

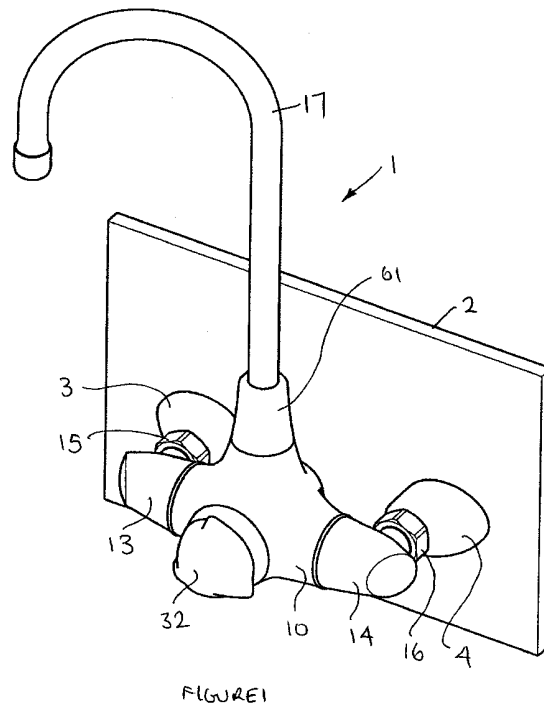
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(54) Abstract Title: **Improvements in or relating to ablutionary fittings**

(57) A thermostatic mixer tap 1 has inlets 3,4 for connection to supplies of hot and cold water and a control knob 32 for manual selection of the temperature of the output water discharged from a spout 17. The spout 17 is mounted for rotation and a flow control mechanism is operable in response to rotation of the spout 17 to adjust the water flow between full on and off.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

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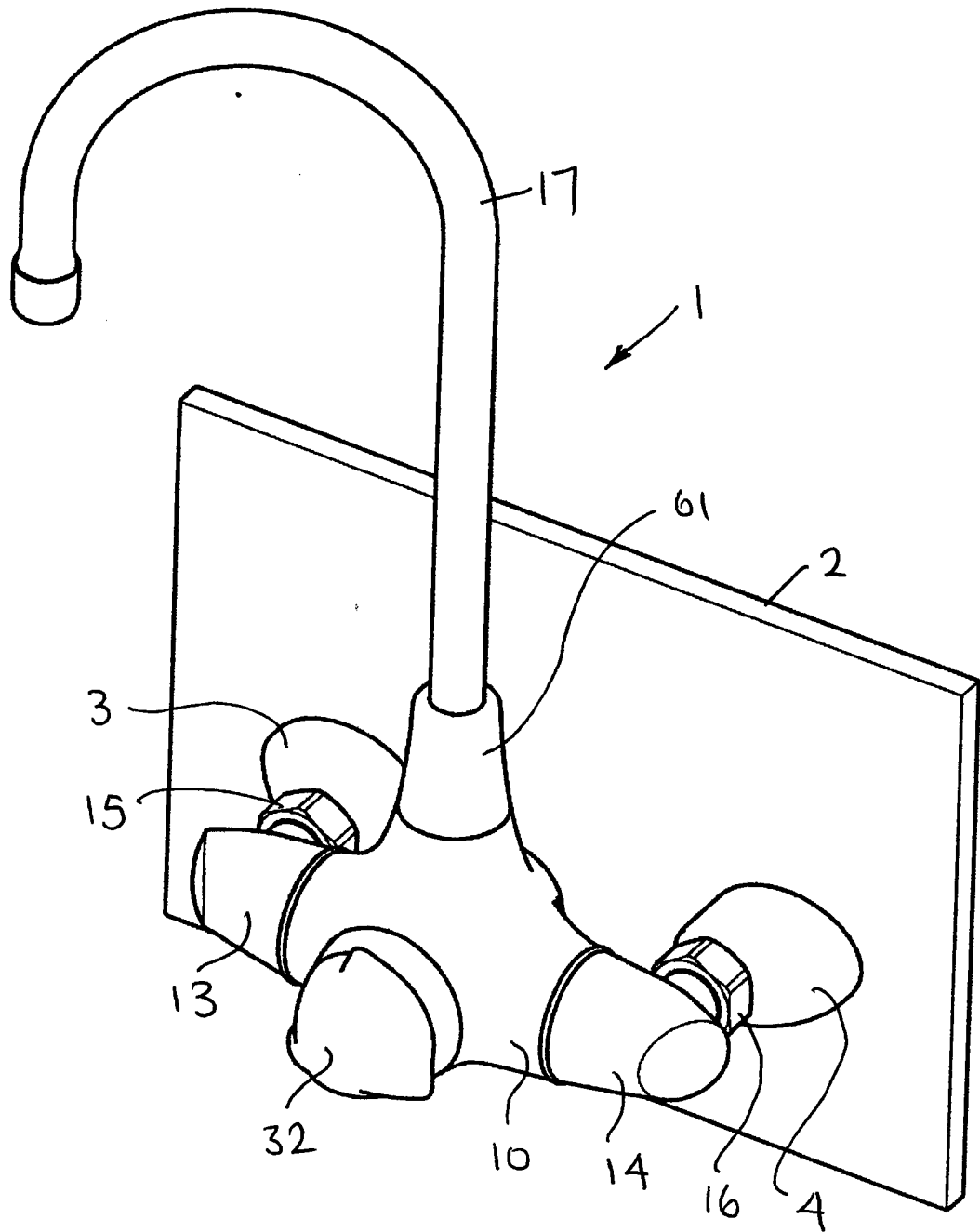


FIGURE 1

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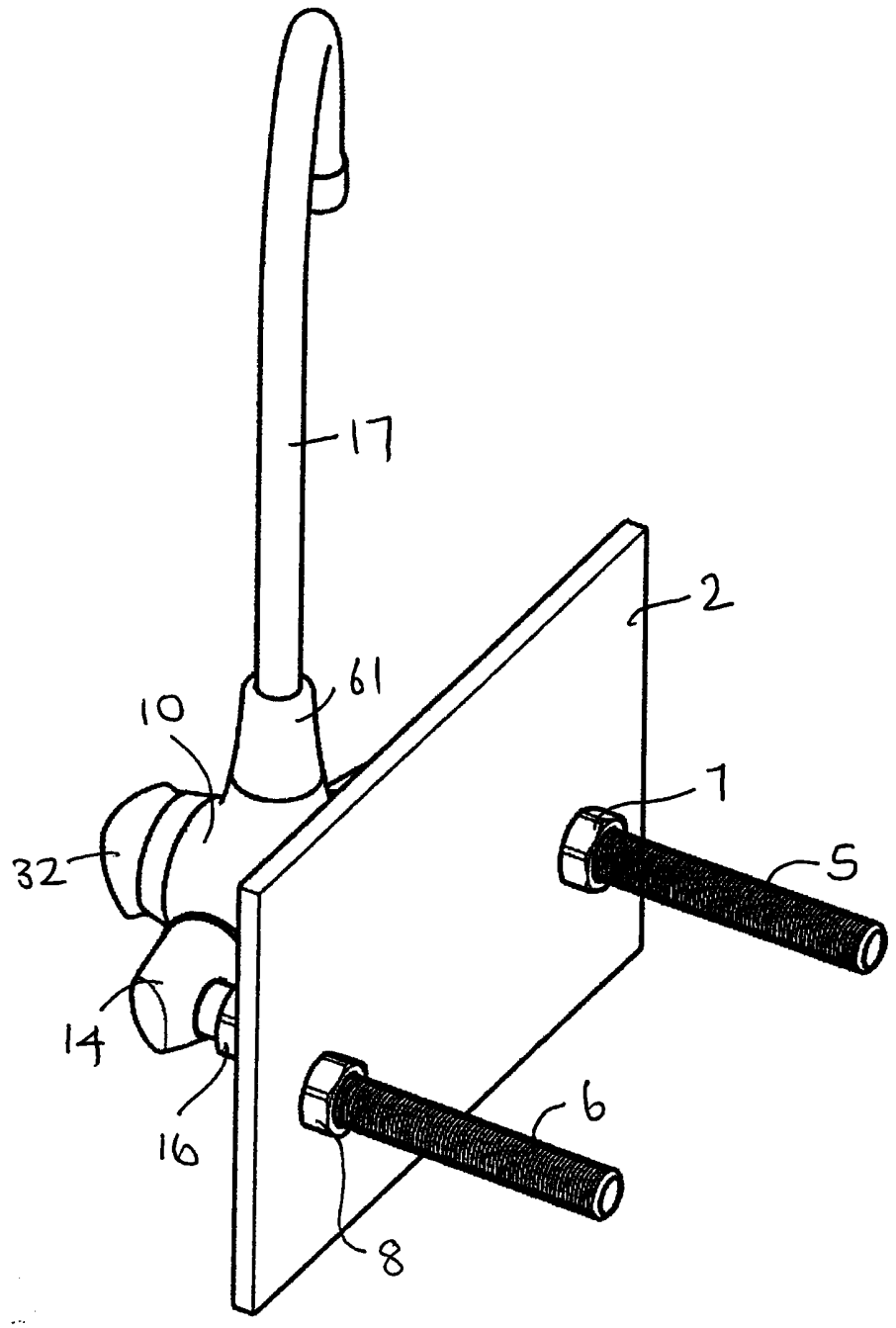


FIGURE 2

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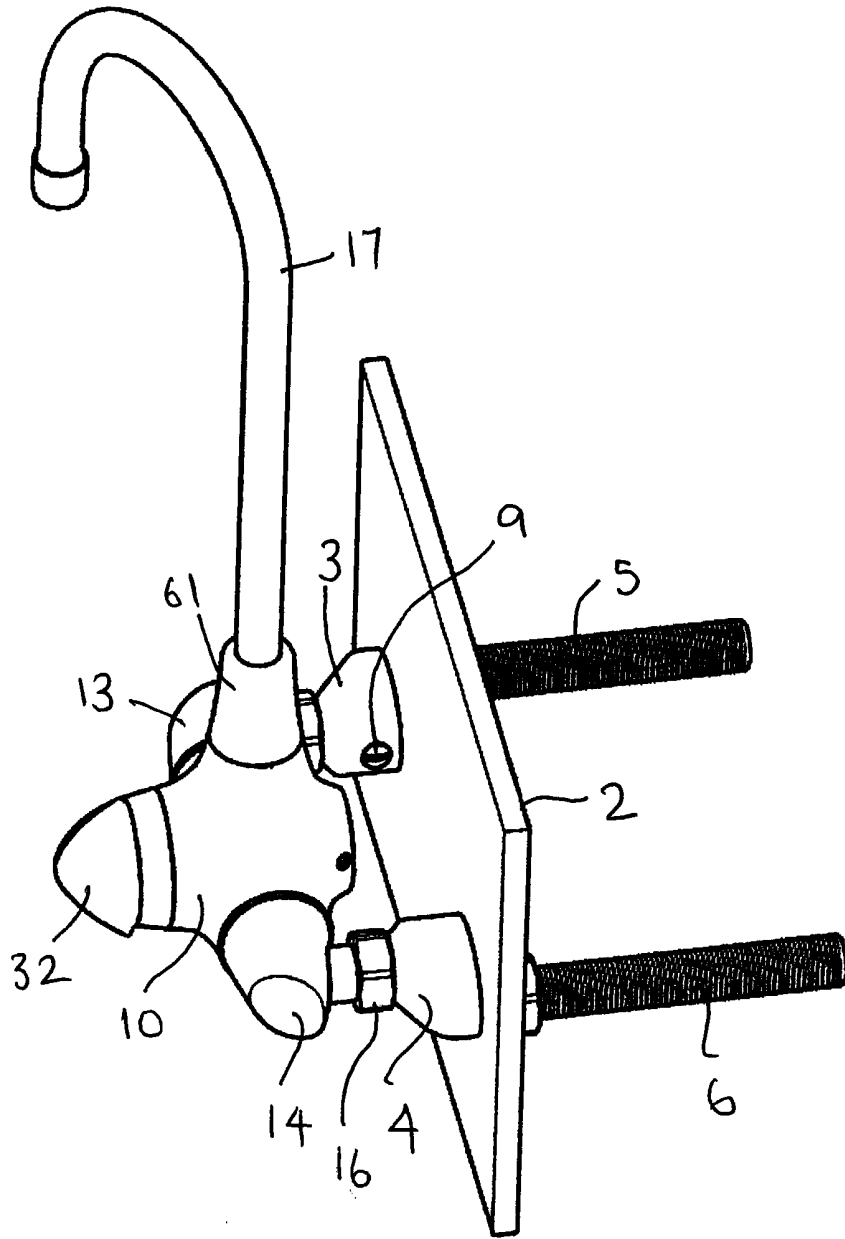


FIGURE 3

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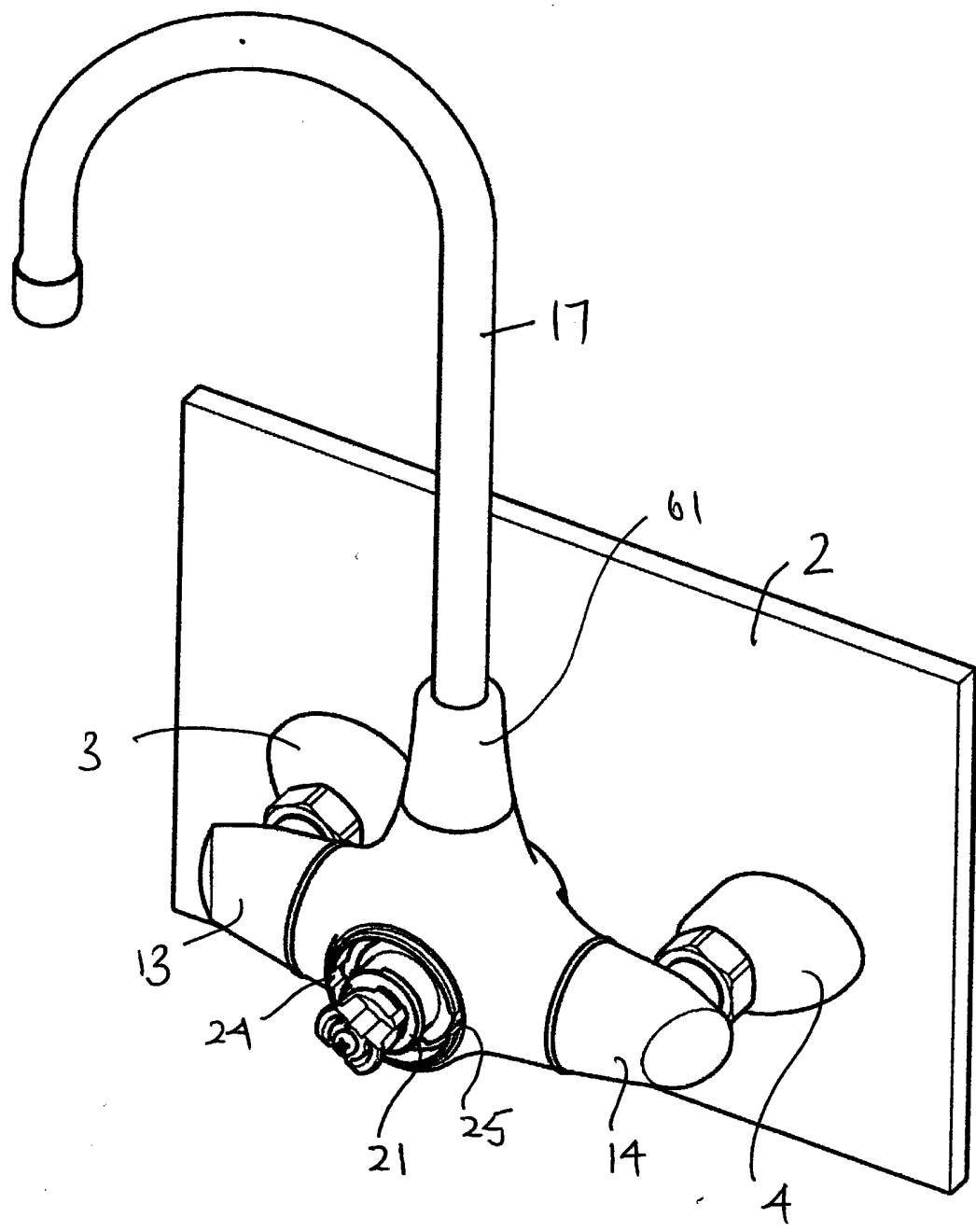


FIGURE 4

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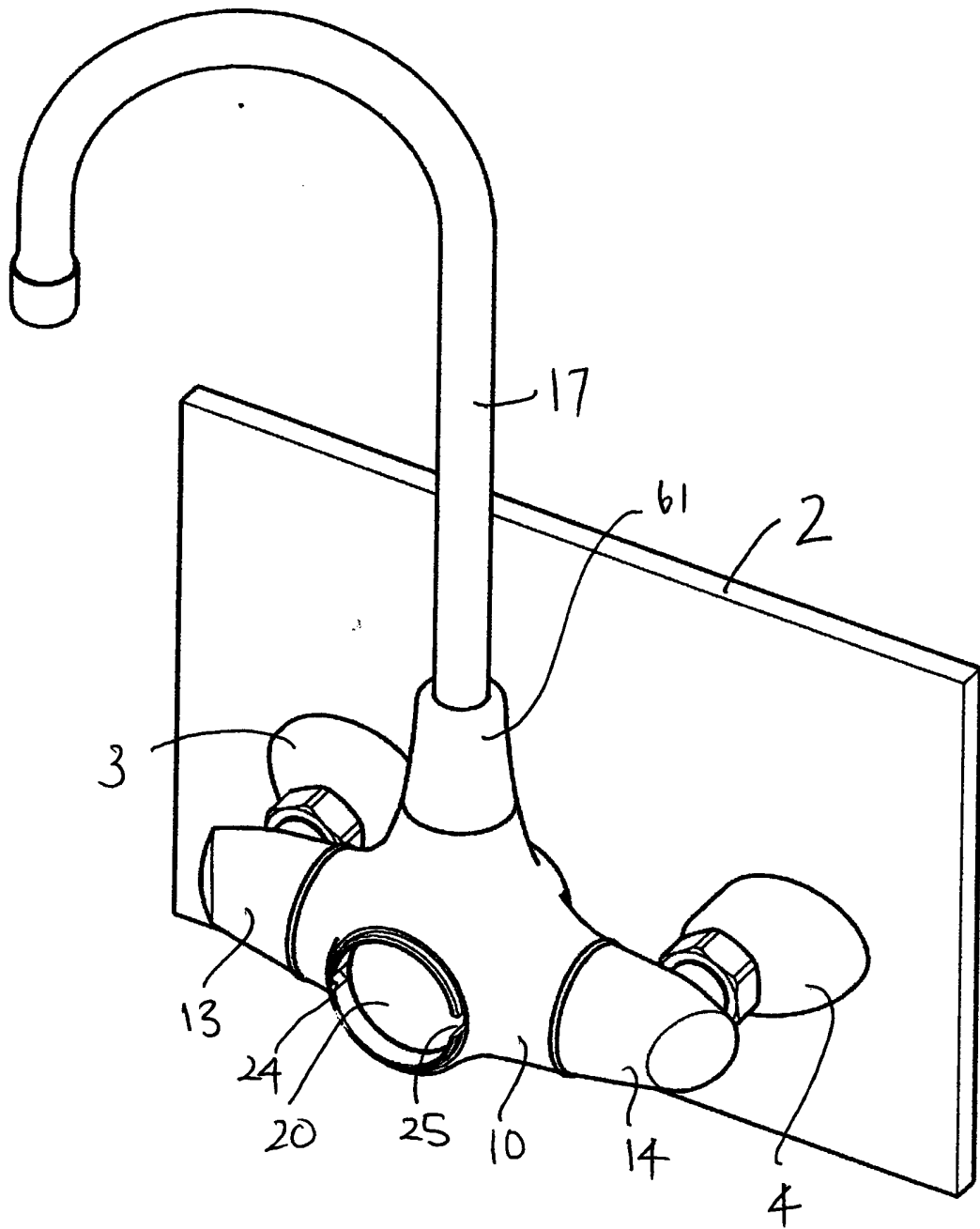


FIGURE 5

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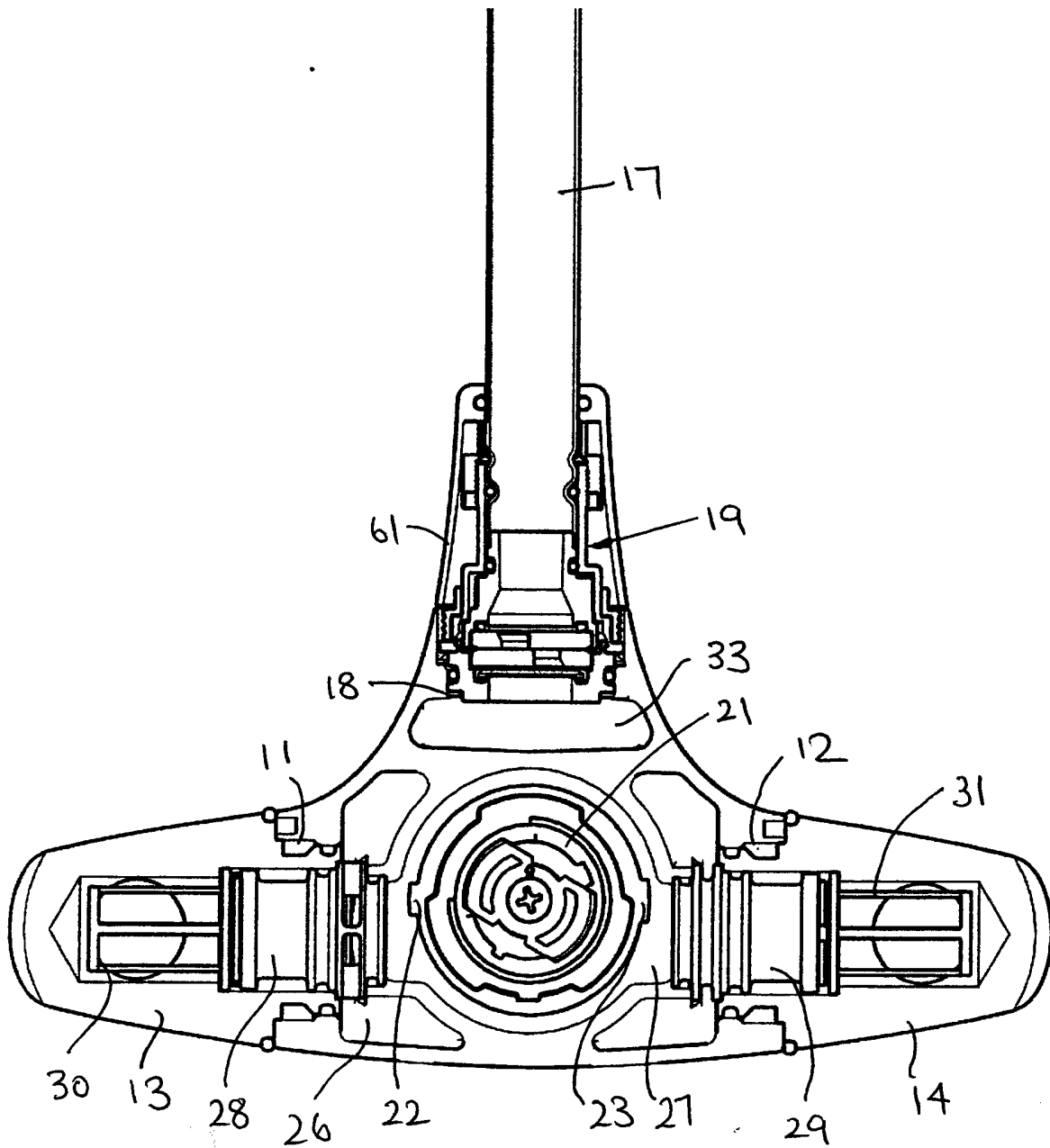


FIGURE 6

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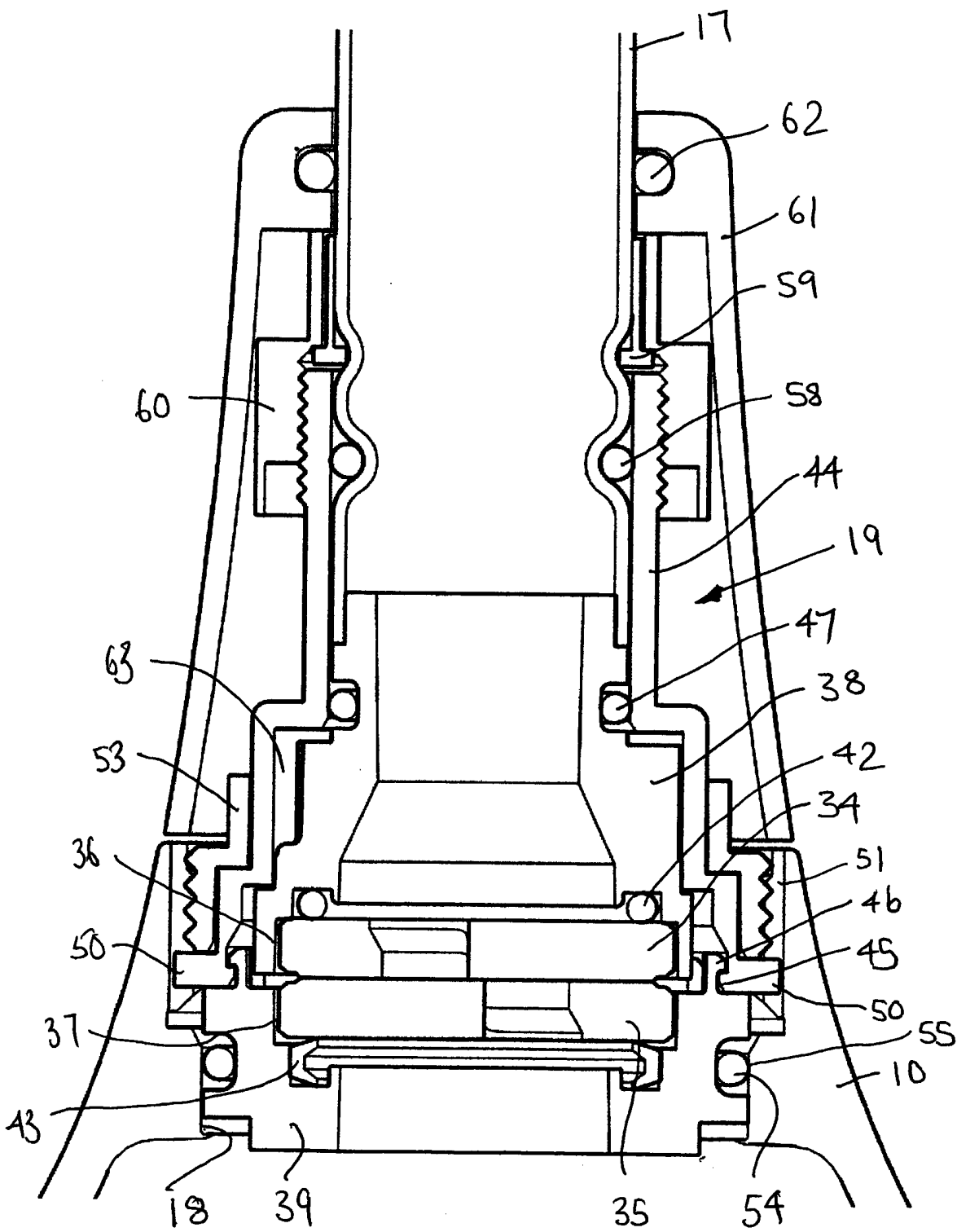


FIGURE 7

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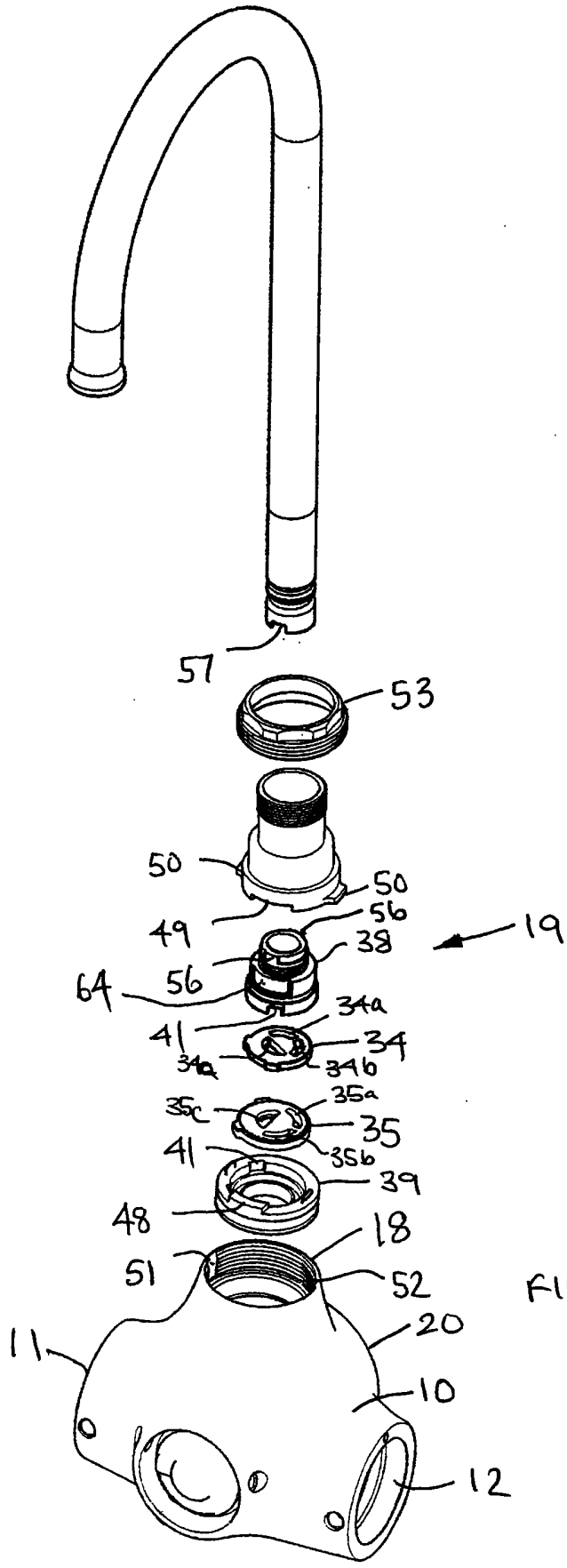
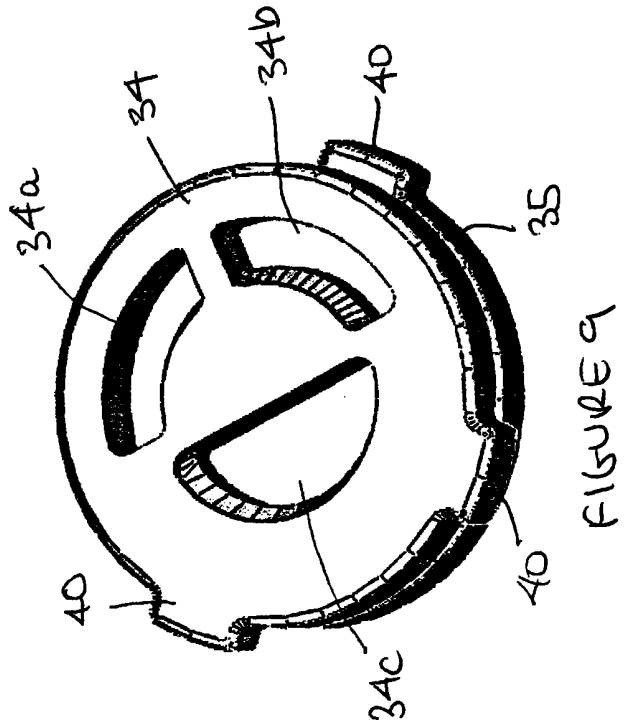
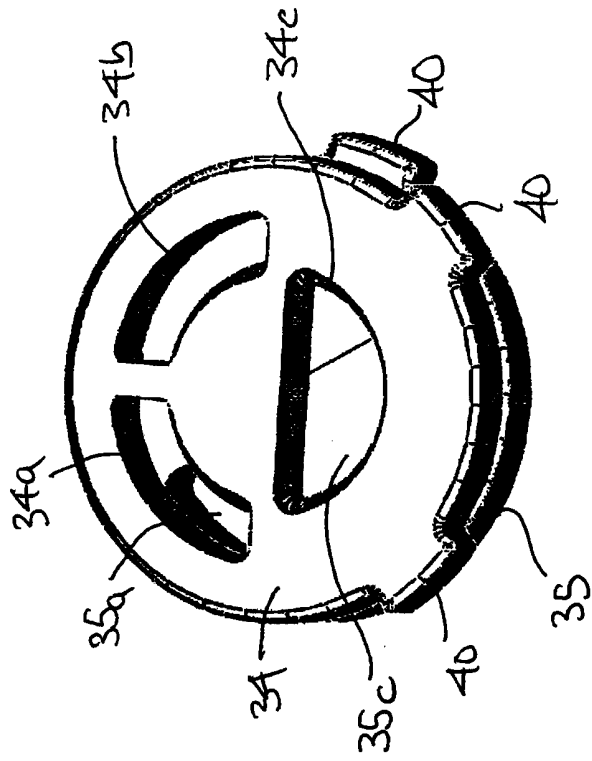
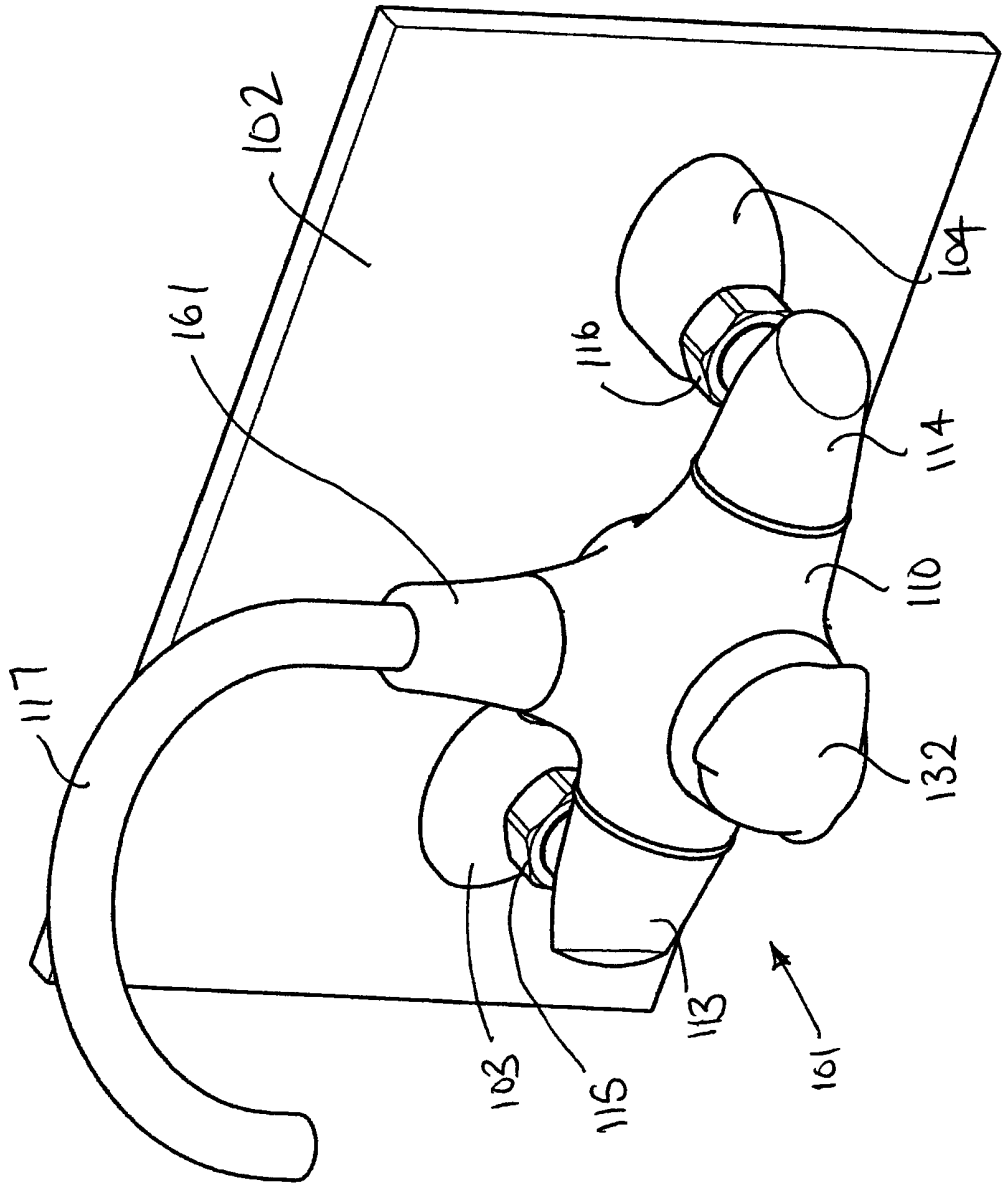


FIGURE 8



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FIGURE 11



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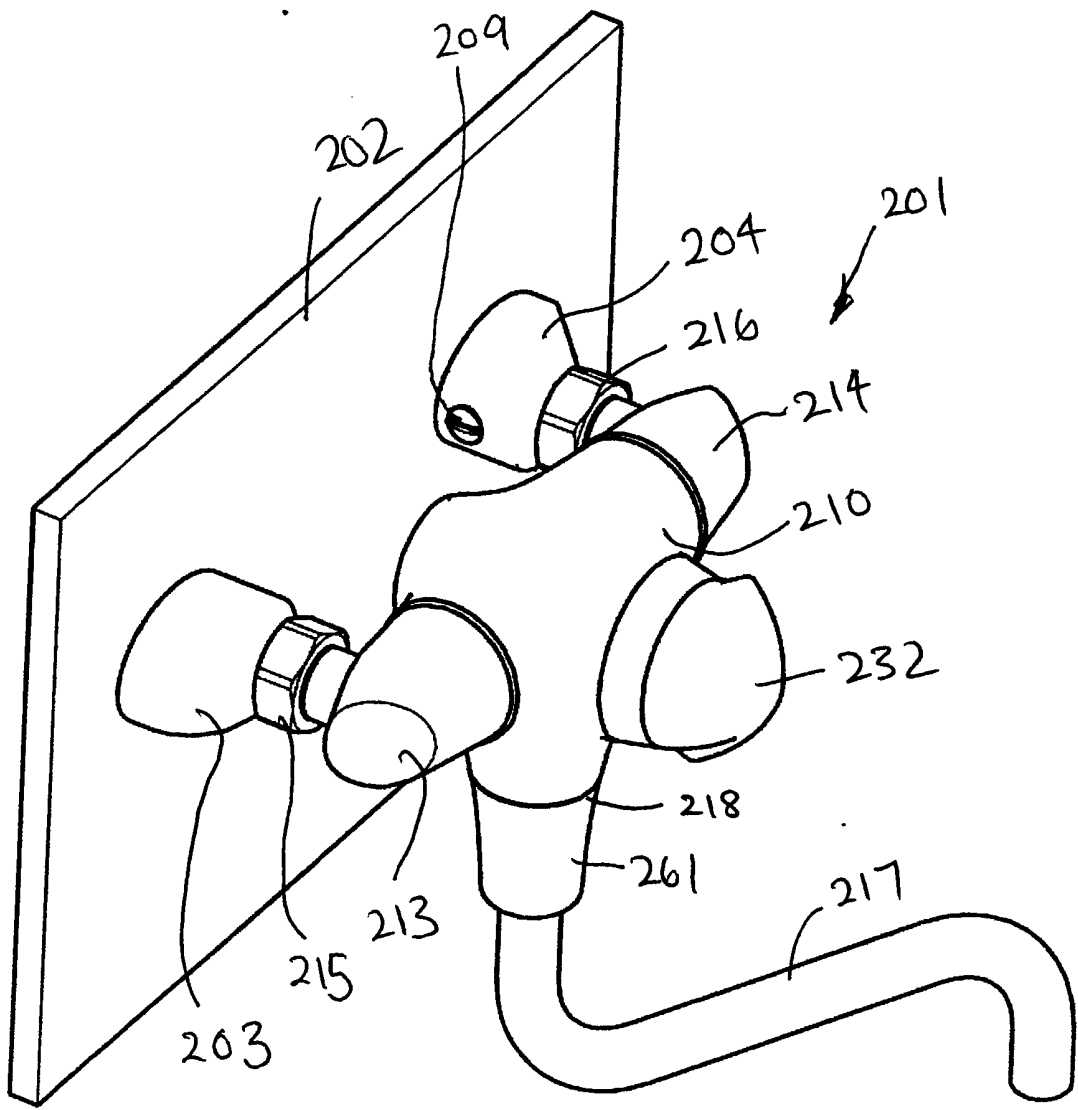


FIGURE 12

IMPROVEMENTS IN OR RELATING TO ABLUTIONARY FITTINGS

This invention concerns improvements in or relating to ablutionary fittings and in particular to a flow control mechanism for such fittings.

5 More especially the invention has application to a flow control mechanism for taps, preferably mixer taps for mixing hot and cold water according to user selection of a desired water temperature and in particular to thermostatic mixer taps.

10 There is a need in hospitals for thermostatic mixer taps for use with surgical washbasins on hospital wards. Each hospital ward has a number of "surgical" washbasins, which are primarily intended for "nursing staff" use. Because the basins are located in an area where patients could potentially use them unsupervised, there is a risk of scalding and,
15 consequently, the hot supply needs to be protected.

Currently, many existing designs of mixer taps for surgical washbasins are non-thermostatic and require an additional mixing valve to be installed to control the hot supply. Recently there is a trend to use pre-
20 plumbed panels onto which sanitary and plumbing fittings and products can be quickly and easily mounted for installation. The provision of an additional mixing valve is undesirable as it usually has to be installed behind these panels rendering it very difficult to service.

25 Another problem with many existing non-thermostatic designs of mixer taps for surgical washbasins is that they have separate hot and cold valve levers for adjusting the outlet water flow and temperature. Two operations are therefore required to set the temperature and produce a mixed flow. Furthermore, the desired water temperature has to be set
30 from scratch each time the mixer is used.

In hospitals, staff often need to shut off the mixer taps without the use of their hands due to contamination issues and general cleanliness. The provision of separate hot and cold levers requires two operations which is naturally awkward when it is not possible to use one's hands.

The present invention has been made from a consideration of the foregoing problems and disadvantages.

10 According to a first aspect of the present invention there is provided in or for an ablutionary fitting, a flow control mechanism operable by adjustment of the position of an outlet through which water is discharged from the fitting.

15 The ablutionary fitting may comprise a tap in which adjustment of the flow control mechanism is effected by moving a spout providing the outlet through which water is discharged from the tap.

The flow control mechanism may be operable by rotation of the spout.

20 Alternatively, operation of the flow control mechanism may be effected by sliding or pivotal movement of the spout or any combination of rotational, sliding or pivotal movement.

The flow control mechanism may provide a simple on/off control of flow in response to movement of the spout. More preferably, however, the flow control mechanism is operable to adjust the flow between full on and off.

The flow control mechanism may be of any suitable type. For example, a valve member movable towards and away from a valve seat in response to movement of the spout.

- 5 In a preferred arrangement, the flow control mechanism comprises a pair of plates arranged in face-to face relationship with at least one hole in each plate that overlap to permit fluid flow and are offset to shut-off fluid flow.
- 10 Preferably the spout is rotatable whereby rotation of the spout causes one of the plates to rotate relative to the other plate between positions permitting and preventing flow.

15 The tap may be a mixer tap connectable to supplies of hot and cold water with means for adjusting the relative proportions of hot and cold water to control the outlet water temperature.

20 Such means may comprise a mixing valve with user operable means such as a control knob or lever for user selection of the desired outlet water temperature.

25 The mixing valve may be non-thermostatic but more preferably is thermostatic to maintain the selected outlet water temperature substantially constant.

30 In another arrangement, the tap may be connectable to a supply of temperature controlled water. For example, the tap may be connected to a ring main through which temperature controlled water is circulated for supplying a plurality of fittings with temperature controlled water.

According to a second aspect of the present invention, there is provided an ablutionary fitting having a spout through which water can flow to an outlet wherein the spout is rotatable to control the water flow.

- 5 Preferably the fitting is a mixer tap having a mixing valve for control of outlet water temperature independently of flow and rotation of the spout operates a flow control mechanism to prevent or permit water flow through the spout.
- 10 In a preferred arrangement, the mixer spout is operatively connected to a ceramic flow control valve, and thus simply rotating the spout controls the flow. Advantageously, the spout is arranged to permit hands-free operation to turn the flow on and off.
- 15 Preferably, the mixing valve is incorporated in a thermostatic cartridge unit detachably located in the main body of the mixer tap and the outlet water temperature is manually set using a temperature control knob.

Advantageously, the mixer tap is adapted for wall or panel mounting via
20 inlet connectors including isolation valves accessible from the front of the wall or panel to allow the incoming hot and cold supplies to be shut-off for servicing, repair or replacement of the mixer tap.

According to a third aspect of the present invention, there is provided a
25 method of controlling flow in an ablutionary fitting by rotating a spout through which water can flow for discharge from the fitting.

Other features, benefits and advantages of the invention will be apparent
from the following description in more detail of exemplary embodiments
30 with reference to the accompanying drawings wherein:

FIGURE 1 is a front perspective view of a thermostatic mixed tap according to the present invention shown fitted to a mounting panel;

5 **FIGURE 2** is a rear perspective view of the tap shown in Figure 1;

FIGURE 3 is a side perspective view of the tap shown in Figure 1;

10 **FIGURE 4** is a front perspective view similar to Figure 1 with the temperature control knob removed to reveal the cartridge unit;

FIGURE 5 is a front perspective view similar to Figure 4 with the cartridge unit removed;

15 **FIGURE 6** is a section through the tap body showing the spout connected to the tap body via a flow control mechanism;

20 **FIGURE 7** is a section to an enlarged scale of the flow control mechanism shown in Figure 6;

FIGURE 8 is an exploded perspective view of the flow control mechanism and spout;

25 **FIGURE 9** is a perspective view showing the ceramic flow control plates of the flow control mechanism in a fully closed position;

FIGURE 10 is a perspective view showing the ceramic flow control plates of the flow control mechanism in a fully open position;

30 **FIGURE 11** is a front perspective view showing an alternative spout;

FIGURE 12 is a front perspective view showing an alternative arrangement of the spout connected to the underside of the tap body.

- 5 Referring first to Figures 1 to 10 of the accompanying drawings, there is shown a thermostatic mixer tap 1 fitted to a mounting panel 2 via inlet connectors 3,4. In this way, there is no tap/basin interface and the potential for dirt traps is reduced.
- 10 The incoming supplies of hot and cold water (not shown) are connected behind the panel 2 to threaded sections 5,6 of the inlet connectors 3,4 that extend through holes (not shown) in the panel 2. The threaded sections 5,6 carry nuts 7,8 respectively that are tightened to secure the inlet connectors 3,4 to the panel 2.
- 15 The inlet connectors 3,4 house isolation valves (not shown) operable via screws 9 (one shown in Figure 3) set in the exposed ends of the inlet connectors 3,4 to shut-off the hot and cold water supplies and isolate the mixer tap 1. This allows the mixer tap 1 to be serviced without having to
- 20 remove the tap 1 from the mounting panel 2, or having to gain access behind the panel 2.
- The mixer tap 1 has a body 10 with opposed inlets 11,12 connected to the inlet connectors 3,4 via respective inlet elbows 13,14 secured to the inlet
- 25 connectors 3,4 by nuts 15,16. A spout 17 is connected to an outlet 18 in the body 10 via a flow control mechanism 19 operable by rotating the spout 17 to control the flow rate of water discharged from the mixer tap 1 as described in more detail later.

The tap body 10 has an opening 20 in the front in which a thermostatic cartridge unit 21 is detachably mounted. The cartridge unit 21 has a pair of lugs 22,23 that are received in opposed cut-outs 24,25 in the opening 20 to locate the cartridge unit 21 in the opening 20. The cartridge unit 21 has a hot water inlet (not shown) opening to a hot water inlet chamber 26 within the body 10 and a cold water inlet (not shown) opening to a cold water inlet chamber 27 within the body 10.

The tap body 10 has symmetric waterways that connect both inlets 11,12 to the inlet chambers 26,27 and the inlet elbows 13,14 are provided with inlet adaptors 28,29 respectively to connect selectively the hot water supply to the hot water inlet chamber 26 and the cold water supply to the cold water inlet chamber 27.

In this embodiment, the inlet adaptor 28 connects the hot supply to the hot water inlet chamber 26 and the inlet adaptor 29 connects the cold supply to the cold water chamber 27. The inlet adaptors 28,29 are colour coded, red for hot and blue for cold, and are interchangeable to allow the incoming supplies of hot and cold water to be connected to either of the inlet connectors 3,4. In this way, the plumbing connections behind the panel 2 can be made in the most convenient manner and the supplies matched to the inlets of the cartridge unit 19 by means of the inlet adaptors 28,29.

The inlet adaptors 28,29 are provided with non-return check valves (not shown) to prevent backflow of the supplies and the inlet elbows 13,14 house filters 30,31 respectively to filter the incoming supplies and remove debris upstream of the check valves. The filters 30,31 are detachably connected to the inlet adaptors 28,29 and are removable from the inlet elbows 13,14 with the adaptors 28,29.

The cartridge unit 21 houses a thermostatic mixing valve (not shown) operable to control mixing of the hot and cold water supplies to provide a source of temperature controlled water according to user selection via a rotatable temperature control knob 32.

The thermostatic mixing valve may be of any suitable type known to those skilled in the art. For example a shuttle valve axially movable between hot and cold seats to control the relative proportions of admixed hot and cold water and a wax thermostat responsive to the outlet water temperature to adjust the position of the shuttle valve to maintain a selected outlet water temperature substantially constant.

The control knob 32 may be rotatable for user selection of the outlet water temperature from full cold to full hot (typically about 60°C). Alternatively, a stop (not shown) may be provided to limit the water temperature that can be selected, for example up to 40°C to reduce the risk of scalding. The stop may be fixed to prevent selection of higher water temperatures or releasable to allow selection of higher water temperatures. The stop may be set during manufacture or during installation.

As will be appreciated, the cartridge unit 21 can be easily removed for servicing, repair or replacement by firstly using the isolation valves to shut off the incoming supplies and isolate the mixer tap 1 as previously described. The temperature control knob 32 can then be removed to allow the cartridge unit 21 to be extracted from the body 10 without having to remove the tap 1 from the mounting panel 2, or having to gain access behind the panel 2.

The cartridge unit 21 has an outlet (not shown) for discharge of temperature controlled water from the mixing valve to an outlet chamber 33 within the tap body 10. The outlet 18 in the tap body 10 opens to the outlet chamber 33 and the flow control mechanism 19 is mounted in the outlet 18 and controls the flow of water from the outlet chamber 33 to the spout 17.

The flow control mechanism 19 comprises a pair of annular ceramic plates 34,35 mounted in face-to-face relationship in opposed recesses 36,37 of a pair of housing members 38,39. The plates 34,35 are located against rotation relative to the associated housing member 38,39 by engagement of radial lugs 40 in cut-outs 41 in the recesses 36,37 and sealing rings 42,43 provide a water-tight seal between the plates 34,35 and the associated recess 36,37.

The housing member 38 is rotatably mounted in a sleeve member 44 secured to the other housing member 39 by engagement of complementary interlocking formations 45,46 to maintain the plates 34,35 in face-to-face relationship while allowing rotation of the upper plate 34 relative to the lower plate 35. A sealing ring 47 provides a water-tight seal between the housing member 38 and the sleeve member 44.

The housing member 39 is secured against rotation relative to the sleeve member 44 by engagement of an upstand 48 on the housing member 39 in a cut-out 49 in the sleeve member 44.

The sleeve member 44 has a pair of radial lugs 50 that are received in opposed axial grooves 51 in a threaded portion 52 of the outlet 18 to locate the flow control mechanism 19 against rotation relative to the body 10 of the mixer tap 1.

The flow control mechanism 19 is secured by engagement of a head nut 53 with the threaded portion 52 and is sealed by engagement of an O-ring 54 carried by the housing member 39 with a non-threaded portion 55 of the outlet 18.

The base of the spout 17 is a push fit in the sleeve member 44 and is secured against rotation relative to the housing member 38 by engagement of a pair of opposed lugs 56 on the housing member 38 in a pair of cut-outs 57 (one only shown) in the base of the spout 17. In this way, rotation of the spout 17 is transmitted to the housing member 38 to rotate the plate 34 relative to the plate 35.

The spout 17 is sealed relative to the sleeve member 44 by an O-ring 58 and is axially retained by a circlip 59 that is secured by threaded engagement of a locking ring 60 with the sleeve member 44. In this way, the spout 17 can be detached from the sleeve member 44 for servicing, repair or replacement.

The flow control mechanism 19 is concealed by a shroud 61 provided with an O-ring 62 that seals around the spout 17 above the locking ring 60. The shroud 61 is axially slidable on the spout 17 to reveal the flow control mechanism 19 for servicing, repair or replacement.

The ceramic plate 34 is provided with through holes 34a,b,c and the plate 35 is provided with matching through holes 35a,b,c for controlling the flow of water from the outlet chamber 33 through the spout 17.

The plate 34 is rotatable relative to the plate 35 in response to rotation of the spout between a closed position (Figure 9) in which the holes 34a,b,c

are offset from the holes 35a,b,c shutting-off the flow of water from the outlet chamber 33 and a fully open position (Figure 10) in which the holes 34a,b,c overlap the corresponding holes 35a,b,c to permit flow of water from the outlet chamber 33. The extent of the overlap may be adjusted to vary the flow rate by rotation of the plate 34 to any intermediate position
5 between the closed and fully open positions

The closed and fully open positions are set by a radial lug 63 set inside the sleeve member 44 that engages a slot 64 on the outside of the housing member 38. The ends of the slot 64 form stops that define the closed and fully open positions.
10

In use, the desired outlet water temperature can be set independently of the flow by rotation of the temperature control knob 32 and the spout 17 rotated to set the flow rate. The flow can be shut-off without changing the position of the temperature control knob 32 so that the mixer tap 1 can be pre-set to provide a desired outlet water temperature each time the spout 17 is rotated to open the outlet 18. Thus, once the temperature has been set, the mixer tap 1 can be operated by just simply rotating the spout 17 to set the flow and only one action is required to shut the flow off. The spout 17 is shaped to permit hands free operation by the users forearms where it is desired to avoid using clean hands after washing to shut-off the flow.
15
20

In this embodiment, the amount of travel between the flow being fully on and fully off is approximately 60 degrees of rotation, so only a limited amount of movement of the spout 17 is required. As a result, the flow can be easily shut off without using the hands in one short action. It will be understood, however, that any range of angular movement may be provided between the closed and fully open positions.
25
30

Referring now to Figure 11, there is shown a modification to the embodiment of Figures 1 to 10. For convenience like reference numerals in the series 100 are used to indicate corresponding parts. In this
5 modification, the spout 117 has a different shape. In other respects the construction and operation of the mixer tap 101 is the same as the previous embodiment.

Referring now to Figure 12, there is shown another modification to the
10 embodiment of Figures 1 to 10. For convenience like reference numerals in the series 200 are used to indicate corresponding parts. In this modification, the tap body 210 is inverted so that the outlet 218 is on the underside and the spout 217 has a different shape to suit the position of the outlet 218. In other respects the construction and operation of the
15 mixer tap 201 is the same as the previous embodiment.

As will now be understood, the present invention provides a spout-driven flow control mechanism for an ablutionary fitting that is simple to operate and permits hands-free operation by use of an appropriate shape for the
20 spout.

The panel-mounted arrangement with isolation valves accessible from the front of the panel is also particularly beneficial and allows servicing, repair or replacement of the flow control mechanism and the thermostatic
25 cartridge unit without removing the mounting panel.

The thermostatic control of outlet water temperature independently of flow control is also especially useful in reducing the risk of accidental scalding and allows the outlet water temperature to be pre-set to provide
30 comfortable hand washing. In this way, once the outlet water temperature

has been set, only one action is required to operate the tap, and the temperature will be the same each time the tap is used.

5 It will be appreciated that the invention has particular application for use in environments where sanitary and thermostatic operation is of great importance and it is desirable to have hands free operation to prevent contamination after washing. For example, in hospitals or any other environment that has similar demands that would benefit from hands free operation such as a clean room manufacturing area or a laboratory.

10

It will be understood, however, that the invention is not limited to such application and the spout-driven flow control mechanism could be applied to ablutionary fittings for domestic use in general. This could be particularly of advantage for disabled users due to the spout acting as a large, easy to use lever. The simple design and its thermostatic operation may also be suitable for use in such environments as public conveniences.

15

Other improvements and modifications that can be made without departing from the concept of the invention described herein will be apparent to those skilled in the art

20

CLAIMS

1. An ablutionary fitting having a flow control mechanism operable by adjustment of the position of an outlet through which water is discharged from the fitting.
5
2. An ablutionary fitting according to claim 1 wherein the ablutionary fitting comprises a tap in which adjustment of the flow control mechanism is effected by moving a spout providing the outlet through which water is discharged from the tap.
10
3. An ablutionary fitting according to claim 2 wherein the flow control mechanism is operable by rotation of the spout.
4. An ablutionary fitting according to claim 2 wherein the flow control mechanism is operable by sliding movement of the spout.
15
5. An ablutionary fitting according to claim 2 wherein the flow control mechanism is operable by pivotal movement of the spout.
- 20 6. An ablutionary fitting according to claim 2 wherein the flow control mechanism is operable by any combination of rotational, sliding or pivotal movement of the spout.
- 25 7. An ablutionary fitting according to any one of claims 2 to 6 wherein the flow control mechanism provides on/off control of flow in response to movement of the spout.
- 30 8. An ablutionary fitting according to any one of claims 2 to 7 wherein the flow control mechanism is operable to adjust the flow between full on and off.

9. An ablutionary fitting according to any one of claims 2 to 8 wherein the flow control mechanism comprises a valve member movable towards and away from a valve seat in response to movement of the spout.
- 5
10. An ablutionary fitting according to any one of claims 2 to 8 wherein the flow control mechanism comprises a pair of plates arranged in face-to face relationship with at least one hole in each plate that overlap to permit fluid flow and are offset to shut-off fluid flow.
- 10
11. An ablutionary fitting according to claim 10 wherein the spout is rotatable and rotation of the spout causes one of the plates to rotate relative to the other plate between positions permitting and preventing flow.
- 15
12. An ablutionary fitting according to any one of claims 2 to 11 wherein the tap is a mixer tap connectable to supplies of hot and cold water with means for adjusting the relative proportions of hot and cold water to control the outlet water temperature.
- 20
13. An ablutionary fitting according to claim 12 wherein the proportioning means comprises a mixing valve with user operable means for user selection of the desired outlet water temperature.
- 25
14. An ablutionary fitting according to claim 13 wherein the user operable means comprises a control knob or lever.
15. An ablutionary fitting according to claim 13 or claim 14 wherein the mixing valve is non-thermostatic.
- 30

16. An ablutionary fitting according to claim 13 or claim 14 wherein the mixing valve is thermostatic to maintain the selected outlet water temperature substantially constant.
- 5
17. An ablutionary fitting according to any one of claims 12 to 16 wherein the mixer tap is adapted for wall or panel mounting via inlet connectors including isolation valves accessible from the front of the wall or panel to allow the incoming hot and cold supplies to be shut-off for servicing, repair or replacement of the mixer tap.
- 10
18. An ablutionary fitting according to any one of claims 2 to 11 wherein the tap is connectable to a supply of temperature controlled water.
- 15
19. An ablutionary fitting according to claim 18 wherein the tap is connected to a ring main through which temperature controlled water is circulated for supplying a plurality of fittings with temperature controlled water.
- 20
20. An ablutionary fitting according to any one of claims 2 to 19 wherein the spout is arranged to permit hands-free operation to turn the flow on and off.
- 25
21. An ablutionary fitting having a spout through which water can flow to an outlet wherein the spout is rotatable to control the water flow.
22. An ablutionary fitting according to claim 21 wherein the fitting is a mixer tap having a mixing valve for control of outlet water temperature

independently of flow and rotation of the spout operates a flow control mechanism to prevent or permit water flow through the spout.

23. An ablutionary fitting according to claim 22 wherein the mixer
5 spout is operatively connected to a ceramic flow control valve, and rotating the spout controls the flow.

24. An ablutionary fitting according to claim 22 or claim 23 wherein
the mixing valve is incorporated in a thermostatic cartridge unit
10 detachably located in the main body of the mixer tap and the outlet water temperature is manually set using a temperature control knob.

25. An ablutionary fitting according to any one of claims 22 to 24
wherein the mixer tap is adapted for wall or panel mounting via inlet
15 connectors including isolation valves accessible from the front of the wall or panel to allow the incoming hot and cold supplies to be shut-off for servicing, repair or replacement of the mixer tap.

26. An ablutionary fitting according to any one of claims 21 to 25
20 wherein the spout is arranged to permit hands-free operation to turn the flow on and off.

27. An ablutionary fitting substantially as hereinbefore described with
reference to Figures 1 to 10 of the accompanying drawings.
25

28. An ablutionary fitting substantially as hereinbefore described with
reference to Figures 1 to 10 of the accompanying drawings as modified by
Figure 11 of the accompanying drawings.

29. An ablutionary fitting substantially as hereinbefore described with reference to Figures 1 to 10 of the accompanying drawings as modified by Figure 12 of the accompanying drawings.
- 5 30. A method of controlling flow in an ablutionary fitting by rotating a spout through which water can flow for discharge from the fitting.
31. A method of controlling flow in an ablutionary fitting substantially as hereinbefore described with reference to Figures 1 to 10 of the
10 accompanying drawings.
32. A method of controlling flow in an ablutionary fitting substantially as hereinbefore described with reference to Figures 1 to 10 of the accompanying drawings as modified by Figure 11 of the accompanying
15 drawings.
33. A method of controlling flow in an ablutionary fitting substantially as hereinbefore described with reference to Figures 1 to 10 of the accompanying drawings as modified by Figure 12 of the accompanying
20 drawings.



INVESTOR IN PEOPLE

Application No: GB 0305403.8
Claims searched: 1-33

Examiner: Judith Dunstan
Date of search: 13 November 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X Y	X:1-3, 5-9, 12-15, 17-18, 20-22, 25-26, 30	US 3168113 A (McJohnson) See figs 1, 4 and 5 especially
X	X:1-3, 5-8, 10-14, 16, 20-24, 26, 30	US 4768557 A (Holzer) whole document especially Fig 8 and col 2 lines 25-26 and col 6 lines 19-29
X	1-8, 10-11, 18-21, 26, 30	EP 0117199 A (Peyrat) Abstract and Figs 1 and 2
X	1-3, 5-8, 12-15, 18-22, 26, 30	GB 0756914 A (Johns) See whole document
X	1-3, 5-9, 20, 21, 26, 30	US 0681315 A (Hedges) See Figs 1-2 and 5-6

Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
& Member of the same patent family	E Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^v:

F2V, U1S

Worldwide search of patent documents classified in the following areas of the IPC⁷:

F16K, E03C

The following online and other databases have been used in the preparation of this search report:

EPODOC, WPI, JAPIO