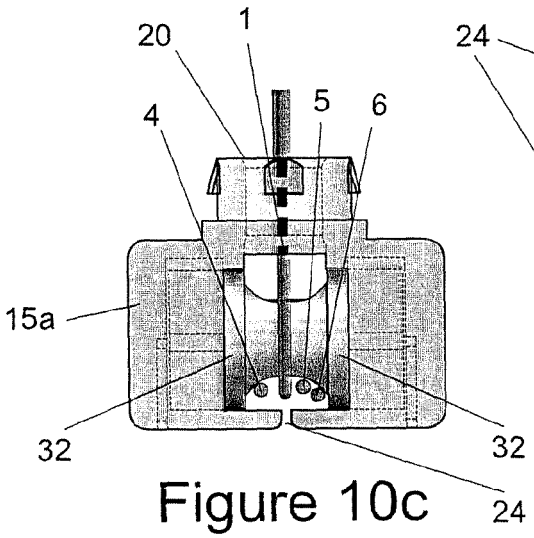


Figure 10c

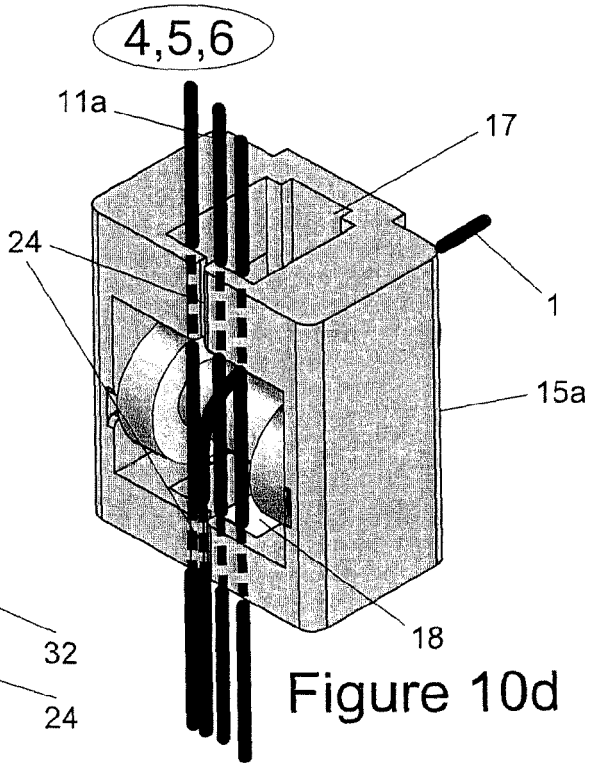


Figure 10d

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EUROPEAN SEARCH REPORT

Application Number
EP 13 38 6029

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	CA 2 219 946 A1 (PREFERRED ENGINEERING PRODUCTS [CA]) 30 April 1999 (1999-04-30) * page 45, lines 17-23; figure 10 *	1,2,5 3,4	INV. E06B9/54
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A	FR 2 708 661 A1 (HAYASHIGUCHI MFG CO LTD [JP]) 10 February 1995 (1995-02-10) * abstract; figure 6 *	1-5	
A	US 564 682 A (EDWARD T. BURROWES) 28 July 1896 (1896-07-28) * abstract; figures 1-4 *	1-5	
A	WO 2012/117262 A1 (PAPADOPOULOS ARGYRIOS [GR]) 7 September 2012 (2012-09-07) * abstract; figure 4 *	1-5	
			TECHNICAL FIELDS SEARCHED (IPC) E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 June 2014	Weißbach, Mark

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- JP 8199948 A **[0010]**