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(54) **Connection device for a tap and a method of connecting parts of a tap together**

(57) This invention relates to a connection device (3, 3') for connecting a first part of a tap (10, 10') to a second part of a tap (10, 10') and a method of connecting a first part of a tap (10, 10') to a second part of a tap (10, 10'). The connection device (3, 3') is substantially hollow, having an opening which extends through the connection device (3, 3') so as to provide a path for fluid to move between the first part and the second part. The method include inserting a connection device (3, 3') into an opening (14, 14') of a transfer pipe (1, 1') of the tap (10, 10'),

via an in use upper end thereof, extending a part of the connection device (3, 3') through an aperture (13, 13') in a wall of the transfer pipe (1, 1'), and connecting the one of an outlet pipe (2) and a mixer pipe (5) to the part of the connection device (3, 3') extending through the aperture (13, 13'). The method includes engaging an Allen key with an internal opening of the connection device (3, 3') via the opening (14, 14') of the transfer pipe (1, 1') so as to tighten the connection between the transfer pipe (1, 1') and the one of the outlet pipe (2) and the mixer pipe (5).

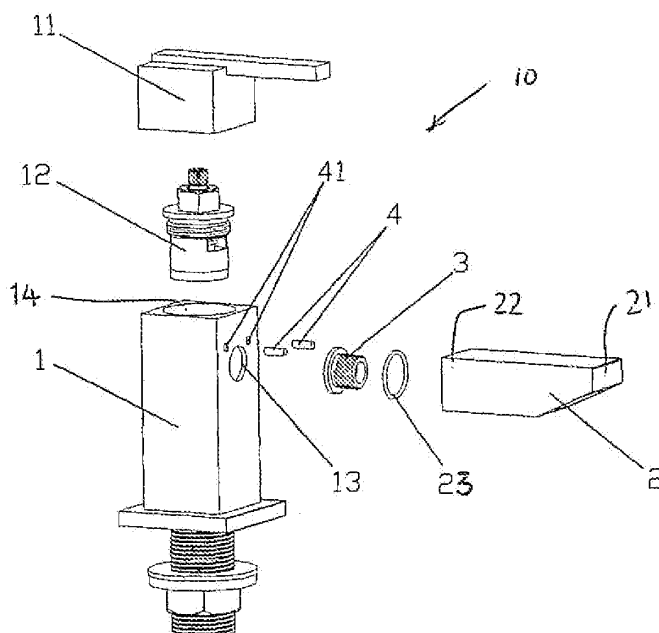


Fig. 2

Description

[0001] This invention relates to a connection device, particularly to a connection device for connecting a first part of a tap to a second part of a tap. The invention also relates to a method of connecting two parts of a tap together.

[0002] It is known in the art of providing taps to provide a water transfer pipe which is connectable to a sanitary installation such as a basin or bath, the transfer pipe being substantially hollow, and a substantially hollow outlet pipe, through which water exits the tap into the sanitary installation. Both of the transfer pipe and the outlet pipe are usually manufactured from metal, therefore the transfer pipe and the outlet pipe are usually welded together, to provide a path for fluid from the transfer pipe into the outlet pipe. Alternatively, screws may be provided on the sides of the pipes. The tap parts connected through welding have a welding joint in the welding area between the pipes, which is difficult to polish and can be unsightly. In the instances where screws are used for affixing to the side of the pipe, the exposed screws tend to become loose, so the pipes become loose and are disconnected. The exposed screws also have a negative influence the appearance. Furthermore, the gap in the joint is large, and water easily leaks out. Therefore such methods of connection are not good for long-term use.

[0003] In accordance with a first aspect of the invention, there is provided a connection device for connecting a first part of a tap to a second part of a tap, the connection device being substantially hollow, having an opening which extends through the connection device so as to provide a path for fluid to move between the first part and the second part.

[0004] An external surface of the connection device may be threaded, for connection to a correspondingly threaded portion of at least one of the first and the second part of the tap.

[0005] The opening through the connection screw may be substantially dodecagonal.

[0006] The connection device may have a first end and a second end, the first end being larger than the second end.

[0007] The first part of the tap may be a transfer pipe and the second part may be an outlet pipe. Alternatively the first part may be a transfer pipe and the second part may be a mixer pipe.

[0008] According to a second aspect of the invention, there is provided a tap including a transfer pipe and at least one of an outlet pipe and a mixer pipe which is connectable to the transfer pipe, the tap further including a connection device for connecting the transfer pipe to the outlet pipe or the mixer pipe, the connection device being substantially hollow so as to provide a path for fluid between the transfer pipe and the outlet pipe or the mixer pipe.

[0009] The transfer pipe may include an aperture in a wall of the transfer pipe, through which a part of the con-

nection device is extendible, the part of the connection device which is extendible through the aperture being connectable to at least one of the outlet pipe and the mixer pipe.

[0010] The part of the connection device which is extendible through the aperture of the transfer pipe may include an externally threaded portion which is connectable to an internal threaded portion of the outlet pipe or the mixer pipe.

[0011] The tap may include a fixing formation for fixing the transfer pipe to one of the outlet pipe and the mixer pipe.

[0012] The fixing formation may include a pair of pins and a corresponding set of openings in each of the transfer pipe and the outlet pipe or the mixer pipe to which the transfer pipe is connected by the connection device.

[0013] The tap may include a sealing ring for sealing the connection between the transfer pipe and the one of the outlet pipe and the mixer pipe.

[0014] According to a third aspect of the invention, there is provided a method of connecting one of an outlet pipe and a mixer pipe of a tap to a transfer pipe of the tap, the method including inserting a connection device into an opening of the transfer pipe, via an in use upper end thereof, extending a part of the connection device through an aperture in a wall of the transfer pipe, and connecting the one of the outlet pipe and the mixer pipe to the part of the connection device extending through the aperture, the method including engaging an Allen key with an internal opening of the connection device via the opening of the transfer pipe so as to tighten the connection between the transfer pipe and the one of the outlet pipe and the mixer pipe.

[0015] This invention has the following benefits: the connection device (a hollow connection screw) is connected to the outlet pipe from the inside of the water transfer pipe, so no welding is required, and the water transfer pipe and the outlet pipe can be firmly connected by tightening the device, and the inside installation structure is tight and not prone to becoming loose, and in instances where a water sealing ring is used, better sealing can be achieved, and therefore the connecting parts cannot be seen from the outside of the product, ensuring an even and smooth appearance and improving the overall quality of the product, and in addition, the product can be easily installed and is usable in a wide range of applications.

[0016] The invention will now be described, by way of example only, with reference to the accompanying drawings, of which:

Figure 1 is an illustrative perspective view of a tap;
Figure 2 is an exploded perspective view of the tap shown in Figure 1;
Figure 3 is an enlarged cross sectional view of a connection between a water transfer pipe and an outlet pipe of the tap shown in Figures 1 and 2;
Figure 4 is a front elevation of a hollow connection screw used in the tap;

Figure 5 is an illustrative perspective view of a second embodiment of a tap including the present invention; and

Figure 6 is a partially exploded perspective view of the tap shown in Figure 5.

[0017] Referring to Figures 1 to 4, there is shown a tap 10. The tap 10 includes a water transfer pipe 1 having a perimeter wall, and an opening 14 which extends from an in use lower end of the transfer pipe 1 to an in use upper end of the transfer pipe 1. The in use lower end of the transfer pipe 1 is connectable to a sanitary installation, such as a basin or bath, and is operable to transfer water from a plumbing system, to an outlet pipe 2 of the tap.

[0018] The outlet pipe 2 extends in a direction which is generally perpendicular to the transfer pipe 1. The outlet pipe 2 has a first end 21 and a second end 22. The first end 21 of the outlet pipe 2 includes an opening through which water is dispensable. The second end 22 of the outlet pipe 2 is connectable to the transfer pipe 1. An inner surface of the second end 22 of the pipe 2 includes a threaded portion, as will be described in further detail below.

[0019] The tap 10 also includes an operating member, in this example a handle 11 which is pivotable in generally vertical plane to control the flow of water through the tap. The handle 11 may also be rotatable in a generally horizontal plane, in order to control the temperature of water flowing through the tap 10.

[0020] The tap 10 also includes a valve assembly 12 which is moveable between an open condition, in which the outlet pipe 2 is fluidly connected to the transfer pipe 1, such that water is permitted to flow from the transfer pipe 1, into the outlet pipe 2, to be dispensed; and a closed condition, in which the transfer pipe 1 and the outlet pipe 2 are fluidly disconnected, so as to prevent the flow of water into and out of the outlet pipe 2. The valve assembly 12 is received in the opening 14 of the water transfer pipe 1, at an in use upper end thereof, and is movable between the open and closed conditions by operation of the handle 11.

[0021] The water transfer pipe 1 and outlet pipe 2 are connected using a connection device. The connection device includes a substantially hollow connection screw 3, having a first end 31 and a second end 32. An outer surface of the connection screw 3 is substantially circular in cross-section, and is threaded. The connection screw 3 has an opening which extends through the screw, between the first end 31 and the second end 32. The opening is substantially dodecagonal in cross-section, for engagement with a suitable Allen key. It will be appreciated that other shaped openings can be provided.

[0022] A substantially circular aperture 13 is provided in the perimeter wall of the water transfer pipe 1, for receiving the connection screw 3. The diameter of the first end 31 of the connection screw 3 is larger than the diameter of the aperture 13.

[0023] The second end 32 of the connection screw 3 is receivable in the aperture 13 from the inside of the water transfer pipe 1. The outlet pipe 2 is connectable to the transfer pipe 1 by virtue of the corresponding screw threads of the second end 22 of the outlet pipe 2 and the connection screw 3. The fact that the connection screw 3 is substantially hollow means that the connection screw include an inner conduit for transferring water from the transfer pipe 1 to the outlet pipe 2.

[0024] As a preferential option in the invention, the transfer pipe 1 and the outlet pipe 2 are further connected together by virtue of a connection formation. Each of the second end 22 of the outlet pipe 2 and an outer surface of the transfer pipe 1 includes a pair of fixing holes 41. The connection formation also includes a pair of fixing pins 4 which are receivable in the openings 41 of the transfer pipe 1, and the outlet pipe 2, so as to hold the transfer pipe 1 and the outlet pipe 2 together more securely than if the connection screw 3 is used alone.

[0025] A water sealing ring 23 is installed at the second end 22 of the outlet pipe 2 in the preferential option, with which better sealing can be achieved after connecting the water transfer pipe 1 and outlet pipe 2.

[0026] In order to connect the parts of the tap 10 together for use, the substantially hollow connection screw 3 is inserted into the opening 14 via the in use upper end of the water transfer pipe 1. The connection screw 3 is able to pass through the opening 14 to enable the second end 32 of the connection screw 3 to extend through the aperture 13 in the wall of the water transfer pipe 1. The first end 31 of the connection screw 3 is larger than the diameter of the aperture 13, and therefore the connection screw 3 cannot pass out of the water transfer pipe 1 via the aperture 13.

[0027] The threaded outer surface of the connection screw is connected to the internally threaded second end 22 of the outlet pipe 2. Then an Allen key is inserted into the opening 14 of the water transfer pipe 1 from the in use upper end. An end of the Allen key is inserted into the opening of the connection screw 3 and engaged therewith, such that turning the Allen key, turns the connection screw 3 and firmly connects the connection screw 3 with the outlet pipe 2. Turning the Allen key repeatedly tightens the hollow connection screw 3 relative to the outlet pipe 2, until the water transfer pipe 1 and the outlet pipe 2 are firmly connected.

[0028] When tightening the connection screw 3 and the outlet pipe 2, fixing pins 4 are used to affix the water transfer pipe 1 and the outlet pipe 2, so that when the Allen key is turned, the water transfer pipe 1 and outlet pipe 2 will not be turned relative to one another, which is better for attachment.

[0029] Once the outlet pipe 2 is fixed to the transfer pipe 1, the Allen key is removed from the opening 14 of the transfer pipe 1, and the valve assembly 12 and the handle 11 are fitted to the in use upper end of the transfer pipe 1.

[0030] Referring to Figures 5 and 6, a second embod-

iment of the invention is shown. The invention is associated with a different type of tap, i.e. a mixer tap. Features which are similar in the two embodiments of the invention, are referred to using like reference numerals, but with the addition of a prime symbol.

[0031] A tap 10' includes first and second water transfer pipes 1', and a water outlet pipe 2'. The tap includes a mixer pipe 5 which extends and fluidly connects each of the transfer pipes 1' to the outlet pipe 2'. The mixer pipe 5 has a first end 51 and a second end 52. Each end 51, 52 of the mixer pipe 5 includes an internally threaded portion.

[0032] The tap 10' also includes a pair of operating members 11' which operate respective valve assemblies 12' (one of which is shown) to move the valve assemblies between open and closed conditions, which respectively permit and prevent the flow of water from the transfer pipes 1' to the outlet pipe 2'. The tap 10' includes two connection screws 3'. One connection screw 3' connects each of the transfer pipes 1' to the mixing pipe 5. The tap 10' may include two fixing formations, including two pairs of pins 41', and a corresponding pair of openings in an outer surface of each of the transfer pipes 1', and in each end of the mixer pipe 5.

[0033] Two water sealing rings 23' are also included to improve the connection between the transfer pipes 1', and the mixer pipe 5.

[0034] In order to connect the parts of the tap 10' together for use, a connection screw 3' is inserted into the opening 14' of each transfer pipe 1', via the in use upper end of each water transfer pipe 1'. Each connection screw 3' is able to pass through the corresponding opening 14' to enable the second end 32' of each connection screw 3' to extend through the corresponding aperture 13' in the wall of the respective water transfer pipe 1'. The first end 31' of each connection screw 3' is larger than the diameter of the respective aperture 13', and therefore the connection screws 3' cannot pass out of the water transfer pipes 1' via the openings 13'.

[0035] The threaded outer surface of each connection screw 3' is connected to one end 51, 52 of the mixer pipe 5. Then an Allen key is inserted into the opening 14' of each water transfer pipe 1' from the respective in use upper end. An end of the Allen key is inserted into the opening of the connection screw 3' and engaged therewith, such that turning the Allen key turns the connection screw 3' and firmly connects the connection screw 3' with the internally threaded portion of the end 51, 52 of the mixer pipe 5. Turning the Allen key repeatedly tightens the hollow connection screw 3' relative to the mixer pipe 5, until the water transfer pipe 1 and the mixer pipe 5 are firmly connected.

[0036] Fixing pins 4' are optionally used to fix each water transfer pipe 1' securely to the mixer pipe 5, so that when the Allen key is turned, the water transfer pipe 1 and mixer pipe 5 will not be turned relative to one another, which is better for attachment.

[0037] The process is repeated to attach the second

transfer pipe 1' to the opposite end 51, 52 of the mixer pipe 5.

[0038] The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. A connection device (3, 3') for connecting a first part of a tap (10, 10') to a second part of a tap (10, 10'), the connection device (3, 3') being substantially hollow, having an opening which extends through the connection device (3, 3') so as to provide a path for fluid to move between the first part and the second part.
2. A connection device (3, 3') according to claim 1 where an external surface of the connection device (3, 3') is threaded, for connection to a correspondingly threaded portion of at least one of the first and the second part of the tap (10, 10').
3. A type of tap connection pipe, according to claim 1 or claim 2 wherein the opening through the connection screw (3, 3') is substantially dodecagonal.
4. A connection device (3, 3') according to any one of claims 1 to 3, having a first end (31, 31') and a second end (32, 32'), the first end (31, 31') being larger than the second end (32, 32').
5. A connection device (3, 3') according to any one of claims 1 to 4, wherein the first part of the tap (10, 10') is a transfer pipe (1) and the second part is an outlet pipe (2).
6. A connection device (3, 3') according to any one of claims 1 to 4 wherein the first part is a transfer pipe (1') and the second part is a mixer pipe (5).
7. A connection device (3, 3') substantially as described herein and/or as described in the accompanying drawings.
8. A tap (10, 10') including a transfer pipe (1, 1') and at least one of an outlet pipe (2) and a mixer pipe (5) which is connectable to the transfer pipe (1, 1'), the tap (10, 10') further including a connection device (3, 3') for connecting the transfer pipe (1, 1') to the outlet pipe (2) or the mixer pipe (5), the connection device (3, 3') being substantially hollow so as to provide a path for fluid between the transfer pipe (1, 1')

and the outlet pipe (2) or the mixer pipe (5).

9. A tap (10, 10') according to claim 8 wherein the transfer pipe (1, 1') includes an aperture (13, 13') in a wall of the transfer pipe (1, 1'), through which a part of the connection device (3, 3') is extendible, the part of the connection device (3, 3') which is extendible through the aperture (13, 13') being connectable to at least one of the outlet pipe (2) and the mixer pipe (5). 5
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10. A tap (10, 10') according to claim 9 wherein the part of the connection device (3, 3') which is extendible through the aperture (13, 13') of the transfer pipe (1, 1') has an externally threaded portion which is connectable to an internally threaded portion of the outlet pipe (2) or the mixer pipe (5). 15
11. A tap (10, 10') according to any one of claims 8 to 10 including a fixing formation for fixing the transfer pipe (1, 1') to one of the outlet pipe (2) and the mixer pipe (5). 20
12. A tap (10, 10') according to claim 11 wherein the fixing formation includes a pair of pins (4, 4') and a corresponding set of openings in each of the transfer pipe (1, 1') and the outlet pipe (2) or the mixer pipe (5) to which the transfer pipe (1, 1') is connected by the connection device (3, 3'). 25
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13. A tap (10, 10') according to any one of claims 8 to 12 including a sealing ring for sealing the connection between the transfer pipe (1, 1') and the one of the outlet pipe (2) and the mixer pipe (5). 35
14. A tap (10, 10') substantially as described herein and/or as shown in the accompanying drawings. 40
15. A method of connecting one of an outlet pipe (2) and a mixer pipe (5) of a tap (10, 10') to a transfer pipe (1, 1') of the tap (10, 10'), the method including inserting a connection device (3, 3') into an opening (14, 14') of the transfer pipe (1, 1'), via an in use upper end thereof, extending a part of the connection device (3, 3') through an aperture (13, 13') in a wall of the transfer pipe (1, 1'), and connecting the one of the outlet pipe (2) and the mixer pipe (5) to the part of the connection device (3, 3') extending through the aperture (13, 13'), the method including engaging an Allen key with an internal opening of the connection device via the opening (14, 14') of the transfer pipe (1, 1') so as to tighten the connection between the transfer pipe (1, 1') and the one of the outlet pipe (2) and the mixer pipe (5). 45
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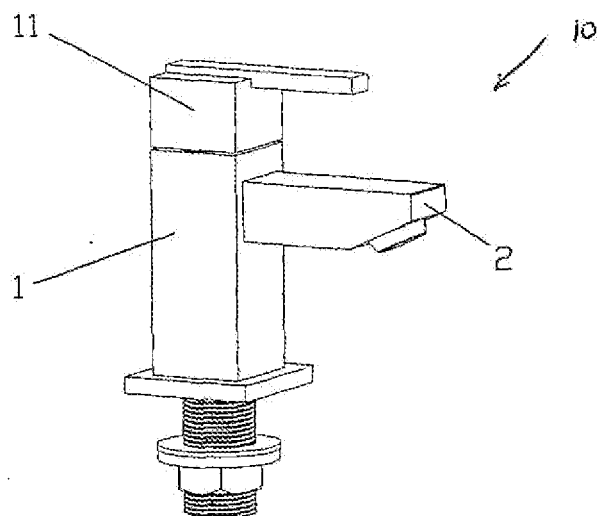


Fig. 1

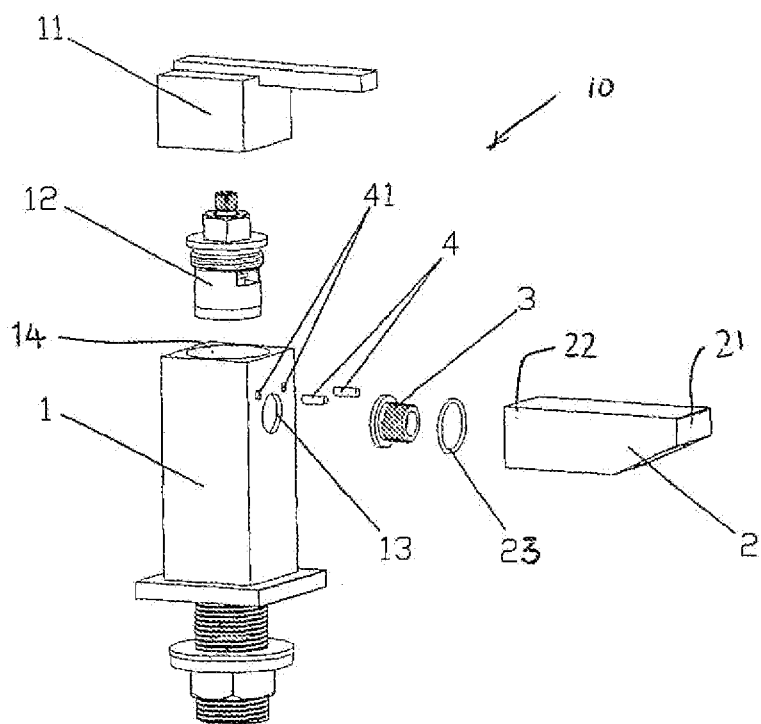


Fig. 2

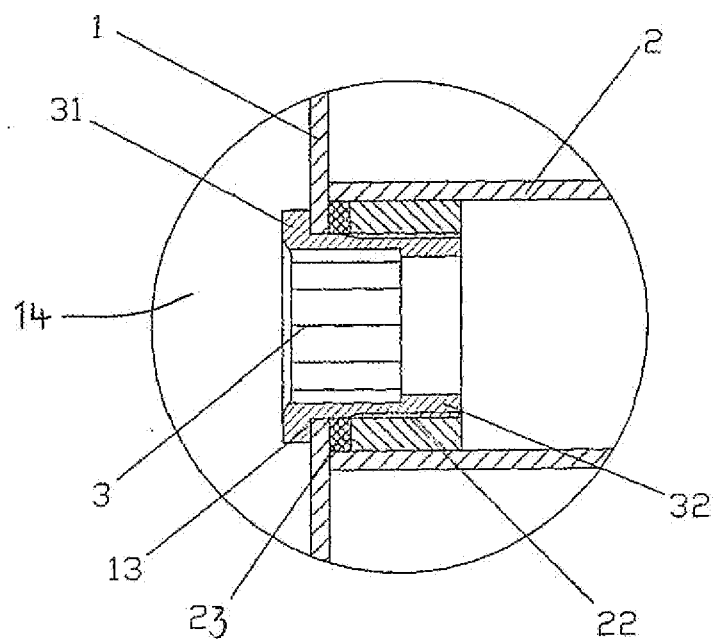


Fig. 3

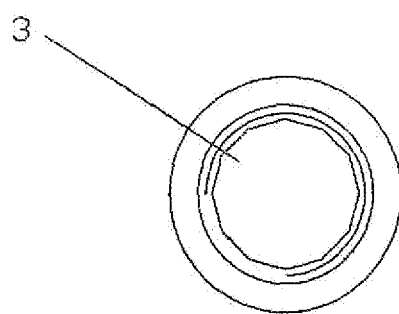


Fig. 4

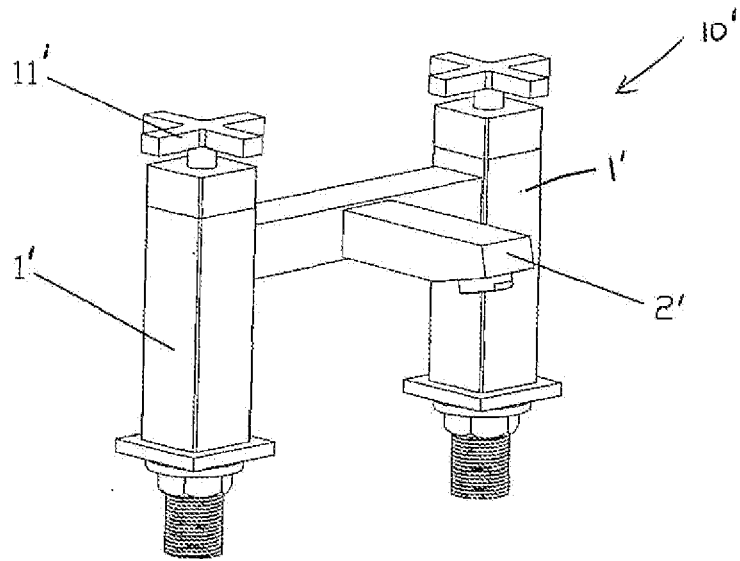


Fig. 5

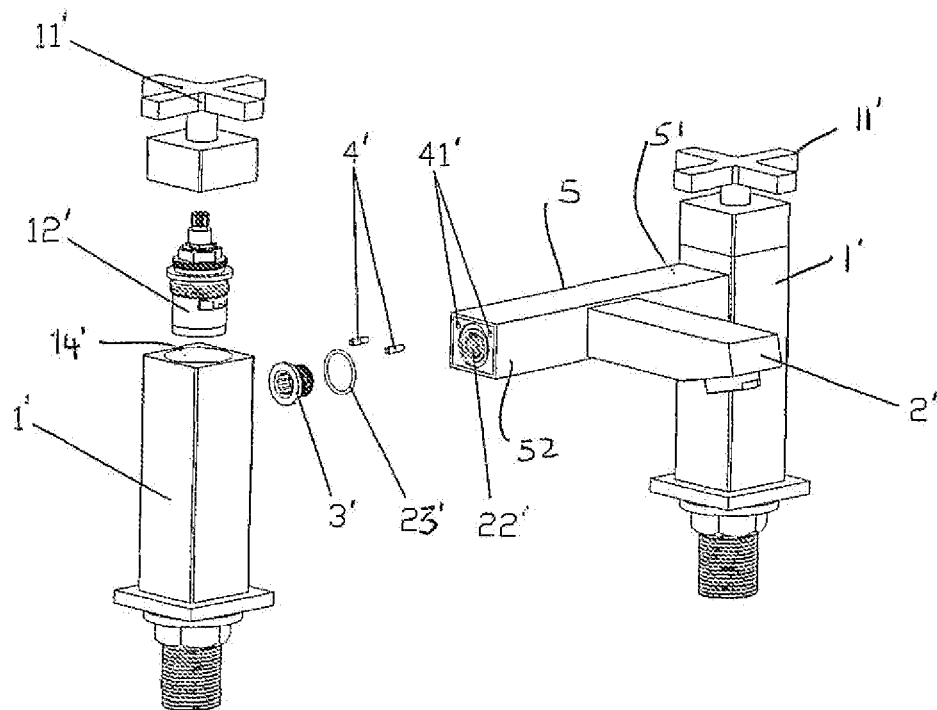


Fig. 6