(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 453 075 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.05.2012 Bulletin 2012/20

(51) Int Cl.:
E04F 13/08 *(2006.01)*

(21) Application number: **10191076.8**

(22) Date of filing: **12.11.2010**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(54) Single module detachable, sliding assembly, aluminium sub-construction system for cladding materials such as glass, ceramic, etc.

(57) The present invention is a sub-construction system wherein aluminum profiles with special geometric shapes are connected to the building by using anchorages (5); modules (15) are composed by assembling frame profiles (2) and cladding materials (7) such as ceramic, wood, aluminum, clay, glass, composite, etc.; modules are assembled to the tab (1.1) on main load-bearing profile (1) by being clamped by means of locking claw (6.2) with special geometric cross-section of fixing plastic (6) without using connection part such as screw, rivet, etc.; fixing sets are not slip by themselves; gaskets, which provide water, dust and air tightness, are assembled to the channels (assembling groove) (2.3) with special geometric shape in the frame profiles (2) of the modules; mechanical support profile (4), which carry dead loads of modules and axial movement due to the wind load, are used; water, dust, air tightness is provided by attaching vertical/horizontal gaskets to the channels with special geometric shape in the main load-bearing profiles after installation of modules (15) to the main load-bearing profile (1); if required, desired module (15) can be disassembled by using disassembly tool (10) with special geometric shape after completed installation of the façade.

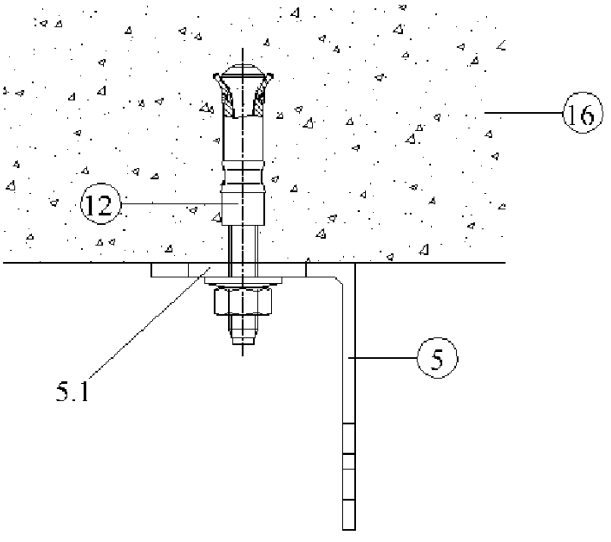


Figure 1

EP 2 453 075 A1

Description

[0001] The present invention relates to an aluminium sub-construction system which enables to install cladding materials such as ceramic, aluminum, wood, clay, glass, composite, etc. onto building and the related materials to be carried by building under loads such as gravity, wind, etc.

Background of the Invention

[0002] In the state of the art; for installation of cladding materials in form of plate such as clay, ceramic, stone, etc. to building, there are sub-construction systems wherein two-channel aluminum fixing profile is fixed to vertical main load bearing profiles by being screwed and cladding material or frame profile assembled with cladding material is located on upper channel of this profile, whereas upper section of the same cladding material or frame profile assembled with cladding material is fitted to lower channel of a second fixing profile in the same geometry, then second fixing profile is screwed to the main load bearing profile as well.

[0003] In another application in the state of the art; for installation process of cladding material such as clay, ceramic, stone, etc. to building, there are sub-construction systems wherein steel connection parts, on which there are 4 protrusions outwards locally, are fixed to main load bearing profiles by being screwed; cladding material is placed to lower grooves of these said connection parts and then a second steel connection part is fixed to the load bearing profile by being screwed such that it will clutch upper section of cladding material into channels therein. (e.g.: Eurofox MTC-v-100)

[0004] Disadvantages of both types of applications are that: the connection parts need to be fixed by being screwed both at the bottom and on the top; and the installed part cannot only be detached if required; water, dust, and air leakage behind the cladding material from gap between the cladding materials cannot be prevented; the cladding material must be resistant to stress and deformations that will occur under its own weight.

[0005] In another application in the state of the art; for installation of cladding material such as clay, ceramic, stone, etc. to building, there are sub-construction systems wherein horizontal load-bearing profiles are fixed to main load bearing profiles by being screwed; local aluminium profiles comprising connection springs on thereof are attached to the horizontal load-bearing profiles; and at first upper section with special geometric cross-section of cladding material is placed to lower channels of the local aluminium profile; and then lower section with special geometric cross-section of cladding material is fixed to the local aluminium profile by means of special elastic springs. (e.g.: US 2008/0010922)

[0006] Disadvantages of these types of applications are that: the connection parts need to be fixed by being screwed; lower and upper sections of the cladding material must be produced with special geometric cross-section; production in these geometries is not possible for some of material types such as ceramic, glass, composite, etc.; water, dust, and air leakage behind the cladding material from gap between the cladding materials cannot be prevented.

[0007] In another application in the state of the art; for installation of cladding material such as clay, ceramic, stone, etc. to building, horizontal load-bearing profiles are fixed to main load bearing profiles by being screwed or riveted continuously. Cladding material in form of plate and locally applied hooks are assembled using suitable anchorage and screwing method. Cladding material in form of plate on the horizontal load-bearing profile is moved towards the main load-bearing profile by means of local hooks then the hooks are used to fix the cladding material to the horizontal load-bearing profiles by moving it downwards. (e.g.: Eurofox MLVk-v-20)

[0008] Disadvantages of these types of applications are that: the cladding material requires suitable anchorage and screw connection; it needs horizontal load-bearing profiles in both lower line and upper line of plate in order that transport process is carried out over the hooks; the cladding material must be resistant to stress and deformations that will occur under its own weight; water, dust and air leakage behind the cladding material from the gaps between the cladding materials cannot be prevented.

[0009] In another application in the state of the art; for installation of cladding material such as clay, ceramic, stone, etc. to building, the cladding material in form of plate is adhered to main load bearing profile directly. (e.g.: Eurofox MTK-v-100)

[0010] In addition to the abovementioned disadvantages, disadvantages of these types of applications are that: the cladding material cannot be detached if required; difficulty of error correction in misapplications; increases of stress occur that may lead to fractures on the cladding material under movements of the building.

[0011] In another application in the state of the art; for installation of cladding material such as clay, ceramic, stone, etc. to building, local connection parts with two-channel are placed to vertical channels on main load bearing profile by being laid and then they are fixed to the main load bearing profile by being screwed or riveted. Cladding material in form of plate is placed to lower grooves of the said local connection parts and then a second connection part is attached to the channels in the load bearing profile such that it will clutch the upper section of the cladding material into the channels therein and it is fixed by being screwed when it is moved onto the cladding material. (e.g.: Faveton Ceram SAH) Disadvantages of these types of applications are that: the connection parts need to be fixed by being screwed both at the bottom and on the top; and the installed part cannot only be detached if required; water, dust and air leakage behind the cladding material from the gaps between the cladding materials cannot be prevented; the cladding ma-

terial must be resistant to stress and deformations that will occur under its own weight; the cladding material requires different geometric cross-sections in the upper and lower horizons thereof.

Objective of the Invention

[0012] The objective of the present invention is to enable cladding materials (7), which are produced from materials such as ceramic, wood, aluminum, clay, glass, composite, etc., to be installed to the load-bearing system of a building using main load-bearing aluminum profiles (1) with special geometric shape, anchorages (5) which enable connection of main load-bearing profiles to the load-bearing system of a building, frame profiles (2) which forms module by being assembled with cladding materials (7), mechanical support profiles (4) which carry dead loads of modules and prevent their axial movement, fixing profile (3) and fixing plastic (6) which enable assembling of modules (15) to the main load-bearing profiles (1) without using connection part such as screw, rivet, etc., gaskets (8,9) which provide water, dust, air tightness in horizontal and vertical joints; and to be carried by the building under loads such as gravity, wind, etc.

[0013] Another objective of the invention is to form modules (15) by assembling of cladding materials (7), which are produced from materials such as ceramic, wood, aluminum, clay, glass, composite, etc., with adhesives (11) of silicone, polyurethane, tape etc. chemically or with connection parts (13) such as screw, rivet, etc. mechanically.

[0014] Another objective of the invention is to enable the modules (15) to be carried by the main load-bearing profile (1) under loads such as wind, impact, etc. by assembling the modules (15), which are composed from assembly of the cladding materials (7) produced from materials such as ceramic, wood, aluminum, clay, glass, composite, etc., with frame profiles (2), to the main load-bearing profile (1) using fixing profiles (3) and fixing plastics (6) without using connection part (13) such as screw, rivet, etc.

[0015] Another objective of the invention is to adjust the position of the fixing set easily after assembling of the fixing set by sliding to the modules (15), in which cladding material (7) made from materials such as ceramic, wood, aluminum, clay, glass, composite, etc. and frame profiles (2) are assembled.

[0016] Another objective of the invention is to provide that the mechanical support profiles (4) with special geometric shapes will prevent the axial movement and carry dead loads of the modules (15), in which cladding material (7) made from materials such as ceramic, wood, aluminum, clay, glass, composite, etc. and frame profiles (2) are assembled.

[0017] Another objective of the invention is to use gaskets (9) which provide water, dust, air tightness in horizontal joints of the modules (15) assembled to the main load-bearing profiles (1).

[0018] Another objective of the invention is to be able to detach and then attach the desired module (15) by using disassembly tool (10) with special geometric shape, if required, after installation of the modules (15) to the main load-bearing profile (1) by using fixing profiles (3) and fixing plastics (6).

Figures Illustrating the Invention

[0019] The present invention should be evaluated in conjunction with the figures which are described below, in order that it's configuration and advantages with the additional members are understood best.

Figure 1 is the sectional view of Building Load-Bearing System - Anchorage

Figure 2 is the sectional view of Main Load-Bearing Profile - Anchorage

Figure 3 is the sectional and isometric view of Fixing profile - Fixing Plastic

Figure 4 is the sectional view of Frame Profile - Cladding Material

Figure 5 is the isometric view of Frame Profile - Cladding Material

Figure 6 is the sectional view of Module - Horizontal Joint Gasket

Figure 7 is the isometric view of Module - Horizontal Joint Gasket

Figure 8 is the sectional and isometric view of Module - Fixing set before Installation

Figure 9 is the sectional and isometric view of Module - Fixing set after Installation

Figure 10 is the sectional view of Main Load-Bearing Profile - Mechanical support profile before Installation

Figure 11 is the isometric view of Main Load-Bearing Profile - Mechanical support profile before Installation

Figure 12 is the isometric view of Main Load-Bearing Profile - Mechanical support profile after Installation

Figure 13 is the sectional view of Main Load-Bearing Profile - Module before Installation

Figure 14 is the isometric view of Main Load-Bearing Profile - Module before Installation

Figure 15 is the sectional view of Main Load-Bearing Profile - Module after Installation

Figure 16 is the isometric view of Main Load-Bearing Profile - Module after Installation

Figure 17 is the sectional view of Main Load-Bearing Profile - Vertical Joint Gasket before Installation

Figure 18 is the sectional view of Main Load-Bearing Profile - Vertical Joint Gasket after Installation

Figure 19 is the sectional view of Main Load-Bearing Profile - Disassembly Tool before Installation

Figure 20 is the isometric view of Main Load-Bearing Profile - Disassembly Tool before Installation

Figure 21 is the sectional view of Main Load-Bearing Profile - Disassembly Tool after Installation

Figure 22 is the isometric view of Main Load-Bearing Profile - Disassembly Tool after Installation

Part numbers

[0020]

1. Main Load-Bearing Profile
1.1 Tab
1.2 Groove for Gasket
1.3 Groove
2. Frame Profile
2.1 Knurled Surface
2.2 Protrusion
2.3 Assembling groove
2.4 Channel
3. Fixing Profile
3.1 Groove
4. Mechanical support profile
4.1 Fin
4.2 Groove for Screw
5. Anchorage
5.1 Horizontal Sliding Slot
6. Fixing Plastic
6.1 Knurl
6.2 Locking claw
6.3 Stopping arm
7. Cladding Material (Ceramic, wood, aluminum, clay, glass, composite, etc.)
8. Vertical Joint Gasket
9. Horizontal Joint Gasket
10. Disassembly Tool
10.1 Cylindrical Protrusion
10.2 Eccentric Protrusion
11. Adhesive (Silicon, tape, polyurethane, etc.)
12. Anchor (Chemical or Mechanical)
13. Connection Part (Screw, rivet, etc.)
14. Fixing Set
15. Module
16. Building Load-Bearing System

Detailed Description of the Invention

[0021] In this detailed description; sub-construction system which enables cladding materials produced from materials such as ceramic, wood, aluminum, clay, glass, composite, etc. to be installed to building load-bearing system and carried by building under loads such as gravity, wind, etc., in general the preferred embodiments of the system, are described only for better understanding of the subject and in such a manner that it won't produce any limiting effect.

[0022] The inventive sub-construction system which enables cladding materials (7) produced from materials such as ceramic, wood, aluminum, clay, glass, composite, etc. to be installed to building load-bearing system (16) and to be carried by building under loads such as gravity, wind, etc. generally consists of: main aluminum load-bearing profiles (1) with special geometric shape which are produced in extrusion presses in accordance with groove of the accessory and installation; anchorages (5) which enable to install the main load-bearing profiles to the load-bearing system of building ; frame profiles (2) which forms modules (15) by being assembled with cladding materials (7), Mechanical support profiles (4) which carry dead loads of modules and axial loads due to the wind loads; fixing profile (3) and fixing plastics (6) with special geometric shape, which are assembled to the main load-bearing profiles (1) without using connection parts such as screw, rivet, etc.; fixing profile (3) and fixing plastics (6) which enable the modules (15) to be carried by main load bearing profiles (1) under loads such as wind, impact, etc.; and gaskets (9, 8) which provide water, dust and air tightness in horizontal and vertical joints.

[0023] The main load-bearing profiles are fixed to the building load-bearing system (16) using anchorages (5) at certain intervals. Number of anchorages (5) to be used is determined depending on the building load-bearing system (16), height of the main load-bearing profile (1), weight of the modules (15) and building height. Anchorages (5) are installed to the building load-bearing system (16) by using chemical or mechanical anchors (12).

[0024] The anchorages (5) can be moved axially by means of its horizontal sliding slots (5.1), without changing the position of the assembly hole, if required, after installation of the anchorages to the building load-bearing system (16).

[0025] After completing the installation of the anchorages (5) to the building load-bearing system (16), the main load-bearing profiles (1) are installed to the anchorages (5) by using connection part (13) such as bolt, rivet, etc.

[0026] After adhesives (11) of silicone, tape etc. type are applied to the knurled surface (2.1) with special geometric shape on the frame profiles (2); frame profile and

inner surface of cladding materials (7), which are produced from materials such as ceramic, wood, aluminum, clay, glass, composite, etc., are assembled. Cladding materials (7) are adhered to the frame profiles by being guided and dead loads of the cladding materials are carried by means of protrusion (2.2) with special geometric shape on the frame profiles (2).

[0027] After the modules (15) are formed, gaskets (9) which provide water, dust, air tightness are assembled to channels (assembling groove) (2.3) with special geometric shapes in the frame profiles (2).

[0028] Mechanical support profiles (4), which carry dead loads of the modules, are fixed to the main load-bearing profiles (1) by using two fixing screws. The modules between the two main load-bearing profiles are placed on fins (4.1) with special geometric shape of the mechanical support profile. The fins (4.1) with special geometric shape of the mechanical support profile (4) enable the dead loads of the modules to be carried by the main load-bearing profile (1). By means of the groove for screw (4.2) with special geometric shape owned by the mechanical support profile (4), it is provided to place the modules by being guided and the axial displacements to be prevented. During fixing of the mechanical support profiles (4), 10 mm joint space which will be formed between the modules (15) is adjusted. This joint space allows extensions that will occur in the modules (15) because of thermal expansions.

[0029] Fixing Plastics (6) are assembled to the inner groove with special geometric shape (3.1) of the fixing profiles (3) without using connection part (13) such as screw, rivet, etc. The Fixing Plastics (6) are placed to the fixing profile (3) groove by being pushed. Knurls (6.1) in the Fixing Plastic (6) are placed to the groove (3.1) with special geometric shape in the fixing profile (3) with the effect of pushing force. The fixing set (14) formed by the fixing profile (3) and the Fixing Plastic (6) is driven to the channels (2.4) with special geometric shapes in the frame profiles (2) which are used to form the modules (15). The position of the fixing set in the frame profiles (14) is adjusted by means of stopping arm (6.3) of fixing plastic (6). Fixing sets (14) are released for each module by sliding in channel of the horizontal frame profiles (2.4) at 5-20 cm left or right distance from mechanical support profile (4). Fixing sets (14) are positioned in any point by means of stopping arm (6.3) of the fixing plastic (6) where it is released and it will not move by itself. Bottom of the modules are located onto the mechanical support profile (4) then the modules are fixed to the main load-bearing profiles (1) by means of the fixing set (14). Fixing process is carried out by sliding the fixing set (14) in the module and by clamping the locking claw of the fixing plastic to the main load-bearing profile (1), without using connection part such as screw, rivet, etc. After assembly of the modules (15) is completed, vertical gasket (8) is installed to groove (1.2) with special geometric shape in the main load-bearing profile (1) in order to close vertical joints occurring between the modules (15) and provide water, dust, air tightness.

[0030] After installation, any module can be disassembled in a very short period of time by using disassembly tool (10) with special geometric shape, when requested. For disassembly process, vertical gaskets (8) in the joints of the main load-bearing profile (1) are detached. End of the disassembly tool (10) is placed to the groove (1.2) with special geometric shape whereto the vertical gaskets (8) on the main load-bearing profile (1) are attached. Protrusion (10.2) with a special geometric shape in the end of the disassembly tool (10), will force axially the fixing profile (3) and fixing plastic (6) when disassembly tool is rotated after positioning the disassembly tool in the axe of the fixing profile (3) and fixing plastic (6), which assemble the modules (15) to the main load bearing profiles (1). With the effect of this force, locking claw of the fixing profile (3) and the Fixing Plastic (6) is enabled to be detached by getting free from the tab (1.1) of the main load-bearing profile (1). This process is applied to all fixing sets that assemble the module (15) to the main load-bearing profile (1). After disassembling of all fixing sets (14) that assemble the module to the main load-bearing profile (1), the disassembling of the modules have been completed and it can be taken out.

Claims

1. The present invention is a sub-construction system which enables cladding materials (7) such as ceramic, aluminum, wood, clay, glass, composite, etc. to be installed onto building; the related cladding materials to be carried on the building under loads such as gravity, wind, earthquake, etc.; consists of mechanical support (4) carrying the modules against gravity load, with special geometric cross-section, frame profiles (2) assembled with cladding materials in order to form module, and connection parts and plastics assembling the modules to the main load-bearing profiles by sliding over/through these frame profiles without using connection part such as screw, rivet, etc.

2. Sub-construction system according to Claim 1, **characterized in that** fixing set (14) is placed to the special geometric shaped channels (2.4) on frame profiles (2) whereto cladding materials (7) such as ceramic, aluminum, wood, clay, glass, composite, etc. are assembled chemically or mechanically.

3. Sub-construction system according to Claim 1, **characterized in that** fixing set (14) is placed to frame profiles (2) whereto cladding materials (7) such as ceramic, aluminum, wood, clay, glass, composite, etc. are assembled chemically or mechanically; and the fixing set (14) is prevented from sliding itself by means of stopping arm (6.3) of fixing plastic (6) after stopping the sliding movement.

4. Sub-construction system according to Claim 1, **characterized in that** the frame profiles (2), which assembled with cladding materials (7) such as ceramic, aluminum, wood, clay, glass, composite, etc. mechanically or chemically, comprise the assembling groove (2.3) for gasket (9) which prevent water, air and dust leakage.

5. Sub-construction system according to Claim 1, **characterized in that** frame profiles (2) and cladding materials (7), such as ceramic, aluminum, wood, clay, glass, composite, etc., are assembled together mechanically or chemically by guiding with protrusion (2.2) with a special geometric shape of the frame profile (2).

6. Sub-construction system according to Claim 1, **characterized in that** fixing profile (3) and fixing plastic (6) are assembled by pushing them toward each other by means of knurl (6.1, 3.1) with a special geometric shape on the fixing profile (3) and fixing plastic (6), without using fixing part such as screw, rivet, etc.

7. Sub-construction system according to Claim 1, **characterized in that** it comprises fixing profile (3) and fixing plastic (6) with special geometric shape which enable cladding materials (7) such as ceramic, aluminum, wood, clay, glass, composite, etc. on thereof to be installed to main load-bearing profiles (1) together with frame profiles (2) by being slid on or inside the frame profiles, without using connection part such as screw, rivet, etc.

8. Sub-construction system according to Claim 1, **characterized in that** fixing plastic (6) is clamped to tab (1.1) on the main load-bearing profile (1) by means of locking claw (6.2) with special geometric cross-section of fixing plastic (6).

9. Sub-construction system according to Claim 1, **characterized in that** movements perpendicular to the laying direction of fixing set (14), which is installed to the frame profiles (2) assembled with cladding materials (7) such as ceramic, aluminum, wood, clay, glass, composite, etc., are blocked by means of the said channel of frame profile (2.4).

10. Sub-construction system according to Claim 1, **characterized in that** it comprises the mechanical support profile (4), which have a fins with a special geometric shape in order to carry the dead load of the modules installed to the main load bearing profile (1), and which have the special groove for screwing in order to prevent the movement of the modules and/or itself by guiding the screw on site, and also prevent the axial movement of the module depending on the wind load.

11. Sub-construction system according to Claim 1, **characterized in that** it comprises a groove (1.2) with special geometric shape, which enables to make a strength assembly by reducing the friction forces during the fixation of the screw on the assembling of the main load-bearing profile (1) and mechanical support profile (4).

12. Sub-construction system according to Claim 1, **characterized in that** it comprises groove for gasket (1.2) with special geometric shape, which enables to assemble the gasket (8) for dust, water and air tightness on the vertical joint, after completing the installation of the modules (15) to the main load bearing profiles (1).

13. Sub-construction system according to Claim 1, **characterized in that** any modules (15) installed to the main load bearing profiles (1) can be disassembled by using disassembly tool (10) with a special geometric shape, in where the fixing set clamping the modules to main load bearing profiles are disassembled.

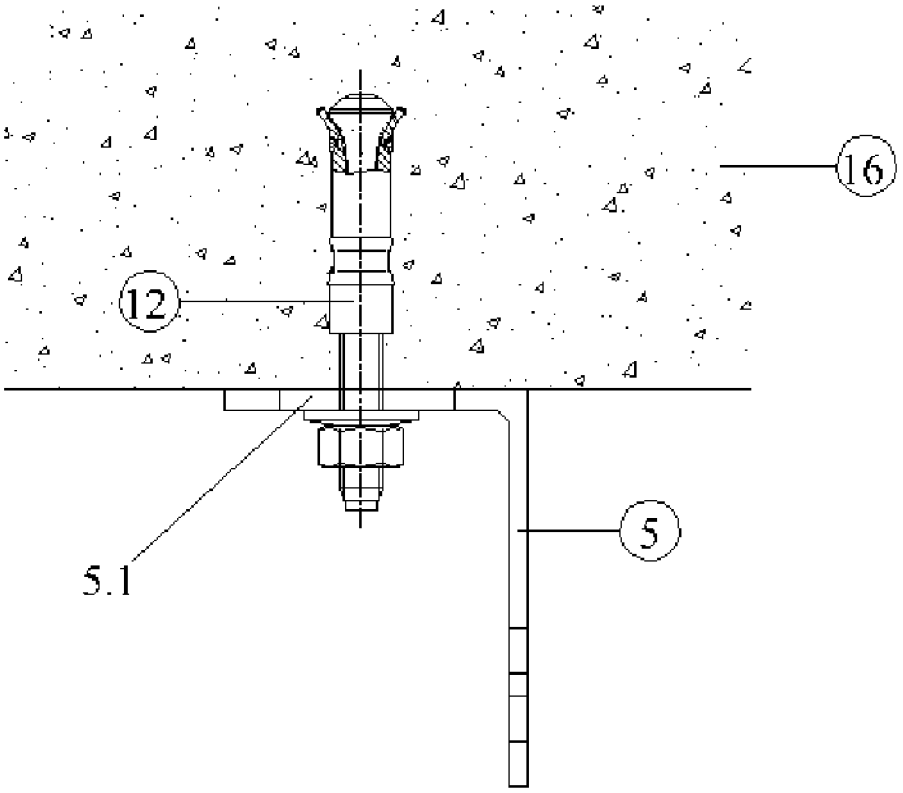


Figure 1

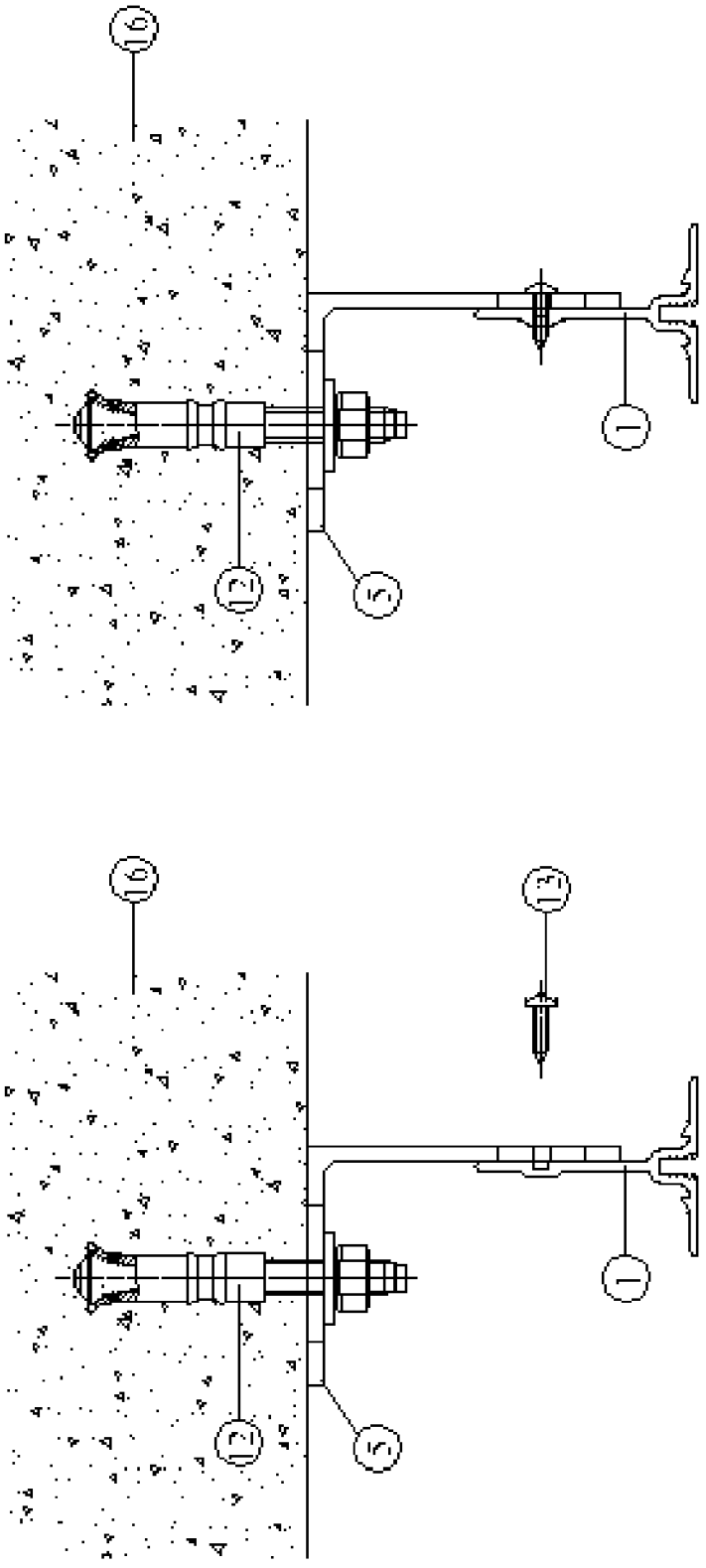


Figure 2

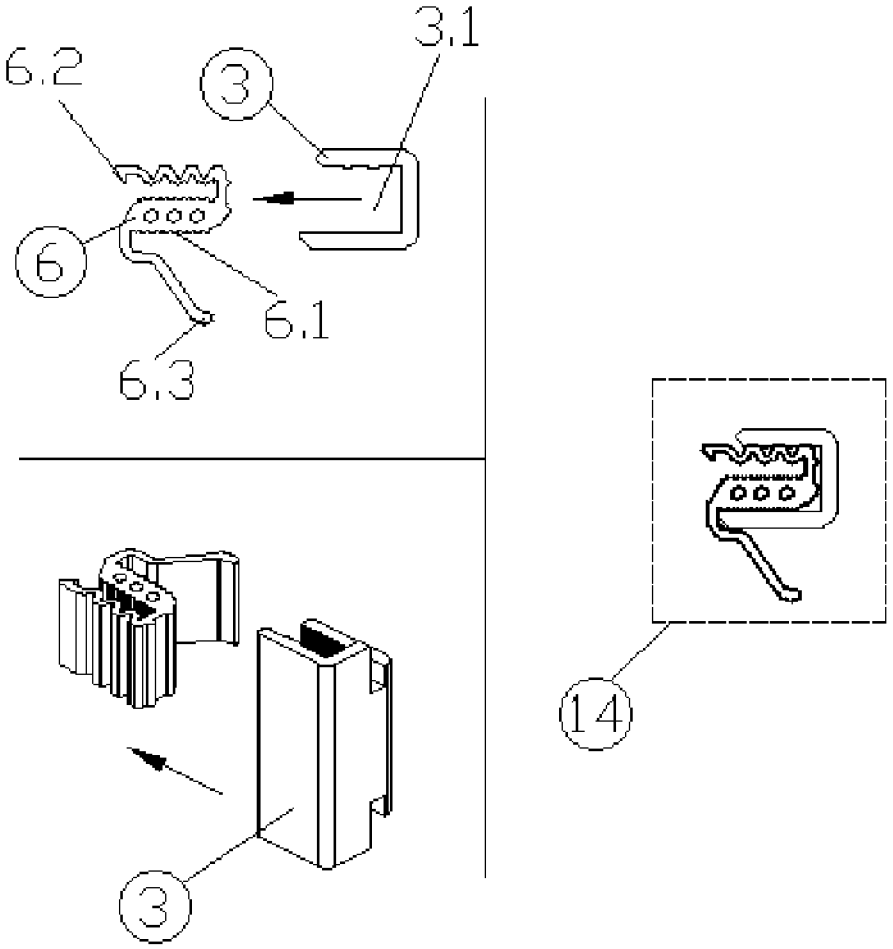


Figure 3

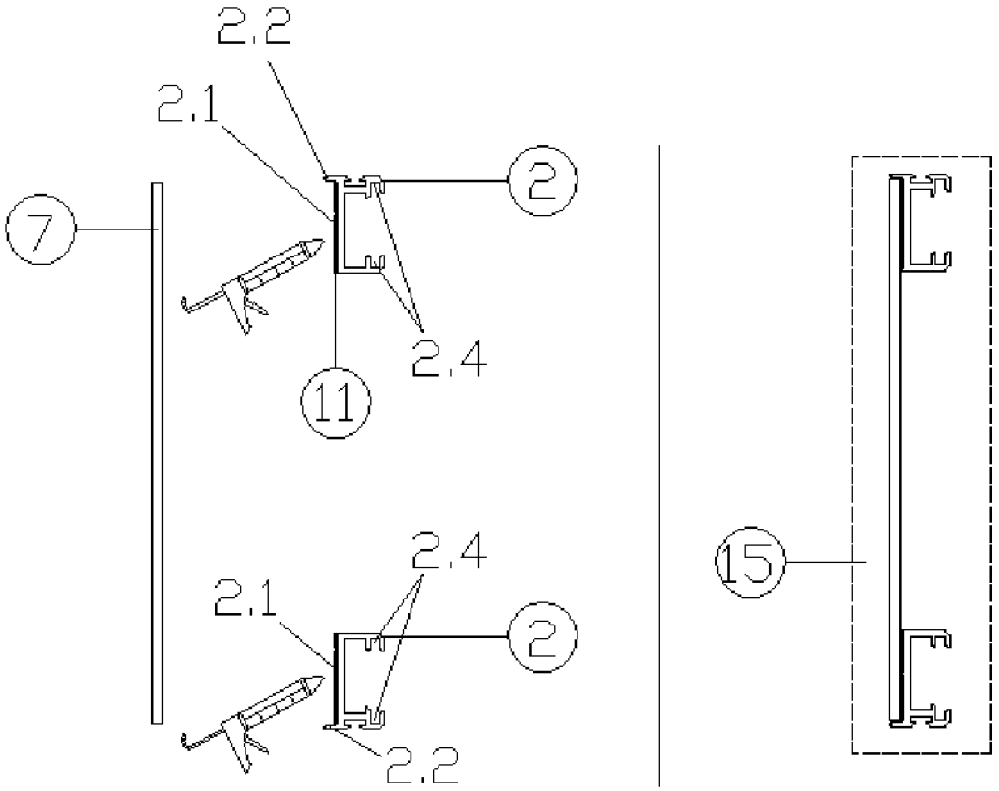


Figure 4

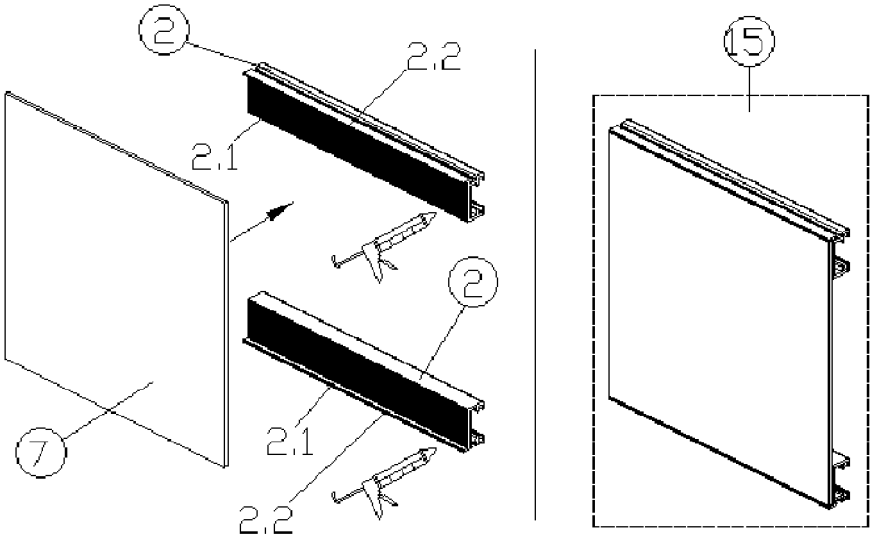
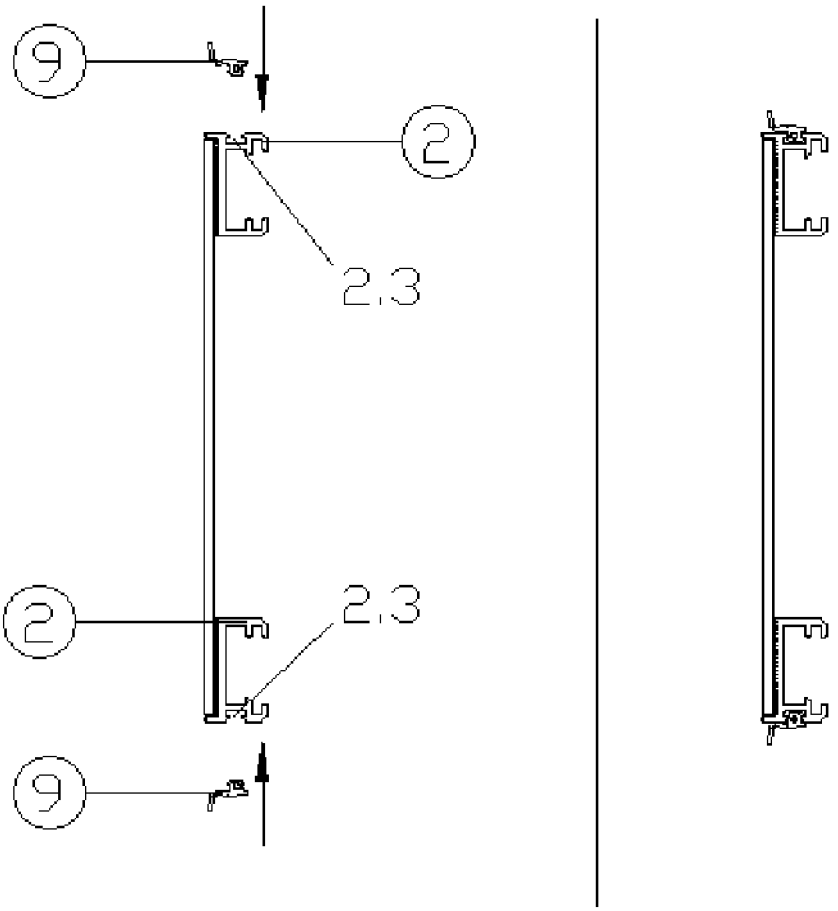


Figure 5



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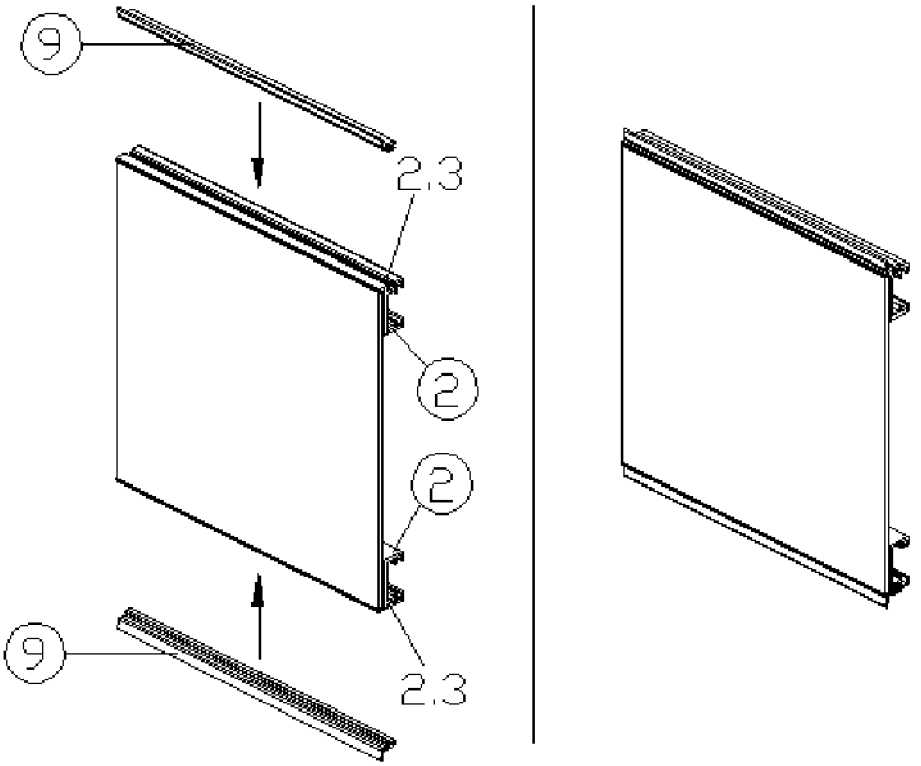

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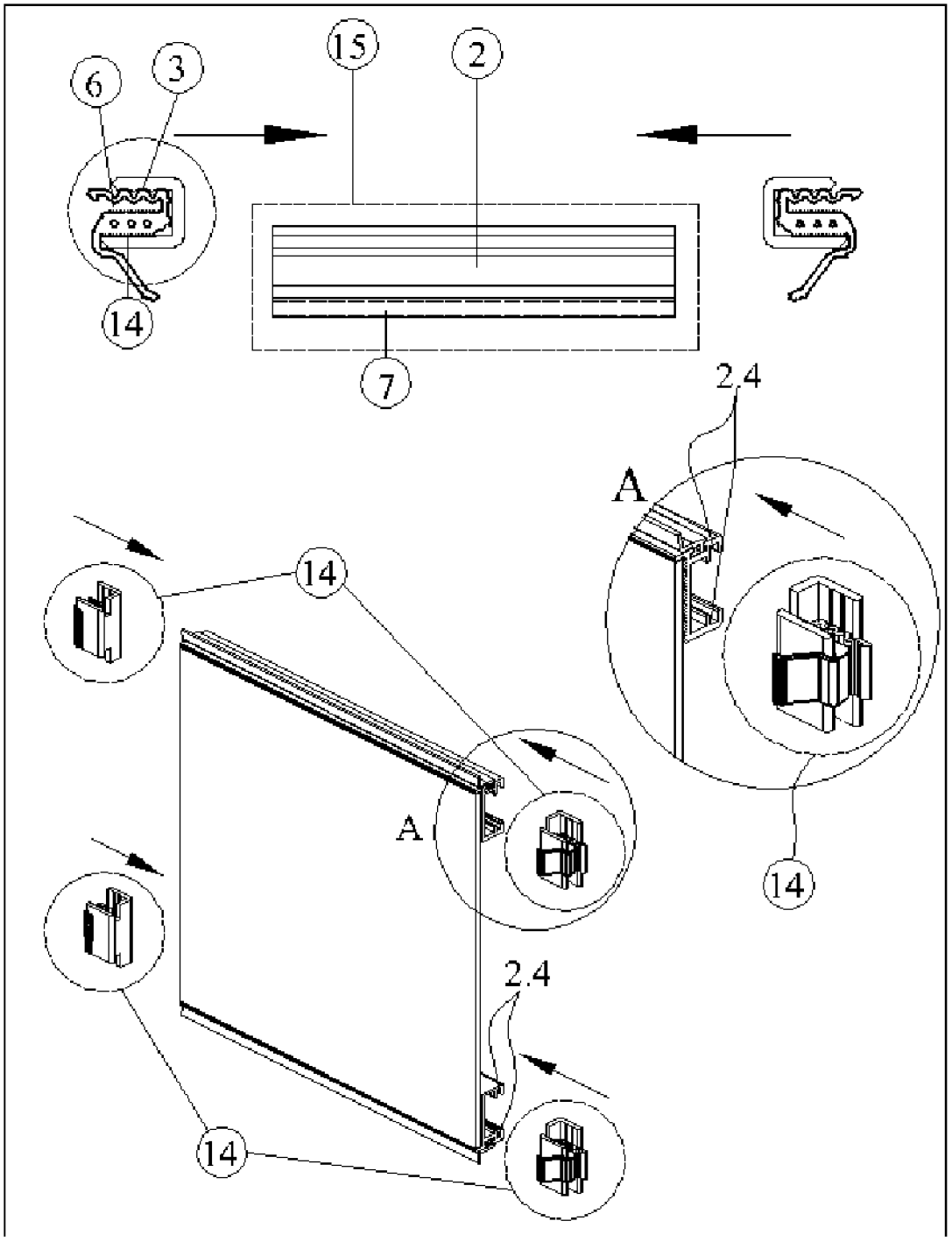


Figure 8

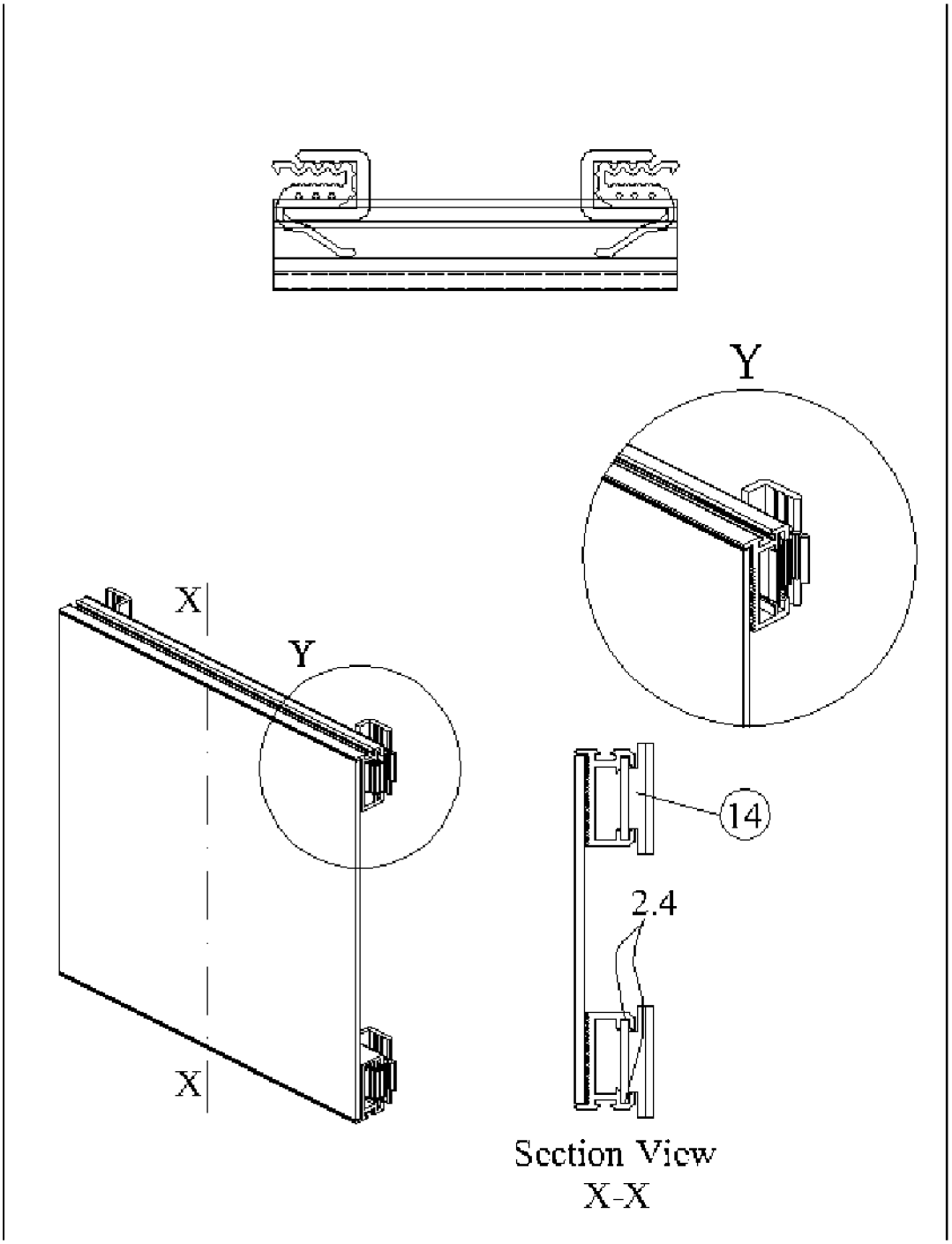


Figure 9

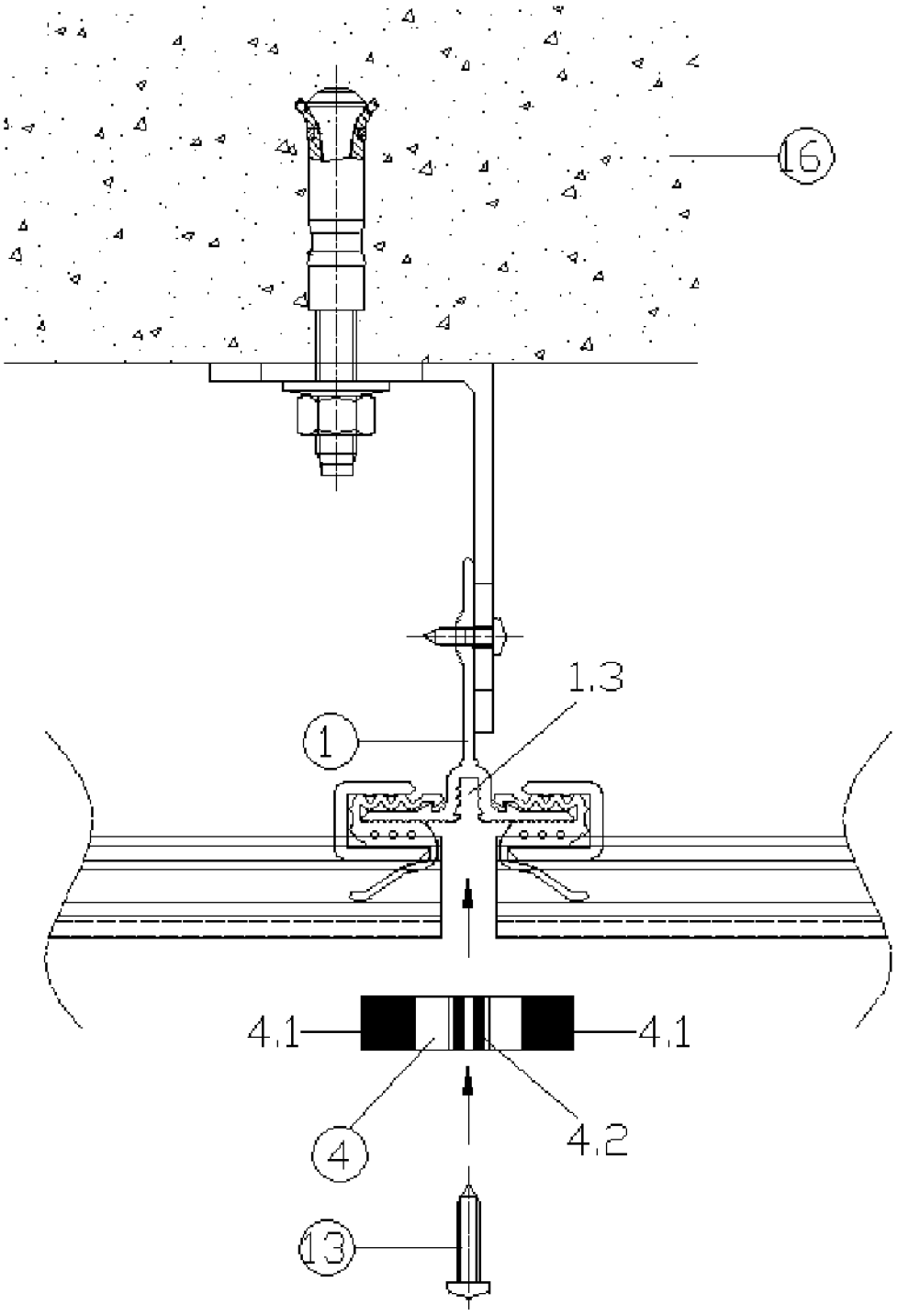


Figure 10

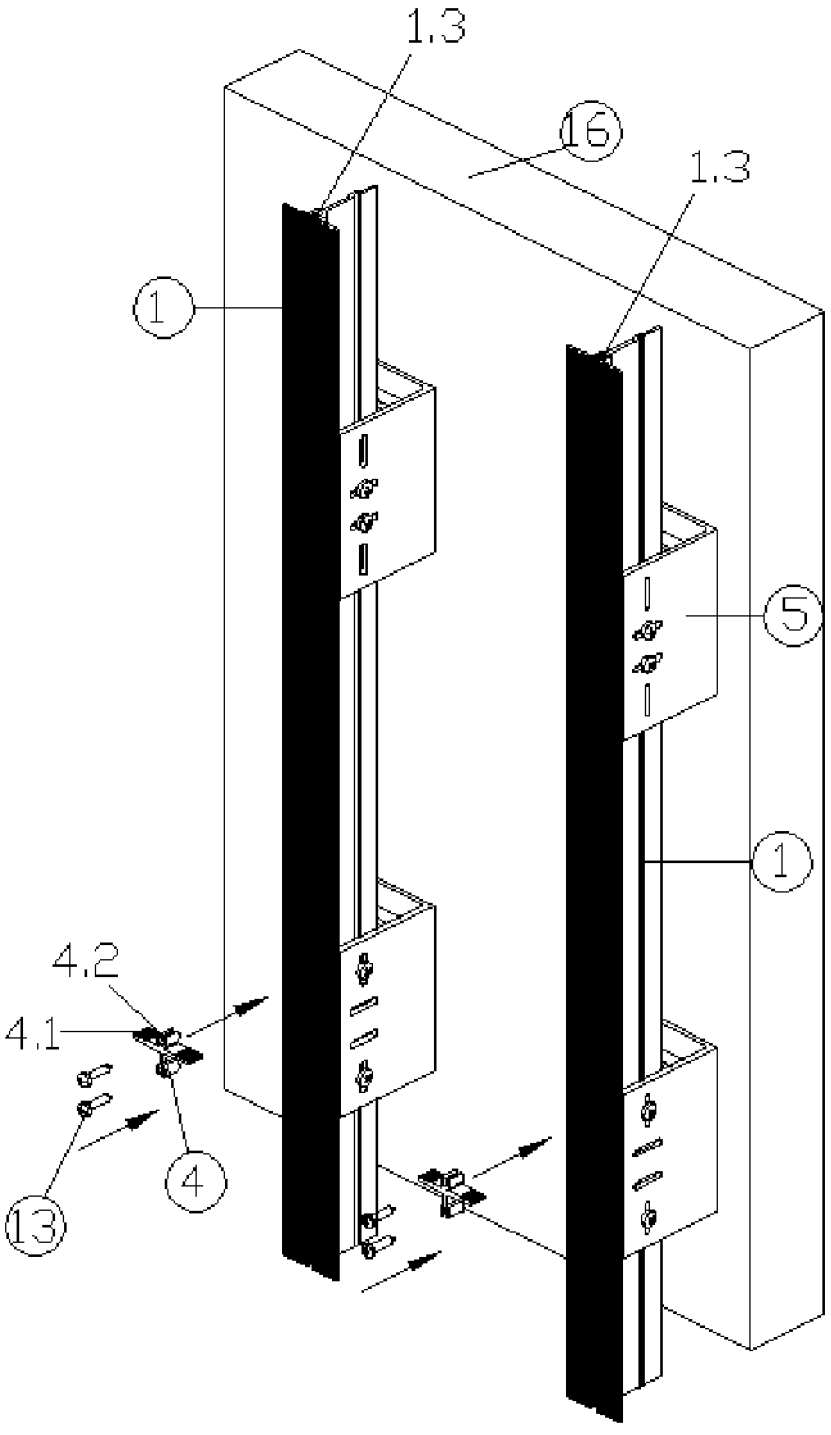


Figure 11

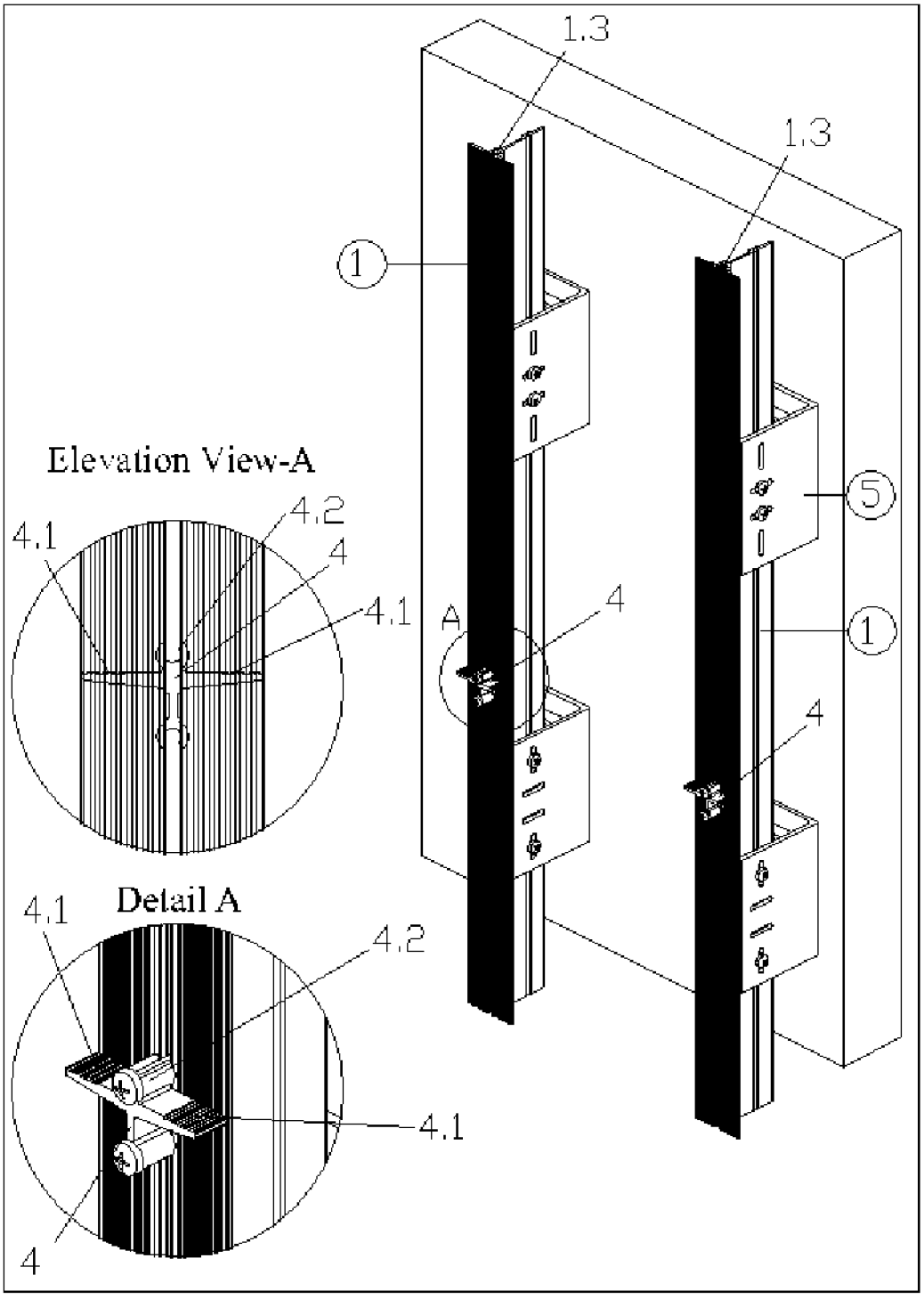


Figure 12

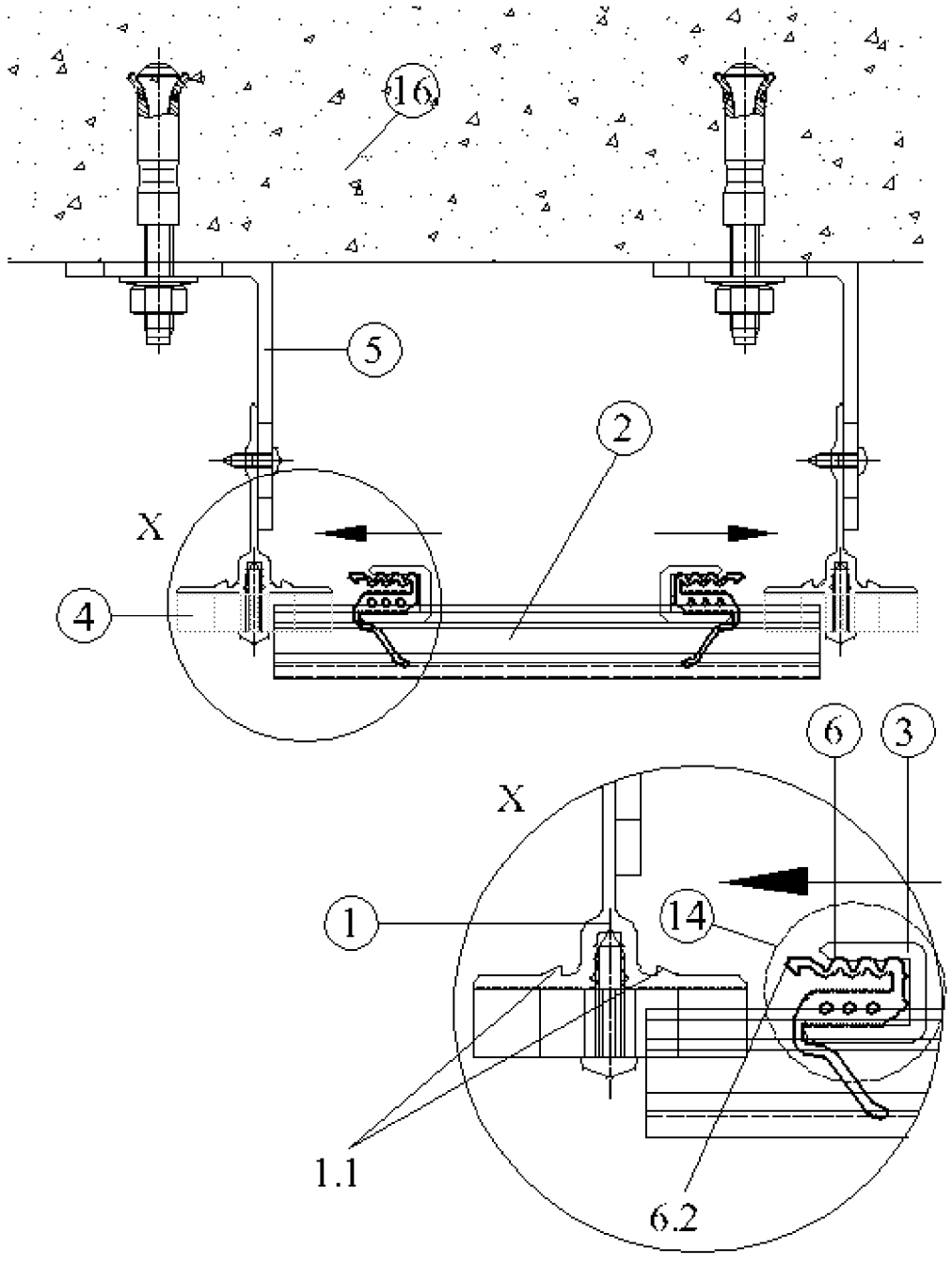


Figure 13

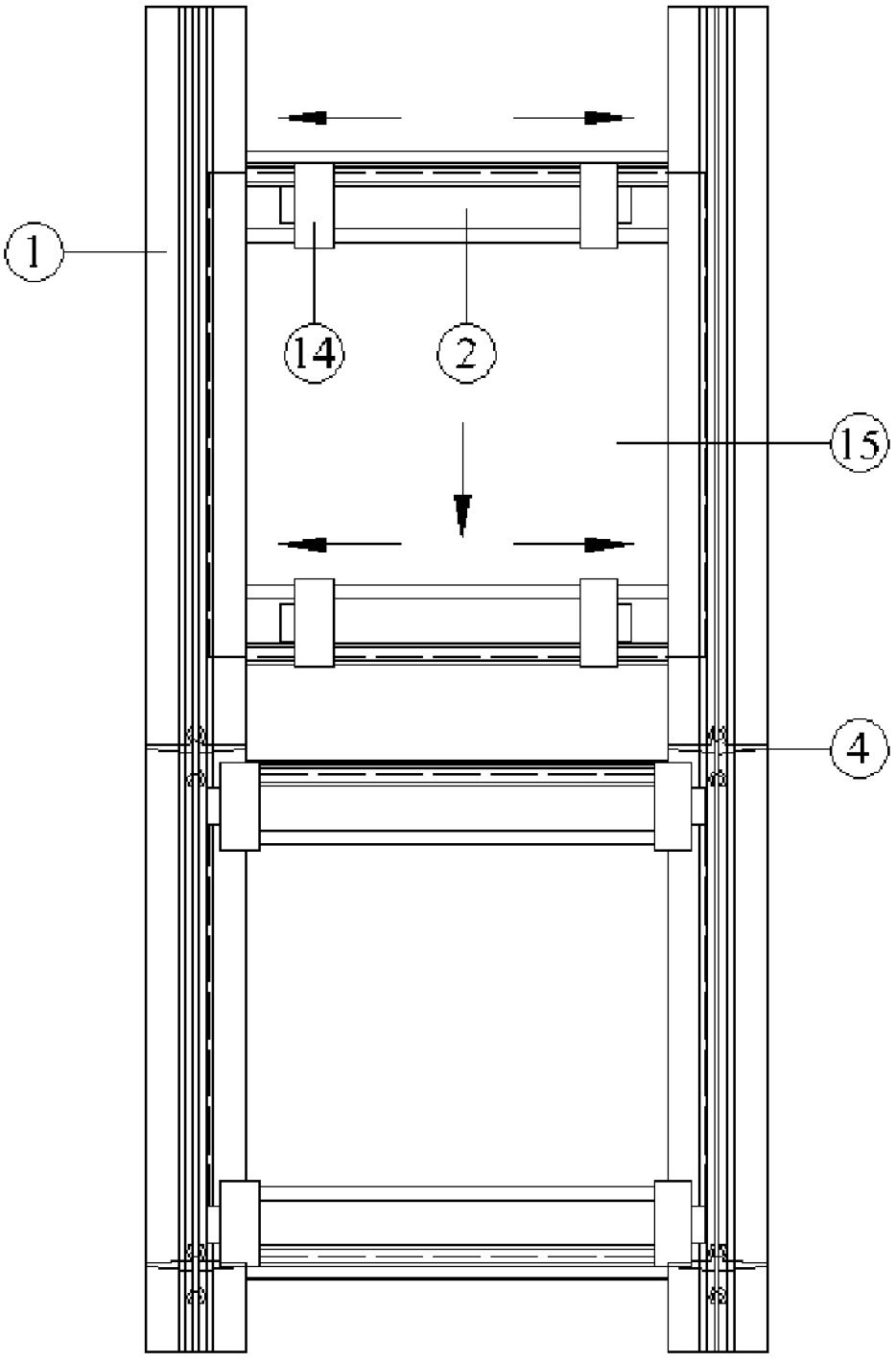
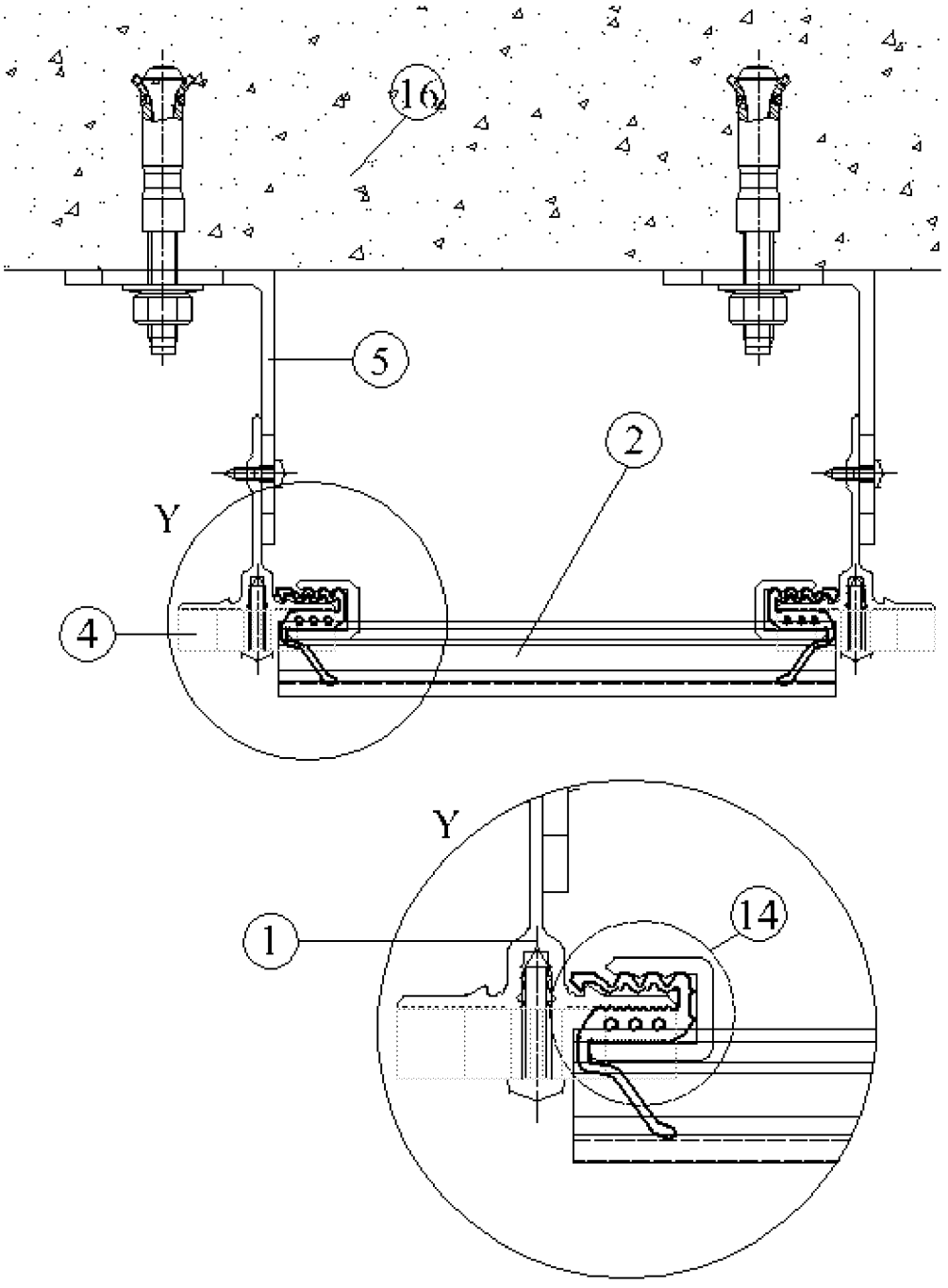


Figure 14



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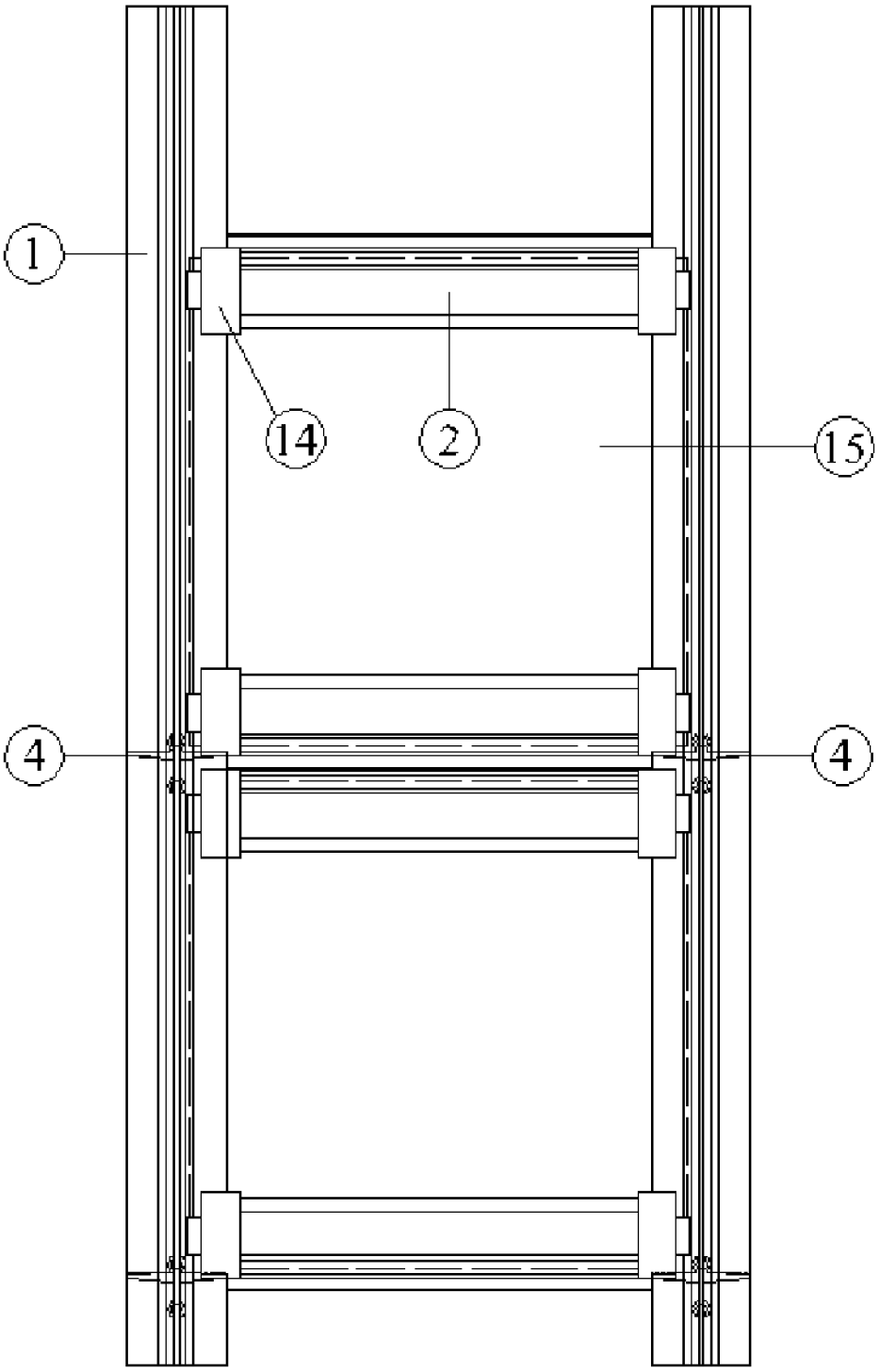

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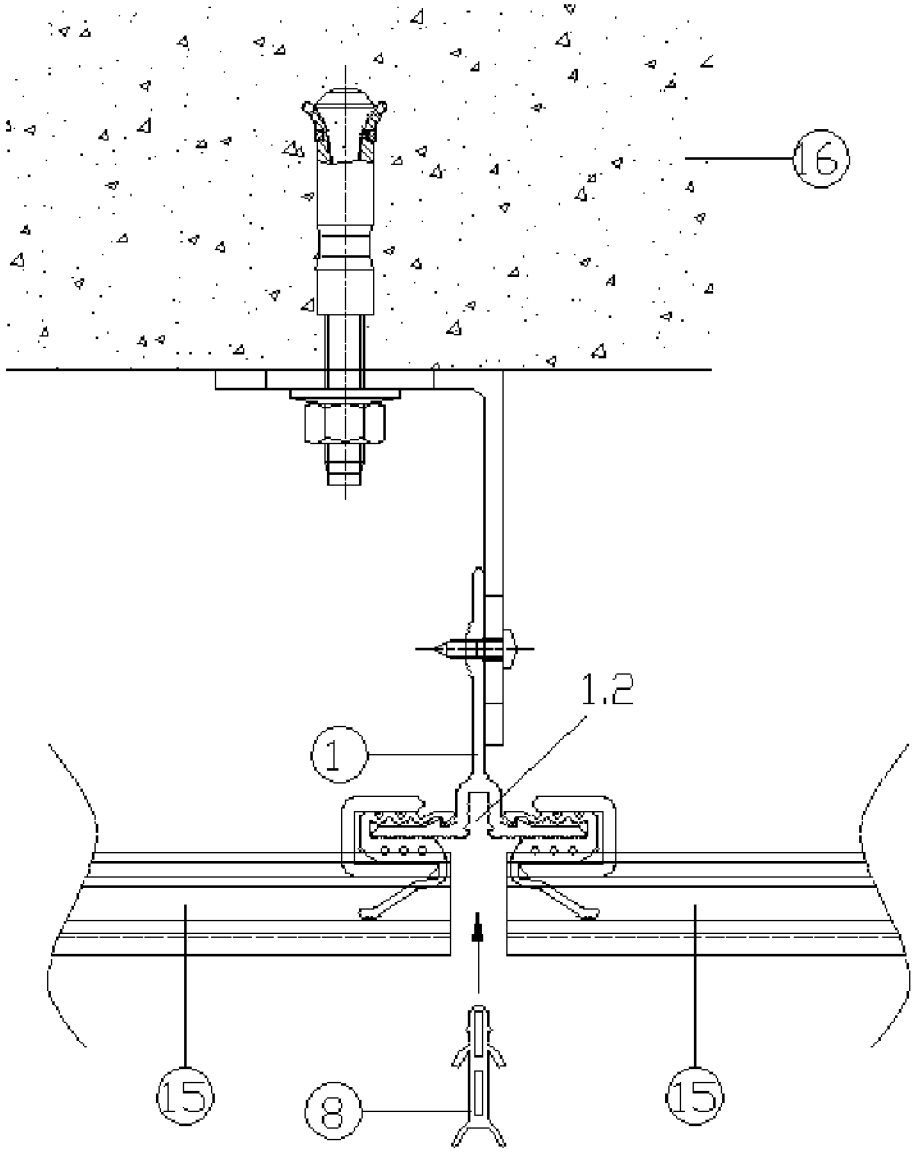
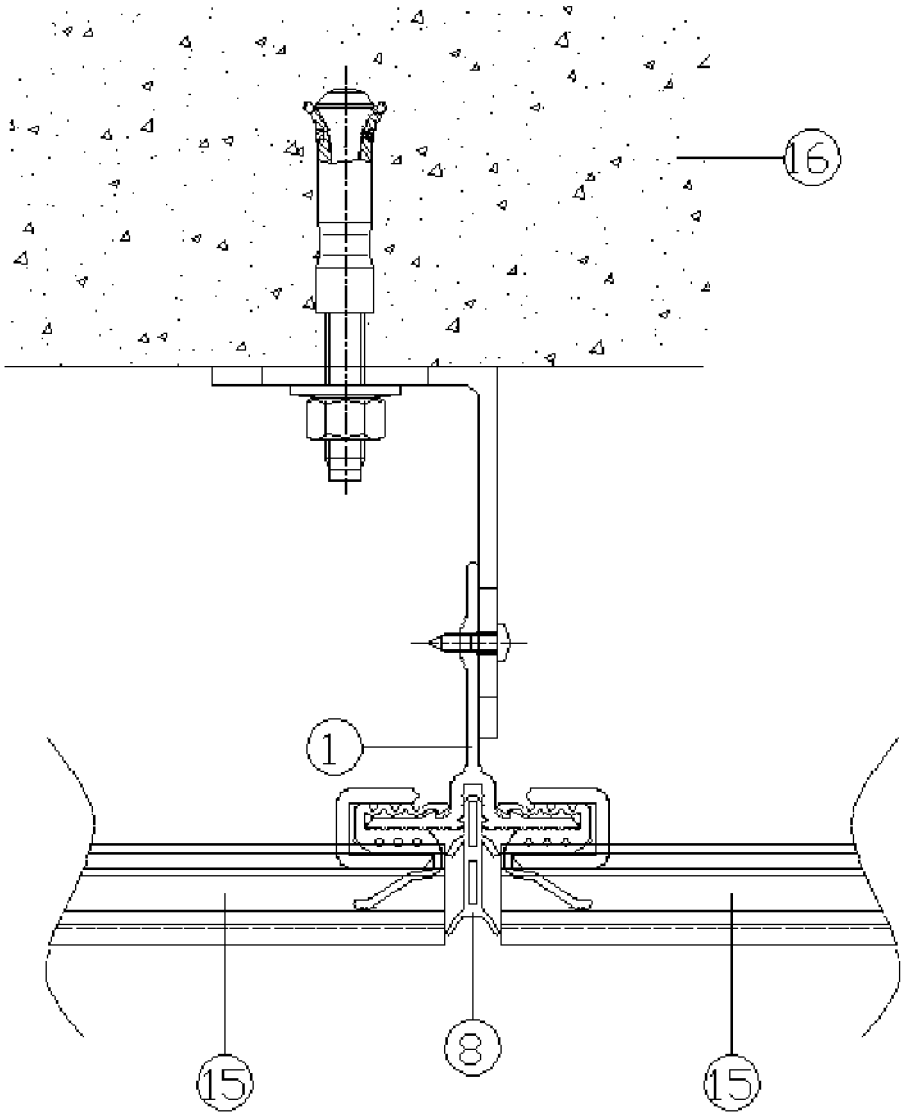


Figure 17



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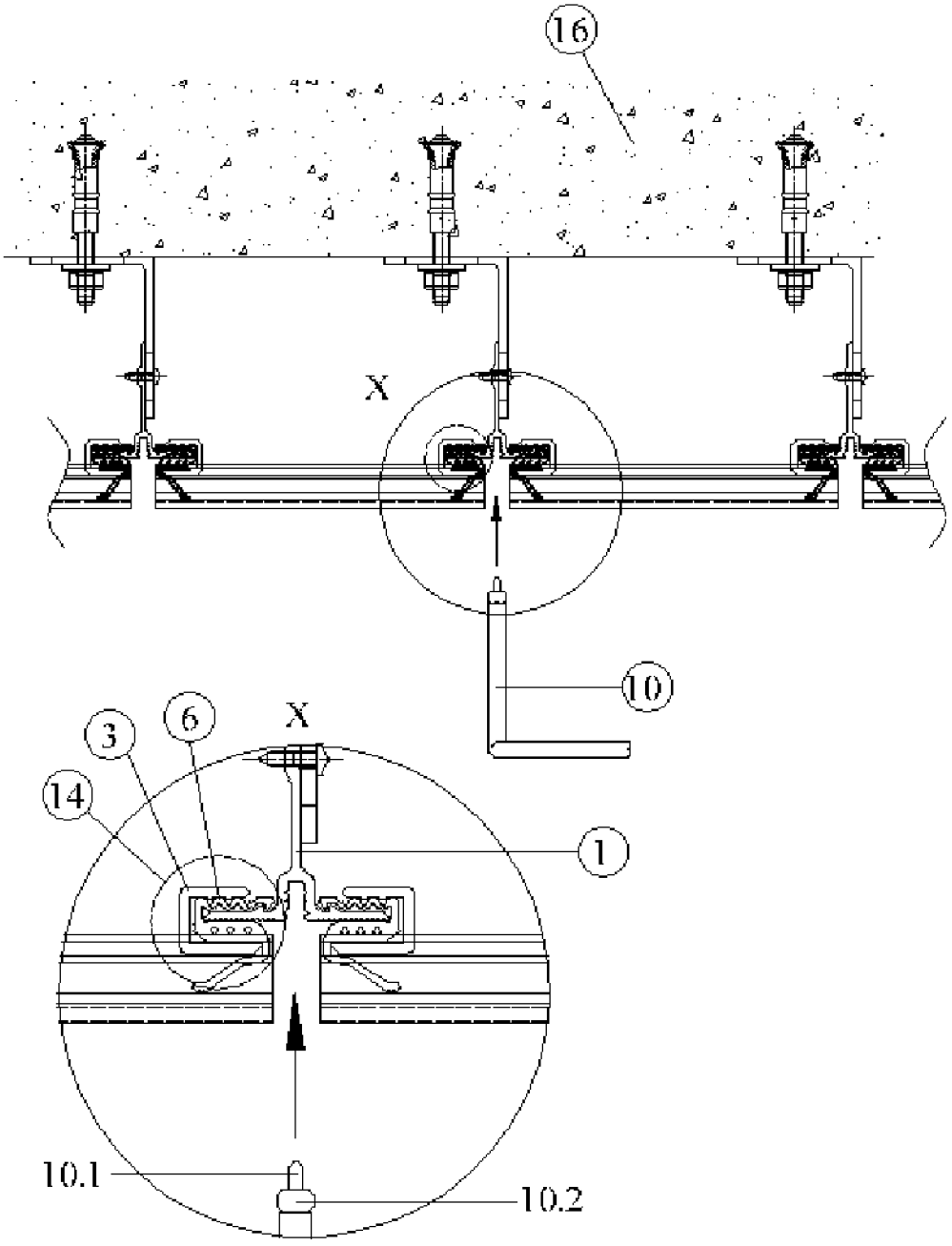

Figure 19

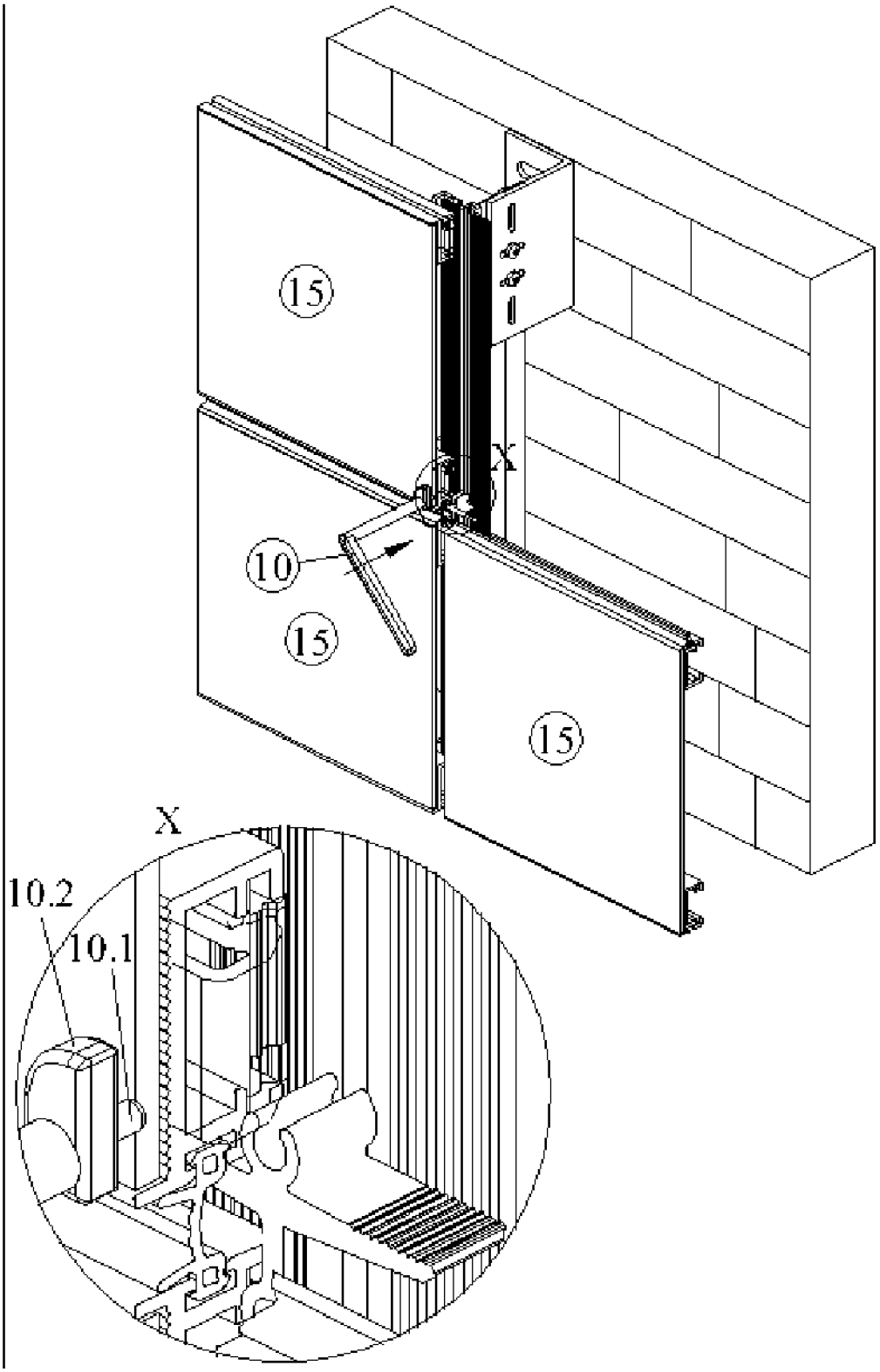

Figure 20

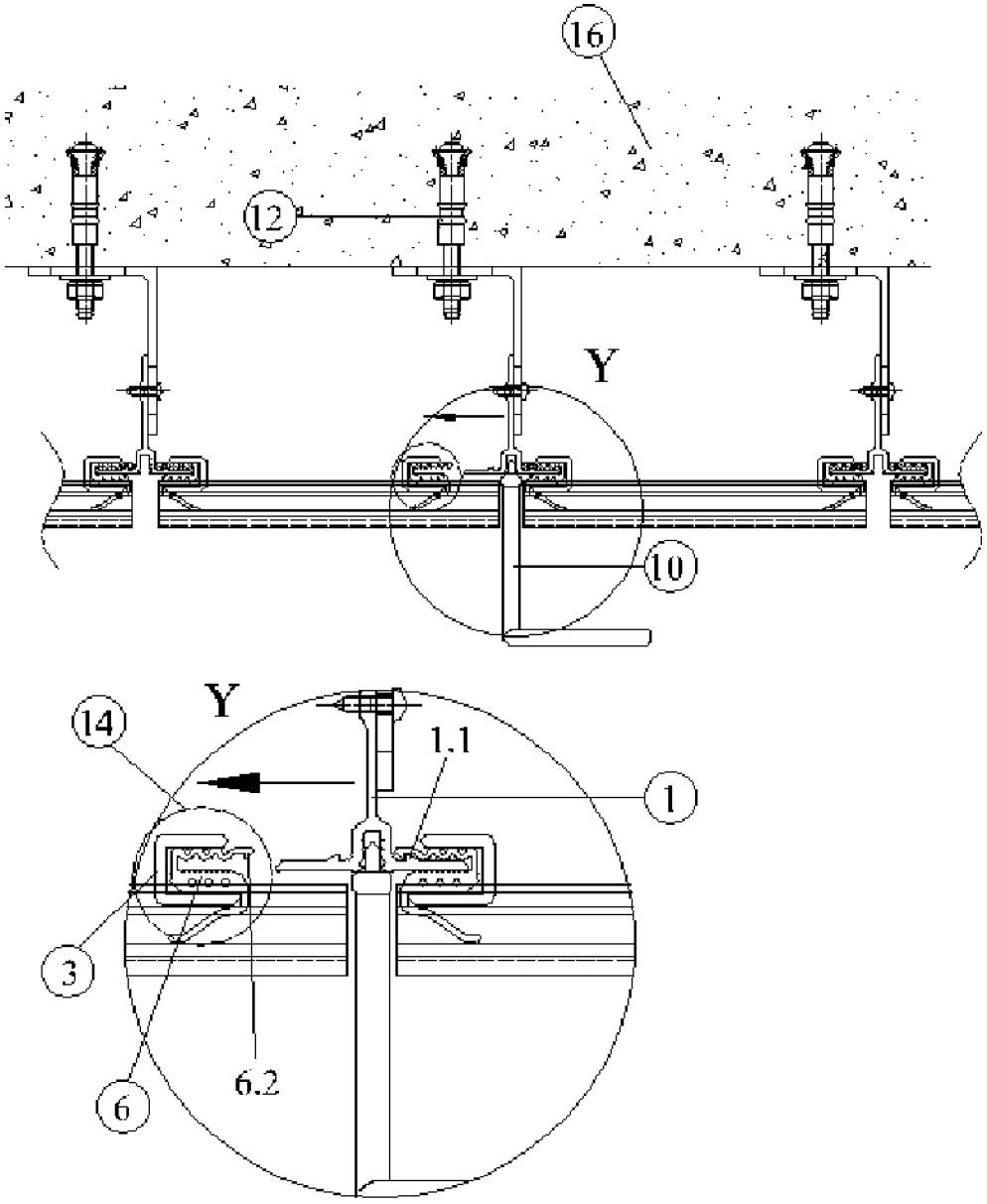

Figure 21

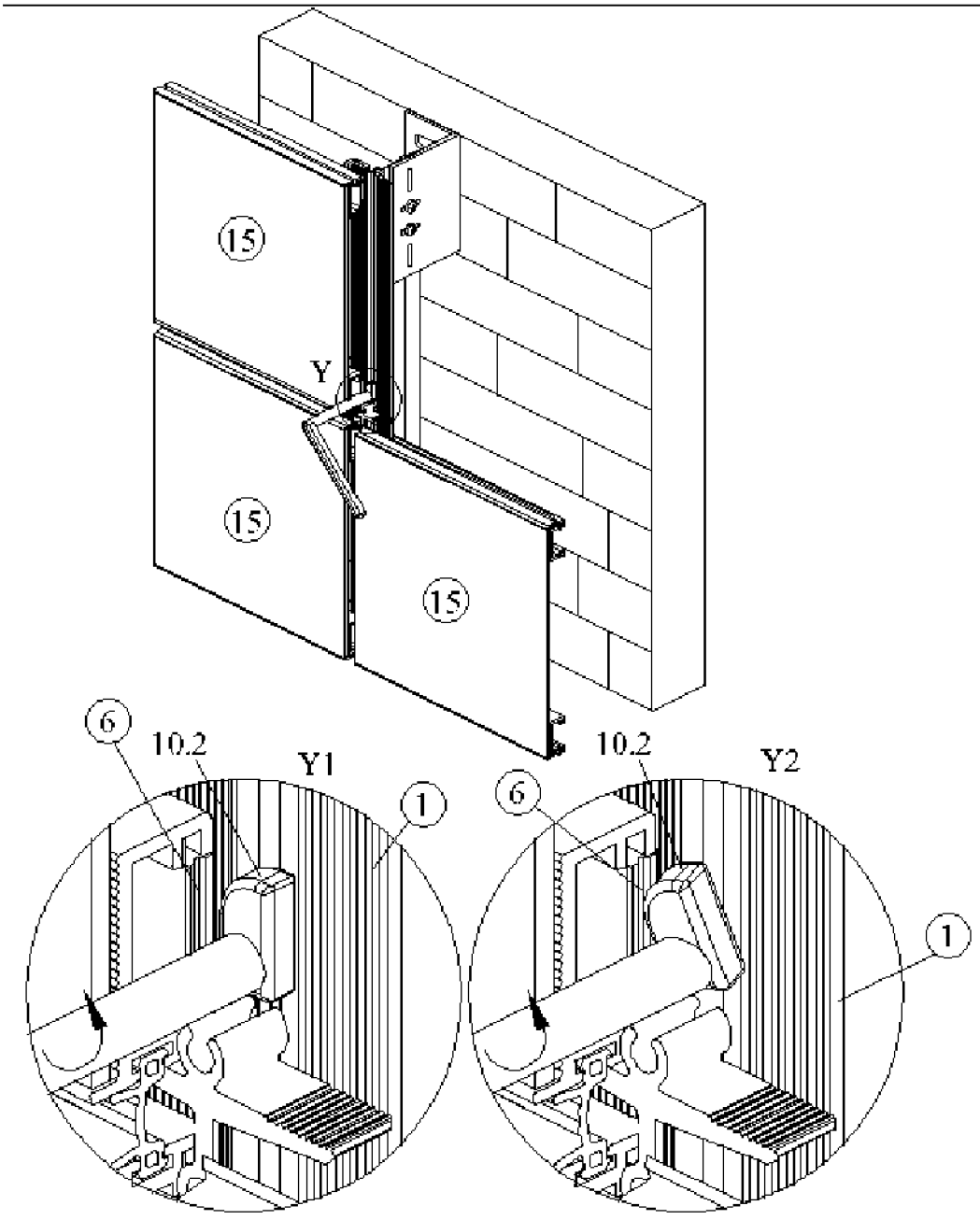

Figure 22

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Place of search	Date of completion of the search	Examiner
The Hague	30 May 2011	Severens, Gert

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