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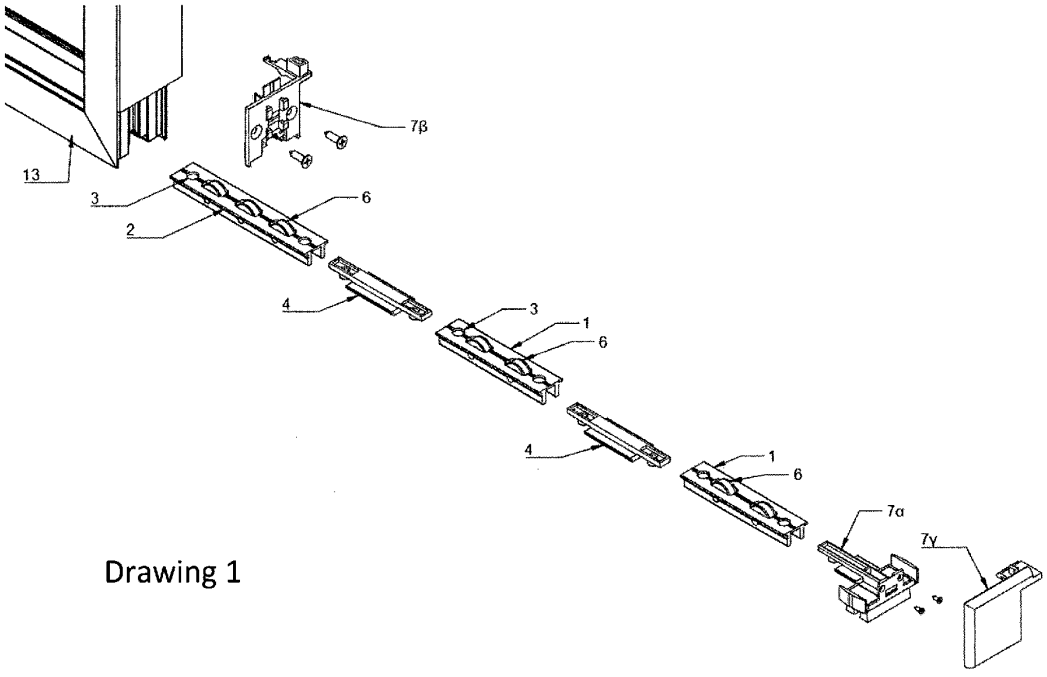
(54) **SLIDING LEAF SUPPORT AND ROLLING SYSTEM**

(57) The invention comprises a series of rollers (1, 2) which are connected together by a connector (4) and form a train. The train is fitted with a special fixing plug (7) at its end, which consists of two plug parts (Part A' and Part B') of which Part B' (7b) is screwed firmly onto the framework, while Part A' (7a) fixes the entire train to the end of the leaf framework, which is accessible. The only fixing point of the train is in Part A' (7a) which can be unscrewed; the entire train can be pulled out of the leaf without the need to remove the leaf from the frame casing. The invention can be applied in all door and window sliding systems, whether overlapping or not.



Drawing 1

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Description

[0001] The invention belongs to the field of engineering and in particular concerns sliding door leaves.

[0002] "Sliding leaf" means a framework which slides on a guide, which is mounted on the bottom horizontal part of the frame casing. In the current state of the art, the movement is carried out using rolling means located in the bottom horizontal part of the leaf framework. The framework rests on rollers, rolls on said rollers and moves. The rollers comprise a shell on which the wheels are supported. The load of the leaf, which is by definition heavy, causes the wear of the rollers and the need for their early (less than 10 years after installation) replacement. The need to replace the rollers occurs even sooner when debris and moisture is trapped between the guide and the bottom part of the leaf, and when there is a fault in the installation of the leaf from the beginning. Users become aware of the rollers starting to wear out, as moving the leaf requires more and more force and in the end, it is absolutely impossible to move it and the leaf becomes immobile. Then it becomes absolutely necessary to replace all the rollers on which the leaf is supported and moved. The technical issue arising in the replacement of rollers is that in the current state of the art, the rollers are not accessible. Therefore, in order to replace them, the entire leaf must be removed from the frame (i.e., removed from its casing) and must be placed in a horizontal from its original, vertical position, so that the technician can replace all the rollers located at the bottom of the leaf. Then, the leaf should then be repositioned in its place within the casing of the frame.

[0003] This technical problem is presented in document US 4,262,451 in which the rollers are screwed into the bottom horizontal part of the frame of the leaf and their replacement requires the complete removal of the framework from the frame.

[0004] The same technical problem is also presented in document EP 0563015, in which the replacement of rollers is done by unscrewing the fixing screw (70, 71), an action that again requires the complete removal of the leaf from the frame.

[0005] Finally, in document EP 4071328 A1, multiple rollers with wheels are used, like in the present invention but with a different operating logic, as they are mounted on the guide of the frame and the invention does not concern the solution of the technical problem of easy replacement of worn rollers from the leaf, but concerns the easy replacement of worn rollers from the guide which is firmly screwed to the floor inside the frame.

[0006] The present invention Sliding leaf support and rolling system, solves the above technical problem by achieving the replacement of rollers without the need to first remove the framework from the frame.

[0007] In a brief disclosure, the present invention comprises a series of rollers which are connected together by a connector and form a train which slides into the bottom horizontal profile of the leaf, wherein there is a configured recess. The connector does not come into contact with the bottom horizontal guide, which is located inside the frame, is metal, usually made of aluminium or inox and on which the rollers roll, in the form of sliding small wagons as in a train. The train is fitted with a special fixing plug at its end, which consists of two plug parts (Part A' and Part B') of which Part B' is screwed firmly onto the framework, while Part A' fixes the entire train to the end of the leaf framework, which can be accessed by the technician. Part A' is covered by a plug-cap. To replace the rollers, the technician simply lifts the leaf, removes the plug-cap, unscrews Part A' of the train's fixing plug and pulls the entire train out. As the only fixing point of the train is in Part A' which is unscrewed by the technician, the entire train can be pulled out of the leaf without the need to remove the leaf from the frame casing. The technician repairs the train or puts a new train in place, inserts and slides it into the bottom horizontal framework of the leaf and when the train is fully inserted into the framework, the technician screws it into the end of the leaf. The replacement of the train has been completed.

[0008] The train may be placed from one end to the other of the bottom horizontal framework of the leaf, or, if the leaf is lightweight, it may cover only the two ends of the leaf, i.e. it may slide in as two parts, with one part of train entering each end of the horizontal framework of the leaf.

[0009] The essential advantage of the invention Sliding leaf support and rolling system is that it solves the technical problem of difficult access and replacement of worn rollers, because thanks to the rollers that have the form and function of a wagon train, their replacement does not require the removal of the leaf from the casing of the frame. Their replacement is done by simply lifting the leaf from its place, at an angle of a few degrees, without having to remove it from its place, but remaining in the position where it is located within the casing of the frame.

[0010] A further essential advantage of the present invention is that the invention can be applied to the entire length of the bottom framework of the leaf, i.e., wheels can be placed along the entire length of the framework of the leaf. This leads to a better distribution of the weight of the leaf on the horizontal guide on which it slides, with the result that the leaf becomes generally lighter, is easier to move for the user, the rollers are not stressed and there is no need to replace them for many years. The invention therefore reduces the replacement frequency of the rollers. The same technical feature of the invention, namely the fact that several rollers can be placed in the bottom part of the leaf framework, even along its entire length, brings about the technical result and the additional advantage of the invention that the system can support a leaf of great weight. Thus, the invention makes it possible to manufacture frames with sliding framework of larger dimensions, width and height than those of prior art. At the same time, it enables the manufacture of frames with sliding framework which are of the same di-

mensions as the frames of the current state of the art, but which can carry ballistic glass panes, i.e. a much higher weight than the weight carried by the sliding frameworks of the current state of the art.

[0011] Furthermore, depending on the requirements of each structure (dimensions, weight), the installation technician can choose the most appropriate combination of rollers, fully customising the components to the requirements of the specific structure. So, for example, in a light leaf they may use only double rollers, or add even triple roller to a heavier one or use only triple rollers for very heavy leaves and/or rollers with even more wheels, etc. The adjustment of each installation to the characteristics of the specific leaf offers flexibility and optimal functionality to the frame.

[0012] Finally, in the current state of the art, the rollers are screwed onto the bottom horizontal part of the framework inside a specific roller chamber configured in the profile, so that the height of the chamber and the height of the rollers are added to the height of the bottom horizontal part, which is therefore always wider than the vertical side parts of the framework. As a result, there is reduced visibility in the lower part of the framework. In contrast, because in the present invention the rollers are held in place by a special fixing plug on the side of the framework, therefore no screws are used to fix them, and also because the rollers enter the profile up to their mid-height, thanks to the special recessed configuration of the profile, the present invention has the additional advantage that the bottom horizontal part of the frame becomes as thin as the vertical side parts of the framework, thus increasing the visibility in the lower part of the framework.

[0013] Furthermore, in the current state of the art, the chamber wherein the angle used for connecting the parts of the framework profile enters is located above the roller chamber, therefore significantly increasing the width of the bottom horizontal profile. In contrast, in the present invention the angle used to connect the parts of the profile framework enters into two separate chambers (instead of a single one), each configured, on either side of the specific profile configuration for the rollers, rather than above the configuration, and therefore the width of the bottom horizontal profile is further reduced in this way too.

[0014] The invention Sliding leaf support and rolling system is set out in the appended Claims.

[0015] The 11 drawings accompanying the invention briefly present the following:

Drawing 1 shows the Sliding leaf support and rolling system, disassembled, in a perspective view: the rollers, the connectors that connect them and the fixing plug consisting of parts A' and B' and its cap.
Drawing 2 shows the same components as drawing 1, from another perspective view.
Drawing 3 shows a double roller, in various views.
Drawing 4 shows a triple roller, in various views.
Drawing 5 shows a combination of rollers, in various views.
Drawing 6 shows a perspective view of the Sliding leaf support and rolling system; Part B' of the fixing plug has already been screwed onto the leaf framework and the entire train is assembled and ready to slide into the bottom horizontal framework of the leaf.
Drawing 7 shows Part A' of the fixing plug, in various views.
Drawing 8 illustrates Part B' of the fixing plug, in various views, used in two variants, depending on whether the framework consists of sides the sides of which are cut by the manufacturer at a 90^0 angle (figure 8a) or 45° (figure 8b).
Drawing 9 shows the cap of the fixing plug, in various views.
Drawing 10 shows a sectional view of the profile of the bottom horizontal part of the framework, into which the entire Sliding leaf support and rolling system enters.
Drawing 11 shows the sectional view of the profile of the bottom horizontal part of the framework of Drawing 10, with the rollers placed within it and resting on the frame guide, on which the train rolls.

[0016] There follows a detailed description of the present invention with reference to the accompanying drawings.

[0017] In a preferred implementation of the invention shown in drawings 1, 2, 3 and 4, the Sliding leaf support and rolling system comprises double rollers (1) [with two wheels (6)] or triple rollers (2) [with three wheels (6)], or rollers with even more wheels. The rollers (1, 2) are parallelogram in shape and their section is "n"-shaped, with symmetrical protrusions (16). They have slots (3) at their ends, which may be in the form of open holes or simple slots. A part of the wheels (6) protrudes above the surface of the roller structure by height A-A' and a part of the wheels (6) protrudes below the surface of the roller (drawings 3, 4). The wheels perform a free circular motion. Throughout the operation of the invention, the wheels (6) in their upper part do not come into contact with any surface of the system. The rollers (1, 2) are connected to each other by means of a roller connector (4). In particular, as illustrated in drawing 5, the roller connector (4) is a component preferably comprising two flat parallelogram parts, the lower flat part (4a) and the upper flat part (4b), structured one on top of the other. The lower flat part (4a) preferably has a width equal to the width of the rollers (1, 2) and in any case not greater than the width of the rollers. The upper flat part (4b) is provided, preferably at both ends, with connecting projections (5). The projections (5) provided on the roller connectors (4) enter the connecting slots (3) provided on the two ends of the rollers (1, 2) and connect the rollers to each other. In this way, the double rollers (1) and the triple rollers (2) are connected serially, thanks to the connectors (4) placed between them, each connector joining two rollers, like a train (drawings 5, 6). The parallelogram shape of the low-

er flat part (4a) of the connector (4) ensures a good fit of each side of the connector (4) with the two sides of the two rollers it connects (drawing 6), which also are parallelogram in shape and as a result of this, stability is ensured both in the connection of all parts of the train and in the flow of the train. The connectors (4) do not rest on the horizontal guide (21) of the frame, on which only the wheels of the rollers (drawing 11) rest and roll. Each connector (4) placed between two rollers (1, 2) and connecting them, has the surface of the lower flat part (4a) lying exactly on the same level with the surface of the rollers (drawing 6), forming a surface continuous with their surface. When the train is assembled, seen in sectional position, no part of the connector (4) protrudes from the part of the rollers (1, 2). This technical feature allows the entire train to enter the bottom horizontal profile (13) of the leaf framework unhindered, through a recess (17) for the entry of the upper part of the wheels and, on either side of this recess (17), two parallel recesses (19) configured in the bottom profile (13) along its entire length (drawings 10, 11), as described in detail below in the installation of the system.

[0018] In addition to the rollers (1, 2) and the connector (4), the Sliding leaf support and rolling system includes a fixing plug (7), which comprises Part A' (7a) and a Part B' (7b). It may also have a cap (7c).

[0019] Part A' (7a) of the fixing plug (7) (drawings 1, 7), has two symmetrical open holes (8), is provided with a cantilever (9) with a projection (10) and brushes (11).

[0020] Part B' (7b) of the fixing plug (7) (drawing 8) has an opening with a total of three configured recesses through which the train enters the bottom horizontal profile (13): two identical symmetrical recesses (22) as slots for the passage of the "π"-shaped section of the train and the protrusions (16) of the train and a configured recess (20) in the upper section as a passage slot for the wheels (6) of the train. With this configuration of the three recesses (22, 22, and 20) the opening in Part B' (7b) of the plug has a section similar to the "π"-shaped section of the train, i.e. the rollers (1, 2) (drawings 3, 4) together with the wheels protruding from them and together with the connector (4), the "π"-shaped recess of Part B' (7b) is slightly larger than the "π"-shaped section of the train. Part B' (7b) is also provided with symmetrical open holes (14) which serve to fit Part A' (7a) of the fixing plug (7) on it.

[0021] Depending on the typology of the leaf used each time, the appropriate Part B' (7b) of the plug is used, which is screwed to the end of the vertical side profile, or to the end of the bottom horizontal profile. Thus, if the framework comprises sides with ends cut by the manufacturer at a 45° angle, the Plug-Part B' can be provided with symmetrical open holes (12) for fixing it on the leaf profile and may also be provided with a cantilever (15) for better fixing to the profile (figure 8b). In contrast, if the framework comprises sides with ends cut at an angle 90^0 the Plug-Part B' has neither holes (12) nor cantilever (15) to be fixed to the framework (figure 8a). However, in any case, whichever variant of the Plug-Part B' is used depending on the frame, it always has two open holes (14) into which the Plug-Part A' is screwed -and a "π"-shaped recess (20) into which the train enters. The opening of the recess has a section similar to the "π"- shaped section of the train, but as mentioned above, the "π"-shaped recess of Part B' (7b) of the plug is slightly larger than the "π"-shaped section of the rollers and the train.

[0022] A cap (7c) can be fitted to the fixing plug (7) (drawings 6 and 9).

[0023] The assembly, installation and operation of the Sliding leaf support and rolling system is carried out as follows:

[0024] First, Part B' (7b) of the fixing plug (7) is screwed onto the end of the bottom horizontal profile (13) of the leaf framework (drawing 1).

[0025] The bottom horizontal profile (13) of the leaf framework is specifically configured (drawings 10, 11) with recesses (17, 19 and 19) along the entire length of the profile.

[0026] The recess (17) (drawing 10), located in the middle and along the entire length of the bottom horizontal profile (13), has height B-B' which is greater than height A-A' of the part from the wheels (6) of the rollers that protrude above the upper surface of the roller structure (drawings 3, 4). The upper Part of the roller wheels will enter said recess.

[0027] The two recesses (19) in the bottom horizontal profile (13) are two straight recesses, parallel to each other, on either side of the aforementioned recess (17), configured along the bottom horizontal profile (13) of the leaf framework, slightly larger than the protrusions (16) bearing the rollers (1, 2) (drawings 3, 4). Thus, the section of the bottom horizontal profile (13) of the leaf, is identical to the "π"-shaped section of the train, as mentioned above, the "n"-shaped recess of the framework (13) is slightly larger than the "π"-shaped section of the train. The section of the opening of the bottom horizontal profile (13) of the leaf, is identical and equal to the "π"-shaped section of the opening of the recess of Part B' (7b) of the plug described above. The configured openings-recesses in the bottom horizontal profile (13) of the leaf framework (recesses 17, 19 and 19) and in Part B' (7b) of the fixing plug (7) (recesses 20, 22 and 22) are openings of identical and equal dimensions (drawing 8). Thus, when Part B' (7b) of the fixing plug (7) is screwed onto the bottom horizontal profile (13) of the leaf framework, the configured openings-recesses (17, 19 and 20) of Part B' (7b) coincide with the openings-recesses of the bottom horizontal profile (13) of the leaf framework and allows the unhindered entry of the train into the bottom horizontal profile (13) of the leaf framework.

[0028] The system of rollers (1, 2) and connectors (4), i.e. the train, will enter and be placed within the opening formed by the recesses (17, 19, 19) of the horizontal profile (13) of the leaf framework. Part B' (7b) of the fixing plug (7) always remains firmly screwed to the profile and is never detached from it, even when the system is replaced due to wear, damage, etc.

[0029] Then, the train is assembled, in the following order, which is indicative and not restrictive as to the operation of the invention: Part A' (7a) of the fixing plug (7) is fitted into the slot (3) from one end of a first roller (1, 2), using the projection (10) of the cantilever (9) (drawings 1 and 6). One end (5) of a first connector (4) is fitted to the slot (3) in the other end of the first roller (1, 2), while the slot (3) of the end of a second roller (1, 2) is fitted to the other end (5) of the first connector (4). One end of a second connector (4) is fitted to the other end of the second roller (1, 2), while one end of a third roller (1, 2) is fitted to the other end of the second connector (4) and so on. In this way, the double or triple rollers (1, 2) and Part A' (7a) of the fixing plug (7) are assembled in series as a train. The rollers are not screwed anywhere, as no screws are used on the train formed and the retention of its parts is achieved thanks to the assembly formed by the slots (3) of the rollers with the connecting projections (5) of the connectors (4). The train is ready to slide in the accesses (17, 19, 19) of the bottom horizontal profile (13) of the leaf framework.

[0030] Once Part B' (7b) of the fixing plug (7) has been screwed to the end of the bottom horizontal profile (13) of the leaf framework, the train formed by the rollers (1, 2) and the connectors (4) together with Part A' (7a) of the fixing plug (7), as a single system, passes through the three recesses (22, 22 and 20) of Part B' (7a) of the fixing plug, then the protrusions (16) provided on the two ends of the rollers (1) enter the two recesses (19) of the profile and the wheels (6) enter the recess (17) provided on the bottom horizontal profile. The connectors (4) also enter. As the section of the connector (4) is in full continuity with the "π"-shaped section of the roller, in specific with the upper surface of the "π" shape, and as the entire train has a section identical and slightly smaller than the section formed by the opening with the recesses of the bottom horizontal profile (17, 19 and 19) and than the section of the opening of Part B' of the plug with its recesses (20, 22 and 22), the passage of the train from Part B (7b) of the plug and the sliding entry of the entire train in the bottom horizontal profile (13) of the leaf framework, is unhindered.

[0031] As mentioned above, the recess (17) (drawing 10) along the entire length of the profile, has height B-B' which is greater than height A-A' of the part from the wheels (6) of the rollers that protrude above the upper surface of the roller structure (drawings 4, 5, 6). Thanks to this technical feature, when the protrusions (16) of the roller (1, 2) enter the recesses (19) of the bottom horizontal profile (13) of the leaf framework, the wheels (6) of the roller are kept at a distance from the upper surface of the leaf profile and do not come into contact with the upper inner surface of the recess (17), because this would immobilise them and prevent them from rolling. Thus, when the system is in operation, the wheels (6) of the rollers rotate and roll unhindered, contacting only on the bottom horizontal guide (21) of the frame, while their upper part does not touch the upper inner surface of the leaf profile at any point.

[0032] Through the open-holes (8) provided in the plug-Part A', it is screwed into the open holes (14) provided in Part B' (7b) of the fixing plug (7), or is assembled to it at any point of it, by any fixing method and means, and is immobilised thereon.

[0033] In this way, Part A' (7a) and Part B' (7b) are fixed together and immobilised at the end of the bottom horizontal profile of the leaf framework. The train is now placed inside the profile, the system installation is complete, and the system is ready for use. The train may be single and run the full length of the leaf, or it may be two part, where each part enters from one end of the leaf and each is positioned in the manner described above.

[0034] A cap (7c) may be screwed/fastened on Part B' (7b) of the fixing plug (7) for aesthetic purposes.

[0035] The replacement or repair of the system is carried out as follows: the leaf is lifted at an angle of a few degrees from the end to which the Support and sliding system is screwed. The cap (7c) is removed. The screws (8), which retain Part A' (7a) of the fixing plug (7) on Part B' (7b), are unscrewed and Part A' (7a) is detached from Part B' (7b). Then, the entire train system, i.e. part A (7a) together with the rollers (1, 2) and the connectors, is pulled and slides out of the recess (17) of the bottom horizontal profile (13) of the leaf profile, passing through the opening (20) of part B' (7b) of the plug. Part B (7b) is not detached from the profile; it remains screwed/fitted there. Outside the framework, the worn part, be it a roller (1, 2) or a connector (4), is replaced or repaired, the train is reassembled and repositioned within the recess of the bottom horizontal profile (13) of the leaf framework, in the manner described above and Part A' (7a) is screwed again onto Part B' (7b) of the fixing plug (7) through the holes (8 and 14) provided in the two parts or Part A' is attached to Part B' by any means and in any manner of fixing.

[0036] The profile has two separate chambers (18) configured along its entire length, each on either side of the configured recess (17) into which the roller train (1, 2) enters. The connecting angles of the profile parts enter the chambers (18), thus reducing the width of the bottom horizontal profile (drawing 11).

[0037] The present invention can be applied in all door and window sliding systems, whether overlapping or not.

[0038] All parts shown in the drawings are individually assigned a reference number and the corresponding terms of these numbers are listed below:

(1) double rollers
(2) triple rollers
(3) slots
(4) roller connector
(4a) lower flat part of roller connector
(4b) upper flat part of roller connector
(5) connecting projections
(6) roller wheels
(7) fixing plug

fixing plug (7a) Part A'
fixing plug (7b) Part B'
(7c) plug-cap

(8) symmetrical open holes
(9) cantilever
(10) projection
(11) brushes
(12) symmetrical open holes
(13) bottom horizontal profile of the leaf
(14) symmetrical open holes
(15) cantilever of fixing plug (7b) Part B'
(16) roll protrusions
(17) profile recesses
(18) two entry chambers of the profile connecting angle
(19) two recesses, train slots
(20) recess of Part B' (7b) of the fixing plug
(21) bottom horizontal guide of the frame
(22) two recesses, train slots

Claims

1. A sliding leaf support and rolling system which rolls on the bottom horizontal guide (21) located within the frame, **characterised**

A) **in that** it includes, connected in series as in a train

at least two rollers with a "π"-shaped section and with protrusions (16), while said rollers have wheels (6) and are provided at their ends with connecting slots (3) in the form of open holes or simple slots, a part of the wheels (6) projecting above the surface of the roller structure (1, 2) by the height A-A' at least one roller connector (4) having at its ends, projections (5) for connection to the roller slots (3),

B) **in that** it includes a fixing plug (7), comprising

Part A' (7a), which bears two symmetrical open holes (8) and a cantilever (9) with a projection (10)
and Part B' (7b) which has symmetrical open holes (14) and an opening with a recess (20) configured in the upper part of the passage of the wheels (6) of the train and on either side of said recess (20) there are two identical symmetrical recesses (22) configured for the passage of the train, while the opening created by the recesses (20, 22, 22) has a section similar to and slightly larger than the "π"-shaped section of the train together with the wheels (6) protruding from its upper surface,

C) **in that** the bottom horizontal profile (13) of the leaf framework is configured with recesses (17, 19 and 19) along the entire length of the profile (13), wherein

the recess (17), located in the middle and along the entire length of the profile (13), has height B-B' which is greater than height A-A' of that part from the wheels (6) of the rollers that protrude above the upper surface of the roller structure
the recess (17) has two straight recesses (19, 19) on either side, parallel to each other, configured along the bottom horizontal profile (13), slightly larger than the protrusions (16) bearing the rollers (1, 2),

and wherein the opening created by the recesses (17, 19, 19) in the horizontal profile (13) has a section similar to and slightly larger than the "n"-shaped section of the train with the wheels (6) protruding from its upper surface and has a section equal to the section of the opening created by the recesses (20, 22, 22) of Part B' (7b) of the fixing plug, since the shaped opening-recesses in the bottom horizontal profile (13) of the leaf framework (recesses 17, 19 and 19) and in Part B' (7b) of the fixing plug (7) (recesses 20, 22 and 22) are openings of identical and equal dimensions,
and **in that**
D) when the train is assembled, seen in sectional view, no part of the connector (4) protrudes from the section of the rollers (1, 2).

2. A system according to claim 1, **characterized in that** the rollers (1, 2) may be with two wheels (6), three wheels (6), or more wheels.

3. A system according to claim 1, **characterized in that** the rollers (1, 2) have a parallelogram shape.

4. A system according to claim 1, **characterized in that** the roller connector (4) has a width up to the width of the rollers (1, 2) and in any case not more than the width of the rollers.

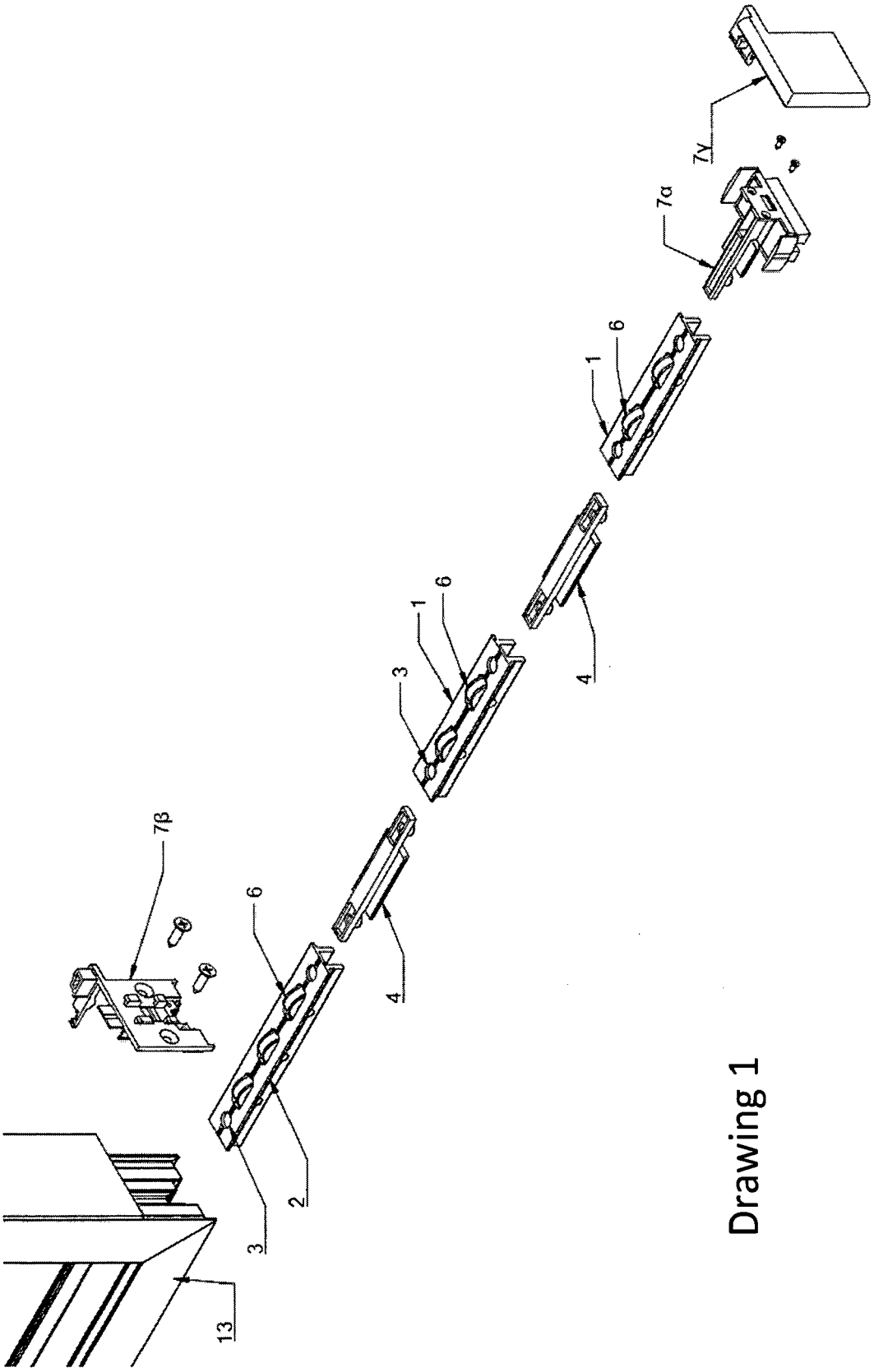
5. A system according to claims 1 and 4, **characterized in that** the (4) roller connector has a parallelogram shape.

6. A system according to claim 1, **characterized in that** said Part A' (7a) of said fixing plug (7) is provided with brushes (11).

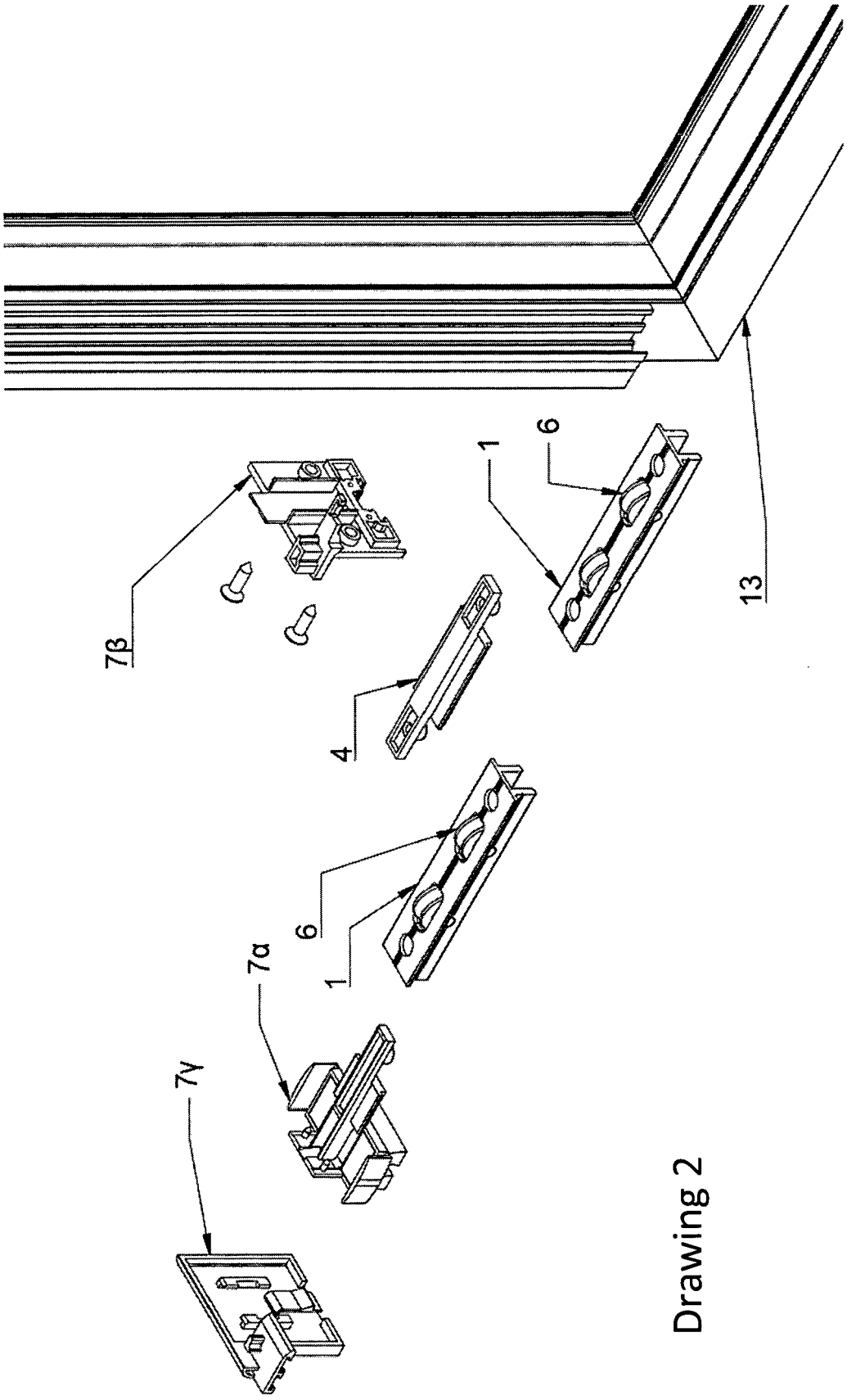
7. A system according to claim 1, **characterized in that**

the profile (13) is provided along its entire length with a configuration of two separate chambers (18), each on either side of the shaped recess (17) for placing within said chambers the corners connecting the parts of the profile.

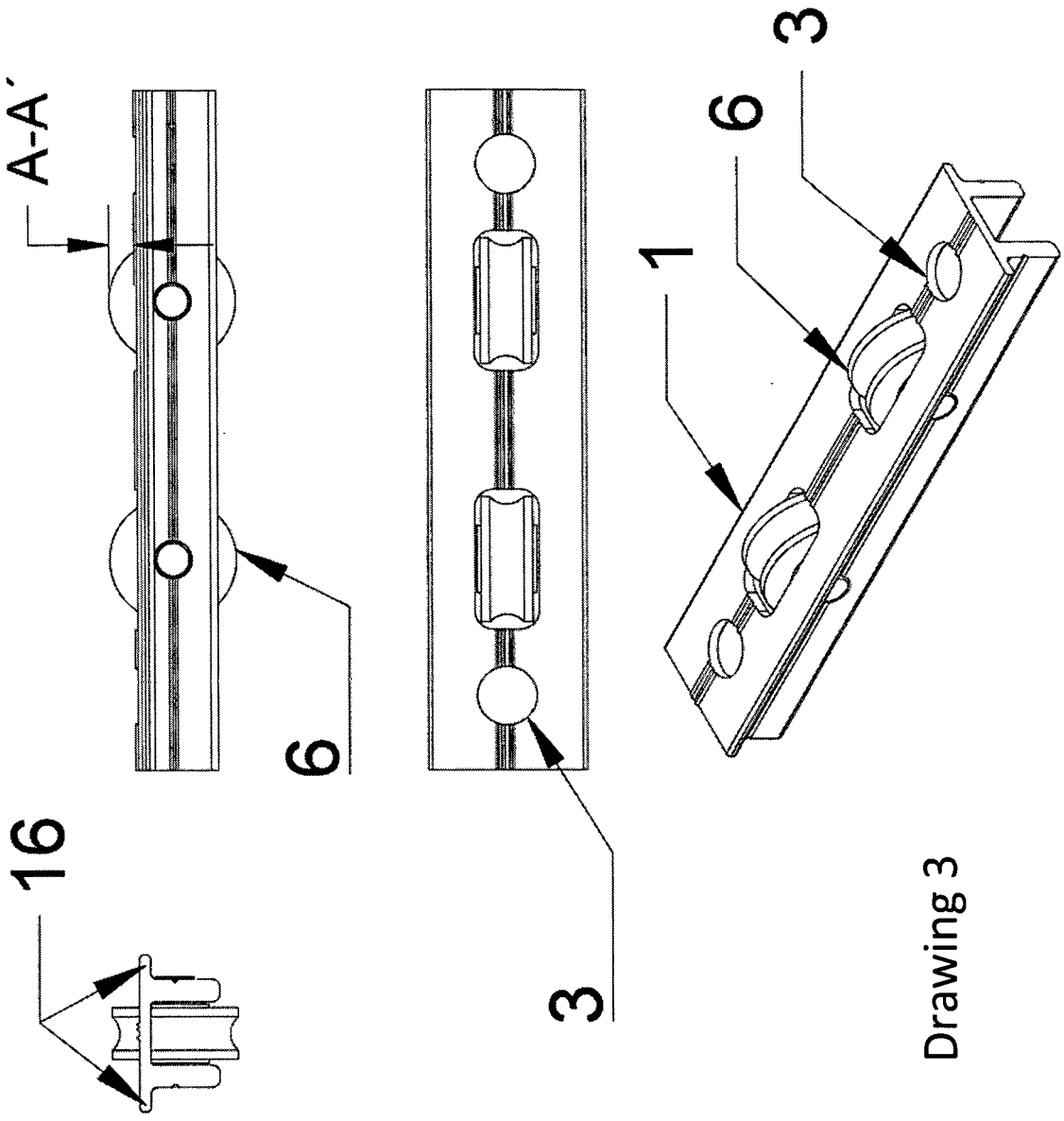
8. A system according to claim 1, **characterized in that** a cap (7c) is placed on top of Part B' (7b) of the fixing plug (7) for aesthetic reasons.



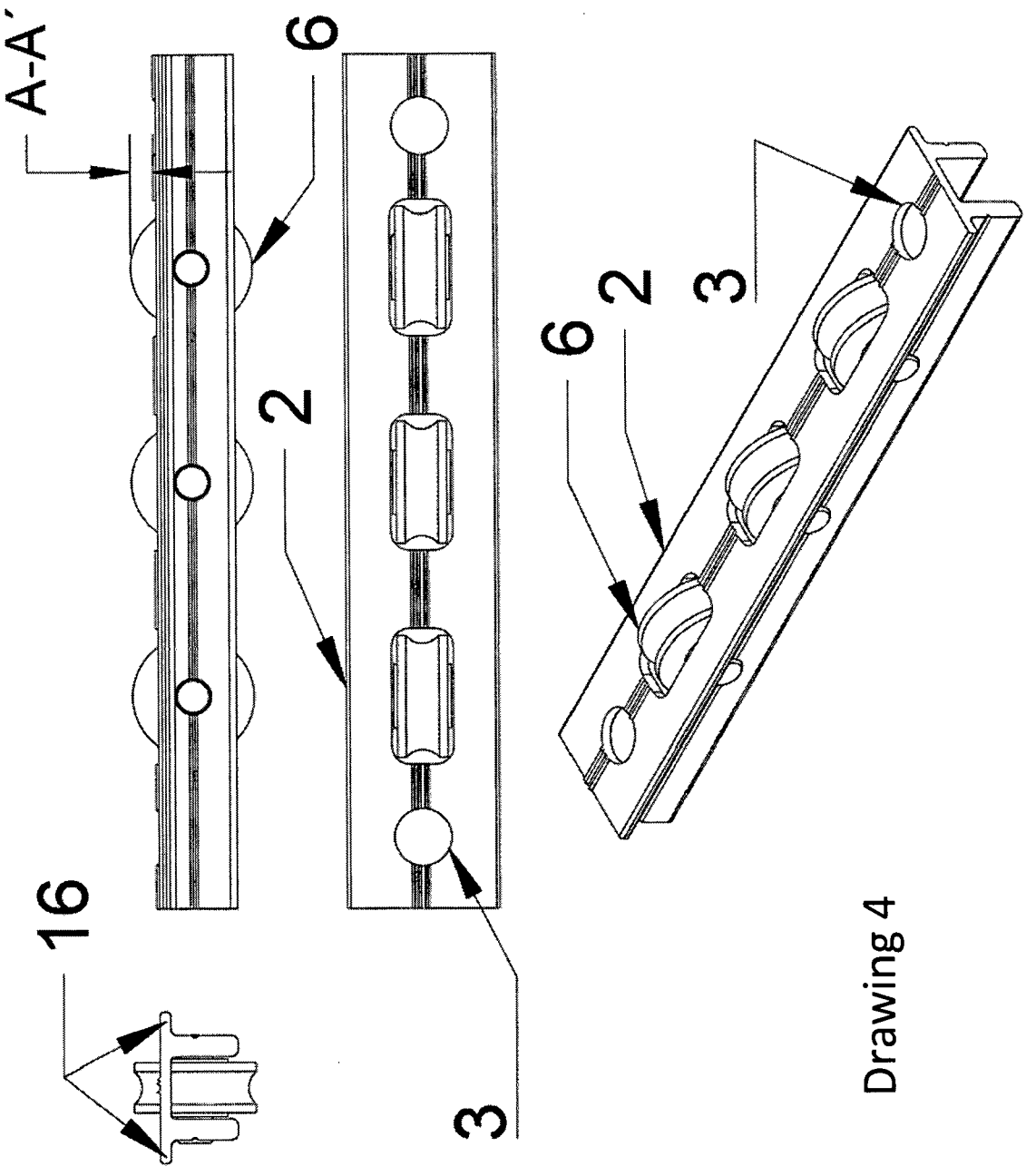
Drawing 1



Drawing 2



Drawing 3



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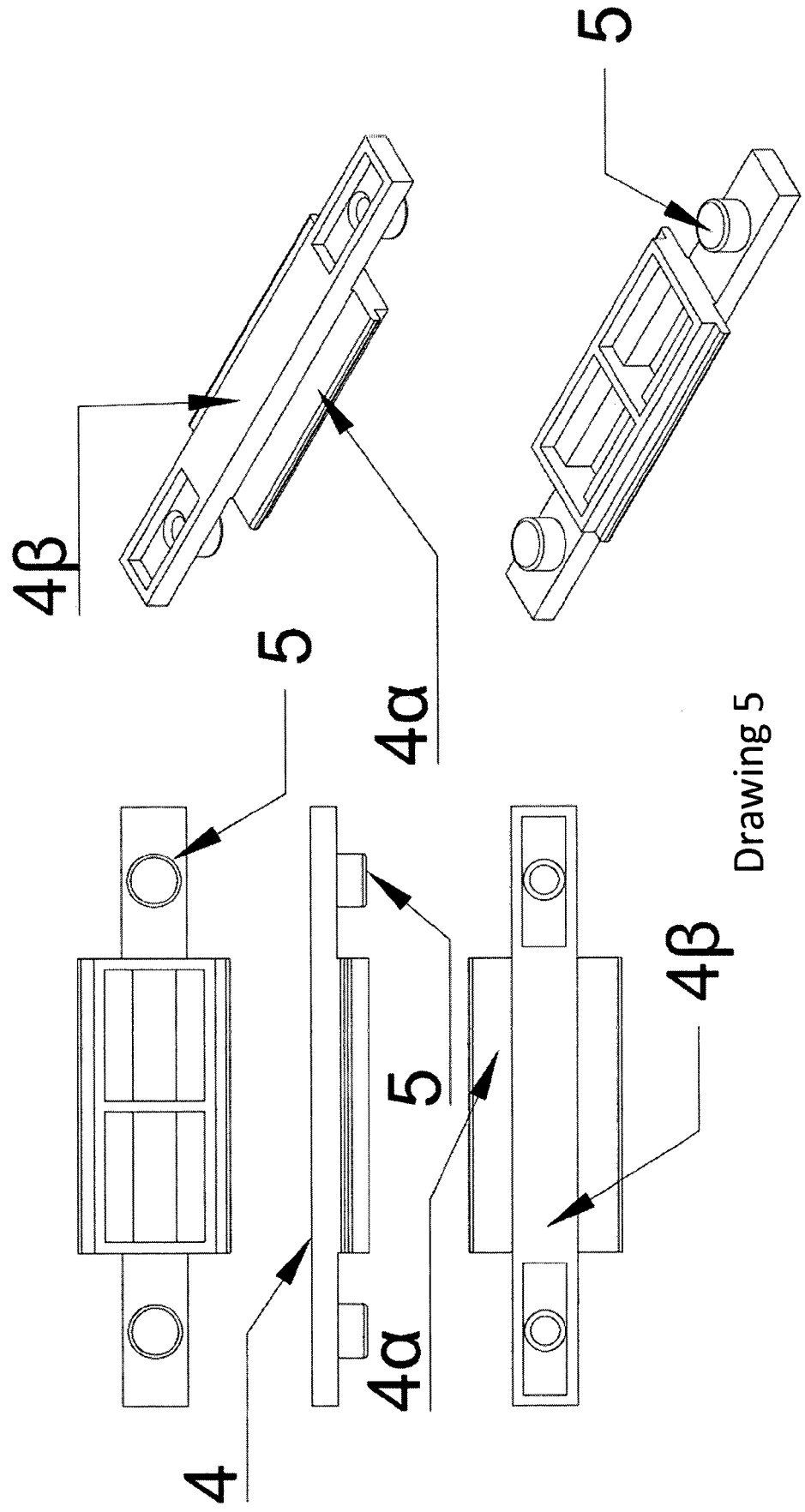

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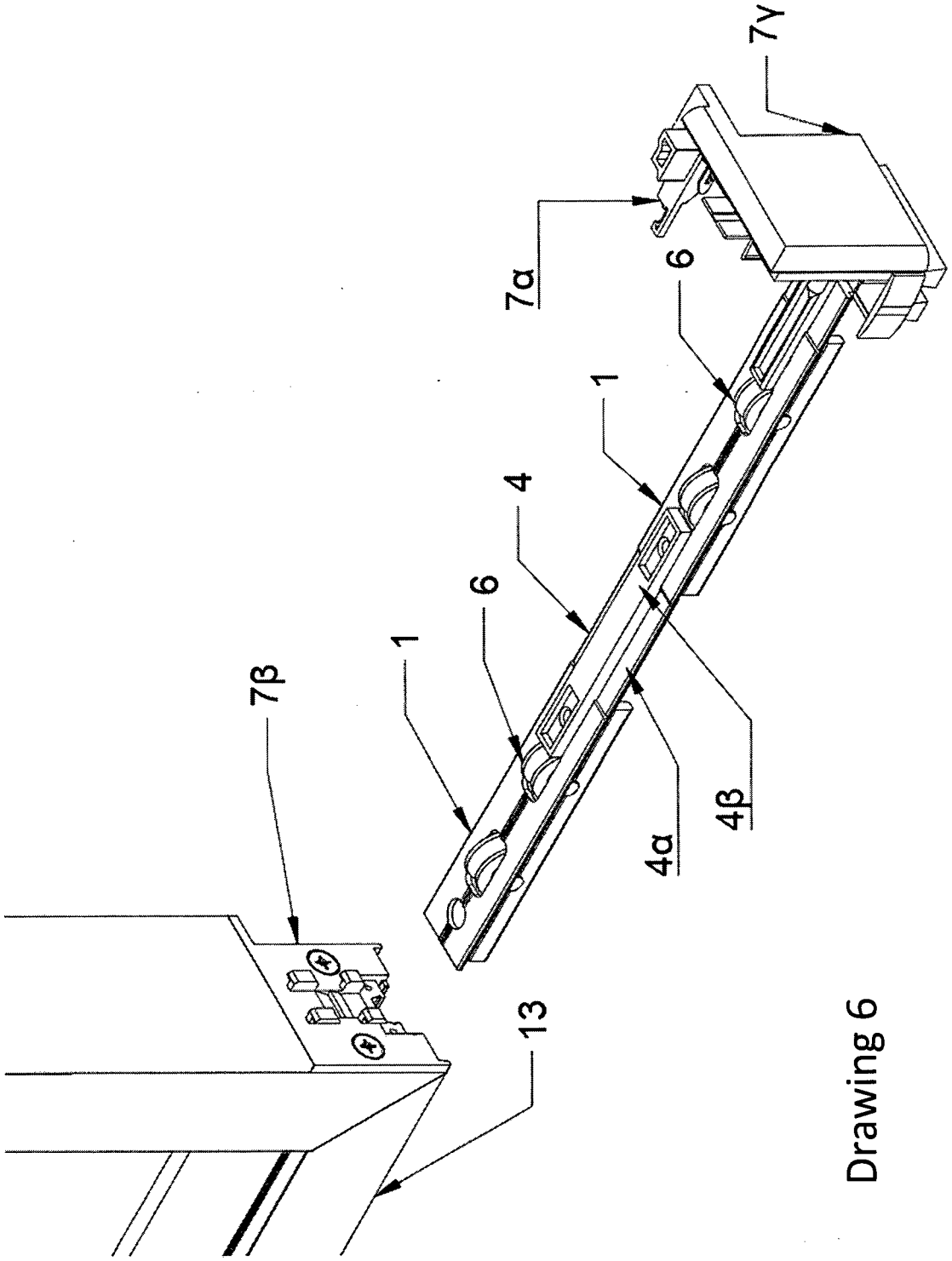

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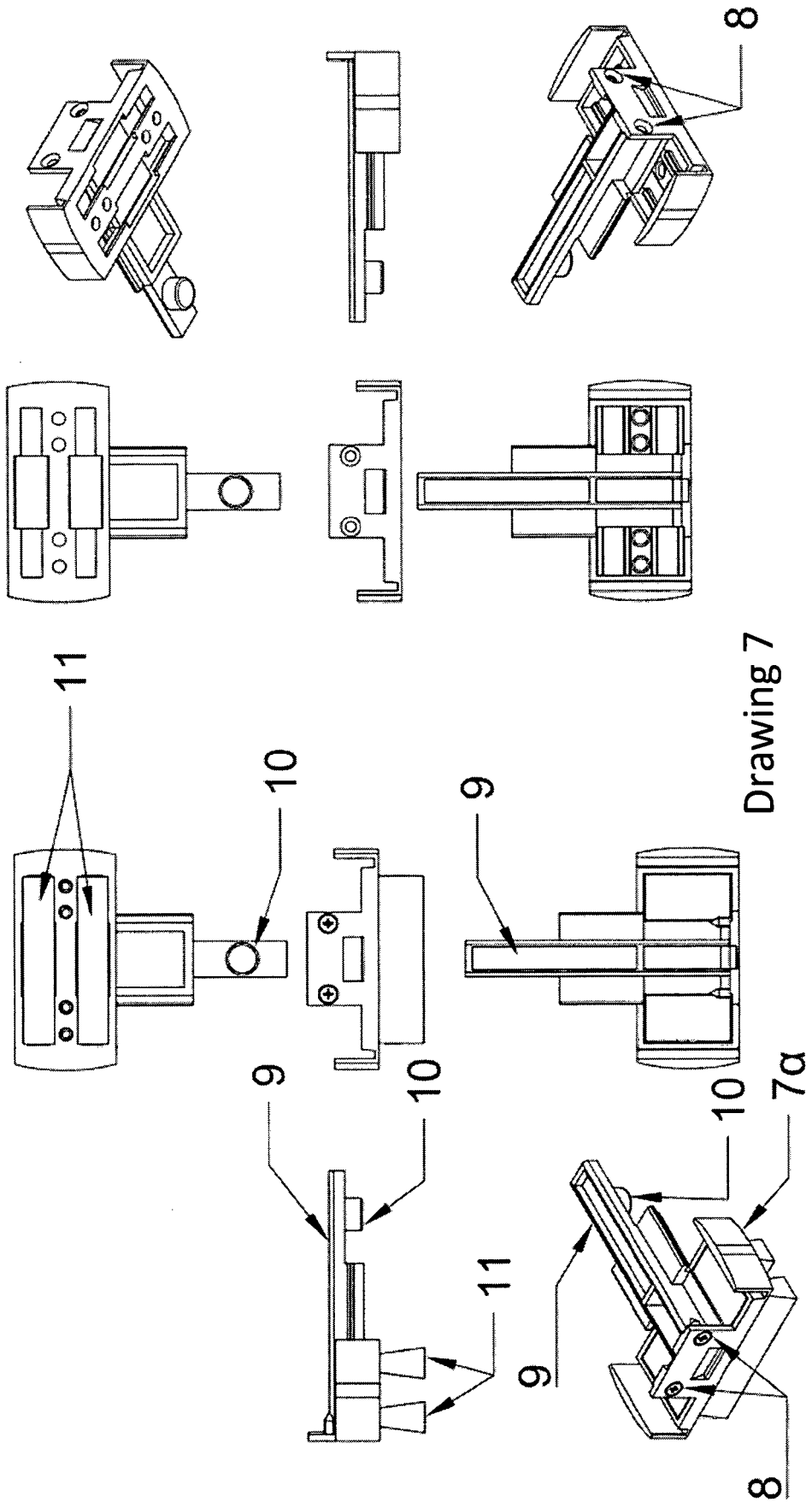
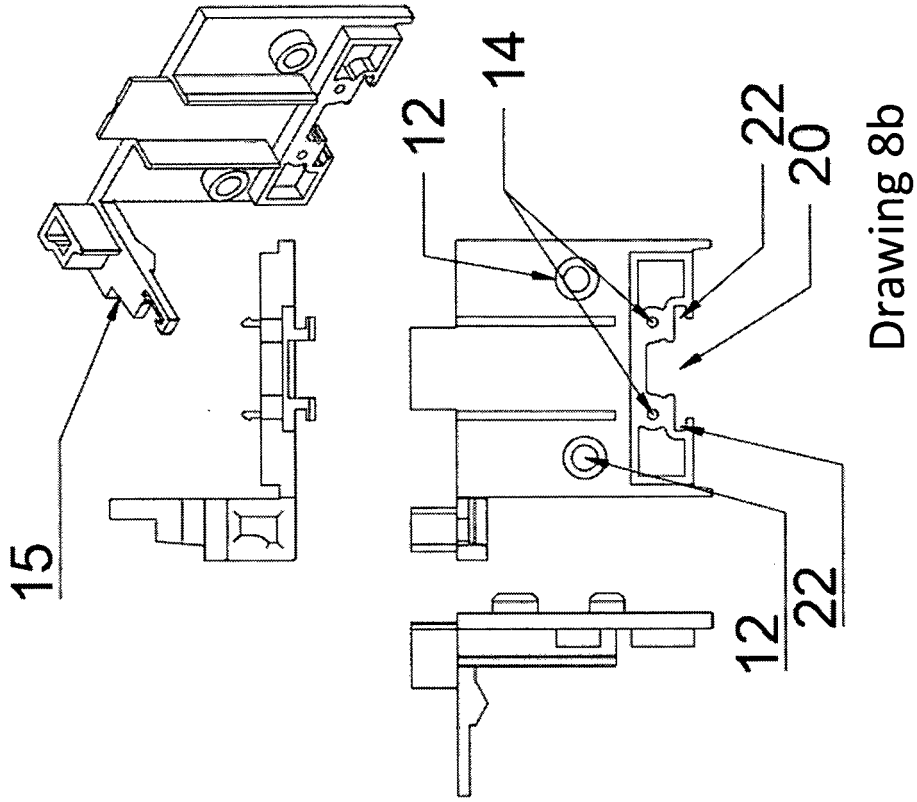
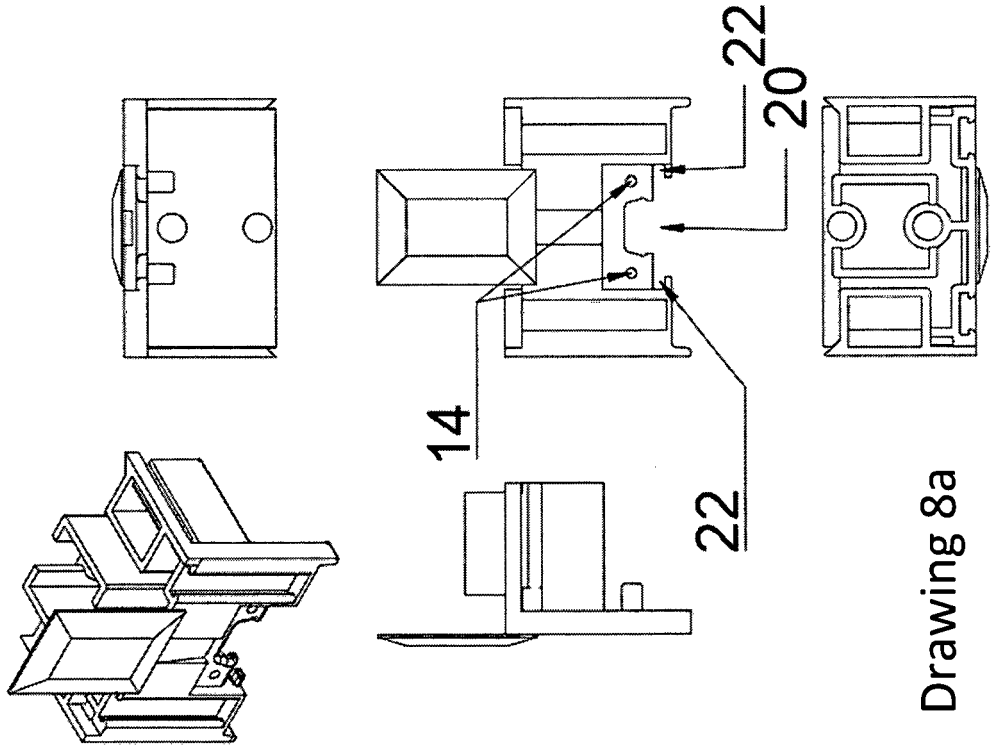


Drawing 7

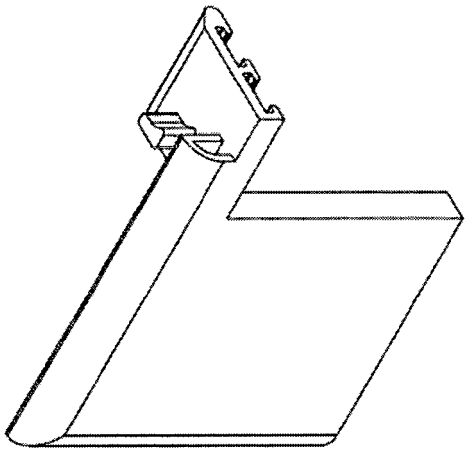


Drawing 8b

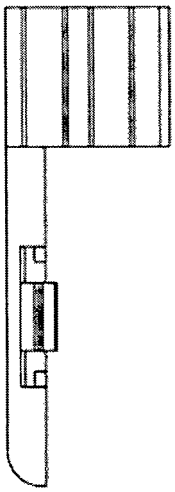


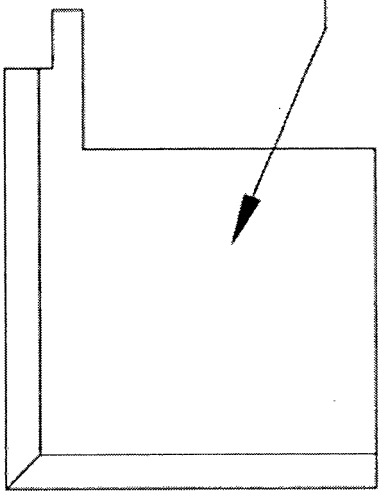
Drawing 8

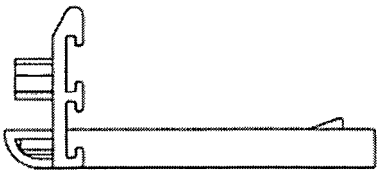
Drawing 8a

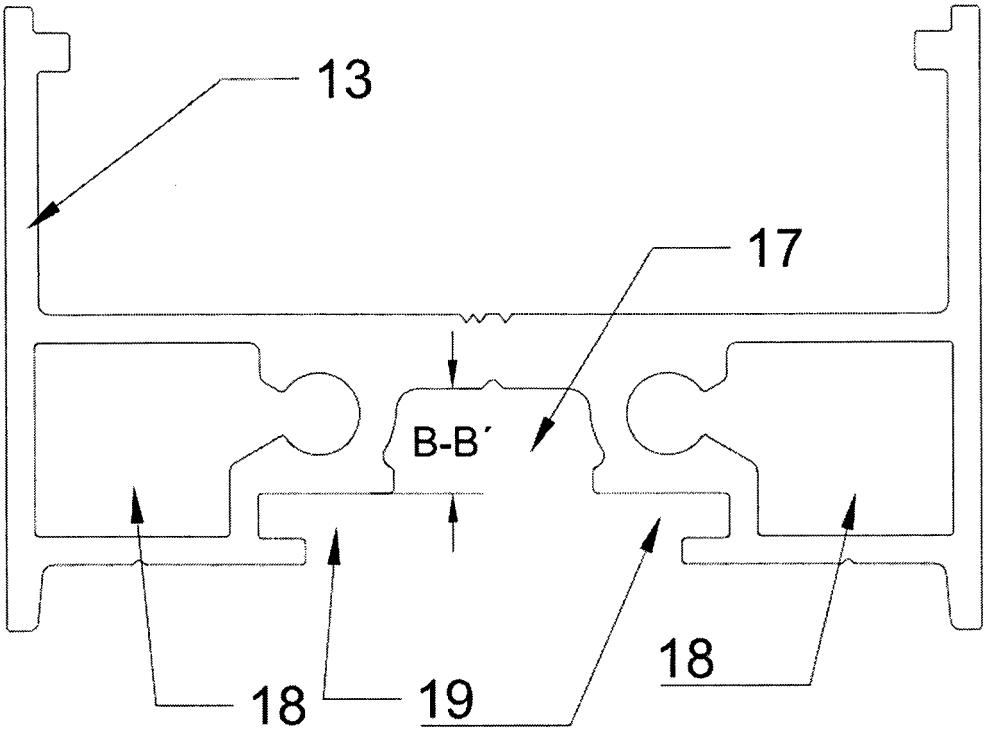


Drawing 9

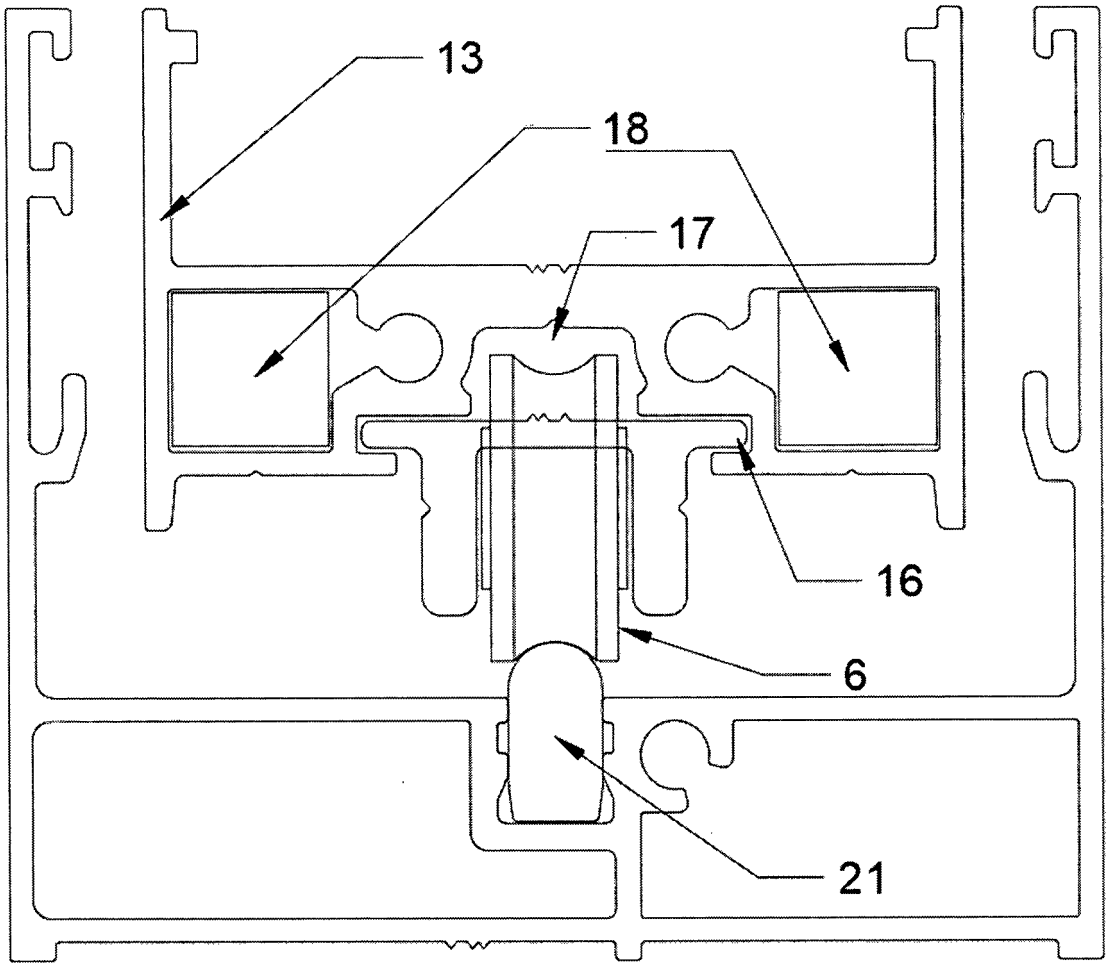








Drawing 10



Drawing 11

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EUROPEAN SEARCH REPORT

Application Number
EP 23 38 6106

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2012/042409 A1 (SAVIO SPA [IT]; BALBO DI VINADIO AIMONE [IT]) 5 April 2012 (2012-04-05) * page 3, line 9 - page 9, line 28; figures 1-12 *	1-8	INV. E05D15/06
A	WO 2014/121350 A1 (REYNAERS ALUMINIUM NV [BE]) 14 August 2014 (2014-08-14) * page 7, line 19 - page 11, line 28; figures 1-7 *	1-8	
A	EP 3 418 484 A1 (HYDRO EXTRUDED SOLUTIONS AS [NO]) 26 December 2018 (2018-12-26) * figure 5 *	1-8	
A	KR 1998 0057018 U (HANG SANG IND CO LTD [KR]) 15 October 1998 (1998-10-15) * figure 1 *	1-8	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	3 April 2024	Viethen, Lorenz

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- EP 4071328 A1 **[0005]**