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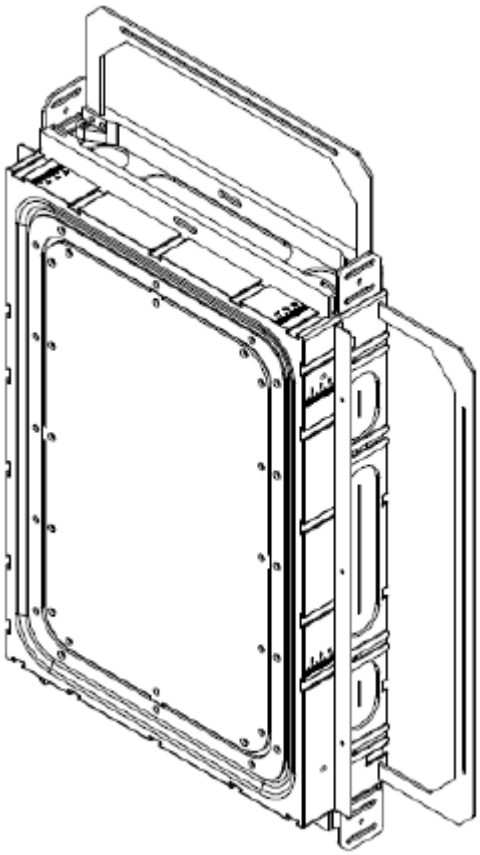
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(54) Title **Concealed box**

(56) References Cited: WO 2011087247 A2, US 2015225931 A1, EP 2896756 A1

(57) Abstract

The invention represents a box for the fixing of sanitary system components 10, the box having a leak tight body 1, characterised in that the body 1 comprises a removable front cover 2, a membrane pressing element 3, a removable rear cover 4, as well as a fixing member 5 with adjustable spacing to install the sanitary system components 10, and at the same time the body 1 has a movable guide 6 with a sliding rail 7 and a fixing member 9 for hydraulic hoses, while the body 1 has defined points 17 for connections and a drain 11 indicating leakage from the sanitary system components 10, and furthermore the body 1 has recesses 15 on the front side and on the rear side for the removable front cover 2, membrane pressing element 3 and removable rear cover 4.



FIELD OF THE INVENTION

The subject-matter of the invention is a concealed box protecting sanitary system components and devices, the product to be used in construction industry and in particular in plumbing.

BACKGROUND OF THE INVENTION

Document SE532544 C2 discloses a device which helps to securely fix a cover and frame. The box consists of a waterproof frame, insulated openings, removable top cover and a leakage sensor. The device also comprises a housing body. It makes it possible to connect pipes and taps to the body without the risk of leakage from the cover. This is particularly useful in damp rooms where water can potentially penetrate the walls. It provides a secure and tight connection between the box and the cover.

Document KR20180138340 A discloses a rectangular-shaped box with an open front surface. Inside the box, there is a pipe and a water tank. The box also has a side wall with an opening, which should be passed through to fix the pipe. There is a connector on the side of the box through which the pipe can be connected to the box. On the front of the box, there is also a cover to protect the pipe and water supply inside. The pipe has an outer tube that contacts the centre to be built into the wall and is connected to a connector. Inside, there is a tube that goes through an opening in the box and enables water to flow inside. The pipe can be used for both cold and hot water. In the cover, there is also an opening to drain any water that may enter the box. The box is a box that can be opened and closed, and provides water supply to buildings during extensions or renovations. It has a communication opening through which a pipe can be passed to provide a water supply to the building. The box also has a cover to protect the pipes and prevent them from being damaged and a drainage system to quickly remove any leaking water, which increases the life of the box.

Document IT201800005457 A1 discloses the invention of an installation box and pipe used in sanitary systems or sinks, which can be placed inside a wall. It consists of a conduit having two sections. The first section is parallel to the outer surface of the wall and

has an outlet at one end. The second section is perpendicular to the first section and has an opening at the free end which can be accessed from the outside. The invention also includes a box-shaped element which can be inserted into a wall and partially surrounds a pipe. The box-like element has walls which provide access and opening.

WO2011087247A2, in accordance with a portion of its abstract, states: “The present invention comprises: a housing formed with an accommodation space in the inside thereof wherein multiple double pipes are inserted and installed to one side and the plurality of double pipes are connected to each other in the accommodation space; a water leakage measurement means which is installed on the housing to detect the degree of water leakage in the accommodation space; an insertion pipe inserted into one side of the housing for attachment or detachment of a fastening hole having a penetrable outer circumference; a connection cap formed at one end of the insertion pipe wherein the lower surface thereof is in contact with the inner surface of the housing and includes a flange section, wherein a fitting hole is formed to fit the water leakage measurement means; and a fixing nut which is connected to the water leakage measurement means at both sides of the flange section of the connection cap to fix and support the water leakage measurement means.”

US2015225931A1, in accordance with its first independent claim, states: “A plumbing supply box installable in a wall recess for connecting one or more water shut-off valves and/or drain openings to in-wall plumbing, the box having a bottom wall and a top wall, at least one opening in the bottom wall and/or top wall for mounting a conduit fitting for a shut-off valve inside the box or for connection of a drain line to the box, wherein the box is made of a thermoset plastic material.”

EP2896756A1, in accordance with its abstract, states: “The invention relates to a device for installation in a wall, such as a plasterboard wall or a breeze block wall, the device comprising: - a shell with a recess and flange arranged around the recess; and - an element nesting in the recess. The invention further relates to a combination of a prewall and a device according to the invention, wherein the prewall comprises an opening in which the recess of the shell is arranged and wherein the flange of the shell lies against the edge of the opening.”

The solutions of concealed box systems presented to date require the use of complex connections between multiple elements of the assembly. Prior art boxes are not versatile and require specific equipment, which is uneconomical for the recipient and introduces

limitations. The way they are installed is complex, costly and time-consuming. There is a need to simplify this design.

The existing prior art solutions also present further disadvantages, being primarily the limitation that prior art products are designed for concealed systems manufactured for specific models or selected specific models from other manufacturers, which limits the versatility of the devices.

Prior art products are designed and built for a specific model of a concealed faucet, making it impossible to install any other faucet than the one for which the box was purchased. The product of the invention aims to be versatile and adaptable to concealed faucets of various manufacturers, making it possible to choose among numerous manufacturers and models of shower faucets and concealed assemblies. In addition, should a concealed element fail, it may be necessary to replace it with a different model, or even a model of a different manufacturer, and at the same time to retain the box and adopt it only for the new concealed element. In prior art products, the entire box must also be replaced in the above case.

SUMMARY OF THE INVENTION

The solution to the above limitations is to use a design of a box that is versatile so that any manufacturer’s concealed system can be fitted into it and quickly adapted directly on site. The technical problems identified are solved by the present invention which provides an improved and versatile product free of the design drawbacks found in the solutions known to date.

In addition, the problem it solves and the main task of the box of the invention is to secure the building structure against being flooded from the elements of the concealed faucets and plumbing connections. In the event of leakage in the concealed element, a shower faucet, the box solution in question will drain the water to the outside of the wall, for example to a floor drain in wet rooms.

To address the problems found in the prior art solutions, a new box design has been proposed and the aim of the invention is also to improve the versatility of use, installing performance and ease of installation of devices from numerous suppliers in the box, to increase economy, while avoiding any hydraulic leakage, by providing an improved

concealed box design. The aim of the invention is to obtain a concealed box product that is versatile, cost-effective and simple to install.

The essence of the invention is a box for the fixing of sanitary system components, the box having a leak tight body, characterised in that the body comprises a removable front cover, a membrane pressing element, a removable rear cover, as well as a fixing member with adjustable spacing to install the sanitary system components, and at the same time the body has a movable guide with a sliding rail and a fixing member for hydraulic hoses, while the body has defined points for connections and a drain indicating leakage from the sanitary system components, and furthermore the body has recesses on the front side and on the rear side for the removable front cover, membrane pressing element and removable rear cover.

Preferably, the body is reinforced with ribs.

Preferably, the body has a scale/graduations.

Preferably, it has a construction support.

Preferably, it comprises inlets/outlets.

Preferably, leak tightness is provided by seals, the sealed removable front cover and the sealed removable rear cover.

Preferably, it is fixed vertically or horizontally by means of a system of fixing members being the movable guide with the movable rail.

The advantage of the invention and its preferable effects versus prior art solutions is that it is possible to service the box from the front and also from the rear. The solution uses a system of guides which enable precise positioning after installation, and there is no need for any additional rack in the wall of the building as in other prior art solutions. The product of the invention is equipped with a system of supports to facilitate the “closing” of the building wall. It also has a system making it possible to fix hydraulic hoses. It can be installed vertically or horizontally depending on the design of the inner module. The product is suitable for use in the Scandinavian construction system, for timber-framed buildings as well as the masonry system. The product is characterised by innovative solutions when it comes to the ease of installation which to a very large extent reduces work time and additional construction materials, as the product is self-sufficient for full installation.

In addition, the product is equipped with elements such as clamping/ fixing/pressing elements for membrane systems securing wall structures, said elements being compatible with most manufacturers on the market. This solution in the best possible way prevents the risk of an error while installing the membrane system. The product is fully versatile, meaning that it does not have to be factory-dedicated to a specific manufacturer. It can be adapted quickly using inner fixing systems even on site, or it can be further adapted. The product has both its front and rear walls fully removable, making it possible to repair the inner element of a concealed faucet, fittings, or plumbing connection. The product is fully leak tight and leak proof.

BRIEF INTRODUCTION OF THE DRAWINGS

The embodiment of the invention is shown in the figures of the drawing, in which:

– Fig. 1 – shows a perspective view of the box,

– Fig. 2a, 2b – show a front view and a side perspective view of the box with the sanitary system components fixed,

– Fig. 3 – shows a perspective view of the box with fittings and connections installed,

– Fig. 4 – shows a perspective view of the box with the dedicated points for connections marked,

– Fig. 5 – shows an exploded view of the box,

– Fig. 6 – shows a front view of the box with guide, rail and fixing member elements,

– Fig. 7 – shows a fragmentary perspective view of the box with the scale/graduations marked on it,

– Fig. 8 – shows a view of the box fixed vertically in the wall with connections,

– Fig. 9 – shows a view of the box fixed horizontally in the wall,

– Fig. 10 – shows a cross-sectional view of the wall into which the box is fitted with the pipe connection shown.

DETAILED DESCRIPTION OF THE DRAWINGS

The box illustrated in figures 1 – 10 has, *inter alia*, the body 1 of the box, front cover 2, membrane pressing element 3, rear cover 4, fixing member 5 of the inner element, guide

6, rail 7, support 8 for construction boards, fixing member 9 for hydraulic hoses, sanitary system components or devices 10, drain 11, seals 12, for example in the form of connectors, inlets/outlets 13, i.e. hydraulic hoses/connections to the inner element (the sanitary system components 10). In addition, the box has reinforcing ribs 14, recesses 15, integrated scale/graduations 16 and defined points 17 for connections. The box may also have a membrane attached to it.

According to the embodiment, the main element of the box is the body 1 of the box, said body comprising two elements sealed and screwed together, made of plastic, for example, but in alternative embodiments the materials may be of other types, as is obvious to a person skilled in the art. The shape of the body 1 is adapted to be versatile for fixing in walls and is generally rectangular, but in alternative embodiments it can take other forms. The body 1 is reinforced on the inside with reinforcing ribs 14 to ensure the rigidity of the entire structure. The body 1 from the front as well as from the rear has recesses 15 which, after the installation of the front cover 2, membrane pressing element 3 and rear cover 4, provides a flush flat surface with the body 1. The body 1 has a sliding fixing system for the movable guides 6 and sliding rails 7, which enables precise installation. Furthermore, as in Fig. 7, on each side of the body 1, there is an integrated scale/graduations 16 that make it possible to precisely adjust the guides 6 and/or construction supports 8 depending on the thickness of the wall finishing materials used. The body 1 has ready-made and marked/defined points 17 for connections, for making openings for hoses/tubes adapted to the needs of the inner element fixed in the body 1, as for example for the sanitary device 10. The body 1 has integral fixing members for all additional elements. The product is leak tight, leak proof and waterproof because of the seals 12 used, with these being, for example, connectors, gaskets and similar seals, as well as because of the sealed removable front cover 2 and sealed removable rear cover 4. The front cover 2 is an element made, for example, of plastic – but in alternative embodiments the materials may be of other types – and reinforced with ribs 14, and adapted by cutting a suitable opening in the front cover 2, said opening compatible with the sanitary device 10, and fixed to the body 1 by screws, and sealed. The membrane pressing element 3 is a stainless steel element, but in alternative embodiments the materials may be of other types, with the purpose of the pressing element 3 being to seal the connection between the membrane and the body 1. Further, the rear cover 4 is a plastic element, but in alternative embodiments the materials may be of other types. The rear cover

4 is removable and is sealed and connected to the body 1 via screws, making it possible to remove and service the sanitary device 10 from the rear side of the body 1. In addition, the fixing member 5 of the inner element, i.e. the sanitary device 10, is made as a stainless steel element, which connects to the body 1 via screws and forms a sliding fixing 5 system, which also makes it possible to adjust the spacing of the fixing members 5. The guide 6, which is made of plastic but in alternative embodiments the materials may be of other types, is placed in the box, with the main function of the guide being to fix and enable the movement of the rail 7, while at the same time the guides installed on the front of the box act as supports against which the construction board clamps, when the wall is being “closed”. When installed, the construction boards clamp directly against the guide 6. In one of the embodiments, the box may have four pieces of guides 6 and rails 7, with the construction boards resting against the front surfaces of the guides 6. The number of guides 6 and rails 7 can be varied in alternative embodiments depending on the shapes of the structure. The rail 7, which is made of metal but in alternative embodiments the materials may be of other types, is used to easily install the box in the wall structure. In the embodiments, the support 8 for the construction boards can also be seen, said support 8 providing a stable wall structure. The box has a fixing member 9 for hydraulic hoses, the fixing member 9 providing fixation for hoses/tubes without the need for additional structural elements. The fixing member 9 for hydraulic hoses, in alternative embodiments, can be located on each side of the body 1 of the box or on any side of the body 1 of the box. The box is essentially dedicated to the fixing of the sanitary system components; i.e. to house the sanitary system component and/or device 10. This is done by screwing the sanitary device 10 to the fixing member 5 of the inner element, through screws, and adjusting the opening in the front cover 2. The box has a drain 11, which drains the water in the event of leakage from the sanitary system component/device 10 and thus informs of the failure of the sanitary system component/device. In addition, seals 12, in the form of, for example, flexible rubber connectors, are placed in the box and arranged where the hoses/tubes enter the body 1 via inlets/outlets 13 for hydraulic hoses/connections. In alternative embodiments, seals 12 can be used in the form of screwed connectors, which, in addition to their sealing function, also act to prevent the tube from being pulled out of the body, and in other forms of, for example, various known solutions found on the market, as will be obvious to the person skilled in the art. Furthermore, in alternative embodiments, in addition to rubber connectors, it is also

possible to use plastic screwed connectors with a rubber gasket inside, which also act to protect the connection, or pipe, PEX or otherwise, from being pulled out of the box. Depending on the configuration of the box, it may comprise inlets/outlets 13 for hydraulic hoses/connections to the inside, and these are realised through the system of seals 12 and hoses/tubes used in the building's plumbing system. In one alternative embodiment, the product can be supplied without pre-cut openings, i.e. the inlets/outlets 13 for hydraulic hoses/connections. Such openings are made by the installer themselves at the defined points 17, and are sealed with seals 12, such as connectors. The inlets/outlets 13 for hydraulic hoses/connections have been introduced to the description to illustrate the operation of a product already installed, after the openings for the inlets/outlets 13 for hydraulic hoses/connections have been cut, which will be present in any application examples for the box.

According to one of the embodiments, the box is compatible with most membrane systems on the market because of the use of an independent membrane pressing element 3. Leak tightness is achieved by pressing the gasket of the membrane system against the body 1 by means of the pressing element 3. The front cover 2 together with the pressing element 3 clearly separates the line of responsibility between the work of the plumber who installs the sanitary system component/device 10 in the box and the construction and finishing work, including the laying of the membrane system. Membrane systems are varied, as is their availability on the market, depending on the chosen finish of the room, hence the membrane pressing element 3 must ensure that the membrane is leak tight.

The box according to the embodiments can be serviced "from the rear", i.e. it can be opened from the other side of the wall via the removable rear cover 4, where this will not cost as much as, for example, in the case of tiles. It is also possible to remove the entire inner element via the rear service "door". If service access to the installed thermostat/mixer, i.e. to the sanitary system component or device 10, were only from the front of the box, a problem would arise in the event of failure and/or servicing, as disassembly would have to be carried out, often by destroying the membrane barrier, which is against recommendations according to standards and legislation, such as the Norwegian TEK17.

According to the embodiment, the box product is installed on a system of slide-out guides 6 and movable rails 7, which makes it possible to install it without the need for an

additional rack. Otherwise, it would be necessary to select an appropriate rack spacing, as for example in Scandinavian construction, which would generate additional work for the installing plumber who would have to make an additional rack.

In alternative embodiments, the box has supports 8 for construction boards, which contributes to improved stability of the structure and facilitates the process when "closing" the wall. In addition, in alternative embodiments, the box has fixing members 9 for hydraulic hoses which enter inside the box, so that there is no need for additional racks/supports to be installed to fix the hoses, making the box versatile and functional. This makes it possible to install all elements directly onto the box, without having to build additional racks for hoses and pipes. The housing, body 1 of the box, is suitable for vertical as well as horizontal installation, making it possible, for example, to install a horizontal or vertical sanitary system component or element 10. This is made possible by the use of fixing members for the guides 6 in the body 1 also on the longer sides of the body, as shown in the accompanying drawing, as in Figs. 8 – 10.

Existing prior art products were mainly adapted to the Scandinavian construction system (i.e. structure of the building made of wood), which caused problems and forced plumbers to come up with unusual solutions when work had to be carried out in masonry construction. The product of the present invention, in the illustrated embodiment, is adapted for both said construction systems, which significantly simplifies work and reduces working time during installation. Installation of the box in masonry construction is possible by using straight rails 7, as shown in Fig. 9. According to Fig. 10, for the installation system, a helpful option in alternative embodiments is also a scale 16 provided by the body 1, which makes it possible to adapt the dimensions for the fixing of the box to the building situation.

The present invention is used in the construction industries, in particular in plumbing. The product has applications in single-family, multi-family and collective buildings. It can be used in residential and business buildings, including commercial buildings, offices, buildings of cultural use, schools, hospitals, hotels, etc.

The present invention is not limited to the embodiments presented above. Various modifications and developments of it within the scope of the attached patent claims are possible, without departing from the essence of the invention.

Claims

1. A box for the fixing of sanitary system components (10), the box having a leak tight body (1), wherein the body (1) comprises a removable front cover (2), a removable rear cover (4), a fixing member (9) for hydraulic hoses, defined points (17) for connections, and recesses (15) on the front side and on the rear side for the removable front cover (2) and removable rear cover (4), **characterised in that** the body comprises a fixing member (5) with adjustable spacing to install the sanitary system components (10), and at the same time the body (1) has a movable guide (6) with a sliding rail (7), while the body (1) has a drain (11) indicating leakage from the sanitary system components (10), and furthermore the body (1) comprises a membrane pressing element (3) and has recesses (15) on the front side and on the rear side for the membrane pressing element (3).
2. The box of claim 1, **characterised in that** the body (1) is reinforced with ribs (14).
3. The box of any one of preceding claims 1-2, **characterised in that** the body (1) has a scale/graduations (16).
4. The box of any one of preceding claims 1-3, **characterised in that** it has a construction support (8).
5. The box of any one of preceding claims 1-4, **characterised in that** it comprises inlets/outlets (13) for hydraulic hoses/connections.
6. The box of any one of preceding claims 1-5, **characterised in that** leak tightness is provided by seals (12), the sealed removable front cover (2) and the sealed removable rear cover (4).
7. The box of any one of preceding claims 1-6, **characterised in that** it is fixed vertically or horizontally by means of a system of fixing members being the movable guide (6) with the movable rail (7).

P a t e n t k r a v

1. Boks for festing av komponenter (10) av et sanitærsystem, idet boksen har et lekkasjetett legeme (1), hvor legemet (1) omfatter et fjernbart frontdeksel (2), et fjernbart bakdeksel (4), et festeelement (9) for hydraulikkslanger, definerte punkter (17) for tilkoblinger, og fordypninger (15) på fremsiden og på baksiden for det fjernbare frontdekselet (2) og det fjernbare bakdekselet (4), k a r a k t e r i s e r t v e d at legemet omfatter et festeelement (5) med justerbar avstand for å montere komponentene (10) av et sanitærsystem, og samtidig har legemet (1) en bevegelig ledeanordning (6) med en glideskinne (7), mens legemet (1) har en drenering (11) som indikerer lekkasje fra komponentene (10) av et sanitærsystem, og videre omfatter legemet (1) et membranpresseelement (3) og har fordypninger (15) på fremsiden og på baksiden for membranpresseelementet (3).

2. Boks ifølge krav 1, k a r a k t e r i s e r t v e d at legemet (1) er forsterket med ribber (14).

3. Boks ifølge et hvilket som helst av de foregående kravene 1–2, k a r a k t e r i s e r t v e d at legemet (1) har en måleskala / graderinger (16).

4. Boks ifølge et hvilket som helst av de foregående kravene 1–3, k a r a k t e r i s e r t v e d at den har en bærekonstruksjon (8).

5. Boks ifølge et hvilket som helst av de foregående kravene 1–4, k a r a k t e r i s e r t v e d at den omfatter innløp/utløp (13) for hydraulikkslanger/-koblinger.

6. Boks ifølge et hvilket som helst av de foregående kravene 1–5, k a r a k t e r i s e r t v e d at lekkasjetetthet tilveiebringes av tetninger (12), det forseglede fjernbare frontdekselet (2) og det forseglede fjernbare bakdekselet (4).

7. Boks ifølge et hvilket som helst av de foregående kravene 1–6, k a r a k t e r i s e r t v e d at den er festet vertikalt eller horisontalt ved hjelp av et system av festeelementer som er den bevegelige ledeanordningen (6) med den bevegelige skinnen (7).

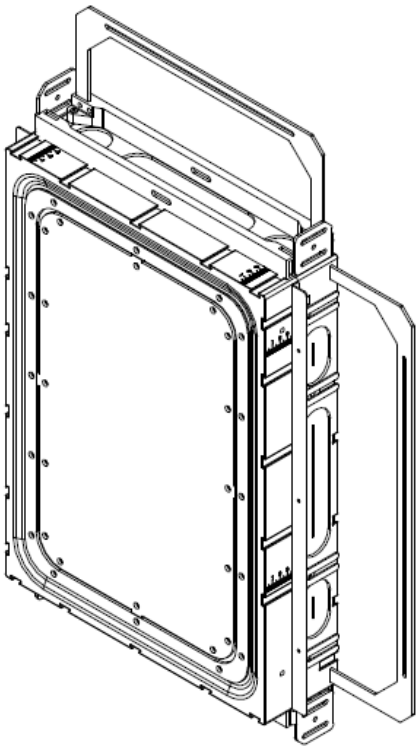


Fig. 1

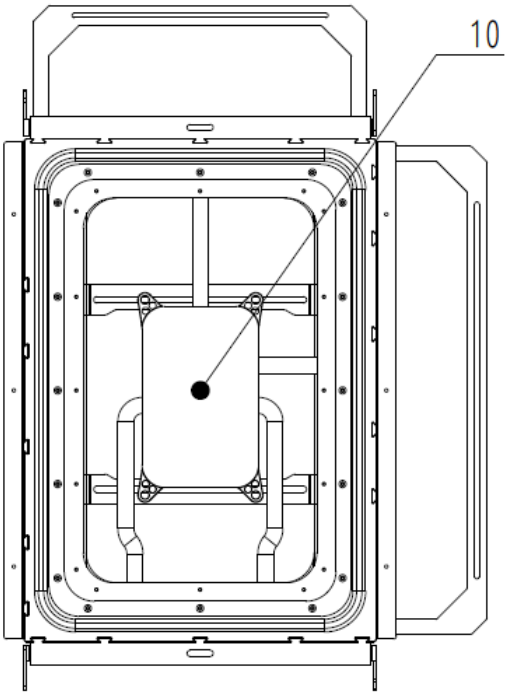


Fig. 2a

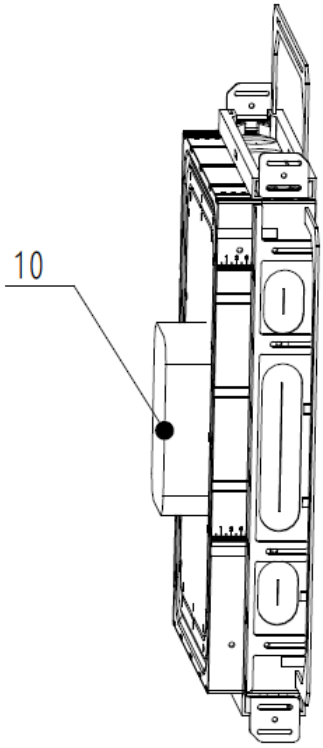


Fig. 2b

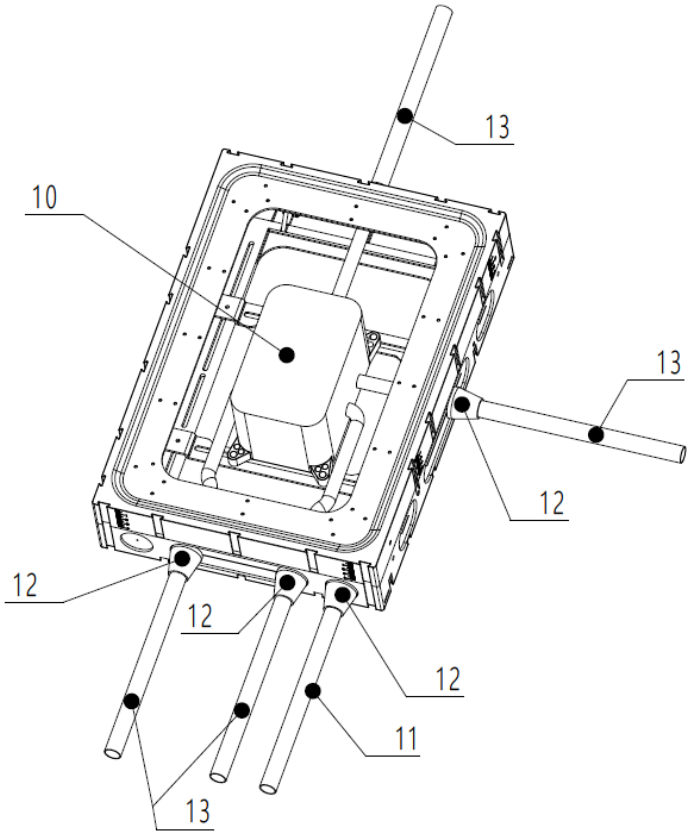


Fig. 3

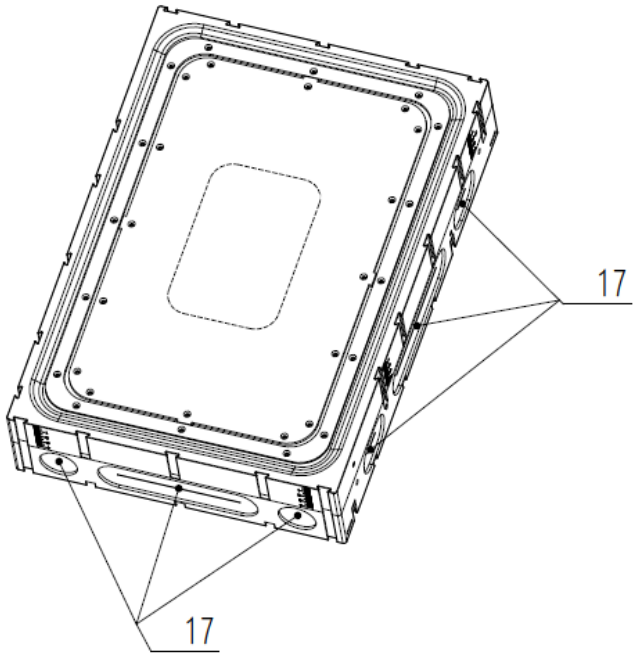


Fig. 4

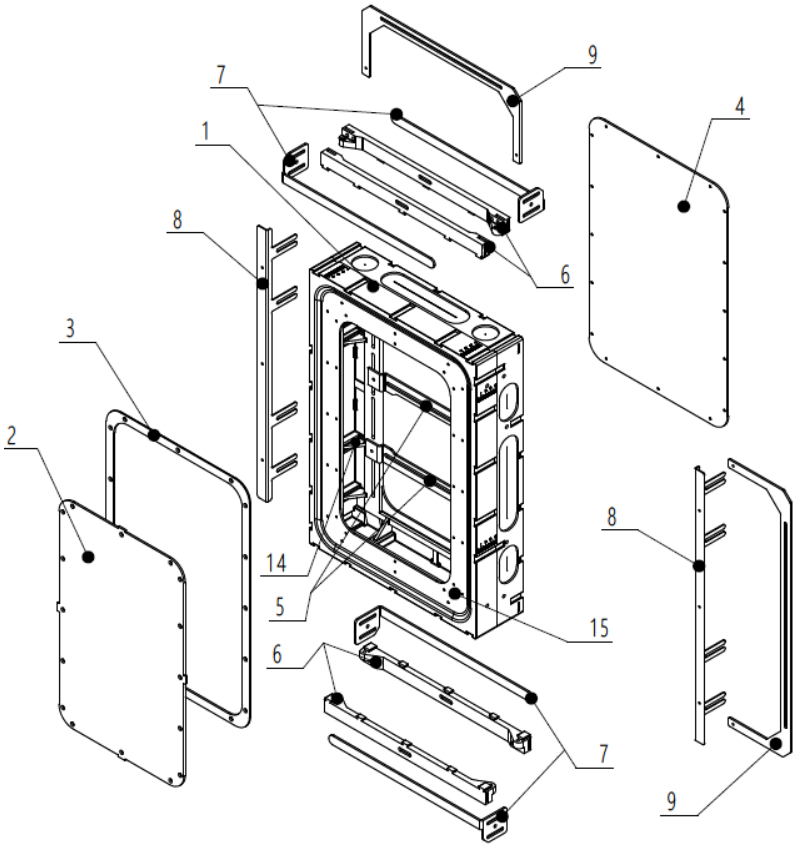


Fig. 5

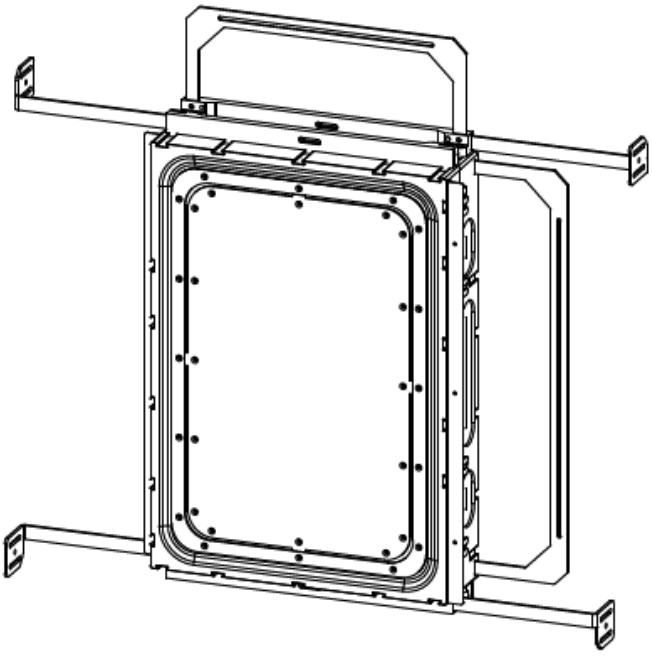


Fig. 6

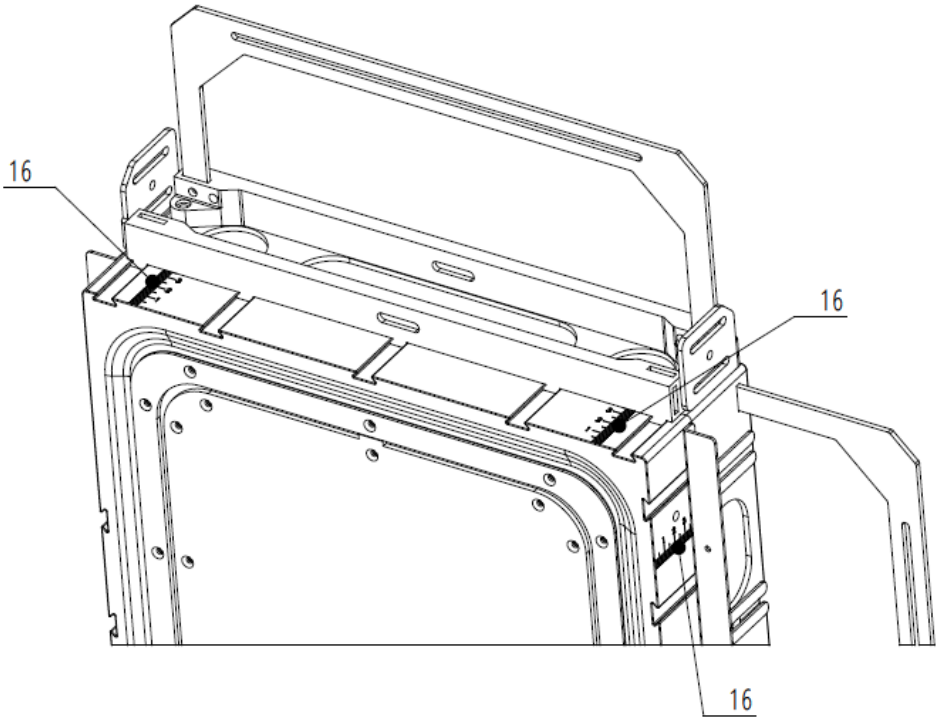


Fig. 7

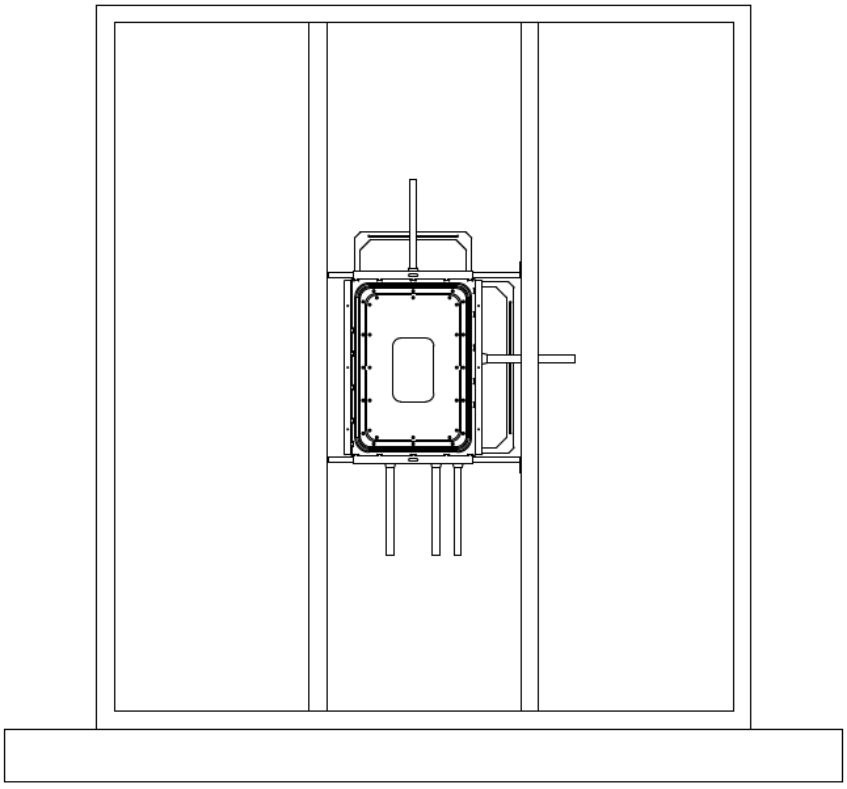


Fig. 8

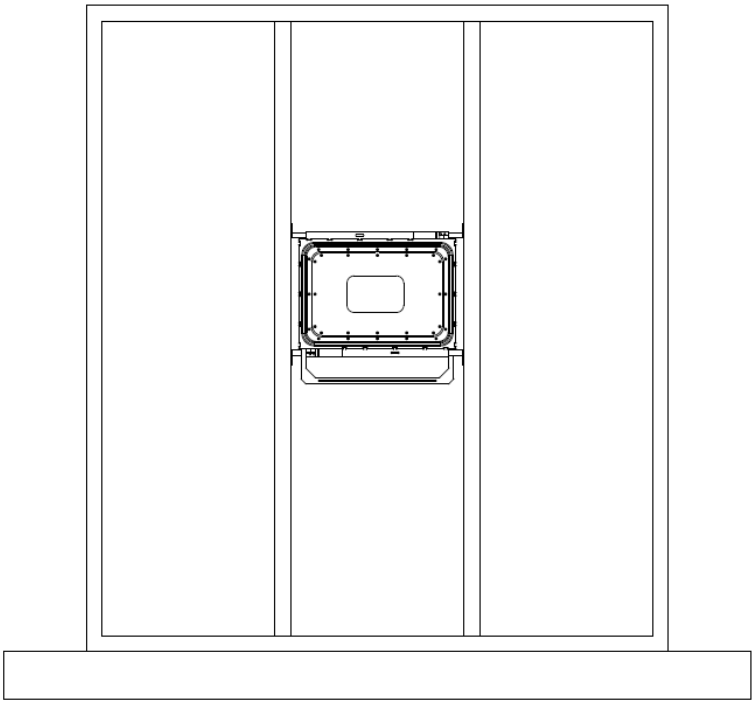


Fig. 9

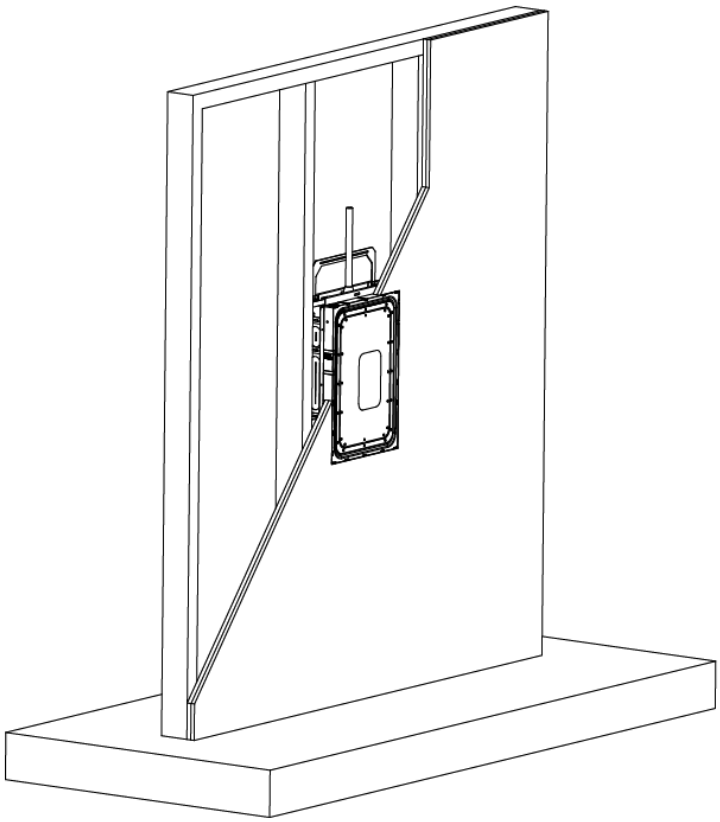


Fig. 10