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

(11) **EP 3 219 862 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
20.09.2017 Bulletin 2017/38

(21) Application number: **16160464.0**

(22) Date of filing: **15.03.2016**

(51) Int Cl.:
E03D 11/12 *(2006.01)* ***E03D 11/14*** *(2006.01)*
E04F 17/00 *(2006.01)* ***E04C 2/52*** *(2006.01)*

(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
Designated Validation States:
MA MD

(71) Applicant: **Uponor Innovation AB**
73061 Virsbo (SE)

(72) Inventor: **Inha, Teemu**
04430 Järvenpää (FI)

(74) Representative: **Papula Oy**
P.O. Box 981
00101 Helsinki (FI)

(54) PLUMBING ARRANGEMENT ELEMENT

(57) A plumbing arrangement element configured to be mounted to a structure of a building comprising a vertical waste pipe system is disclosed, the plumbing arrangement element being configured to support a toilet bowl having a waste outlet. The plumbing arrangement element comprises a vertical support structure configured to be mounted stationarily to the structure of the building; a movable unit comprising a structure to which to attach the toilet bowl; and a waste pipe assembly for conducting waste from the toilet bowl to the vertical waste pipe system of the building, the waste pipe assembly comprising a movable waste pipe arrangement. The movable unit and the movable waste pipe arrangement are configured to be adjustable with respect to the vertical support structure in the vertical direction, the plumbing arrangement element thereby being configured to allow the height adjustment of the structure to which to attach the toilet bowl.

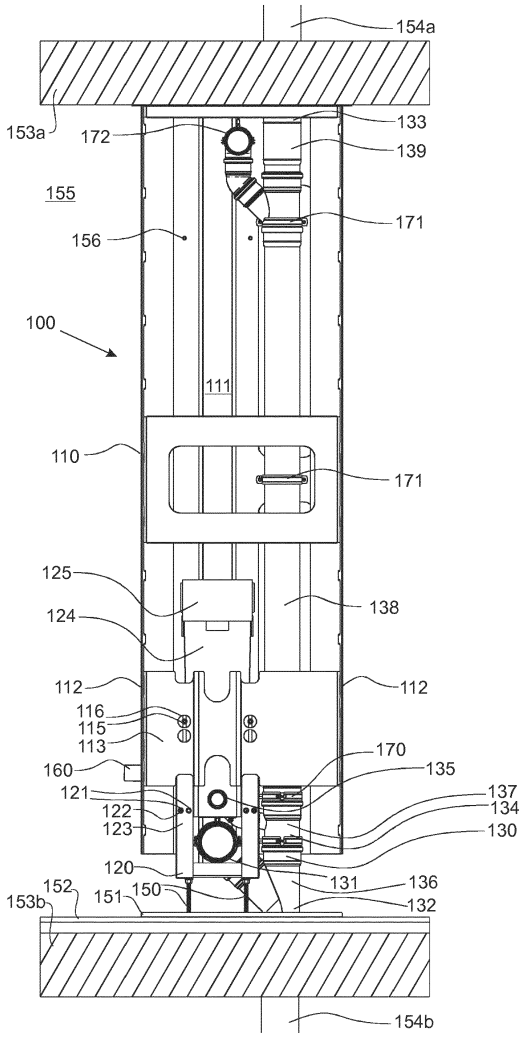

Fig. 1

EP 3 219 862 A1

Description

FIELD OF THE INVENTION

[0001] The invention relates to a plumbing arrangement element, a plumbing system and a method for installing a plumbing arrangement element.

BACKGROUND

[0002] Historically, sanitary rooms, including bathrooms, lavatories or washrooms, of buildings with several floors and several apartments have water and sewage installations arranged into vertical shafts running inside structural walls, and into horizontal lines inside the floor/ceiling structures between the floors. In other words, the pipes and other conducting elements for water and waste (sewage) installations are often embedded within structures of stone, concrete, tile or other such building material. When renovations need to be done and the water and sewage installations need to be replaced, costly and time-consuming cutting-in operations may be needed to access the pipes.

[0003] In newer buildings, modern constructions rules and building codes may require that all such pipelines should be installed so that they are accessible for maintenance, repair and future renovations without breaking the wall or floor/ceiling structures of the building. For example, water conduits leading fresh water from a mains line to a shower, a toilet or a washbasin must be surface-installed on the walls. Naturally, there are lead-through points for the pipes between floors and walls. In addition, modern building codes have strict requirements for wet sealing and water proofing, as well for constructions that allow possible leaks to be detected by leading the leaking water/liquid outside any closed structures where they become visible.

[0004] These kinds of installations may be time-consuming and may require great precision from the persons conducting the installations to avoid any mistakes that could lead to water or moisture damages within the sanitary rooms or building structures.

[0005] Different prefabricated sanitary room installation elements have been introduced to partially replace on-site installation, both in new buildings and in renovation projects.

[0006] Such installation elements may comprise a cassette or cabinet with at least part of the plumbing, piping, insulation and connecting points preinstalled. The installation assembly may need to have correct dimensions and very tight tolerances for the variation in different dimensions to ensure a successful final on-site installation.

[0007] Such elements may contain a structure to which to attach a toilet bowl. However, the dimensions of the installation site, such as the final floor elevation, may be difficult to determine before the installation and may vary between buildings and even different parts of the same building. There may therefore exist a need to adjust the height of the toilet bowl to be mounted to the element.

SUMMARY

[0008] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.

[0009] A plumbing arrangement element configured to be mounted to a structure of a building comprising a vertical waste pipe system is disclosed. The plumbing arrangement element is configured to support a toilet bowl having a waste outlet, and the plumbing arrangement element comprises a vertical support structure configured to be mounted stationarily to the structure of the building; a movable unit, the movable unit comprising a structure to which to attach the toilet bowl; and a waste pipe assembly for conducting waste from the toilet bowl to the vertical waste pipe system of the building, the waste pipe assembly comprising a movable waste pipe arrangement, and the movable waste pipe arrangement comprising a waste pipe fitting for connecting the waste pipe assembly to the waste outlet of the toilet bowl. The waste pipe assembly may have an upper end and a lower end, wherein the upper end is connectable to the vertical waste pipe system of the building above the plumbing arrangement element, and the lower end is connectable to the vertical waste pipe system below the plumbing arrangement element. The movable unit and the movable waste pipe arrangement are configured to be adjustable with respect to the vertical support structure in the vertical direction, the vertical support structure forming a guide for the adjustment of the movable unit in the vertical direction, the plumbing arrangement element thereby being configured to allow the height adjustment of the structure to which to attach the toilet bowl.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The accompanying drawings, which are included to provide a further understanding of the invention and constitute a part of this specification, illustrate embodiments of the invention and together with the description help to explain the principles of the invention. In the drawings:

Fig. 1 is a front view of a plumbing arrangement element according to an embodiment;

Fig. 2A illustrates an exemplary embodiment of a part of a plumbing arrangement element;

Fig. 2B shows the embodiment of Fig. 2A in a different position;

Fig. 3 illustrates an exploded view of an embodiment of a movable unit and a movable waste pipe arrangement;

Fig. 4 is a top sectional view of a plumbing arrange-

ment element according to an embodiment; and
Fig. 5 illustrates an exemplary embodiment of a plumbing system.

DETAILED DESCRIPTION

[0011] A plumbing arrangement element configured to be mounted to a structure of a building, the building comprising a vertical waste pipe system, is disclosed, the plumbing arrangement element being configured to support a toilet bowl having a waste outlet, wherein the plumbing arrangement element comprises a vertical support structure configured to be mounted stationarily to the structure of the building; a movable unit, the movable unit comprising a structure to which to attach the toilet bowl; and a waste pipe assembly for conducting waste from the toilet bowl to the vertical waste pipe system of the building, the waste pipe assembly comprising a movable waste pipe arrangement, and the movable waste pipe arrangement comprising a waste pipe fitting for connecting the waste pipe assembly to the waste outlet of the toilet bowl; wherein the waste pipe assembly has an upper end and a lower end, wherein the upper end is connectable to the vertical waste pipe system of the building above the plumbing arrangement element, and the lower end is connectable to the vertical waste pipe system below the plumbing arrangement element; and the movable unit and the movable waste pipe arrangement are configured to be adjustable with respect to the vertical support structure in the vertical direction, the vertical support structure forming a guide for the adjustment of the movable unit in the vertical direction, the plumbing arrangement element thereby being configured to allow the height adjustment of the structure to which to attach the toilet bowl.

[0012] The plumbing arrangement element may be configured to be mounted to a wall of the building, to a ceiling of the building, or to both.

[0013] The vertical support structure may comprise or be a housing. The vertical support structure may also comprise or be a vertical panel or a plurality of (two or more) vertical panels. The vertical support structure may also comprise or be a vertical rail or a plurality of (two or more) vertical rails. In embodiments in which the vertical support structure is a housing, the movable unit may be disposed within or inside the housing. The movable waste pipe arrangement and at least a part of the waste pipe assembly may also be disposed within or inside the housing.

[0014] The movable unit and the movable waste pipe arrangement may be configured to be raisable or lowerable with respect to the vertical support structure in the vertical direction. The movable waste pipe arrangement may be connected to the movable unit. They may therefore be simultaneously adjustable.

[0015] The movable unit and the movable waste pipe arrangement are configured to be set or slidably adjusted between a lower position and an upper position.

[0016] The movable unit may comprise a body formed of sheet metal or of aluminium profiles, the body being slidably adjustable in the vertical direction with respect to the vertical support structure, the vertical support structure forming a guide for the adjustment of the body of the movable unit in the vertical direction. The body may be formed of sheet metal that is folded, bent or deep drawn. The metal may be e.g. steel, stainless steel or aluminium. The aluminium profiles may be extruded.

[0017] The vertical support structure may comprise at least one vertical section formed of sheet metal or of aluminium profiles, the vertical section forming a guide for the adjustment of the body of the movable unit in the vertical direction. The at least one vertical section may include one or more of the back wall, the front wall and/or the side walls of the vertical support structure. The vertical section may be formed of sheet metal that is folded, bent or deep drawn. The metal may be e.g. steel, stainless steel or aluminium. The aluminium profiles may be extruded. The vertical support structure may comprise two or more such vertical sections.

[0018] The movable unit may be immovable in the lateral direction with respect to the vertical support structure.

[0019] The movable unit may be attachable stationarily to the vertical support structure. It may thus be attached stationarily to the vertical support structure when it has, in use, been adjusted with respect to the vertical support structure in the vertical direction. The movable waste pipe arrangement may be connected to the movable unit. Thus the movable waste pipe arrangement may be attached stationarily to the vertical support structure via the movable unit, but the movable waste pipe arrangement may also be attached directly to the vertical support structure when it has, in use, been adjusted. The movable unit may also be releasably attachable to the vertical support structure.

[0020] The plumbing arrangement element may comprise a number of pipe support members for attaching the movable waste pipe arrangement to the movable unit.The plumbing arrangement element may comprise one, two or more or a plurality of such pipe support members.

[0021] The waste pipe assembly may extend substantially along or through the entire length of the vertical support structure, such as a housing, in the vertical direction.

[0022] The components of the waste pipe assembly may be made of any suitable material, including suitable plastic materials, such as polypropene (PP) or polyvinylchloride (PVC), polyethene (PE), polybutene (PB), a plastic-metal composite (e.g. a thin layer of aluminum surrounded by any suitable plastic, such as PP, PE or cross-linked polyethylene (PEX), on both sides), or cast iron.

[0023] The waste pipe assembly may comprise a stationary part that is stationary with respect to the vertical support structure. One of the stationary part and the mov-

able waste pipe arrangement may be partially slidable inside the other so that the total length of the waste pipe assembly is adjustable in the vertical direction. In other words, either one of the stationary part and the movable waste pipe arrangement may be partially slidable inside the other. One of the stationary part and the movable waste pipe arrangement may be partially and sealingly or sealably slidable inside the other. A sealing ring or other suitable sealing structure may be disposed between the stationary part and the movable waste pipe arrangement so that a sealed connection or joint is formed between the stationary part and the movable waste pipe arrangement.

[0024] To this end, the waste pipe assembly may further comprise a pipe fitting configured to slidably receive a part of one of the stationary part and the movable waste pipe arrangement, thereby connecting the stationary vertical upper part and the movable waste pipe arrangement so that the total length of the waste pipe assembly is adjustable in the vertical direction. The pipe fitting may be configured to sealingly or sealably receive a part of one of the stationary part and the movable waste pipe arrangement. The pipe fitting may thus be provided with a sealing ring or other suitable sealing structure.

[0025] Such a pipe fitting may be an expansion fitting. In other words, the waste pipe assembly may comprise an expansion fitting connecting the stationary part and the movable waste pipe arrangement.

[0026] In the context of this specification, the term "expansion fitting" may refer to any pipe fitting suitable for use in the waste pipe assembly that has a sleeve configured to surround the end of a pipe or a pipe fitting placed in the sleeve, wherein the sleeve has a length that is sufficient to allow for the movement of the end of the pipe or pipe fitting within the sleeve in the direction of the length of the expansion fitting while maintaining a secure joint. In an embodiment, the expansion fitting may allow for the movement of the end of the part, pipe or pipe fitting within the sleeve in the direction of the length of the expansion fitting for a distance of about 20 - 200 mm. The expansion fitting thus may allow telescopic movement of the pipe or pipe fitting placed into the sleeve. Expansion fittings may provide for linear vertical adjustment of the waste pipe assembly. Yet they may have similar sealing as other components of the waste pipe assembly and may be safe in use. The expansion fitting may comprise a sealing ring or other suitable sealing structure.

[0027] The waste pipe assembly may comprise a stationary vertical upper part that is stationary with respect to the vertical support structure, and a pipe fitting configured to slidably receive a part of one of the stationary vertical upper part and the movable waste pipe arrangement, thereby connecting the stationary vertical upper part and the movable waste pipe arrangement so that the total length of the waste pipe assembly is adjustable in the vertical direction. Either one of the stationary vertical upper part and the movable waste pipe arrangement may be partially and sealingly or sealably slidable inside the other. In other words, the pipe fitting may be configured to slidably and sealingly receive the part of either one of the stationary vertical upper part and the movable waste pipe arrangement. A sealing ring or other suitable sealing structure may be disposed between the stationary vertical upper part and the movable waste pipe arrangement and/or within the pipe fitting so that a sealed connection or joint is formed between the stationary vertical upper part and the movable waste pipe arrangement.

[0028] The waste pipe assembly may further comprise an expansion fitting connecting the stationary vertical upper part and the movable waste pipe arrangement.

[0029] The waste pipe assembly may have an upper part, the upper part of the waste pipe assembly comprising a pipe fitting configured to slidably receive the lower end of a second waste pipe assembly of a second plumbing arrangement or an intermediate pipe fitting, the intermediate pipe fitting being connected or connectable to a second waste pipe assembly of a second plumbing arrangement element, to thereby connect the second waste pipe assembly to the waste pipe assembly. The pipe fitting may be configured to slidably and sealingly receive the lower end of the second waste pipe assembly or the intermediate pipe fitting. A sealing ring or other suitable sealing structure may be disposed between the lower end of the second waste pipe assembly or the intermediate pipe fitting and the pipe fitting configured to receive it and/or within the pipe fitting.

[0030] Such a pipe fitting may be an expansion fitting. In other words, the upper part of the waste pipe assembly may comprise an expansion fitting configured to connect a second waste pipe assembly of a second plumbing arrangement element to the upper part of the waste pipe assembly.

[0031] A single such pipe fitting, such as an expansion fitting, may be configured to allow a vertical adjustment of about 30 - 200 mm. However, such pipe fittings configured to allow a smaller or greater vertical adjustment may also be contemplated. Depending on e.g. how many such pipe fittings, such as expansion fittings, are included in the plumbing arrangement element, the plumbing arrangement element may be configured to allow an adjustment of the total length of the waste pipe assembly of at least 20 mm, or at least 60 mm, or about 20 - 250 mm. This may assist in installing the plumbing arrangement element and in adjusting the movable waste pipe arrangement. Plumbing arrangement elements in which the adjustment of the total length of the waste pipe assembly is greater may, however, also be contemplated. The adjustability of the total length of the waste pipe assembly may make the installation of the plumbing arrangement element easier.

[0032] The plumbing arrangement element may be configured to allow an adjustment of the height of the structure to which to attach the toilet bowl of at least 2 mm, or about 2 - 50 mm. Plumbing arrangement elements in which the adjustment of the height of the structure to

which to attach the toilet bowl is greater may, however, also be contemplated.

[0033] The movable waste pipe arrangement may comprise a sink waste pipe arrangement that is connectable to an outlet of a sink. The sink may be adjacent to the plumbing arrangement element, when in use. Thus waste water from the sink may be directed to the vertical waste pipe system of the building via the plumbing arrangement element.

[0034] The plumbing arrangement element may be a prefabricated plumbing arrangement element. In the context of this specification, the term "prefabricated" may refer to an element that is assembled in a factory as opposed to the installation site (i.e. the building, the structures of which the plumbing arrangement element is to be mounted to), and thus the element is provided to the installation site while already containing all the components of the element. In particular, the prefabricated element may comprise the vertical support structure, the movable unit and the waste pipe assembly. The plumbing arrangement element may be a plumbing arrangement cassette.

[0035] The movable unit may comprise a flushing water pipe assembly, means for attaching a toilet cistern, and optionally a toilet cistern.

[0036] The plumbing arrangement element may further comprise pipes or pipelines for fresh water, grey water pipes, heating and/or for ventilation. Any of the pipes or pipelines may be soundproofed. The plumbing arrangement element may further comprise electric wiring and/or telecommunications or data communications cabling. The plumbing arrangement element may also be provided with a water barrier where required. However, the plumbing arrangement element, for instance a prefabricated plumbing arrangement element, does not necessarily have to comprise all components of the plumbing arrangement element described in this specification. For instance, prefabricated plumbing arrangement element does not necessarily have to comprise all parts of the housing or any water pipes or pipelines.

[0037] A plumbing system is also disclosed, the plumbing system comprising a first plumbing arrangement element and a second plumbing arrangement element, wherein the first and second plumbing arrangement elements are located in two vertically adjoining spaces; wherein the first and second plumbing arrangement elements are plumbing arrangement elements according to one or more of the embodiments of the plumbing arrangement element disclosed in this specification; the first plumbing arrangement comprises a first waste pipe assembly having a lower end and an upper end and the second plumbing arrangement comprises a second waste pipe assembly having a lower end and an upper end; the lower end of the first waste pipe assembly is connected or connectable to the upper end of the second waste pipe assembly; and the first and second plumbing arrangement elements are configured to form or form a continuous vertical waste pipe system between the vertically adjoining spaces.

[0038] The plumbing arrangement elements of the system may be mounted to or configured to be mounted to structures of the building, such as walls and/or ceilings.

[0039] The plumbing system may comprise a plurality of plumbing arrangement elements configured to form or forming a continuous vertical waste pipe system between the vertically adjoining spaces. The plumbing system may further be connectable or connected to the vertical waste pipe system of the building. The plumbing system may thus be configured to form a part of the vertical waste pipe system of the building.

[0040] One of the upper end of the second waste pipe assembly and the lower end of the first waste pipe assembly or an intermediate pipe fitting may be partially slidable inside the other so that the upper end of the second waste pipe assembly and the lower end of the first waste pipe assembly or the intermediate pipe fitting are slidably adjustable with respect to each other in the vertical direction. One of the upper end of the second waste pipe assembly and the lower end of the first waste pipe assembly or the intermediate pipe fitting may be partially and sealingly or sealably slidable inside the other. A sealing ring or other suitable sealing structure may be disposed between the upper end of the second waste pipe assembly and the lower end of the first waste pipe assembly or the intermediate pipe fitting so that a sealed connection or joint is formed between the upper end of the second waste pipe assembly and the lower end of the first waste pipe assembly or the intermediate pipe fitting.

[0041] The plumbing system, i.e. either the first or the second plumbing arrangement element, may further comprise a pipe fitting configured to slidably (and optionally sealingly or sealably) receive one of the upper end of the second waste pipe assembly and the lower end of the first waste pipe assembly or the intermediate pipe fitting.

[0042] The upper part of the second waste pipe assembly may comprise an expansion fitting, and the lower end of the first waste pipe assembly may be connected or connectable to the expansion fitting at the upper part of the second waste pipe assembly.

[0043] A method for installing the plumbing arrangement element is disclosed, wherein the plumbing arrangement element is any plumbing arrangement element according to one or more of the embodiments disclosed in the specification, the method comprising mounting the vertical support structure stationarily to a structure of a building; adjusting the height of the structure to which to attach the toilet bowl by adjusting the movable unit and the movable waste pipe arrangement in the vertical direction with respect to the vertical support structure; and optionally attaching the toilet bowl to the structure to which to attach the toilet bowl.

[0044] The method may further comprise attaching the movable unit stationarily to the vertical support structure. The movable unit may be attached stationarily to the ver-

tical support structure prior to attaching the toilet bowl.

[0045] The waste pipe assembly may comprise a stationary part that is stationary with respect to the vertical support structure; wherein the method comprises sliding one of the stationary part and the movable waste pipe arrangement partially inside the other, thereby adjusting the total length of the waste pipe assembly in the vertical direction. In other words, either one of the stationary part and the movable waste pipe arrangement is sliding partially inside the other.

[0046] The method may comprise mounting the vertical support structure stationarily to the structure of the building; optionally connecting the upper end of an intermediate pipe fitting to the lower end of the movable waste pipe arrangement; placing the lower end of the movable waste pipe arrangement or the intermediate pipe fitting into a pipe fitting below the movable waste pipe arrangement, the pipe fitting thereby slidably receiving the lower end of the movable waste pipe arrangement or the intermediate pipe fitting; and adjusting the height of the structure to which to attach the toilet bowl by adjusting the movable unit, the movable waste pipe arrangement and optionally the intermediate pipe fitting in the vertical direction with respect to the vertical support structure so that the lower end of the intermediate pipe fitting slides inside the pipe fitting.

[0047] In the context of the method, the pipe fitting configured to slidably (and optionally sealingly or sealedly) receive a part of one of the stationary vertical upper part and the movable waste pipe arrangement may be any suitable pipe fitting described in this specification, such as an expansion fitting.

[0048] The method may comprise mounting the vertical support structure stationarily to the structure of the building; optionally connecting the upper end of an intermediate pipe fitting to the lower end of the movable waste pipe arrangement; placing the lower end of the movable waste pipe arrangement or the intermediate pipe fitting into an expansion fitting below the movable waste pipe arrangement; and adjusting the height of the structure to which to attach the toilet bowl by adjusting the movable unit, the movable waste pipe arrangement and optionally the intermediate vertical pipe in the vertical direction with respect to the vertical support structure so that the lower end of the movable waste pipe arrangement or the intermediate pipe fitting slides inside the expansion fitting.

[0049] The movable waste pipe arrangement and the intermediate vertical pipe may be lowered in the vertical direction with respect to the vertical support structure so that the lower end of the intermediate pipe slides inside the expansion fitting.

[0050] The waste pipe assembly may comprise a stationary vertical upper part that is stationary with respect to the vertical support structure, the stationary vertical upper part having a lower end, and a pipe fitting configured to slidably (and optionally sealingly or sealedly) receive a part of one of the stationary vertical upper part and the movable waste pipe arrangement; wherein the method comprises placing the lower end of the stationary vertical upper part into the pipe fitting; adjusting the height of the structure to which to attach the toilet bowl by adjusting the movable unit and the movable waste pipe arrangement in the vertical direction with respect to the vertical support structure so that the lower end of the stationary vertical upper part slides inside the pipe fitting.

[0051] In the context of the method, the pipe fitting configured to slidably receive a part of one of the stationary vertical upper part and the movable waste pipe arrangement may be any suitable pipe fitting described in this specification, such as an expansion fitting.

[0052] As the plumbing arrangement element may be prefabricated, less work at the installation site may be required to set up the waste pipe assembly required for the toilet bowl. The plumbing arrangement element may be fast and easy to install, in particular when compared to assembling the waste pipe assembly required from individual components provided separately, and there may be less room for installation errors. Further, the quality of the plumbing arrangement element and its components may be improved, in particular when compared to setting up the waste pipe assembly required from individual components provided separately.

[0053] The plumbing arrangement element required a relatively small installation surface area, i.e. footprint. The plumbing arrangement element is also simple to manufacture with mirrored handedness. The body of the movable unit may be manufactured so that it is symmetrical in the horizontal direction.

[0054] The plumbing arrangement element also allows installing two or more plumbing arrangement element vertically in alignment into a continuous structure extending to two or more vertically adjoining spaces, thereby forming a continuous vertical waste pipe system.

[0055] The plumbing arrangement element also makes it possible to adjust the height of the toilet bowl in a stepless manner.

[0056] Servicing and replacing the components the plumbing arrangement element may be relatively easy.

[0057] The plumbing arrangement element may, in some embodiments, allow readjusting the height of the toilet bowl even after the toilet bowl has been mounted. The toilet bowl may be removed before the readjusting.

[0058] The structure of the movable unit may be relatively low-cost to manufacture, and the movable unit and the plumbing arrangement element may be relatively easy to assemble. It is possible to connect the movable waste pipe arrangement to the movable unit instead of having to connect and support parts of the movable waste pipe arrangement separately to other parts of the plumbing assembly element. The movable unit and the movable waste pipe arrangement may also be easily simultaneously adjustable.

[0059] The detailed description provided below in connection with the appended drawings is intended as a description of the present examples and is not intended to represent the only forms in which the present example

may be constructed or utilized. However, the same or equivalent functions and sequences may be accomplished by different examples.

[0060] A plumbing arrangement element 100 of Fig. 1, shown as a side view, comprises a vertical support structure 110, which in this embodiment is a housing having a back wall 111 and side walls 112. The housing further comprises a front wall 113 which may be detachable. An attaching arrangement 115, for instance a nut and a bolt, for attaching the body 120 of the movable unit to the back wall 111 of the housing 110 can, in this Fig, be seen through an opening 116 in the front wall 113.

[0061] The plumbing arrangement element 100 further comprises a movable unit comprising a body 120 disposed within the housing 110. The body 120 of the movable unit has a vertical section 123 towards the front of the plumbing arrangement element 100. The movable unit has two pairs of orifices 121 disposed to the vertical section 123 to which to attach a toilet bowl. Threaded rods 122 may be mounted in the orifices 121. The length of the threaded rods 122 may vary, for instance depending on the toilet bowl to be mounted. The threaded rods 122 may or may not be included in the plumbing arrangement element 100. As they may be provided separately, they are not necessarily included in the structure to which to attach the toilet bowl. The distances between the two pairs of orifices 121, the distance between the orifices 121 of each pair and the diameter of the orifices 121 may be standardized, so that any toilet bowl configured to be wall mounted and conforming to the standard may be mounted to the threaded rods 122.

[0062] The movable unit further comprises an upper part 124 extending upwards from the body 120, the upper part 124 thus forming a structure to which to attach a toilet cistern. The toilet cistern 125 for holding flushing water, which may be included in the plumbing arrangement element 100 or provided separately to be attached later, may be attached to the upper part 124. Flushing water may be led to the cistern 125 through a flexible pipe, such as a flexible, i.e. bendable, cross-linked polyethylene (PEX) pipe. The movable unit also comprises a flushing water pipe assembly 135 that is connectable to the flushing water inlet of the toilet bowl. In another embodiment, the toilet cistern 125 may be stationarily connected or connectable to the vertical support structure. In such embodiments, the flushing water pipe assembly 135 may be adjustable in the vertical direction, for instance if the flushing water pipe assembly 135 comprises two parts, one of which is partially slidable inside the other so that the total length of the flushing water pipe assembly 135 is adjustable in the vertical direction in a manner similar to the waste pipe assembly.

[0063] The plumbing arrangement element 100 further comprises a waste pipe assembly 130 for conducting waste from the toilet bowl to the plumbing system of the building. The waste pipe assembly 130 has a lower end 132 and an upper end 133. The upper end 133 is connectable to the vertical waste pipe system 154a of the building above the plumbing arrangement element, and the lower end 132 is connectable to the vertical waste pipe system 154b below the plumbing arrangement element. The upper end 133, the lower end 132 or both may have a joint fitting (not shown) for connecting to the vertical waste pipe system 154a, 154b. The waste pipe assembly 130 thus extends substantially throughout the entire housing 110 and may extend outside the housing 110. The lower end 132 and the upper end 133 of the waste pipe assembly 130 may be connected to the vertical waste pipe system 154 of the building directly or via suitable vertical pipes and/or pipe fittings.

[0064] The waste pipe assembly 130 comprises a movable waste pipe arrangement 134, which is connected and secured to the body 120 of the movable unit via suitable pipe support members 170, such as brackets or clamps. The movable waste pipe arrangement 134 comprises a waste pipe fitting 131 for connecting the waste pipe assembly to the waste outlet of the toilet bowl. The waste pipe fitting 131 comprises a horizontal part having an inlet that is configured to be connected to the waste outlet of the toilet bowl. In this embodiment, the waste pipe fitting 131 has a bend of about 90°, for instance a bend of about 88.5°, but other suitable waste pipe fittings with different geometries and bends with other angles may also be contemplated. In another embodiment, the waste pipe fitting 131 may be formed of two pipe fittings, each having a bend of about 45°.

[0065] The movable waste pipe arrangement 134 further comprises a Y-shaped branch fitting 136 for connecting the waste pipe fitting 131 to the vertical parts of the waste pipe assembly 130. Other suitable branch fittings with different geometries may also be contemplated. In other embodiments, the waste pipe fitting 131 for connecting the waste pipe assembly to the waste outlet of the toilet bowl may be horizontal and directly connected to the vertical parts of the movable waste pipe arrangement 134. Further, in this embodiment, the branch of the Y-shaped branch fitting lies at an angle of about 45° to the vertical part of the Y-shaped branch fitting and to the movable waste pipe arrangement 134, but other angles, such as an angle of about 50-60° might save some space within the plumbing arrangement element 100. The movable waste pipe arrangement 134 may further comprise another branch fitting 137 for connecting a sink waste pipe arrangement 160 connectable to the outlet of a sink (not shown) adjacent to the plumbing arrangement element 100. Such a sink waste pipe arrangement may allow for connecting the outlet of a sink via the waste pipe assembly 130 to the vertical pipe system of the building, if a sink is to be placed adjacent to the plumbing arrangement element.

[0066] The waste pipe assembly 130 further comprises a stationary upper part comprising a vertical pipe 138 extending upwards from the movable waste pipe arrangement 134 and pipe support elements 171 for connecting the vertical pipe 138 stationarily to the housing 110. The vertical pipe 138 and other parts of the waste

pipe assembly 130 above the movable waste pipe arrangement may thus be stationarily connected to the housing 110 and thereby configured not to move in the vertical direction. In this exemplary embodiment, the waste pipe assembly 130 further comprises a pipe fitting 172 configured to be connected to the floor drain (not shown) of the space above the plumbing arrangement element. The branch fitting 137 for the sink could also be a part of the stationary upper part of the waste pipe assembly 130, for instance if connected to the vertical pipe 138.

[0067] The waste pipe assembly 130 further comprises an expansion fitting 139 connected to the upper end of the vertical pipe 138. The expansion fitting 139 may form the upper end 133 of the waste pipe assembly, or an intermediate pipe fitting (not shown) may be connected to the expansion fitting 139 for connecting the upper end 133 to the vertical waste pipe system 154a of the building above the plumbing arrangement element.

[0068] In this embodiment, the Y-shaped branch fitting 136 forms the lower end 132 of the waste pipe assembly 130. An intermediate pipe fitting (not shown) may be connected to the Y-shaped branch fitting 136 and extend downwards from the Y-shaped branch fitting 136. The intermediate pipe may then be connected to the vertical waste pipe system 154b of the building below the plumbing arrangement element.

[0069] The plumbing arrangement element 100 is mounted against a wall 155 of the building. The housing is mounted stationarily against the wall 155 using suitable means. The attaching arrangement 115 is in this embodiment configured to attach the vertical support structure to the structure of the building, in this embodiment to the wall. In this embodiment bolts of the attaching arrangement 115 extend through elongated openings in the movable unit 120 and the back wall 111 of the housing, thereby attaching both releasably to the wall of the building 155 and to each other. The attaching arrangement 115 could also be disposed to any part of the housing 110, for instance to various locations along the back wall 111. The upper part of the back wall 111 of the housing 110 is further attached to the wall 155 of the building using a second attachment arrangement 156, for instance a nut and a bolt.

[0070] The plumbing arrangement element 100 extends to a horizontal building structure 153a above and may be mounted to the horizontal building structure 153a using suitable means (not shown). The horizontal building structure may be a horizontal structure separating vertically adjoining spaces, such as an a floor structure, such as an intermediate floor or a concrete floor slab, a floor/ceiling structure, or it may be a ceiling.

[0071] When the plumbing arrangement element 100 is mounted, the body 120 of the movable unit may rest on structures below. In this embodiment, the body 120 of the movable unit is configured to rest on and against adjustable vertical support members 150 below the body 120, the adjustable vertical support members 150 extending to a support plate 151 resting on a surface material layer 152 of the horizontal building structure 153b below the plumbing arrangement element 100. In this embodiment, the adjustable vertical support members 150 comprise threaded rods and nuts to secure the body 120 in place at the selected height. The adjustable vertical support members 150 may be included in the plumbing arrangement element, but they may also be provided separately. However, other suitable adjustable support members could also be contemplated, such as angle irons or other structural steel parts, and be configured to allow the adjustment of the height of the movable unit. The weight of the toilet bowl and any additional load on the toilet bowl, when in use, may thus be mainly distributed to and borne by the adjustable vertical support members 150.

[0072] When the plumbing arrangement element 100 is mounted and the height of the movable unit has been adjusted, the toilet bowl may be mounted and a wall or panel (not shown) of a suitable material may be disposed in front of the plumbing arrangement element 100, e.g. a metal panel or tiling. Depending on the material of the wall or panel, it may be removable so that the plumbing arrangement element 100 may be accessed for servicing and replacing components.

[0073] Fig. 2 shows a perspective view of a part of the plumbing arrangement element 100. The movable unit and the movable waste pipe arrangement 134 may be configured to be set between an upper position and a lower position. Fig. 2A shows the movable unit and the movable waste pipe arrangement 134 in the upper position. In the upper position, the two pairs of orifices 121 disposed to the vertical section 123 to which to attach a toilet bowl and the threaded rods 122 inserted in the orifices 121 are also at their highest position.

[0074] The body 120 of the movable unit and the front wall 113 of the housing 110 are, in this embodiment, formed of folded metal sheets. The metal may be any suitable metal, such as steel or stainless steel. They might, however, also be formed of bent or deep drawn metal sheets or of aluminium profiles. The body 120 of the movable unit has a vertical indentation 126 in the front of the body 120. A vertical section of the housing, in this embodiment the front wall 113, of the housing has a complementary vertical indentation 114 that is substantially aligned and superimposed at least partially with the vertical indentation 126 of the body 120. The complementary vertical indentation 114 in the front wall 113 fits against the vertical indentation 126 in the front of the body 120. The body 120 may thus be slidingly adjustable, i.e. slidingly movable, with respect to the housing. When the body 120 is adjusted with respect to the housing 110, the housing 110 and in particular the complementary vertical indentation 114 may guide the movement of the body 120, so that it may be adjusted in the vertical direction only, and not in the lateral direction, i.e. the horizontal direction or a direction perpendicular to the vertical direction. Corresponding vertical indentations may be dis-

posed in the back of the body 120 and in the back wall 111 of the housing 110 (not visible in this Fig.) and/or in the side walls of the body 120 and any walls of the housing 110 that may lie against the side walls of the body. Sliding tape 173, for instance a polytetrafluoroethylene (PTFE) sliding tape or other low friction sliding tape, or another sliding aid or a mechanical sliding structure, such as a sliding rail, may be disposed between the body 120 and the housing 110 to assist in the adjusting of the body 120, for instance on the vertical indentation 126.

[0075] The body 120 may thus be relatively compact and provide sufficient space for fitting all required components within the housing 110 and the body 120.

[0076] When in use, the movable unit, including the body 120 and the upper part 124, and the movable waste pipe arrangement 134 may be adjusted simultaneously with respect to the vertical support structure, i.e. the housing 110, in the vertical direction. The plumbing arrangement element 100 may be mounted to the wall 155 when in the upper position, so that when the housing is mounted stationarily, the height of the movable unit comprising the orifices 121 and optionally the threaded rods 122 to which to attach toilet bowl may be adjusted. The movable unit and the movable waste pipe arrangement 134 may be lowered, i.e. adjusted downwards, until a desired height is reached. Then the movable unit may be secured stationarily to the housing 110 using suitable means (not visible in this Fig.). The body 120 of the movable unit may then be configured to rest against the adjustable vertical support members 150 below the body 120 at the desired height.

[0077] The lower end 132 of the waste pipe assembly 130, in this embodiment the lower end of the Y-shaped branch fitting 136, may simultaneously be lowered towards and through an opening 157 in the support plate 151 resting on the surface material layer 152 of the horizontal building structure 153b. A lead-through channel may extend from the opening 157 through the horizontal building structure 153b, so that the lower end of the waste pipe assembly may extend to the lead-through channel. The lower end 132 may then be connected to a vertical waste pipe system 154b of the building below the plumbing arrangement element or, as in this exemplary embodiment, to an expansion fitting 239 at the upper end of the waste pipe assembly of a second plumbing arrangement element below the horizontal building structure as described in more detail below.

[0078] The side wall 112 of the housing 110 has an elongated opening 161 that is configured to allow the vertical adjustment of the sink waste pipe arrangement 160 connectable to the outlet of a sink (not shown) adjacent to the plumbing arrangement element 110. Other aspects of the embodiment shown in Figs 2A and 2B are generally similar to those of the embodiment shown in Fig. 1.

[0079] The side walls 112 may have a width of less than 300 mm, or less than 250 mm, or less than 220 mm. The depth of the plumbing arrangement element 100 (i.e. in this embodiment, the distance between the front wall 113 and the back wall 111 of the housing 110) may thus be less than 300 mm, or less than 250 mm, or less than 220 mm.

[0080] Fig. 2B shows the same movable unit and movable waste pipe arrangement 134 in the lower position. When in use in the lower position, the body 120 of the movable unit lies lower with respect to the housing 110 and rests on the adjustable vertical support members 150. The lower end of the Y-shaped branch fitting 136 extends through the opening 157 and the lead-through channel (not visible) extending downwards from the opening. The lower end of the Y-shaped branch fitting 136 may be connected to the vertical waste pipe system 154 of the building below the plumbing arrangement element or, as in this exemplary embodiment, to the expansion fitting 239 (not visible) at the upper end of the waste pipe assembly of a second plumbing arrangement element below the horizontal building structure.

[0081] Depending on the desired height of the structure to which to attach the toilet bowl and thereby the desired height of the toilet bowl to be attached, the movable unit and the movable waste pipe arrangement 134 may be set continuously between any position between the upper position and the lower position. The term "height of the structure to which to attach the toilet bowl" may be understood as referring to the vertical distance of the structure to which to attach the toilet bowl from the horizontal building structure on which the plumbing arrangement element may be configured to rest, when in use.

[0082] Fig. 3 illustrates an exploded view of an embodiment of a movable unit and a movable waste pipe arrangement. The body 120 of the movable unit comprises three parts 127, 128 and 129 formed of folded sheet metal, for instance folded, bent or deep drawn steel or stainless steel sheets. The front part 127 has a vertical section 123 having orifices 121 to which to attach the toilet bowl.

[0083] The front part 127 also has a vertical indentation 126 that may be substantially aligned or superimposed at least partially with the complementary vertical indentation 114 in the front wall 113 in the housing shown in Figs. 1 and 2. A pipe support member 170, such as a bracket or a clamp, is connected to the front part 127 for connecting and securing the waste pipe fitting 131 to the waste outlet of the toilet bowl.

[0084] The body 120 further comprises a back part 128. The back part 128 has an opening 181 for leading through the branch fitting 137 for the sink waste pipe arrangement 160 connectable to the outlet of a sink (not shown). The movable waste pipe arrangement 134 may be connected and secured to the back part 128 using suitable pipe support members 170, such as brackets or clamps. The back part 128 may comprise means for securing the body 120 stationarily to the housing 110. In this embodiment, the back part 128 comprises a back wall 182 that may be disposed against the back wall 111 of the housing 110 and secured e.g. with a bolt through the orifice 183. In embodiments comprising another type

of vertical support structure than a housing, such as a vertical panel or wall or a vertical rail, the back wall 182 of the back part 128 may be disposed against the vertical support structure.

[0085] In this embodiment, the back wall 182 of the back part 128 also has a vertical indentation 126. A complementary vertical indentation may be disposed in the back wall 111 of the housing 110, so that the vertical indentation 126 of the back wall 182 of the back part 128 and the complementary vertical indentation of the back wall 111 of the housing 110 may be substantially aligned or superimposed at least partially. The vertical indentations serve as guides for the adjusting of the movable unit. Other guiding structures may also be contemplated instead of the vertical indentations 126, such as other structures in one of the the vertical support structure or in the body 120 of the movable unit projecting against complementary structures in the other. In an embodiment, the vertical support structure may comprise protrusions or other slidable elements and the body 120 of the movable unit may comprise one or more grooves configured to receive the protrusions such that the protrusions may move along the one or more grooves when the movable unit is adjusted. In another embodiment, the body 120 of the movable unit may comprise protrusions and the vertical support structure may comprise one or more grooves configured to receive the protrusions such that the protrusions may move along the one or more grooves when the movable unit is adjusted.

[0086] The body 120 further comprises an intermediate part 129 disposed between the front part 127 and the back part 128. The intermediate part 129 may be configured to rest on and against the adjustable vertical support members 150. As it may bear, when in use, most of the weight and load from the toilet bowl to be attached, the intermediate part 129 may be made of a material that is thicker and/or stronger than the material of the front part 127 and the back part 128. The intermediate part 129 has orifices 121 configured to receive the threaded rod 122. The intermediate part may be provided with a counterpart, such as a nut fastened to the intermediate part 129, the counterpart having inner threads so that it is configured to receive and engage the threaded rod 122. The edges of the orifices 121 may also be provided with inner threads. The orifices 121 of the intermediate part 129 are aligned with the orifices 121 in the vertical section 123 of the front part 127. In other embodiments, it is possible not to include the intermediate 129 part, for instance if the front part 127 and the back part 128 are formed of a material strong enough to bear the load from the toilet bowl to be attached.

[0087] The front part 127, the back part 128 and the intermediate part 129 may be secured together using suitable fastening means, such as nuts and bolts or rivets. They may be secured together by welding, which may improve the load-bearing capacity of the body 120. They may also be attached releasably, thus allowing access to the inside of the body 120, for instance by removing the front part 127. It would also be possible to combine or integrate the front part 127, the back part 128 and the intermediate part 129 into a single piece, i.e. to form the body 120 as a single piece. The body 120 may be a hollow structure having walls formed from folded, bent or deep drawn sheet metal, the walls having suitable openings for leading various parts of the movable waste pipe arrangement through the walls of the body 120. It would also be possible to provide a body 120 comprising two, four or more parts formed of folded, bent or deep drawn sheet metal secured together. It would further be possible to provide a body 120 formed of aluminium profiles secured together.

[0088] The body 120 has four walls and a number of openings in the walls for leading through various components of the waste pipe assembly. In this embodiment, the body 120 is symmetrical in the lateral direction. If it is necessary to change the handedness of the plumbing arrangement element, it is not necessary to change the design of the body 120.

[0089] The upper part 124 and the cistern 125 attached to the upper part 124 above the body 120 of the movable unit may be secured to the body 120 using suitable means. The front part 127, in this embodiment the vertical indentation 126, has an opening 180 for leading through the flushing water pipe assembly 135 that is connectable to the flushing water inlet of the toilet bowl to be mounted.

[0090] The movable waste pipe arrangement 134 comprises the Y-shaped branch fitting 136 or other branch fitting to which the waste pipe fitting 131 is connected. As toilet bowls configured for wall mounting typically have a horizontal waste outlet, the waste pipe fitting 131 may have a horizontal part that is connectable to the waste outlet of the toilet bowl, and optionally one or more vertical or inclined parts. The waste pipe fitting 131 has, in this embodiment, a bend of about 88.5°, but other suitable waste pipe fittings with different geometries may also be contemplated. The inclined part of the waste pipe fitting 131 is connected to the branch of the Y-shaped branch fitting 136. The branch fitting 137 for connecting a sink waste pipe arrangement 160 is disposed above and connected to the Y-shaped branch fitting 136.

[0091] One of the stationary part of the waste pipe assembly 130 and the movable waste pipe arrangement may be partially slidable inside the other so that the total length of the waste pipe assembly is adjustable in the vertical direction. In this exemplary embodiment, the movable waste pipe arrangement 134 further comprises an expansion fitting 140 at the upper part of the movable waste pipe arrangement 134. The lower end of the vertical pipe 138 extending upwards from the movable waste pipe arrangement 134 that is shown in Fig. 1 may be inserted into the expansion fitting 140, such that the lower end of the vertical pipe 138 is inserted to a depth inside the expansion fitting. The vertical pipe 138, being a part of the stationary part of the waste pipe assembly 130, and the movable waste pipe arrangement 134, may thus be partially slidable inside the other so that the total length

of the waste pipe assembly 130 is adjustable in the vertical direction. In other embodiments, an expansion fitting could be disposed such that the movable waste pipe arrangement 134 would be partially slidable to the expansion fitting connected to the vertical pipe 138. The depth may be adjusted so that the movable waste pipe arrangement 134 may be adjusted to a desired height. The expansion fitting 140 and the movable waste pipe arrangement 134 may therefore be configured to be adjusted with respect to the housing 110 and any stationary part of the waste pipe assembly 130, including the vertical pipe 138 while maintaining a fluid connection throughout the waste pipe assembly 130.

[0092] When the movable unit and the movable waste pipe arrangement 134 are in the upper position, the end of the vertical pipe 138 may be inserted to a depth inside the expansion fitting that is smaller than the depth when the movable unit and the movable waste pipe arrangement 134 are in the lower position. In other embodiments, a further waste pipe component such as a waste pipe fitting could be provided between the vertical pipe 138 and the expansion fitting 140, such that the further component could be inserted into the expansion fitting 140 instead of the vertical pipe 138. The expansion fitting 140 therefore provides an adjustable jointing between the movable waste pipe arrangement 134 and the stationary vertical part of the waste pipe assembly. The expansion fitting may be configured to allow a vertical adjustment of about 20 - 200 mm.

[0093] It may also be possible to combine or integrate one or more of the components of the movable waste pipe arrangement 134, such as the waste pipe fitting 131, the Y-shaped branch fitting 136, branch fitting 137 for connecting a sink waste pipe arrangement 160 and/or the expansion fitting 140, into a single piece. This may reduce the number of pipe connections required and simplify their manufacture.

[0094] Other aspects of the embodiment shown in Fig. 3 are generally similar to those of the embodiments shown in Figs. 1, 2A and 2B.

[0095] Fig. 4 shows a top sectional view of an embodiment of the plumbing arrangement element. The front wall 113 of the housing has a complementary vertical indentation 114 that is substantially aligned and superimposed at least partially with the vertical indentation 126 of the body 120. The complementary vertical indentation 114 in the front wall 113 fits against the vertical indentation 126 in the front of the body 120. In this Fig., parts of the front wall 113 are not shown, and thus the back wall 111 of the housing 110 is visible. The back wall 182 of the back part 128 of the body 120 has a second vertical indentation 126, which is substantially aligned with the second complementary vertical indentation 114 in the back wall 111 of the housing. When the body 120 is adjusted with respect to the housing 110, the housing 110 and in particular the complementary vertical indentations 114 may guide the sliding movement of the body 120, so that it may be adjusted in the vertical direction only, and not in the lateral direction, i.e. the horizontal direction or a direction perpendicular to the vertical direction.

[0096] Fig. 4 shows the plumbing arrangement element 100 in use, when the height of the body 120 of the movable unit and the structure to which to attach the toilet bowl has already been adjusted. The back wall 182 of the movable unit is releasably attached to the back wall 111 of the housing and to the wall 155 with the attachment arrangement 115, in this embodiment a nut and a bolt, the bolt passing through the elongated orifice 183 and a corresponding orifice in the back wall 111.

[0097] In this embodiment, the side walls 112 and the front wall 113 of the housing 110 could be disposed of, the back wall 111 thus being the vertical section functioning as the vertical support structure.

[0098] This embodiment of the plumbing arrangement element 100 further comprises a cold water pipe arrangement 174, a hot water pipe arrangement 175 and a heating conduit 176, each surrounded by insulation 177.

[0099] Other aspects of the embodiment shown in Fig. 4 are generally similar to those of the embodiments shown in Figs. 1, 2A and 2B and 3.

[0100] Fig. 5 illustrates an exemplary embodiment of a plumbing system 300. Fig. 5 is intended as a schematic representation of the system rather than an actual sectional view through the entire system, as the floor/ceiling structure is shown as a sectional view while the plumbing arrangement elements are shown as a side view. The plumbing system comprises a first plumbing arrangement element 100 and a second plumbing arrangement element 200 located in two vertically adjoining spaces such as rooms, for instance toilets, bathrooms, washrooms or lavatories, separated by the floor/ceiling structure 153, the second plumbing arrangement element 200 located below the first plumbing element 100. For clarity, only a part of both elements is shown. The aspects of the embodiment of the elements shown in Fig. 5 are generally similar to those of the embodiments shown in Figs. 1, 2A and 2B, 3 and 4.

[0101] The lower end 132 of the first waste pipe assembly 130 is, when in use, connected to the upper end 233 of the second waste pipe assembly 230, so that the first 100 and second 200 plumbing arrangement elements form a continuous vertical waste pipe system between the vertically adjoining spaces. The upper part of the second waste pipe assembly 230 comprises an expansion fitting 239, and the lower end 132 of the first waste pipe assembly 130 is connected the expansion fitting 239 at the upper end of the second waste pipe assembly 130 via an intermediate pipe fitting 191 extending through the opening 157 and the lead-through channel 190. As the thickness of the horizontal building structure 153 may vary, the intermediate pipe fitting 191 may be an intermediate pipe that may be cut to length at the installation site. The intermediate pipe fitting 191 may thus not necessarily be included in the plumbing arrangement element 100, 200 but may be provided separately.

[0102] The upper end 192 of the intermediate pipe fit-

ting 191 may first be connected or attached to the Y-shaped branch fitting 136, which forms the lower end 132 of the first waste pipe assembly 130. The lower end 193 of the intermediate pipe fitting 191 may then be placed or inserted into the expansion fitting 239, such that the lower end 193 of the intermediate pipe fitting 191 is inserted to a depth inside the expansion fitting 239. The depth may be adjusted so that the first movable waste pipe arrangement 134 of the first waste pipe assembly 130 may be adjusted to a desired height. Upon adjusting, the intermediate pipe fitting 191 is thus partially sliding inside the expansion fitting 239. Thus the height of the structure to which to attach the toilet bowl may be adjusted by lowering the first movable unit 120, the first movable waste pipe arrangement 134 and the intermediate vertical pipe fitting 191 in the vertical direction with respect to the first housing 110 of the first plumbing arrangement element 100, so that the lower end of the intermediate pipe fitting 191 moves slidably within the expansion fitting 239. The first movable waste pipe arrangement 134 may therefore be configured to move with respect to the first housing 110 and any stationary part of the first waste pipe assembly 130, thus forming and maintaining a fluid connection sealedly with the second waste pipe assembly 230. When the first movable unit 120 and the first movable waste pipe arrangement 134 are in the upper position, the lower end of the intermediate pipe fitting 191 may be inserted to a depth inside the expansion fitting 239 that is smaller than the depth when the first movable unit 120 and the first movable waste pipe arrangement 134 are in the lower position. In other embodiments, a further waste pipe component such as a waste pipe fitting could be provided between the Y-shaped branch fitting 136 and the intermediate pipe fitting 191 and/or between the intermediate pipe fitting 191 and the expansion fitting 239. The expansion fitting 239 in the upper part of the second waste pipe assembly 230 therefore provides an adjustable jointing between the first movable waste pipe arrangement 134 and the stationary vertical part of the second waste pipe assembly 230. The expansion fitting may be configured to allow a vertical adjustment of at least 20 mm, or about 20 - 200, or about 60 - 100 mm.

[0103] In embodiments where the plumbing arrangement element comprises two or more expansion fittings, they may together allow a vertical adjustment of at least 20 mm, or at least 60 mm, or about 20-250 mm.

[0104] It is obvious to a person skilled in the art that with the advancement of technology, the basic idea of the invention may be implemented in various ways. The invention and its embodiments are thus not limited to the examples described above; instead they may vary within the scope of the claims. The term "comprising" is used in this specification to mean including the feature(s) or act(s) followed thereafter, without excluding the presence of one or more additional features or acts. It will further be understood that reference to 'an' item refers to one or more of those items.

Claims

1. A plumbing arrangement element (100) configured to be mounted to a structure (153, 155) of a building comprising a vertical waste pipe system (154a, 154b), the plumbing arrangement element being configured to support a toilet bowl having a waste outlet, wherein the plumbing arrangement element comprises
   a vertical support structure (110) configured to be mounted stationarily to the structure of the building;
   a movable unit (120), the movable unit comprising a structure (121) to which to attach the toilet bowl; and
   a waste pipe assembly (130) for conducting waste from the toilet bowl to the vertical waste pipe system of the building, the waste pipe assembly comprising a movable waste pipe arrangement (134), and the movable waste pipe arrangement comprising a waste pipe fitting (131) for connecting the waste pipe assembly to the waste outlet of the toilet bowl; **characterized in that**
   the waste pipe assembly has an upper end (133) and a lower end (132), wherein the upper end is connectable to the vertical waste pipe system (154a) of the building above the plumbing arrangement element, and the lower end is connectable to the vertical waste pipe system (154b) below the plumbing arrangement element; and
   the movable unit and the movable waste pipe arrangement are configured to be adjustable with respect to the vertical support structure in the vertical direction, the vertical support structure forming a guide for the adjustment of the movable unit in the vertical direction, the plumbing arrangement element thereby being configured to allow the height adjustment of the structure (121, 123) to which to attach the toilet bowl.

2. The plumbing arrangement element according to claim 1, wherein the movable unit comprises a body (120) formed of sheet metal or of aluminium profiles, the body being slidably adjustable in the vertical direction with respect to the vertical support structure (110), the vertical support structure forming a guide for the adjustment of the body of the movable unit in the vertical direction.

3. The plumbing arrangement element according to claim 2, wherein the vertical support structure (110) comprises at least one vertical section (113) formed of sheet metal or of aluminium profiles, the vertical section forming a guide for the adjustment of the body of the movable unit in the vertical direction.

4. The plumbing arrangement element according to any one of claims 1 - 3, wherein the plumbing arrangement element (100) comprises a number of pipe support members (170) for attaching the mov-

able waste pipe arrangement (134) to the movable unit.

5. The plumbing arrangement element according to any one of claims 1 - 4, wherein the waste pipe assembly (130) comprises a stationary part (138, 139) that is stationary with respect to the vertical support structure (110), wherein one of the stationary part and the movable waste pipe arrangement (134) is partially slidable inside the other so that the total length of the waste pipe assembly is adjustable in the vertical direction.

6. The plumbing arrangement element according to any one of claims 1 - 5, wherein the waste pipe assembly (130) comprises a stationary vertical upper part (138, 139) that is stationary with respect to the vertical support structure, and a pipe fitting (140) configured to slidably receive a part of one of the stationary vertical upper part and the movable waste pipe arrangement (134), thereby connecting the stationary vertical upper part and the movable waste pipe arrangement (134) so that the total length of the waste pipe assembly is adjustable in the vertical direction.

7. The plumbing arrangement element according to any one of claims 1 - 6, wherein the upper part of the waste pipe assembly (230) comprises a pipe fitting (239) configured to slidably receive a part of a second waste pipe assembly (130) of a second plumbing arrangement element (100) or an intermediate pipe fitting (191), the intermediate pipe fitting being connected or connectable to a second waste pipe assembly of a second plumbing arrangement element, to thereby connect the second waste pipe assembly to the waste pipe assembly (230).

8. The plumbing arrangement element according to any one of claims 1 - 7, wherein the plumbing arrangement element 100 is configured to allow an adjustment of the total length of the waste pipe assembly (130) of at least 20 mm, or at least 60 mm, or about 20 - 250 mm, and an adjustment of the height of the structure (121, 123) to which to attach the toilet bowl of at least 2 mm, or about 2 - 50 mm.

9. The plumbing arrangement element according to any one of claims 1 - 8, wherein the movable waste pipe arrangement (134) comprises a sink waste pipe arrangement (160) that is connectable to an outlet of a sink.

10. The plumbing arrangement element according to any one of claims 1 - 9, wherein the plumbing arrangement element (100) is a prefabricated plumbing arrangement element.

11. The plumbing arrangement element according to any one of claims 1 - 10, wherein the movable unit comprises a flushing water pipe assembly (135), a structure (124) to which to attach a toilet cistern, and optionally a toilet cistern (125).

12. A plumbing system, comprising a first plumbing arrangement element (100) and a second plumbing arrangement element (200), wherein the first and second plumbing arrangement elements are located in two vertically adjoining spaces; wherein
the first and second plumbing arrangement elements are plumbing arrangement elements according to any one of claims 1 - 11;
the first plumbing arrangement comprises a first waste pipe assembly (130) having a lower end (132) and an upper end (133) and the second plumbing arrangement comprises a second waste pipe assembly (230) having a lower end and an upper end (233);
the lower end of the first waste pipe assembly is connected or connectable to the upper end of the second waste pipe assembly; and
the first and second plumbing arrangement elements are configured to form a continuous vertical waste pipe system (130, 230) between the vertically adjoining spaces.

13. The plumbing system according to claim 12, wherein one of the upper end of the second waste pipe assembly (230) and the lower end (132) of the first waste pipe assembly (130) is partially slidable inside the other so that the upper end of the second waste pipe assembly and the lower end of the first waste pipe assembly are slidably adjustable with respect to each other in the vertical direction.

14. A method for installing the plumbing arrangement element according to any one of claims 1 - 11, comprising
mounting the vertical support structure (110) stationarily to a structure of a building (153, 155);
adjusting the height of the structure (121) to which to attach the toilet bowl by adjusting the movable unit and the movable waste pipe arrangement (134) in the vertical direction with respect to the vertical support structure (110); and
optionally attaching the toilet bowl to the structure to which to attach the toilet bowl.

15. The method according to claim 14, wherein the waste pipe assembly (130) comprises a stationary part (138, 139) that is stationary with respect to the vertical support structure (110); wherein the method comprises sliding one of the stationary part and the movable waste pipe arrangement (134) partially inside the other, thereby adjusting the total length of the waste pipe assembly in the vertical direction.

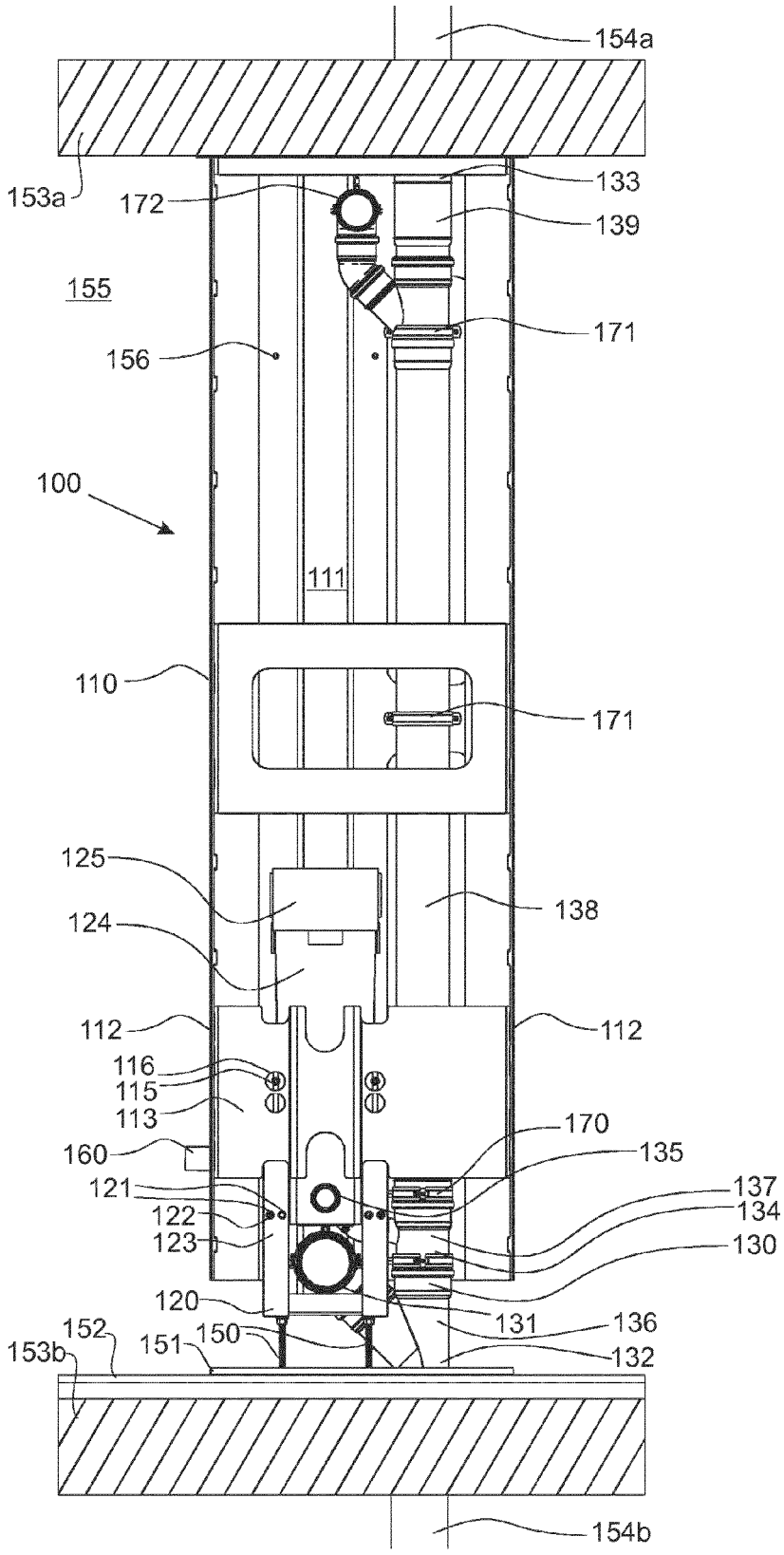
154a
153a
172
133
139
155
171
156
100
111
110
171
125
138
124
112
112
116
115
113
160
170
135
121
137
122
134
123
130
120
131
136
152
151
150
132
153b
154b

Fig. 1

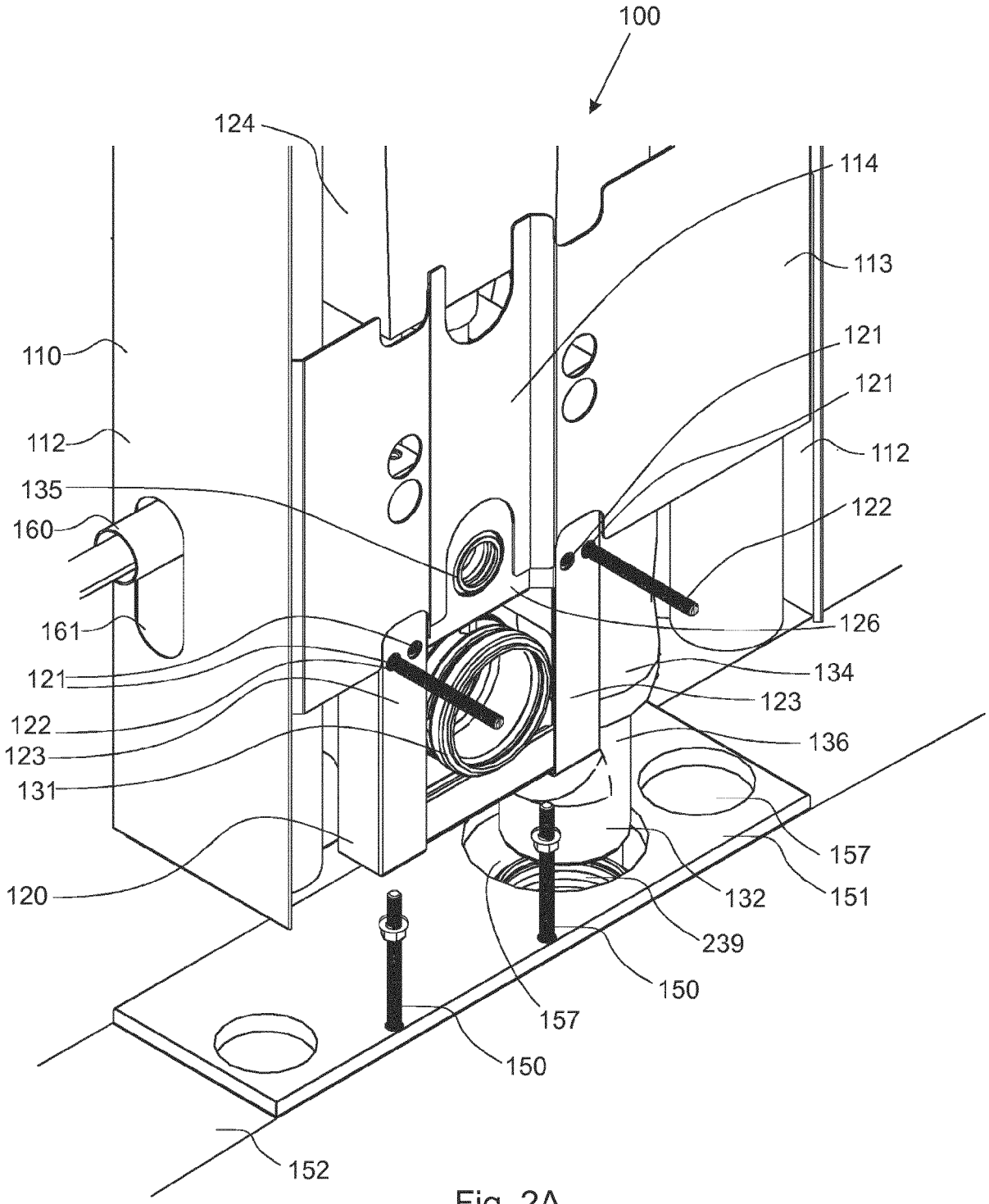
100
124
114
113
110
121
121
112
112
135
122
160
126
161
134
121
123
122
136
123
131
157
120
132
151
239
150
157
150
152

Fig. 2A

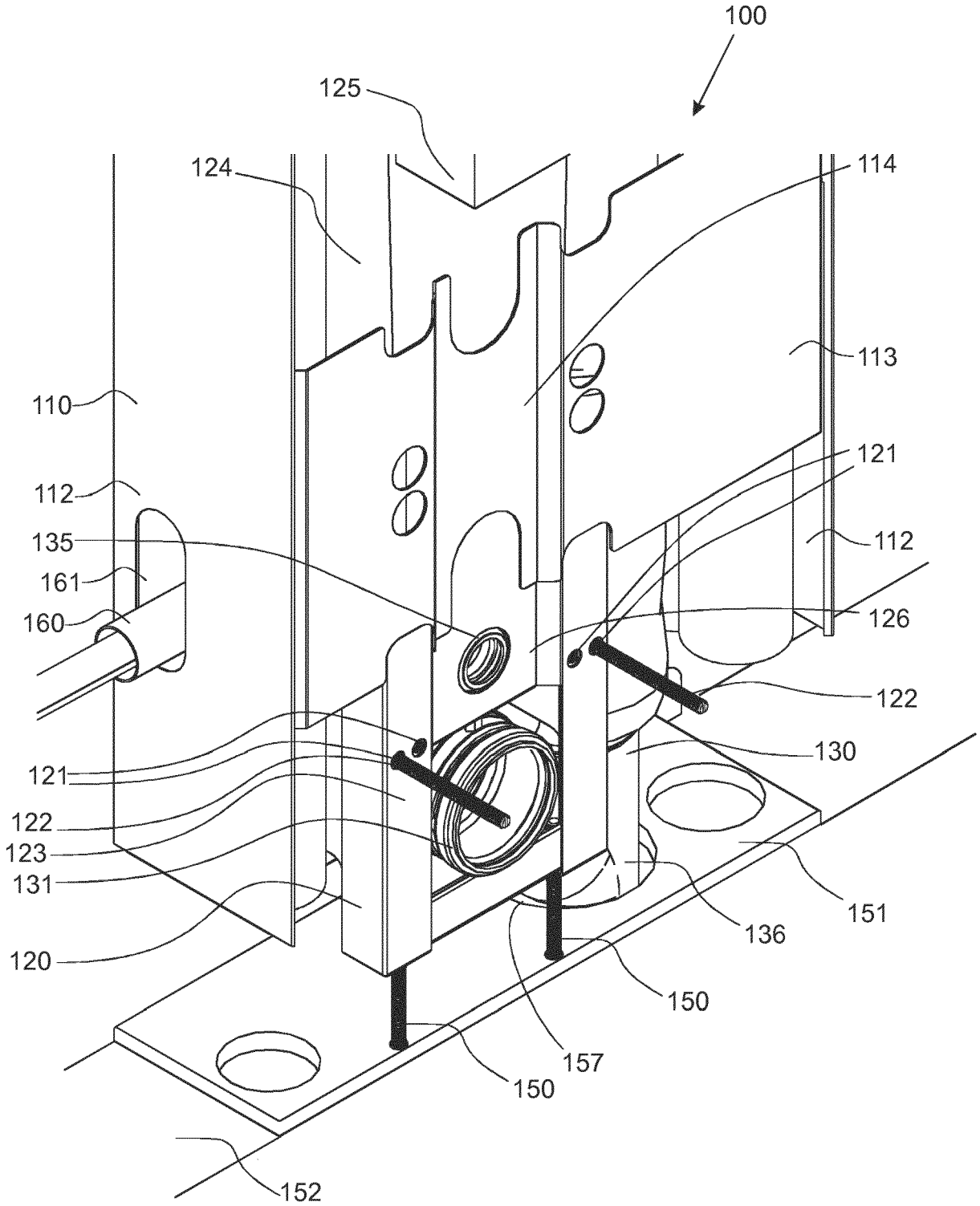
100
125
124
114
113
110
121
112
135
112
161
126
160
122
130
121
122
123
131
151
136
120
150
157
150
152

Fig. 2B

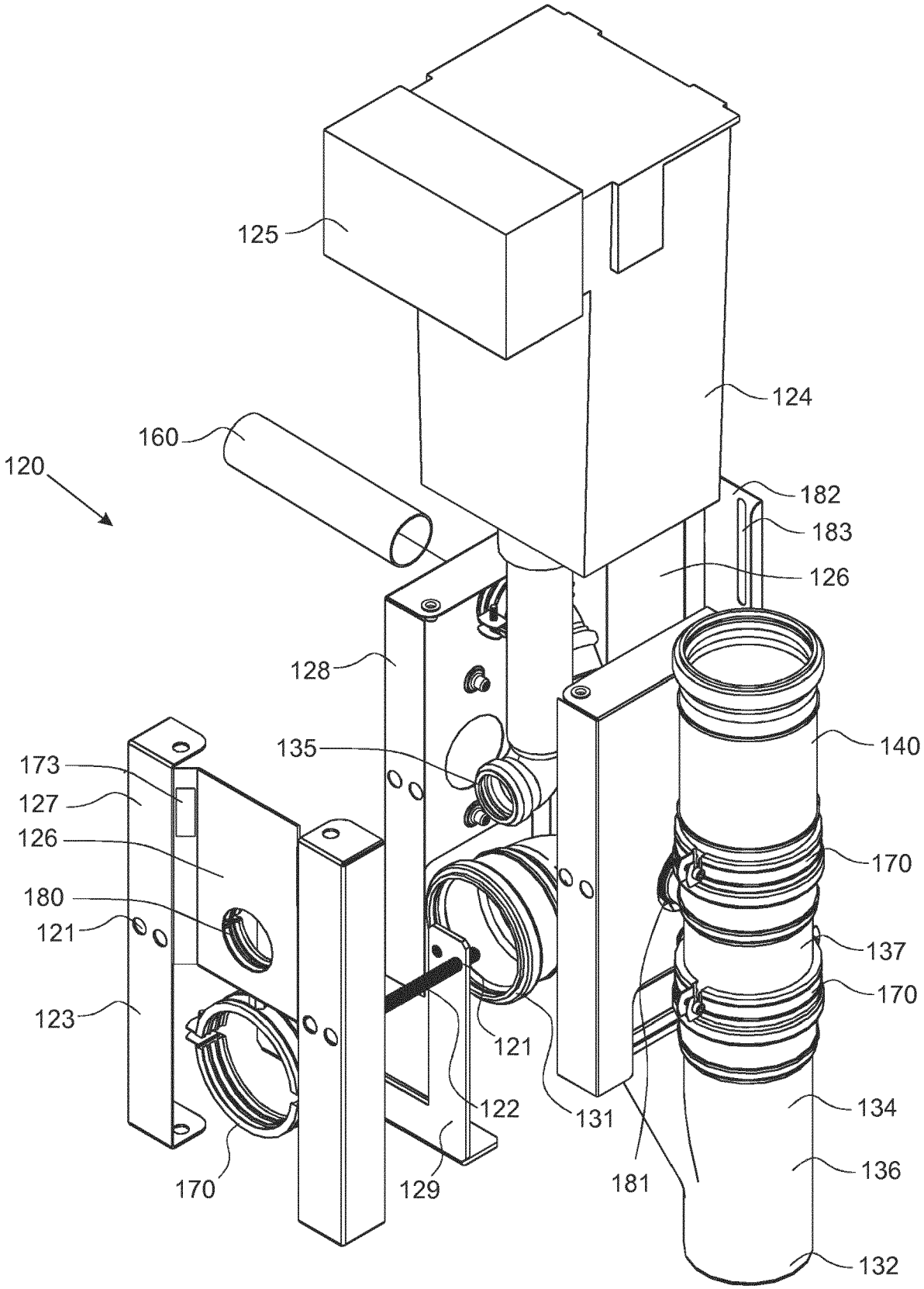
125
124
160
120
182
183
126
128
135
140
173
127
126
170
180
121
137
170
123
121
122
131
134
136
170
129
181
132

Fig. 3

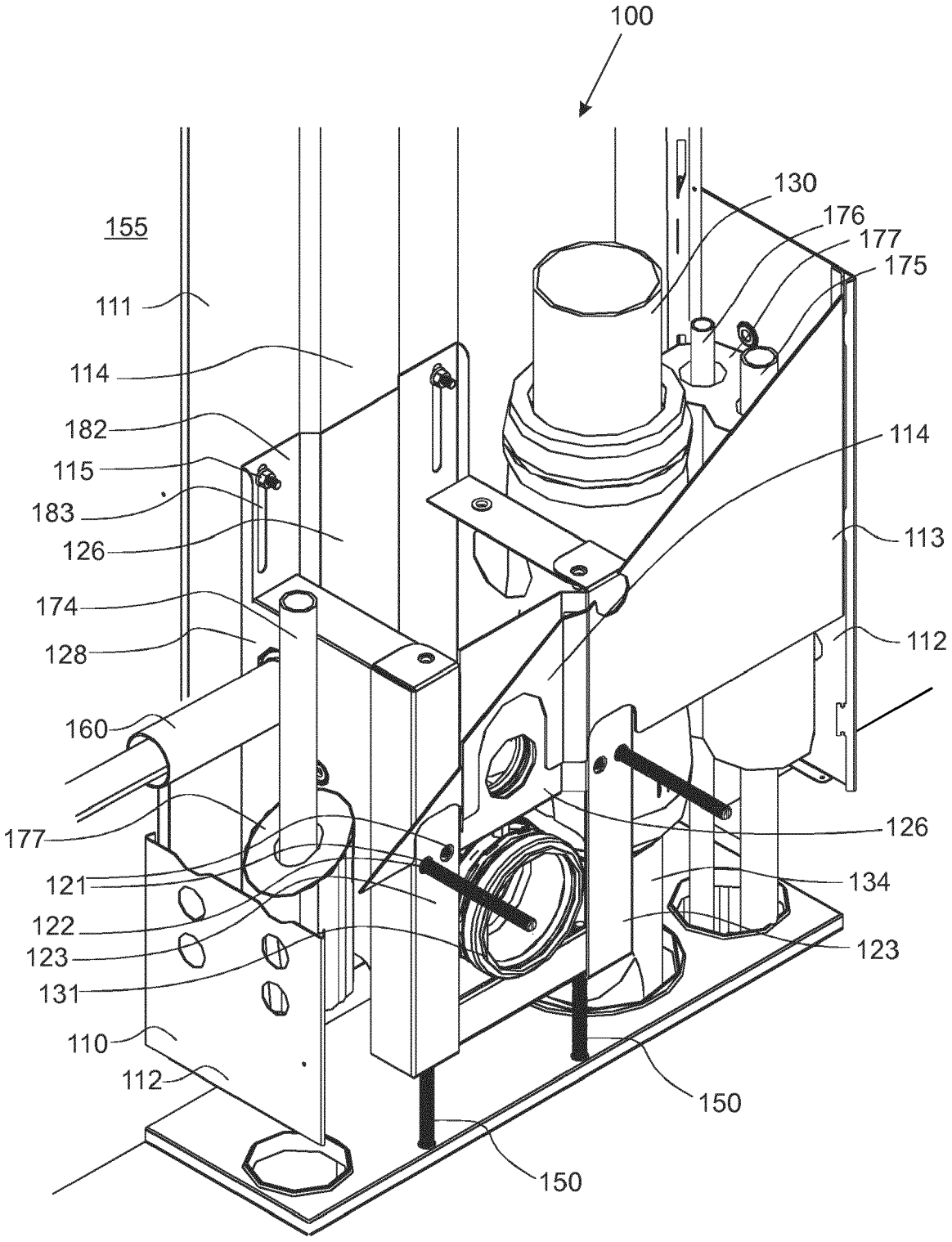
100
155
111
114
182
115
183
126
174
128
160
177
121
122
123
131
110
112
130
176
177
175
114
113
112
126
134
123
150
150

Fig. 4

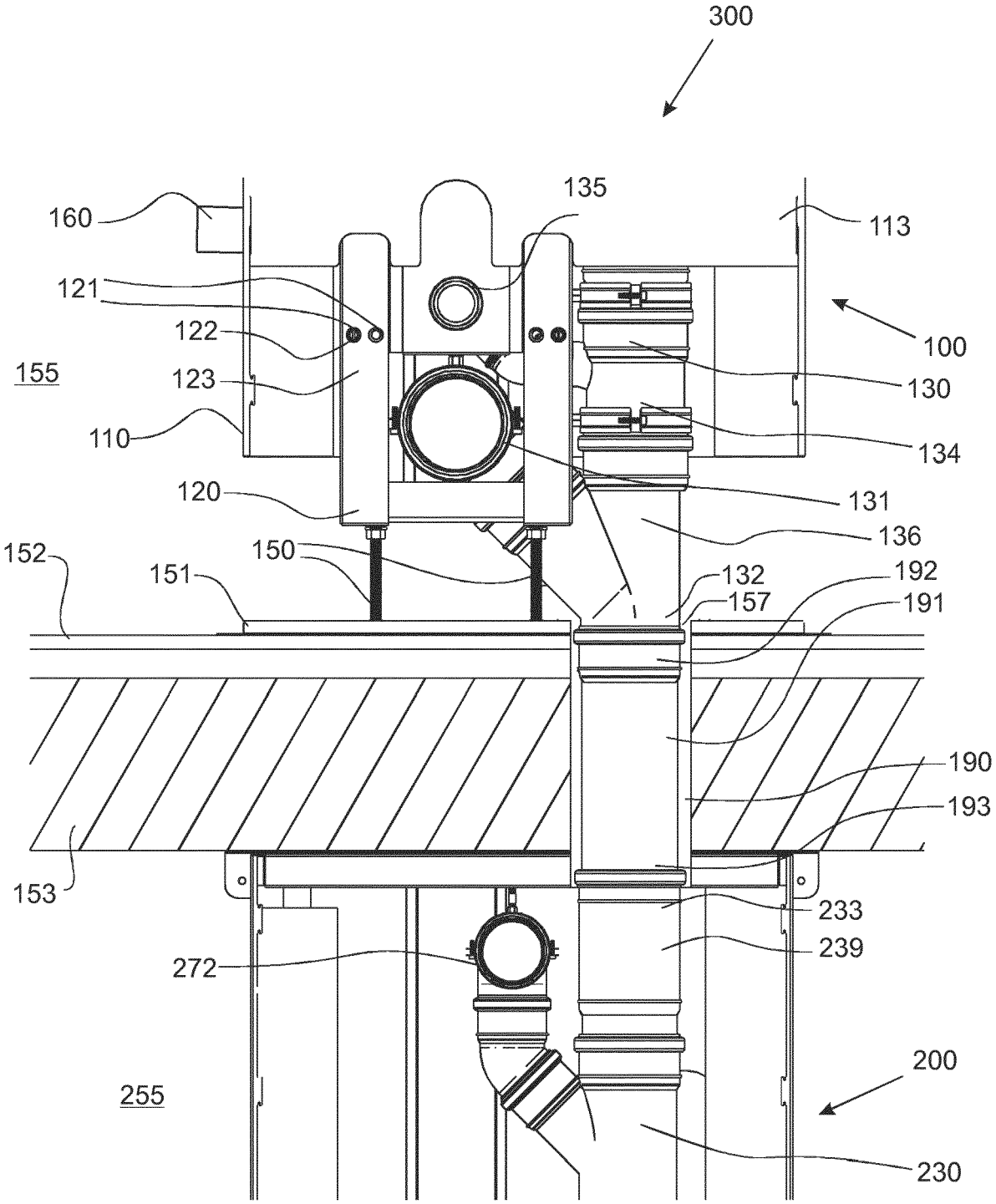
300
160
135
113
121
122
155
123
100
130
110
134
120
131
136
152
150
151
132
192
157
191
190
193
153
233
239
272
200
255
230

Fig. 5

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 16 16 0464

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 359 262 A1 (APRECO V O F [NL]) 5 November 2003 (2003-11-05)	1-6,8, 10,11, 14,15	INV. E03D11/12 E03D11/14
Y	* column 5, paragraph 21 - column 6, paragraph 24 * * column 9, paragraphs 32, 33; figures 1, 2, 3, 5 *	1-3,7-15	E04F17/00 E04C2/52

X	DE 89 12 047 U1 (ERICH GARY) 30 November 1989 (1989-11-30)	1-6,8, 10,11, 14,15	
	* page 4, line 20 - page 6, line 32; figures 1-4 *		

Y	DE 295 07 439 U1 (ROHLOFF INGO [DE]) 29 June 1995 (1995-06-29)	1,7-15	
A	* the whole document *	4,5	

Y	WO 94/06975 A1 (LASSE BUTLER ARKITEKTKONTOR AB [SE]; BUTLER THEOBALD LARS [SE]) 31 March 1994 (1994-03-31) * the whole document *	1,7,8, 10-15	
	-----		TECHNICAL FIELDS SEARCHED (IPC)
Y	FR 2 971 530 A1 (NEXILIS [FR]) 17 August 2012 (2012-08-17)	1-3,10, 11,14	E03D E04F E04C
A	* page 7, line 15 - page 11, line 17; figures *	8	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 September 2016	Fajarnés Jessen, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 16 0464

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

14-09-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1359262 A1	05-11-2003	EP 1359262 A1	05-11-2003
		NL 1020434 C2	21-10-2003
DE 8912047 U1	30-11-1989	NONE	
DE 29507439 U1	29-06-1995	NONE	
WO 9406975 A1	31-03-1994	EP 0665919 A1	09-08-1995
		WO 9406975 A1	31-03-1994
FR 2971530 A1	17-08-2012	FR 2971530 A1	17-08-2012
		WO 2012110713 A1	23-08-2012

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82