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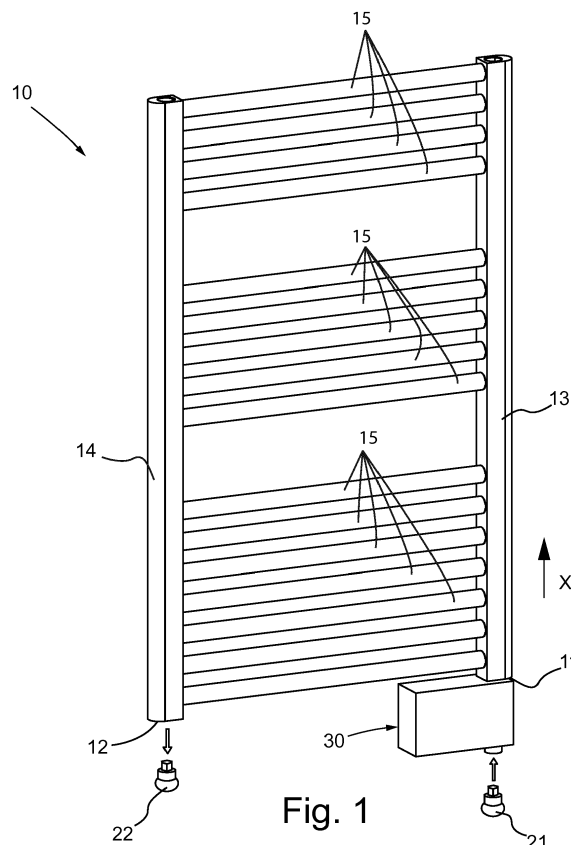
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(54) **CONTROL DEVICE FOR A RADIATOR, RADIATOR OF THE ELECTRO-HYDRAULIC TYPE COMPRISING SAID CONTROL DEVICE, METHOD FOR CONTROLLING SAID RADIATOR**

(57) A control device (30) for a radiator (10) having an inlet mouth (11) and an outlet mouth (12) that can be connected to respective hydraulic fittings of a hydraulic system comprising: a three-way junction element (31) having a first (32) and a second (33) mouth coaxial to one another between which a main duct extends, and a third mouth (34), the first mouth (32) being arranged to be connected to at least one of the mouths of the radiator (10), the third mouth being arranged to be connected to one of the hydraulic system fittings such that such fitting is substantially coaxial with the first (32) and the second (33) mouth; an electric heater (35), the electric heater (35) having an end coupled to the second mouth (33) and extending within the three-way junction element (31) until passing through the first mouth (32), and protruding outside, the electric heater (35) being selectively connectable to a power supply line; an electrovalve unit (37, 38) arranged to selectively open a fluid connection between the three-way junction element (31) and the hydraulic system; an electronic control unit (40) configured to drive the electrovalve unit (37, 38) and control the selective connection between the electric heater (35) and the power supply line.



Description

[0001] The present invention relates to a control device for a radiator, a radiator of the electro-hydraulic type comprising said control device and a control method of such radiator.

[0002] The towel rail radiators are currently very widespread, and are much appreciated for the pleasant aesthetic and functionality thereof.

[0003] Among the towel rail radiators, in particular, the so-called towel warmers are commonly used in bathrooms as they offer the possibility not only to heat the room but also to heat or dry the bathroom towels.

[0004] For simplicity of description hereinafter, non-limiting reference will be made to the towel warmers; however, similar considerations may be applied to all radiators. Typically the towel warmers have a structure adapted to be fixed to a wall, generally composed of two column elements parallel to each other and intended to be vertically installed with respect to the ground, and from a plurality of transversal elements that extend parallel to each other between the two column elements. The column elements and the transversal elements consist of tubular bodies of various shape internally hollow, and are connected to each other so as to form a hydraulic circuit.

[0005] The towel warmers of the hydraulic type are arranged to be connected to a hydraulic distribution system of a thermal carrier liquid, typically hot water at an entrance temperature generally comprised between 40°C and 85°C.

[0006] In particular, the column elements are connected one to the supply line fitting of the hydraulic system through an adjustment valve and another to the exit line fitting of the system through an opening/closing valve. The column element connected to the supply line may be defined as inlet header of the hydraulic circuit, while the column element connected to the exit line may be defined as outlet header of the hydraulic circuit.

[0007] The supply and exit line fittings are arranged in the walls during the installation step of the hydraulic system.

[0008] Typically, the connection between the column elements and the supply and exit line fittings are carried out at the bottom ends of the column elements.

[0009] Then, there are towel warmers of the electric type wherein the elements are filled with a heating fluid, for example diathermic oil, and there is an electric heater, generally made with an electric resistance housed in an insulating enclosure carried by a support box-shaped body. The latter is coupled underneath a column element such that the electric heater is inserted into the column element and connected outside of the radiator structure to the electric supply system.

[0010] The towel warmers of the electro-hydraulic or hybrid type combine the heating action of the thermal carrier liquid flow and that of the electric heater. In this type of towel warmer, a column element is connected to the hydraulic supply line while the other column element

is connected to the exit line of the system and to the support box-shaped body of the electric heater through the interposition of a T-junction element. Such T-junction element has a first mouth connected to the support box-shaped body of the electric heater, a second mouth coaxial with the first connected to the bottom end of the outlet header and a third mouth having transversal axis with respect to the first and second and connected to the hydraulic exit line.

[0011] Therefore, in this configuration, the exit line fitting is offset with respect to the axis of the outlet header, since the exit line fitting is connected to the third mouth of the T-junction, which is transversal with respect to the other two.

[0012] Therefore, in order to convert a towel warmer of the hydraulic type into a towel warmer of the hybrid type, invasive building works must be done to move the exit line fitting in an offset position with respect to the axis of the outlet header.

[0013] Furthermore, the electric heater of a towel warmer of the hybrid type is generally electrically activated only when the thermo-sanitary hydraulic system is not active or in any case when the adjustment and opening/closing valves are in a closed position and, thus, isolate the hydraulic circuit of the towel warmer from the thermo-sanitary hydraulic system. This is due to the fact that if the electric heater is activated while water circulates in the towel warmer, only a high waste of energy would be obtained, without heating the room since the additional heat produced from the resistance is carried away by the water that continues to circulate and thus exits from the hydraulic circuit of the towel warmer.

[0014] The need to activate the electric heater may arise in the mid-seasons when the normal heating systems of the houses are off, or in the case of thermo-sanitary hydraulic systems that use new energy sources such as for example condensing boilers and heat pumps. In this latter case, the delivery temperature of the water is typically low comprised between 35°C and 50°C. Therefore, even if the towel warmer is correctly sized for the room, the low water temperature does not allow a rapid drying of the towels, and does not allow for obtaining some degrees higher in the room.

[0015] The object of the present invention is to obviate the drawbacks mentioned hereinabove and in particular to devise a control device that allows converting a radiator of the hydraulic type into a radiator of the electro-hydraulic type avoiding the need to necessarily carry out masonry works.

[0016] Another object of the present invention is to provide a radiator of the electro-hydraulic type simple to mount and with high energy efficiency.

[0017] Yet another object of the present invention is to provide a control method of a radiator of the electro-hydraulic type, which allows managing the operation of the electric heater avoiding energy waste.

[0018] These and other objects according to the present invention are achieved creating a control device

for a radiator, a radiator of the electro-hydraulic type comprising such control device and a control method of said radiator of the electro-hydraulic type as described in the independent claims.

[0019] Further features of the control device for radiators of the electro-hydraulic type, of the radiator of the electro-hydraulic type comprising such control device and of the control method of said radiator of the electro-hydraulic type are subject of the dependent claims.

[0020] The features and advantages of the control device for a radiator, a radiator of the electro-hydraulic type comprising such control device and a control method of said radiator of the electro-hydraulic type according to the present invention will appear more clearly from the following description, made by way of a non-limiting example with reference to the accompanying schematic drawings, wherein:

- figure 1 is a perspective schematic view of a first embodiment of a radiator of the electro-hydraulic type according to the present invention;
- figure 2 is a perspective schematic view of a first embodiment of a control device according to the present invention;
- figure 3 is a sectional view of the control device of figure 2;
- figures 4a and 4b are two perspective schematic views of a junction element comprised in the control device of figure 2;
- figure 4c is a split view of the junction element of figure 4a and 4b;
- figure 5 is an exploded view of the control device of figure 2 free from the box-shaped body;
- figure 6 is a perspective schematic view of a second embodiment of a radiator of the electro-hydraulic type according to the present invention;
- figure 7 is a perspective schematic view of a second embodiment of a control device according to the present invention;
- figure 8 is a sectional view of the control device of figure 7;
- figure 9 is a perspective schematic view of a third embodiment of a radiator of the electro-hydraulic type according to the present invention;
- figure 10 is a perspective schematic view of a third embodiment of a control device according to the present invention;
- figure 11 is a sectional view of the control device of figure 10.

[0021] With reference to the figures, reference numeral 10 globally denotes a radiator.

[0022] The radiator 10 may be, for example, a towel rail warmer as the one shown in figure 1.

[0023] Such radiator has a structure adapted to be fixed to a wall, having an inlet mouth 11 and an outlet mouth 12 that can be connected to respective hydraulic fittings 21, 22 of a hydraulic distribution system. In par-

ticular, the inlet mouth 11 is intended to be connected to a hydraulic supply line of the distribution system that feeds thermal carrier fluid into the radiator; such thermal carrier fluid once circulated in the radiator comes out from the same through the outlet mouth 12 which is intended to be connected to an exit line of the distribution system. By thermal carrier liquid it is meant to preferably indicate hot water at a entrance temperature generally comprised between 25°C and 90°C.

[0024] In the particular embodiment shown, the structure of the radiator 10 comprises two column elements 13, 14 parallel to each other and intended to be installed vertically with respect to the ground, and a plurality of transversal elements 15 that extend parallel to each other between the two column elements 13, 14. The column elements 13, 14 and the transversal elements 15 may consist of tubular bodies of various shape internally hollow, and are connected to each other so as to form a hydraulic circuit.

[0025] According to the present invention the radiator 10 comprises a control device 30 adapted to operate the radiator 10 in an electro-hydraulic mode, i.e. such as a radiator of the electro-hydraulic type.

[0026] Such control device 30 comprises a three-way junction element 31 having a first 32 and a second 33 mouth coaxial to each other and a third mouth 34. The three-way junction element 31, in particular, has a main duct that extends between the first 32 and the second 33 mouth.

[0027] The first mouth 32 is arranged to be coupled to at least one of the mouths 11, 12 of the radiator 10.

[0028] Such first mouth 32, therefore, may be provided with a connector 39, for example a nipple or a fitting by one part coupled by interlocking with the first mouth 32 and from the opposite part threaded so as to be able to couple with one of the mouths 11, 12 of the radiator 10.

[0029] In any case, the control device may be associated indifferently with the inlet mouth 11 or with the outlet mouth 12 of the radiator 10.

[0030] Preferably such coupling is of the screw-nut type. The inlet mouth 11 and the outlet mouth 12 of the radiator 10, in fact, may be threaded and arranged to engage in screwing with the first mouth 31 of the three-way junction element 31 also provided with threading at the end or with the connector 39 where provided.

[0031] The third mouth 34 of the three-way junction element 31 is arranged to be connected to one of the hydraulic fittings 21, 22 of the hydraulic distribution system so that said fitting is substantially coaxial with the first 32 and the second 33 mouth of the three-way junction element 31.

[0032] Preferably, the main duct of the three-way junction element 31 is connected to a derivation duct formed in a single piece with the main duct thereof. In this case, the third mouth 34 is the terminal mouth of this derivation duct. The derivation duct may be shaped such that the terminal mouth thereof coincident with the third mouth 34 is substantially coaxial with the first 32 and the second

33 mouth; in this way the third mouth 34 may be directly or through a connector coupled to fitting of the hydraulic system therewith aligned in axial direction.

[0033] As an alternative in the particular embodiment shown, the derivation duct is shaped such that the terminal mouth thereof coincident with the third mouth 34 is offset axially with respect to the axis of the first 32 and of the second 33 mouth.

[0034] In a further alternative embodiment not shown, the three-way junction element is a T-joint; in this case the third mouth 34 has a transversal axis with respect to that of the first 32 and of the second 33 mouth.

[0035] In both embodiments that are provided with the third mouth 34 with axis different with respect to the first 32 and to the 33 second mouth, the third mouth 34 is provided with a fitting element 36 capable of connecting two elements transversely offset to each other. Such fitting element 36 is connected by a part to the third mouth 34 of the three-way junction element 31 and by another part to one of the hydraulic fittings 21, 22 of the hydraulic distribution system. Preferably, the fitting element 36 is a flexible tube. As an alternative such fitting element 36 is stiff but describes a non-rectilinear path adapted to the fluid connection between the third mouth 34 of the three-way junction element 31 and the fitting of the system, which therefore may be aligned axially with respect to the first 32 and to the second 33 mouth, as well as to the column element of the radiator 10 to which the control device 30 is connected.

[0036] The control device 30 further comprises an electric heater 35 having an elongated shape along a longitudinal X axis.

[0037] Preferably, as shown in figure 2, the electric heater 35 is a resistor housed inside of an insulating enclosure of corresponding shape.

[0038] The electric heater 35 has an end coupled to the second mouth 33 of the three-way junction element 31 such as to completely occlude the same; the electric heater 35 extends in the three-way junction element 31 defining with the inner walls of the main duct a passage for the thermal carrier fluid, until passing through the first mouth 32 and protruding outside the three-way junction element 31. It is noted that the electric heater 35 is shaped to not occlude the first mouth 32 of the three-way junction element 31, but to pass through such first mouth leaving a passage port for the thermal carrier fluid.

[0039] In the particular embodiment shown in figure 3, the electric heater 35 is screwed to second mouth 33 of the three-way junction element 31, such coupling in any case capable of being of another type for example shape.

[0040] In any case the electric heater 35 is selectively connected to an electrical power supply line, for example by a cable that comes out at the second mouth 33 of the three-way junction element 31.

[0041] The control device 30 further comprises an electrovalve unit 37, 38 arranged to selectively open the fluid connection between the three-way junction element 31 and the hydraulic distribution system.

[0042] In the embodiment shown in figure 3, the electrovalve unit 37, 38 is capable of controlling the opening and the closing of the opening of the main duct from which the derivation duct starts. The electrovalve unit 37, 38 may comprises, in particular, an electrovalve that as shown has a piston 37 operable by an electromagnetic actuator 38.

[0043] In the embodiment shown in figure 3, the electrovalve unit 37, 38 is associated with the junction element 31 at a fourth connection mouth 41, wherein the piston 37, in particular, is inserted.

[0044] The control device 30, advantageously, also comprises an electronic control unit 40 configured to drive the electrovalve unit 37, 38 and control the selective connection between the electric heater 35 and the power supply line. The electronic control unit 40 is electrically supplied and is capable of operating the electromagnetic actuator 38 of the electrovalve unit 37, 38 and of turning on or off the electric heater 35. Preferably, the electronic control unit 40 is configured to carry out a power-on procedure of the electric heater 35 during the heating in hydraulic mode.

[0045] By heating in hydraulic mode it is meant to indicate the operating mode of the radiator 10 in which the hot thermal carrier fluid circulates in the radiator 10 thereof in order to heat the room where the radiator 10 is installed and/or to dry the towels rested on the same.

[0046] In such operating mode, the power-on procedure of the electric heater 35, according to the present invention, comprises the steps:

- driving the electrovalve unit 37, 38 such as to close the fluid connection, the control of which is carried out by the electrovalve unit 37, 38 itself;
- turning on the electric heater 35. Such steps may be implemented in any one chronological order.

[0047] In this way the electronic control unit 40 is capable of turning on the electric heater 35 in any condition also during the heating in hydraulic mode.

[0048] Preferably, the control device 10 comprises one or more sensors for detecting one or more climatic parameters related to the electronic control unit 40. For example, such sensors may be room temperature and humidity sensors.

[0049] In this case, the electronic control unit 40 is configured to carry out the power-on procedure of the electric heater 35 if the climatic parameters detected by the sensors reach predetermined values.

[0050] For example, the electronic control unit 40 may be programmed such as to carry out the power-on procedure of the electric heater 35 when the temperature of the room where the radiator 10 is installed reaches a preset temperature.

[0051] Preferably, the electronic control unit 40 is also configured to receive a command from a user, and to carry out the power-on procedure of the electric heater 35 following a user's command. In this case, for example

the electronic control unit 40 may be provided with an inlet connected to interfacing means with the user such as a button. It is also possible to arrange interfacing means such as a keyboard or a touch screen through which a user may program the turning on of the electric heater 35.

[0052] In an embodiment of the present invention the control device 30 comprises a single box-shaped body 50 wherein the three-way junction element 31, the electric heater 35, the electrovalve unit 37 and the electronic control unit 40 are at least partially housed. The box-shaped body 50 further has openings at the first 32 and the second 33 mouth of the three-way junction element 31 in order to allow the connection of the control device 30 respectively with the radiator 10 and the hydraulic distribution system.

[0053] In particular, the electric heater 35 protrudes outside the three-way junction element 31 and the box-shaped body 50 slipping, during the mounting of the control device 30 on the radiator 10, into the corresponding column element.

[0054] The electric heater 35, in particular, passes through the first mouth 11 of the three-way junction element 31 leaving a passage port for the thermal carrier fluid which comes from the hydraulic system and penetrates inside the three-way junction element 31 through the third mouth 34.

[0055] Preferably, the control device 30 comprises a plurality of box-shaped modules 60, 60', 60'' connected to one another in succession wherein a first box-shaped module 60' and a second box-shaped module (60'') are adapted to be connected respectively to the inlet mouth 11 or to the outlet mouth 12 of the radiator 10 or vice versa.

[0056] In this case, preferably, the first box-shaped module 60' supports at least the three-way junction element 31, the electric heater 35, the fitting element 36; the electrovalve unit 37, 38 may be supported by the first box-shaped module 60' or by the second box-shaped module 60''. The latter embodiment is shown in figure 6.

[0057] In any case, the electronic control unit 40 may be housed in any one of the box-shaped modules 60, 60', 60''.

[0058] The box-shaped modules 60, 60', 60'' are mechanically connected to one another and allow the passage of the wiring necessary for connecting the electronic control unit 40 to the electrovalve unit 37, 38, to the electric heater 35, to the sensors and to the electrical power supply line.

[0059] As shown in figure 4, many box-shaped modules 60 may be arranged between the first box-shaped module 60' and the second box-shaped module 60'' as many as necessary to cover the distance between the two. In this way, the control device 30 takes on a shape which extends substantially across the transversal width of the radiator 10. Anyway, thanks to the modularity thereof the control device 10 may be adapted to radiators having different transversal extensions.

[0060] In a particular embodiment of the present inven-

tion, the box-shaped modules 60, 60', 60'' are telescopic with one another, as shown in figure 7.

[0061] In the case shown the second box-shaped module 60'' is arranged to telescopically slide within the first box-shaped module 60'.

[0062] Even in the event of telescopic modules, it is possible to provide for more than two telescopic modules.

[0063] In the particular embodiment shown, the first box-shaped module 60' supports the three-way junction element 31, the electric heater 35, the fitting element 36, the electronic control unit 40 while the second box-shaped module 60'' supports the electrovalve group 37, 38. However, the electronic control unit 40 may be housed in any one of the telescopic box-shaped modules 60, 60', 60''. Furthermore, also in this case the first box-shaped module 60' may support besides the elements mentioned above also the electrovalve unit 37, 38. Preferably, the control device 10 comprises one or more sensors for detecting the temperature of the thermal carrier fluid that is intended to circulate in the radiator 10 and the electronic control unit 40 is configured to command or interrupt the supply of the thermal carrier fluid in the radiator 10 during cooling in the hydraulic mode if the temperature of the thermal carrier fluid falls below a lower threshold value.

[0064] By cooling in the hydraulic mode it is meant to indicate the operating mode of the radiator 10 in which the thermal carrier fluid circulates at a low temperature, for example comprised between 5°C and 25°C, in order to refrigerate the room where the radiator 10 is installed.

[0065] In order to interrupt the supply of the thermal carrier fluid in the radiator 10, the electronic control unit 40 commands the electrovalve unit 37, 38 to close the fluid connection, the control of which is carried out by the same. It is to be noted that the interruption of the supply of the thermal carrier fluid in the radiator 10 occurs both in the case wherein the electrovalve unit closes the fluid connection with the supply line fitting and in the case wherein the electrovalve unit closes the fluid connection with the exit line fitting. In fact, also in the latter case the fluid circulation in the radiator 10 is substantially blocked.

[0066] According to an alternative embodiment, the control device 30 comprises a thermostatic valve configured to close one of the fluid connections between the radiator 10 and the hydraulic system when the temperature of the thermal carrier fluid falls below a lower threshold value.

[0067] In combination with the interruption of the supply of the thermal carrier fluid, which may occur one of the two modes described above, the electronic control unit 40 may further be configured to switch on the electric heater 35, when the temperature of the fluid falls below a temperature corresponding to the dew point in order to avoid the formation of annoying condensation on the walls of the radiator 10.

[0068] The method for controlling the radiator 10 provides, in the first place, the step wherein such radiator 10 is installed on a wall connecting it to a hydraulic dis-

tribution system; this means to connect in a suitable manner as described above also the control device 30 comprised in said radiator 10.

[0069] During the heating in hydraulic mode, the control method, according to the present invention, comprises the steps:

- detecting one or more climatic parameters;
- when the detected climatic parameters reach predetermined values, or following a user's command, to command the electrovalve unit 37, 38 such as to close the fluid connection, the control of which is carried out by the electrovalve unit 37, 38 itself;
- turning on the electric heater 35.

[0070] The power-on step of the electric heater 35 and of the closing of the fluid connection controlled by the electrovalve unit 37, 38 may be implemented in any reciprocal chronological order.

[0071] Furthermore, preferably, the control method during the cooling in the hydraulic mode provides the steps:

- detecting the temperature of the thermal carrier fluid;
- if the temperature of the thermal carrier fluid falls below a lower threshold value to command the electrovalve unit 37, 38 such as to close the fluid connection the control of which is carried out by the electrovalve unit 37, 38 itself.

[0072] The features of the control device, of the radiator of the electro-hydraulic type comprising the said control device and the control method of such radiator, which are object of the present invention, as well as the relative advantages are clear from the above description.

[0073] In fact, the control device 10 allows the converting of a radiator of the hydraulic type into one of the electro-hydraulic type in a simple and easy way without having to necessarily resort to brickwork to move one or more distribution system fittings. In fact, the three-way junction element allows the connecting of the control device with a hydraulic fitting substantially coaxial with the respective column element of the radiator.

[0074] Furthermore, the electronic control unit of the control device according to the present invention allows the turning on of the electric heater in any operating condition of the radiator avoiding energy waste since before such power-on inhibits the forced circulation of the thermal carrier fluid within the radiator.

[0075] The power-on of the electric heater when the temperature of the thermal carrier fluid is close to the dew point allows the avoiding of the formation of condensation on the outside surface of the radiator. Finally, it is clear that several changes and variations may be made to the control device, the heater, the control method thus conceived, all falling within the invention; moreover, all details can be replaced with technically equivalent elements. In the practice, the materials used as well as the

sizes, can be whatever, according to the technical requirements.

5 Claims

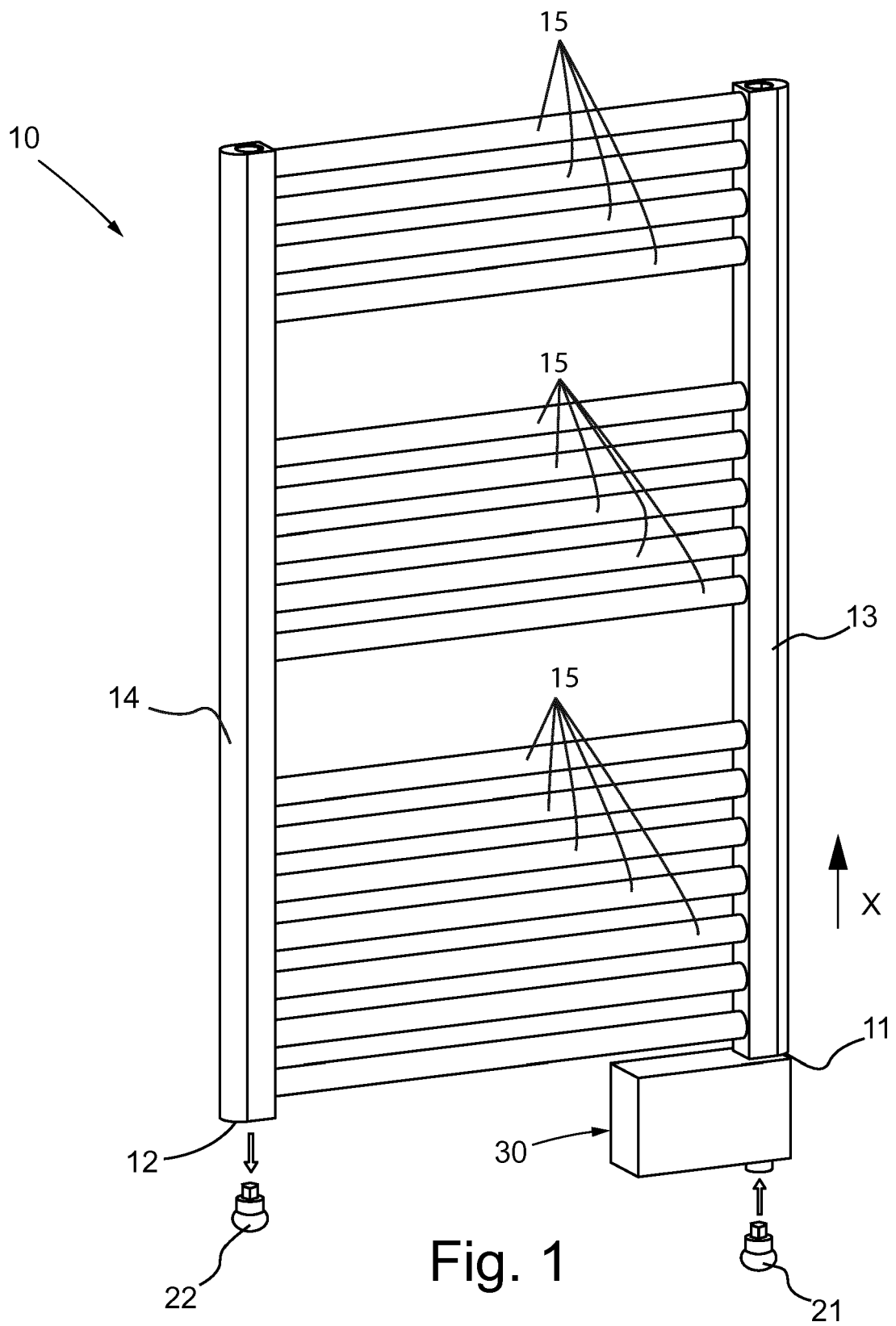
1. Control device (30) for a radiator (10) having an inlet mouth (11) and an outlet mouth (12) that can be connected to respective hydraulic fittings of a hydraulic distribution system comprising:

- a three-way junction element (31) having a first (32) and a second (33) mouth coaxial to one another between which a main duct extends and a third mouth (34), said first mouth (32) being arranged to be connected to at least one of said mouths of said radiator (10), said third mouth being arranged to be connected to one of said hydraulic fittings of said hydraulic distribution system such that said fitting is substantially coaxial with said first (32) and said second (33) mouth of said three-way junction element (31);
- an electric heater (35) having an elongated shape along a longitudinal axis, said electric heater (35) having one end coupled to said second mouth (33) of said three-way junction element (31) such as to completely close the same and extending in said three-way junction element (31), defining with the inner walls of said main duct a passage for a thermal carrier fluid, until passing through said first mouth (32) leaving a passage port and protruding outside said three-way junction element (31), said electric heater (35) being selectively connectable to a power supply line;
- an electrovalve unit (37, 38) arranged to selectively open a fluid connection between said three-way junction element (31) and said hydraulic distribution system;
- an electronic control unit (40) configured to drive said electrovalve unit (37, 38) and control the selective connection between said electric heater (35) and said power supply line.

2. Control device (30) according to claim 1 wherein said third mouth (34) has an axis different with respect to said first mouth (32) and said second (33) mouth, said third mouth (34) being provided with a fitting element (36) connected, on one side, to said third mouth (34) and, on the other side, arranged to be connected to one of said hydraulic fittings of said hydraulic distribution system.

3. Control device (30) according to claim 1 or 2 wherein said electronic control unit (40) is programmed to carry out, during heating in the hydraulic mode, a power-on procedure of said electric heater (35) that comprises the steps of:

- driving said electrovalve unit (37, 38) such as to close said fluid connection controlled by said electrovalve unit (37, 38);
 - turning on said electric heater (35).
4. Control device (30) according to claim 3 comprising one or more sensors for the detection of one or more climatic parameters related to said electronic control unit (40), said electronic control unit (40) being configured to carry out said power-on procedure of said electric heater if the climatic parameters detected by said sensors reach predetermined values.
5. Control device (30) according to claim 3 or 4 wherein said electronic control unit (40) is configured to receive a command from a user, and to carry out said power-on procedure of said electric heater (35) following a user's command.
6. Control device (30) according to one of the preceding claims comprising a single box-shaped body (50) wherein said three-way junction element (31), said electric heater (35), said electrovalve unit (37, 38) and said electronic control unit (40) are at least partially housed, said box-shaped body (50) having openings at said first (32) and said second (33) mouth of said three-way junction element (31) to allow the connection of said control device (30) respectively with said radiator (10) and said hydraulic distribution system.
7. Control device (30) according to one of the claims from 1 to 5 comprising a plurality of box-shaped modules (60, 60', 60'') connected to one another in succession wherein:
- a first box-shaped module (60') and a second box-shaped module (60'') are adapted to be connected respectively to said inlet mouth (11) and to said outlet mouth (12) of said radiator (10) or vice versa, wherein said first box-shaped module (60') supports at least said three-way junction element (31), said electric heater (35), said fitting element (36);
 - said electrovalve unit (37, 38) being supported by said first box-shaped module (60') or by said second box-shaped module (60'');
 - said electronic control unit (40) being housed in one of said box-shaped modules (60, 60', 60'').
8. Control device (30) according to claim 7 wherein said box-shaped modules (60, 60', 60'') are telescopic with one another.
9. Control device (30) according to one of the preceding claims comprising one or more sensors for detecting the temperature of said thermal carrier fluid that circulates in said radiator (10), said electronic control unit (40) being configured to interrupt the supply of the thermal carrier fluid in said radiator (10) during cooling in the hydraulic mode if the temperature of the thermal carrier fluid falls below a lower threshold value.
10. Control device (30) according to one of the preceding claims comprising a thermostatic valve configured to close one of said fluid connections between said radiator (10) and said hydraulic distribution system when the temperature of the thermal carrier fluid falls below a lower threshold value.
11. Radiator (10) of the electro-hydraulic type comprising a control device (30) according to one or more of the preceding claims.
12. Method for controlling a radiator (10) according to claim 11 comprising the steps of:
- installing said radiator (10) on a wall connecting it to a hydraulic distribution system;
 - during heating in the hydraulic mode:
 - detecting one or more climatic parameters;
 - if the climatic parameters detected reach predetermined values, or following a user's command, driving an electrovalve unit (37, 38) of a control device (30) of said radiator (10) such as to close a fluid connection controlled by said electrovalve unit (37, 38);
 - turning on said electric heater (35).
13. Control method according to claim 12 comprising the steps of:
- during cooling in the hydraulic mode:
- detecting the temperature of the thermal carrier fluid;
 - if the temperature of the thermal carrier fluid falls below a lower threshold value, driving said electrovalve unit (37, 38) of said control device (30) of said radiator (10) such as to close said fluid connection controlled by said electrovalve unit (37, 38) .



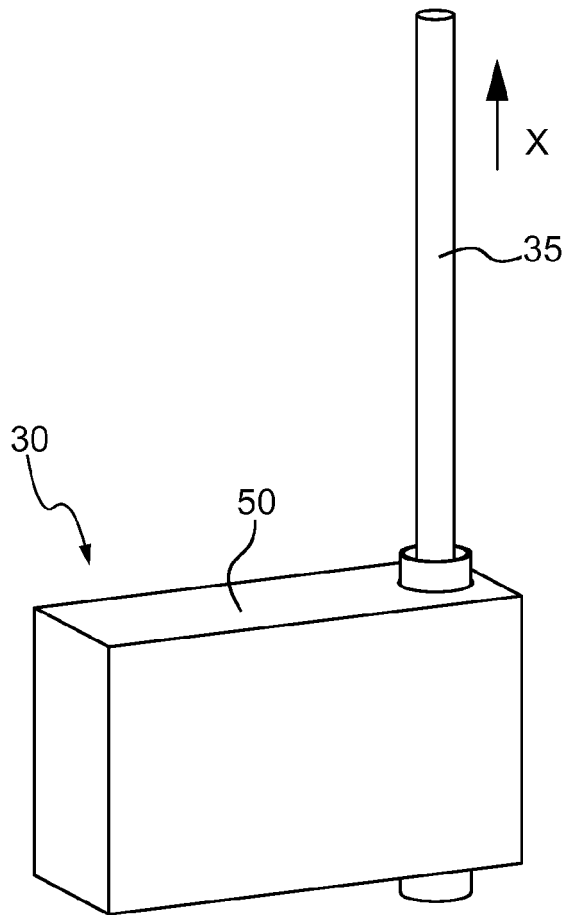


Fig. 2

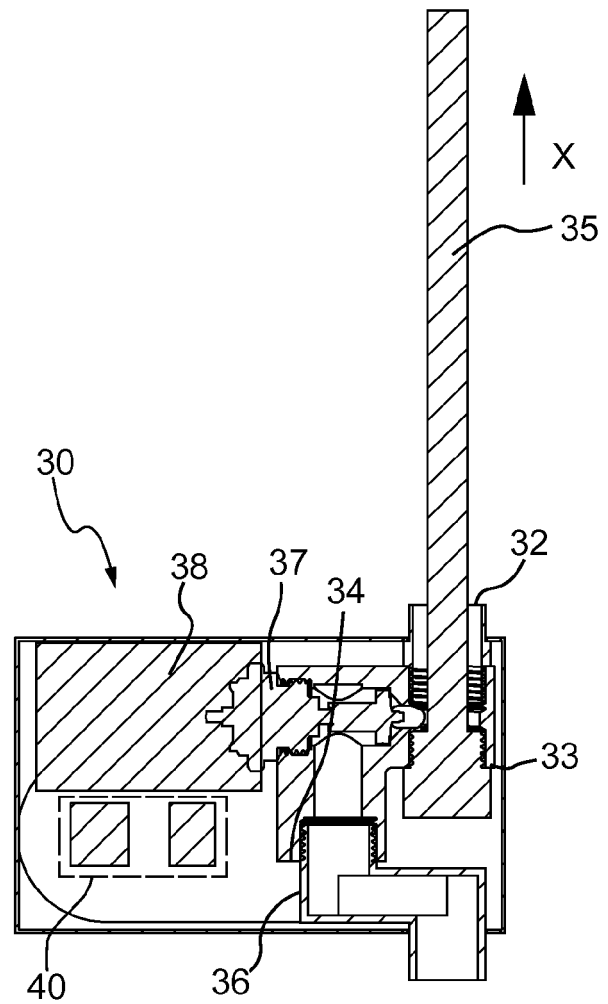


Fig. 3

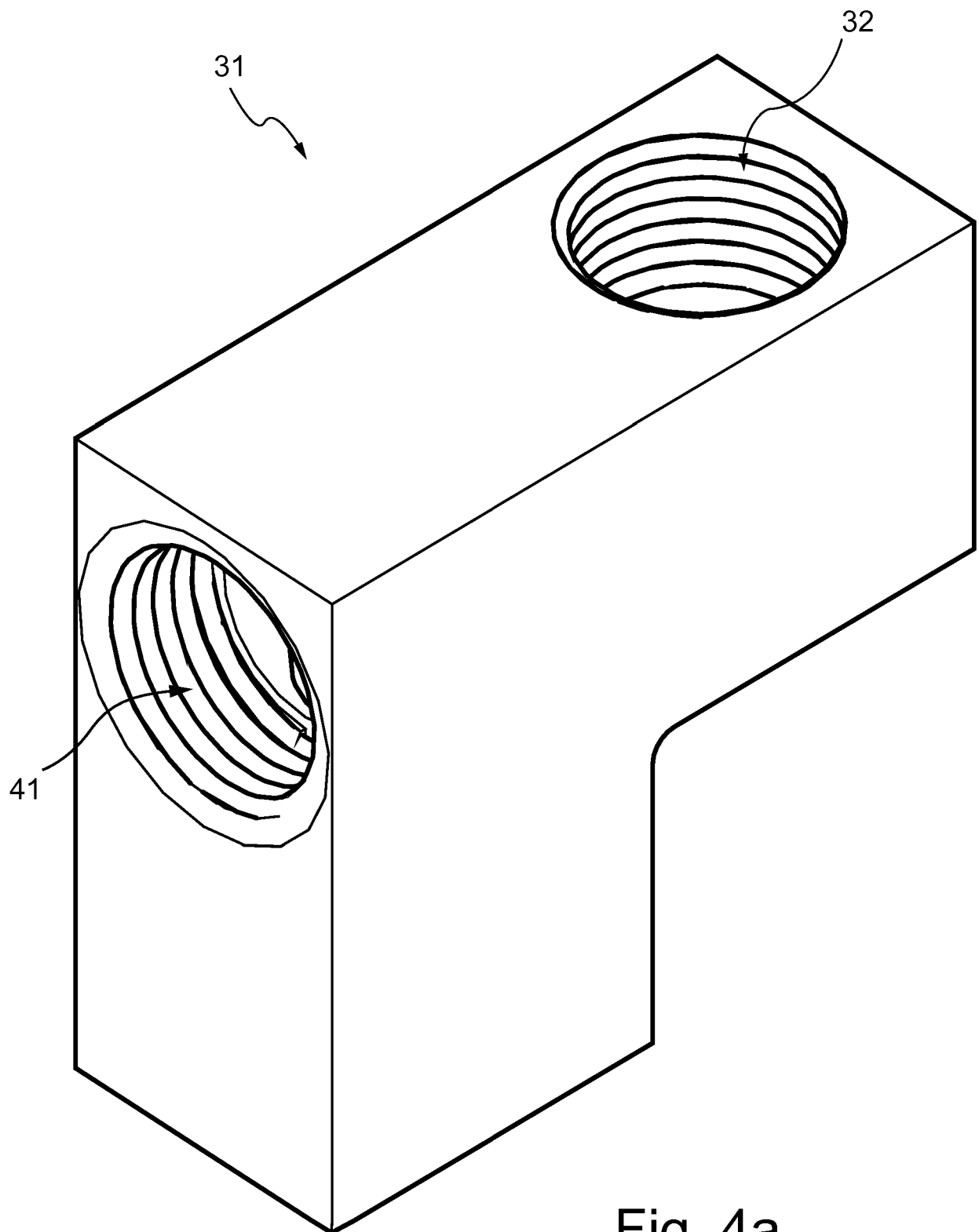


Fig. 4a

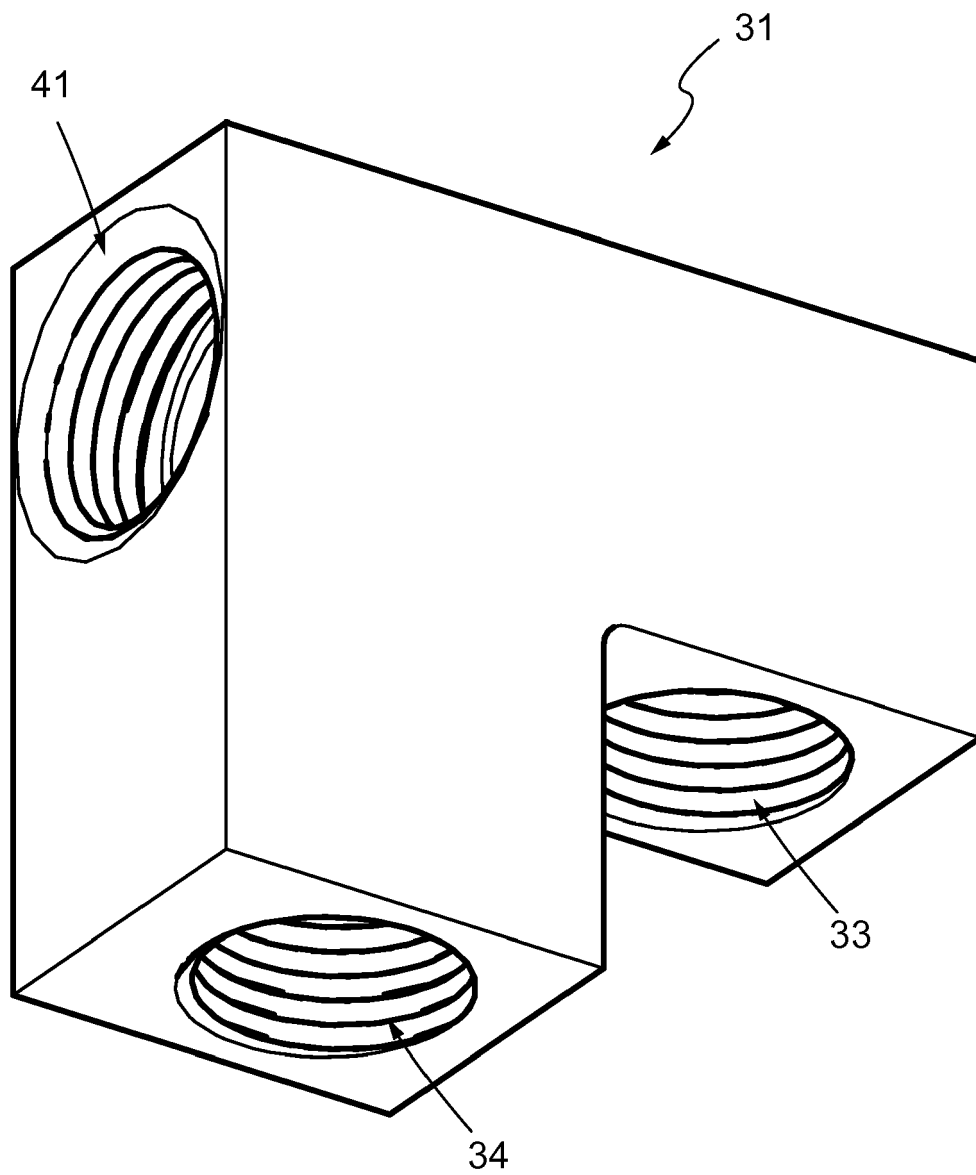


Fig. 4b

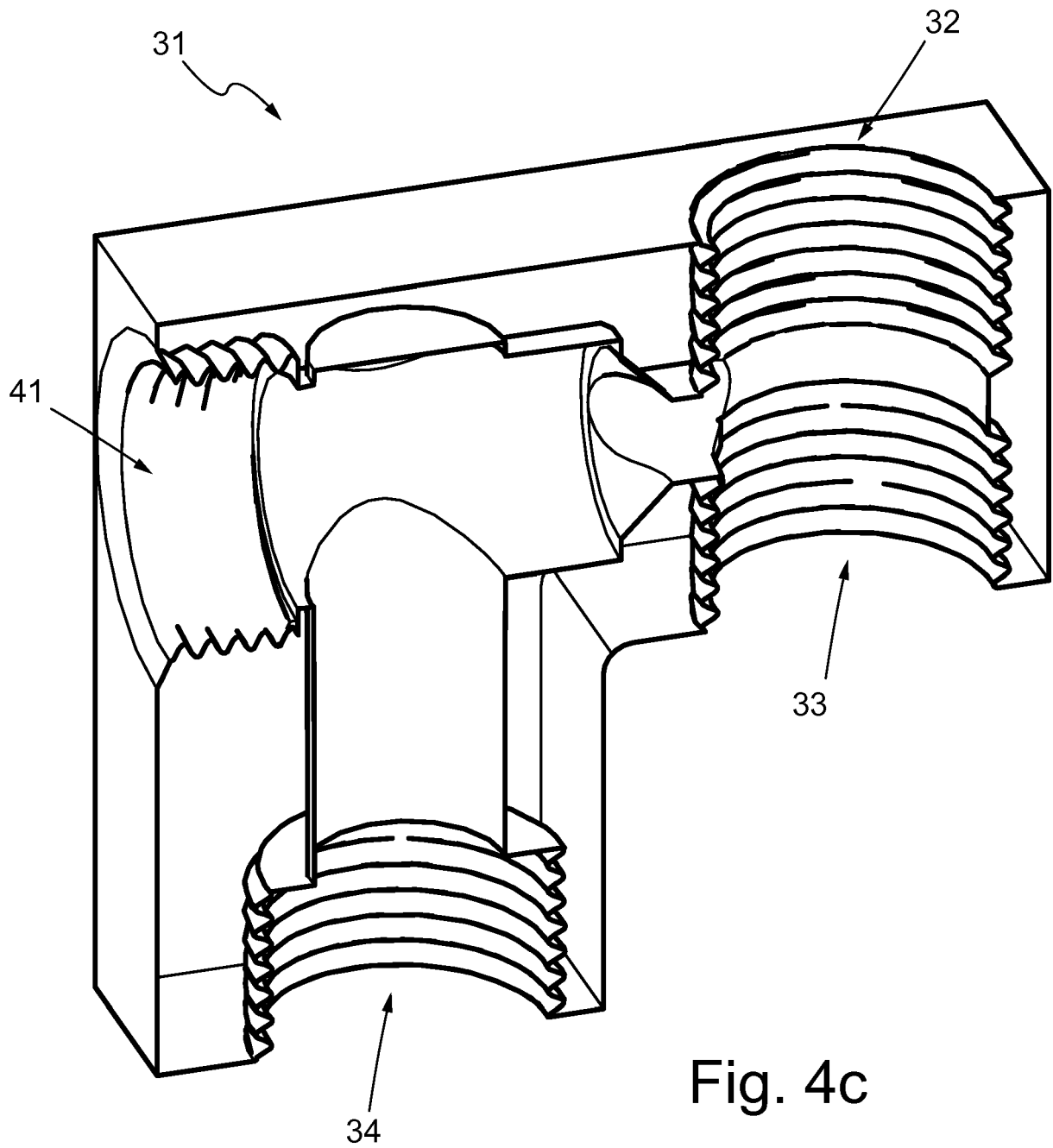


Fig. 4c

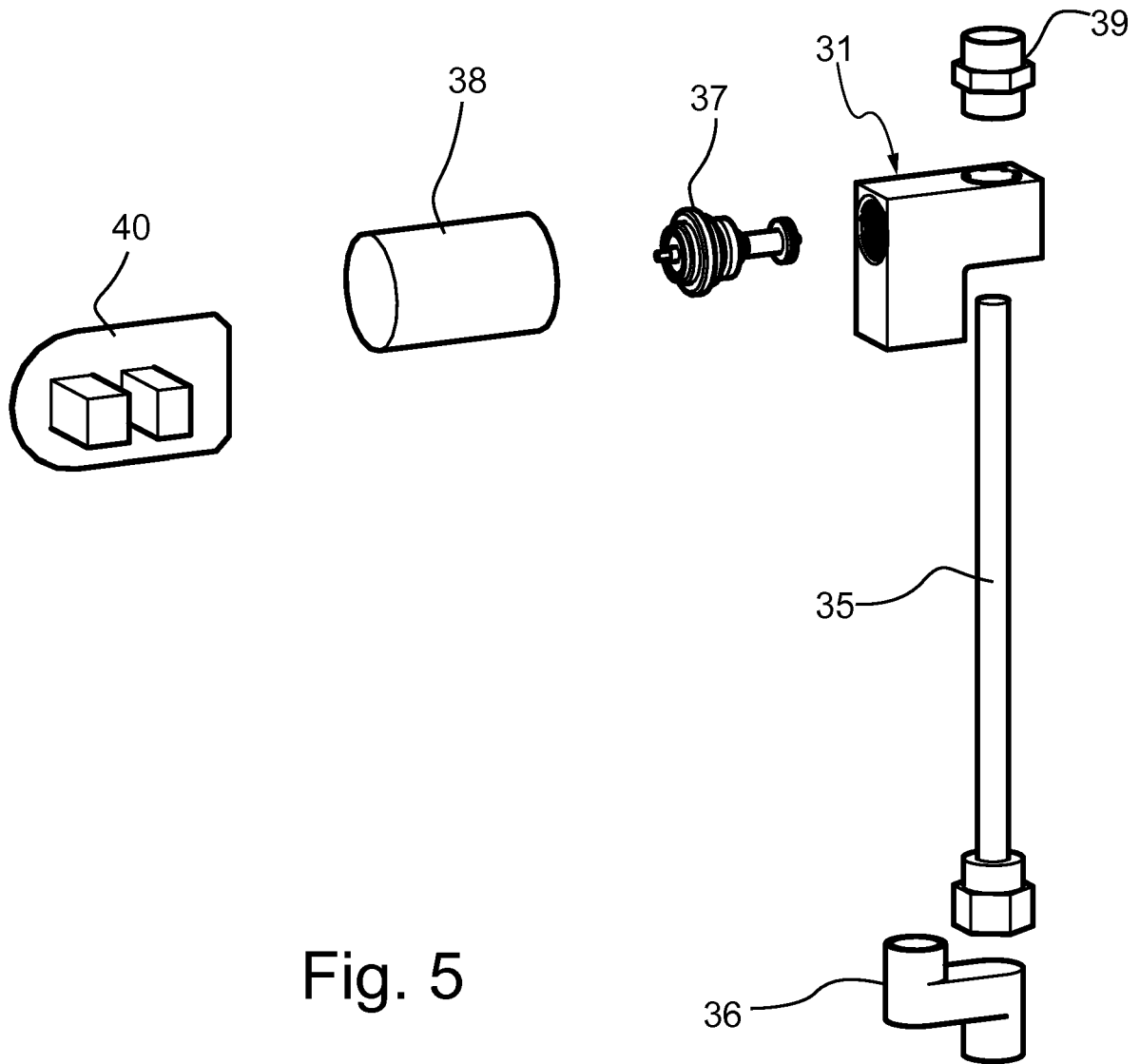


Fig. 5

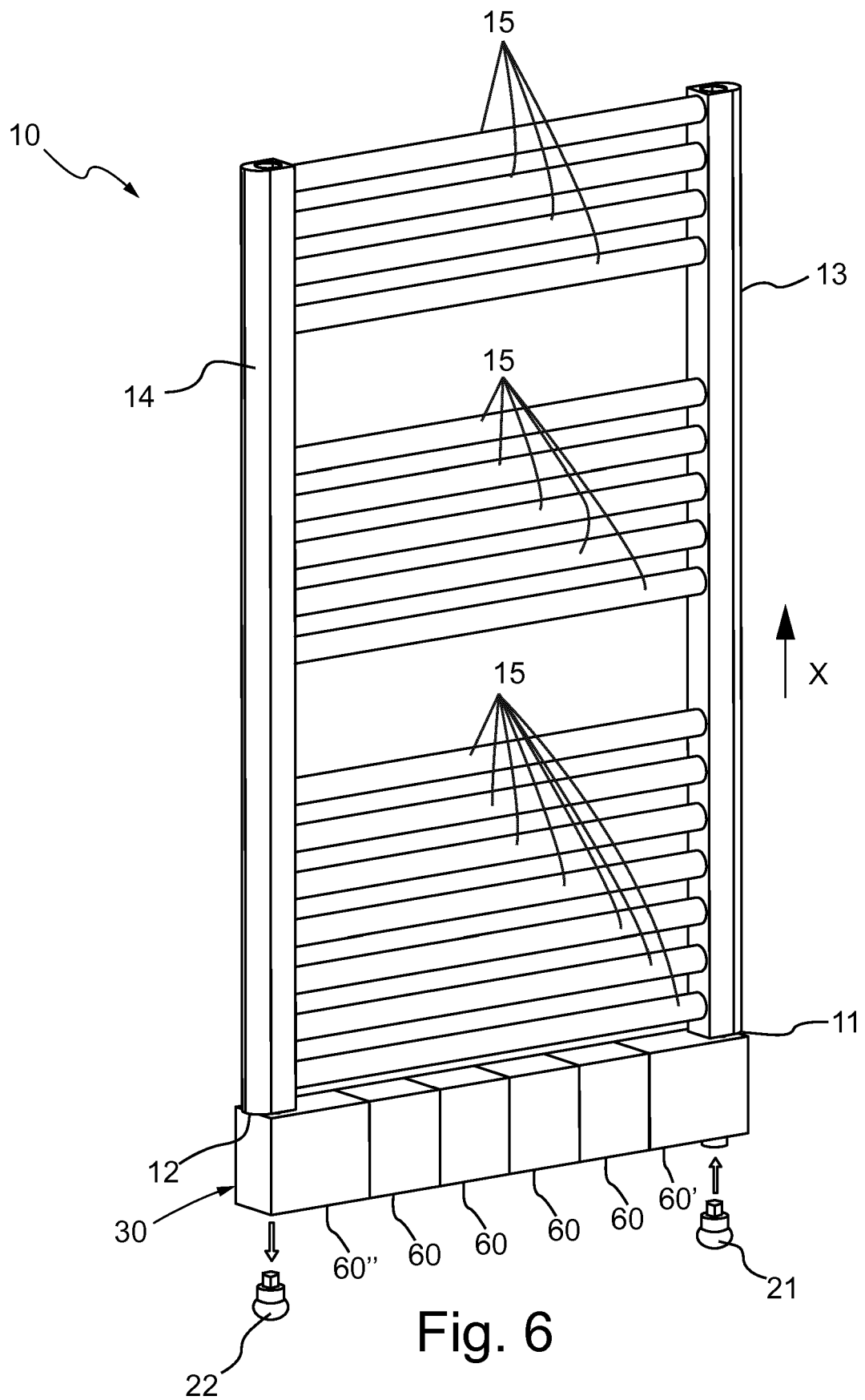


Fig. 6

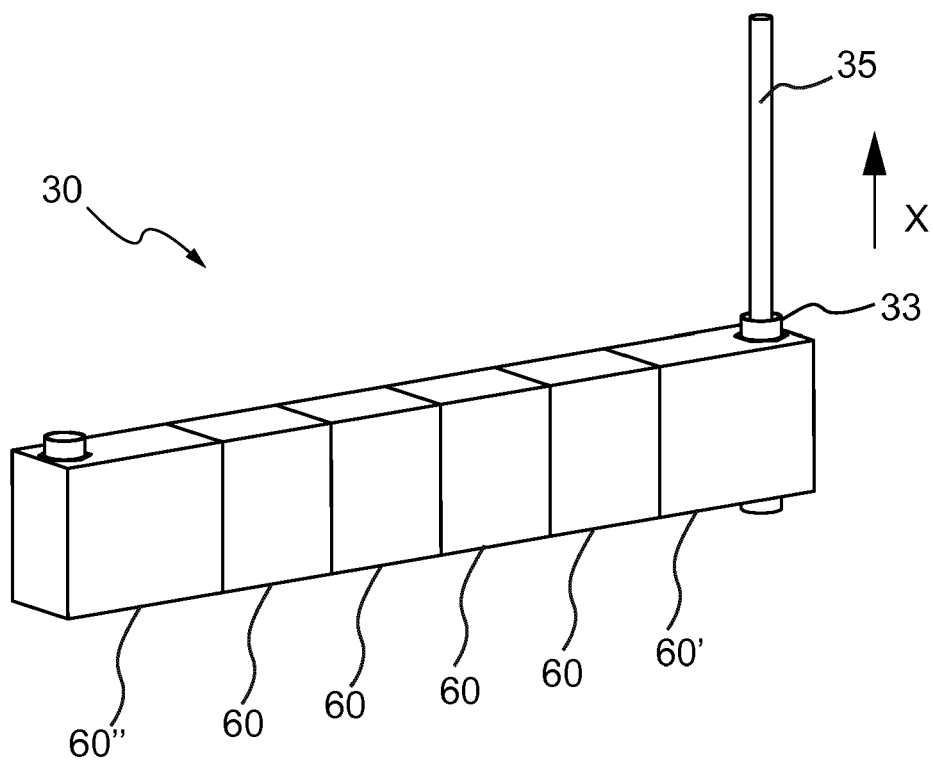


Fig. 7

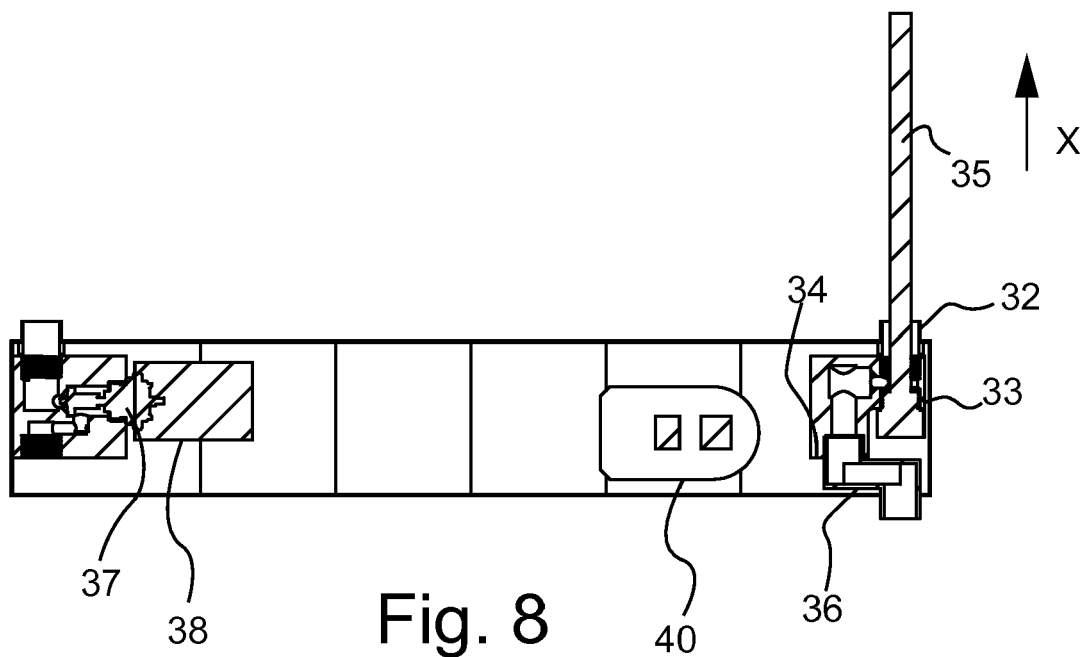


Fig. 8

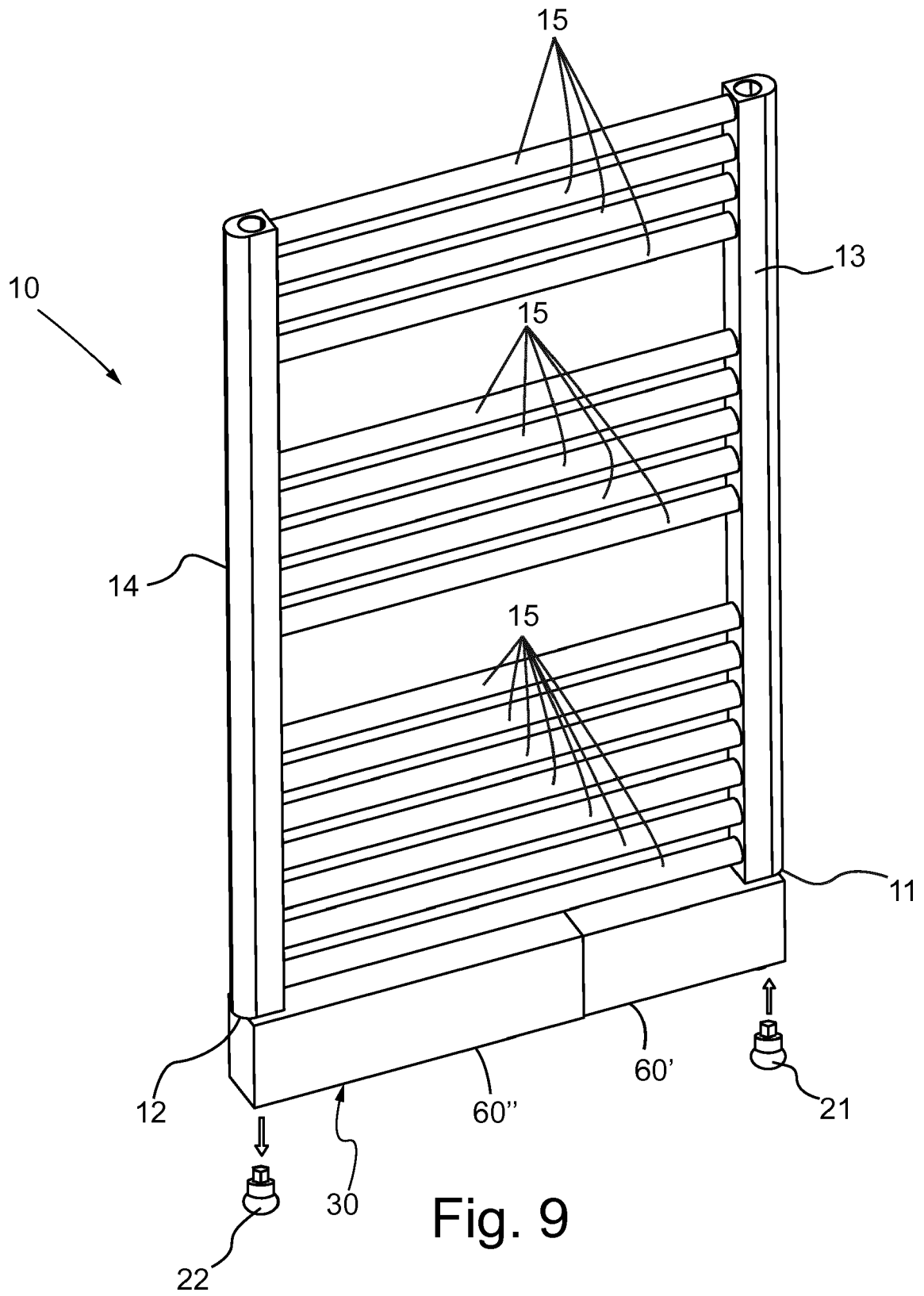
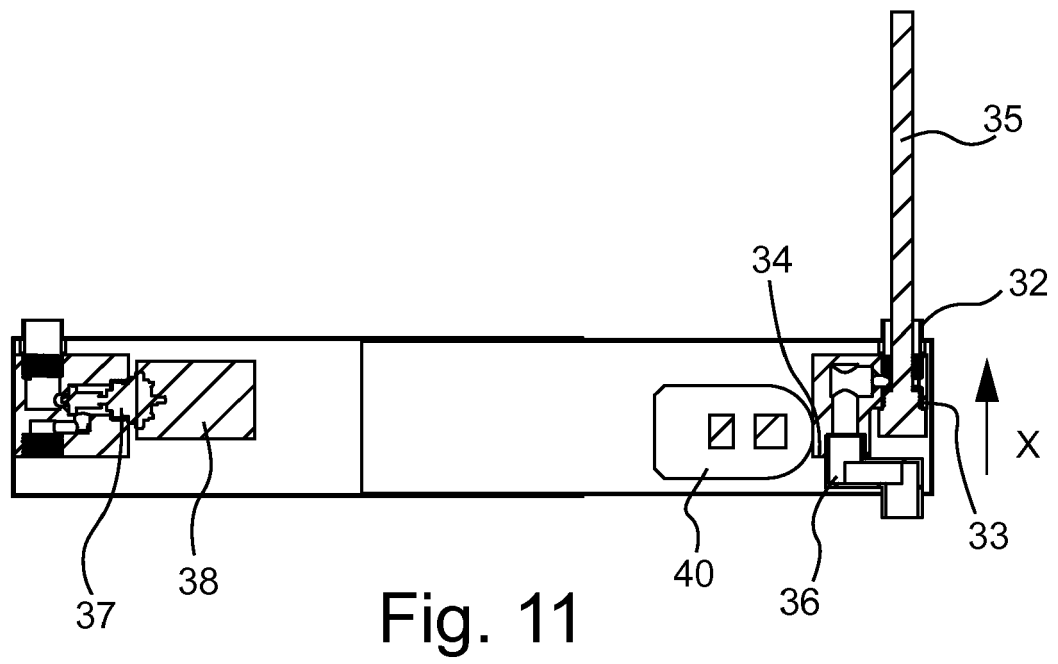
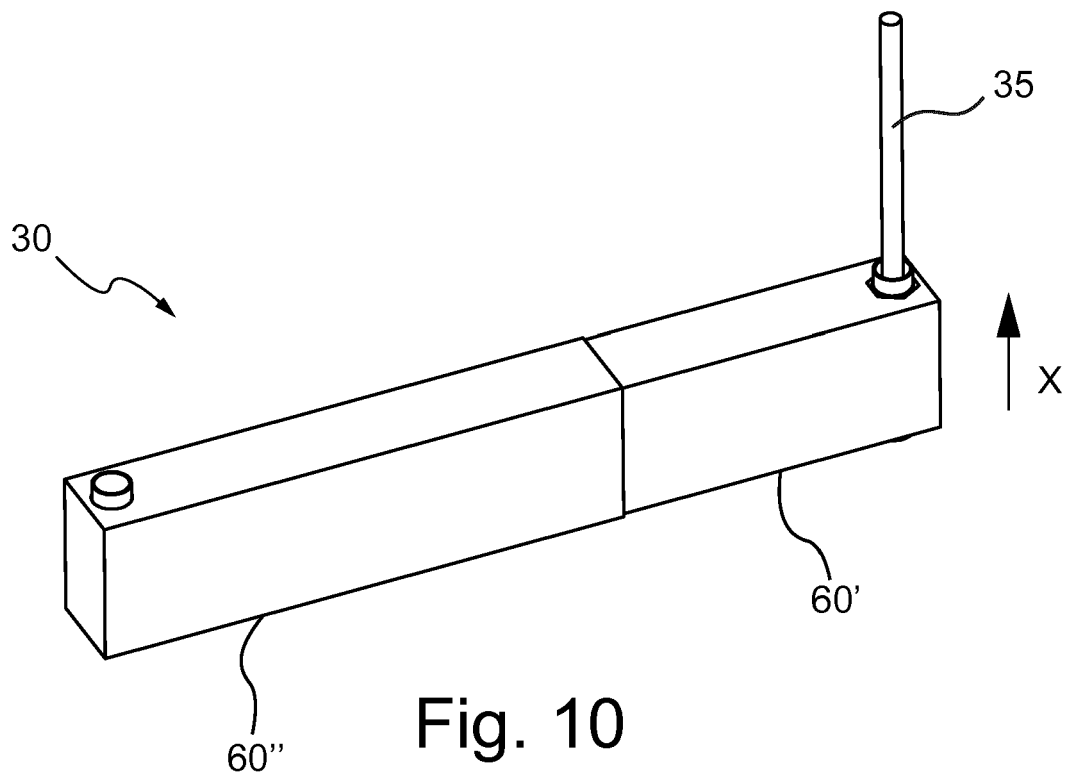


Fig. 9





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