

(19)



(11)

EP 1 298 258 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
18.04.2007 Bulletin 2007/16

(51) Int Cl.:
E03C 1/04 (2006.01)

(21) Application number: **02021579.4**

(22) Date of filing: **26.09.2002**

(54) **Single-control mixing faucet with a horizontal mixing cartridge**

Einhebelmischarmatur mit horizontaler Mischpatrone

Mélangeur à commande unique avec cartouche horizontale

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
IE IT LI LU MC NL PT SE SK TR**

(30) Priority: **26.09.2001 IT MI20012000**

(43) Date of publication of application:
02.04.2003 Bulletin 2003/14

(73) Proprietor: **CRS S.P.A.**
28010 Fontaneto D'Agogna, NO (IT)

(72) Inventor: **Cristina, Riccardo**
28024 Gozzano (Novara) (IT)

(74) Representative: **Cicogna, Franco**
Ufficio Internazionale Brevetti
Dott.Prof. Franco Cicogna
Via Visconti di Modrone, 14/A
20122 Milano (IT)

(56) References cited:
DE-U- 9 309 418 US-A- 5 146 951
US-A- 5 743 463

EP 1 298 258 B1

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a single-control mixing faucet construction, with a horizontal mixing cartridge, which has been specifically designed for bath tubs and showers.

[0002] As is known, the method for making such a single-control faucet is very complex, mainly due to operating difficulties affecting the faucet body casting operation.

[0003] The above difficulties cause a comparatively high waste amount in the first processing steps in which the faucet body is frequently affected by cracks and blow-holes rendering the faucet body unusable.

[0004] The document US-A-5 743 463 discloses the preamble of claim 1.

SUMMARY OF THE INVENTION

[0005] Accordingly, the aim of the present invention is to provide such a single-control mixing faucet construction, with a horizontal mixing cartridge, particularly suitable for bath tubs and showers, which overcomes the above mentioned drawbacks affecting the prior art.

[0006] Within the scope of the above mentioned aim, a main object of the present invention is to provide such a mixing faucet construction the faucet body of which is made by a casting process, while overcoming all the above mentioned problems affecting prior casting processes.

[0007] Yet another object of the present invention is to provide such a mixing faucet construction which can be made in a comparatively small time and with a cost less than that required for making conventional faucets.

[0008] According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a single-control mixing faucet construction, according to claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of the invention, which is illustrated, by way of an indicative, but not limitative, example in the accompanying drawings, where:

Figure 1 is a front perspective view of a single-control mixing faucet construction, for bath tubs, according to the invention;

Figure 2 is an exploded perspective view of the faucet construction shown in figure 1;

Figure 3 is a front view of the faucet construction of figures 1 and 2;

Figure 4 is a cross-sectioned top plan view of the faucet construction of figures 1 to 3; and

Figure 5 is a front perspective view of a single-control mixing faucet construction for showers, according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] With reference to the number references of the above mentioned figures, the single-control mixing faucet construction according to the present invention, which has been generally indicated by the reference number 1, comprises a holding body 2, made by any suitable casting method, so as to define therein at least two cavities, respectively indicated by the reference numbers 3 and 4, coupled to a fitting 5, provided for hot water, and a further fitting 6, provided for cold water.

[0011] The fittings 5 and 6 can further comprise eccentric fitting elements 12 and 13, of any per se known types.

[0012] The holding body 2 defines moreover an outlet 7, including an aerating device 8 and a switching element 9, in turn comprising a fitting 10 for connection to the shower flexible hose, not specifically shown, and a driving rod 11.

[0013] In the shower mixing faucet construction shown in figure 5 and generally indicated by the reference number 101, the body 102 does not include a delivery outlet, but only a fitting 110 for connecting with the shower flexible tube, not shown.

[0014] With reference to figures 2 and 4, the inner cavity 4 of the holding body 2 comprises a diaphragm 14 for connection to a bottom element or portion 15 of a mixing cartridge 16 which, advantageously can be of any suitable standard types.

[0015] The mixing cartridge 16, in particular, receives hot or warm water coming from the cavity 3 through a duct 17 applied to a port formed in the separating diaphragm or membrane 18, between the cavities 3 and 4.

[0016] The mixing cartridge 16 is moreover supplied with cold water coming from the cavity 19, coupled to the fitting 6 by a specifically designed coupling arrangement machined on the bottom element 15 and including a circular crown slot.

[0017] The mixing cartridge 16 is controlled by a control lever assembly 20, including a cartridge lever insert 21, associated with a control lever body 22, in turn including a control lever insert 23.

[0018] The mixed water exiting the cartridge 16, and passing through axially extending holes 24 formed through the bottom element 15, enters the cavity 4 to arrive at the delivery outlet 7.

[0019] The switching element 9 allows to offset the water flow to the fitting 8 for a shower flexible hose, or other auxiliary using device.

[0020] For making the subject faucet construction, the duct 17 is threaded and glued to the bottom element 15, before the assembling operation inside the cast holding

body 2.

[0021] After having assembled the duct 17 - bottom element 15 assembly inside the cast holding body 2, there are defined three separated chambers, i.e. a hot or warm water chamber, defined by the cavity 3, a cold water chamber, defined by the cavity 19, and a mixed water chamber, defined by the cavity 4.

[0022] It has been found that the invention fully achieves the intended aim and objects.

[0023] In fact, the invention provides a single-control mixing faucet construction, with a horizontal mixing cartridge, comprising a cast body having gaps for the passage therethrough of water which gaps are very broad and can be made in a simple manner.

[0024] An important advantage of the invention is that the mentioned inner gaps have been obtained in said cast holding body by using insert elements, made of brass bars, which are engaged in the body during the assembling operation thereof.

[0025] The cast body can be further machined by any desired known machining equipment (for example of a CNC type), thereby greatly reducing the making time and cost.

[0026] In practicing the invention, the used materials, and the contingent size and shapes, can be any, depending on requirements and the status of the art.

Claims

1. A single-control mixing faucet construction (1), including a horizontal mixing cartridge (16), comprising a cast holding body (2), the cast holding body (2) defining three separated chambers inside said holding body, i.e. a hot water chamber, a cold water chamber and a mixing water chamber, **characterized in that** the cast holding body (2) comprises an inner central separating diaphragm or membrane (18) cast therein thereby forming in the cast holding body (2) two broad inner cavities (3, 4), the first broad inner cavity (3) forming the hot water chamber, the second broad inner cavity (4) comprising the mixing cartridge (16) and a tubular duct (17) for the mixing cartridge to receive hot water coming from the hot water chamber, the mixing cartridge arranged opposite the cold water fitting (6) of the cast holding body (2) to form the cold water chamber and the remainder of the second broad inner cavity (4) between the mixing cartridge (16) and the cast central separating diaphragm or membrane (18) outside the tubular duct (17) forming the mixed water chamber.
2. A mixing faucet construction, according to Claim 1, **characterized in that** said holding body (2) comprises at least a second diaphragm (14) for connecting a bottom element (15) included in said mixing cartridge (16), with the tubular duct (17) coupled at a hole formed in said separating diaphragm or mem-

brane (18) of said broad inner cavities (3, 4).

3. A mixing faucet construction, according to Claim 1 or 2, **characterized in that** said mixing cartridge (16) is supplied with cold or hot water from a third cavity (19) coupled to the cold or hot water fitting (6) respectively, by a coupling machined pattern formed on the bottom element (15).
4. A mixing faucet construction, according to one or more of the preceding claims, **characterized in that** said machined coupling pattern formed on said bottom element (15) comprises a circular crown slot.
5. A mixing faucet construction, according to one or more of the preceding claims, **characterized in that** the mixed water exits said mixing cartridge (16) and enters the mixed water chamber coupled to the delivery outlet, passing through axially extending holes (24) formed through said bottom element (15).
6. A mixing faucet construction, according to one or more of the preceding claims, **characterized in that** said mixing cartridge (16) is driven by a control lever assembly (20) comprising a cartridge lever insert (21), coupled to a control lever body (22), in turn including a control lever insert (23).
7. A method for making a single-control mixing faucet construction, according to Claim 1, with a horizontal mixing carriage (16), **characterized in that** said method comprises the steps of:
 - providing a holding body (2) made by a casting process, and including at least two broad cavities (3, 4) therein,
 - providing at least three separated chambers inside said cast holding body (2) by insert elements (21, 23) made of brass bars, and applied in an assembling operation of said faucet.
8. A method, according to Claim 7, **characterized in that** said method comprises the step of coupling the tubular duct (17) to a bottom element (15) of the mixing cartridge (16) and assembling the duct-bottom element assembly inside the cast body.

Patentansprüche

1. Einhebelmischarmatur (1) einschließlich einer horizontalen Mischpatrone (16), umfassend ein gegossenes Gehäuse (2), wobei das gegossene Gehäuse (2) drei voneinander getrennte Kammern innerhalb des Gehäuses aufweist, d.h. eine Heißwasserkammer, eine Kaltwasserkammer und eine Mischwasserkammer, **dadurch gekennzeichnet, dass** das Gehäuse (2) eine innen liegende zentrale Trenn-

wand oder Membran (18) umfasst, die darin eingegossen ist und damit zwei breite Innenräume (3, 4) im gegossenen Gehäuse (2) bildet, wobei der erste breite Innenraum (3) die Heißwasserkammer bildet und der zweite breite Innenraum (4) die Mischpatrone (16) und einen röhrenförmigen Kanal (17) umfasst, damit die Mischpatrone Heißwasser von der Heißwasserkammer empfangen kann, wobei die Mischpatrone gegenüber dem Kaltwasseranschluss (6) des gegossenen Gehäuses (2) angeordnet ist, und damit die Kaltwasserkammer bildet, und der Rest des zweiten breiten Innenraums (4) zwischen der Mischpatrone (16) und der gegossenen zentralen Trennwand oder Membran (18) außerhalb des röhrenförmigen Kanals (17) die Mischwasserkammer bildet.

2. Einhebelmischarmatur nach Anspruch 1, **dadurch gekennzeichnet, dass** das Gehäuse (2) mindestens eine zweite Membran (14) zur Befestigung eines Bodenelements (15) als Teil der Mischpatrone (16) umfasst, wobei der röhrenförmige Kanal (17) an einer Öffnung in der Trennwand oder Membran (18) der breiten Innenräume (3, 4) befestigt ist.

3. Einhebelmischarmatur nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Mischpatrone (16) über eine dritte Kammer (19) mit Kalt- und Warmwasser versorgt wird, die mit dem Kalt- oder Heißwasseranschluss (6) durch eine maschinell bearbeitete Verbindung auf dem Bodenelement (15) verbunden ist.

4. Einhebelmischarmatur nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die maschinell bearbeitete Verbindung auf dem Bodenelement (15) einen kreisförmigen Kronenschlitz umfasst.

5. Einhebelmischarmatur nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Mischwasser an der Mischpatrone (16) austritt und in die Mischwasserkammer eintritt, die mit dem Endauslass verbunden ist, und das dabei durch die sich axial erstreckenden Öffnungen (24), die durch das Bodenelement (15) gebildet werden, geführt wird.

6. Einhebelmischarmatur nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Mischpatrone (16) durch eine Hebelvorrichtung (20) geregelt wird, die einen Patronenhebeleinsatz (21), der mit einem Hebelkörper (22), der einen Patronenhebeleinsatz (23) umfasst, verbunden ist.

7. Ein Verfahren zur Herstellung einer Einhebelmischarmatur nach Anspruch 1 mit einer horizontalen

Mischpatrone (16), **dadurch gekennzeichnet, dass** das Verfahren die folgenden Schritte umfasst:

Bereitstellung eines Gehäuses (2), das im Gussverfahren hergestellt ist und mindestens zwei breite Räume (3, 4) darin umfasst;
Bereitstellung von mindestens drei voneinander getrennten Kammern im gegossenen Gehäuse (2) durch Einsatzelemente (21, 23), die aus Messingstäben bestehen und betriebsfähig in der Armatur angebracht sind.

8. Ein Verfahren nach Anspruch 7, **dadurch gekennzeichnet, dass** das Verfahren den Schritt des Verbindens des röhrenförmigen Kanals (17) mit einem Bodenelement (15) der Mischpatrone (16) und den Zusammenbau des Kanalbodenelements innerhalb des gegossenen Gehäuses umfasst.

Revendications

1. Construction de robinet de mélange à commande unique (1), incluant une cartouche de mélange horizontale (16), comprenant un corps de support coulé (2), le corps de support coulé (2) définissant trois chambres séparées à l'intérieur dudit corps de support, c'est-à-dire, une chambre d'eau chaude, une chambre d'eau froide et une chambre d'eau de mélange, **caractérisée en ce que** le corps de support coulé (2) comprend un diaphragme ou une membrane de séparation centrale interne (18) coulée dans celui-ci, formant ainsi dans le corps de support coulé (2) deux cavités internes larges (3, 4), la première cavité interne large (3) formant la chambre d'eau chaude, la deuxième cavité interne large (4) comprenant la cartouche de mélange (16) et une conduite tubulaire (17) pour que la cartouche de mélange reçoive l'eau chaude provenant de la chambre d'eau chaude, la cartouche de mélange étant agencée à l'opposé du raccord d'eau froide (6) du corps de support coulé (2) pour former la chambre d'eau froide, et le reste de la deuxième cavité interne large (4) entre la cartouche de mélange (16) et le diaphragme ou la membrane de séparation centrale coulée (18) à l'extérieur de la conduite tubulaire (17) formant la chambre d'eau mélangée.

2. Construction de robinet de mélange selon la revendication 1, **caractérisée en ce que** ledit corps de support (2) comprend au moins un deuxième diaphragme (14) permettant de raccorder un élément inférieur (15) inclus dans ladite cartouche de mélange (16), la conduite tubulaire (17) étant couplée à un orifice formé dans ledit diaphragme ou ladite membrane de séparation (18) desdites cavités internes larges (3, 4).

3. Construction de robinet de mélange, selon la revendication 1 ou 2, **caractérisée en ce que** ladite cartouche de mélange (16) est alimentée en eau froide ou chaude à partir d'une troisième cavité (19) couplée au raccord d'eau froide ou chaude (6) respectivement, par un motif usiné de couplage formé sur l'élément inférieur (15). 5

4. Construction de robinet de mélange selon au moins une des revendications précédentes, **caractérisée en ce que** ledit motif de couplage usiné formé sur ledit élément inférieur (15) comprend une fente de couronne circulaire. 10

5. Construction de robinet de mélange selon l'une quelconque des revendications précédentes, **caractérisée en ce que** l'eau de mélange sort de ladite cartouche de mélange (16) et entre dans la chambre d'eau mélangée couplée à la sortie de délivrance, traversant lesdits orifices s'étendant axialement (24) formés à travers ledit élément inférieur (15). 15 20

6. Construction de robinet de mélange selon au moins une des revendications précédentes, **caractérisée en ce que** ladite cartouche de mélange (16) est entraînée par un ensemble de levier de commande (20) comportant un insert de levier de cartouche (21), couplé à un corps de levier de commande (22), incluant à son tour un insert de levier de commande (23). 25 30

7. Procédé de fabrication d'une construction de robinet de mélange à commande unique selon la revendication 1, avec un chariot de mélange horizontal (16), **caractérisé en ce que** ledit procédé comprend les étapes de : 35

fourniture d'un corps de support (2) fabriqué à partir d'un processus de coulage, et incluant au moins deux cavités larges (3, 4), 40

fourniture d'au moins trois chambres séparées à l'intérieur dudit corps de support coulé (2) par des éléments d'insert (21, 23) constitués de barres en laiton, et appliqués dans une opération d'assemblage dudit robinet. 45

8. Procédé selon la revendication 7, **caractérisé en ce que** ledit procédé comprend l'étape de couplage d'une conduite tubulaire (17) à un élément inférieur (15) de la cartouche de mélange (16) et d'assemblage de l'élément inférieur de la conduite à l'intérieur du corps coulé. 50

55

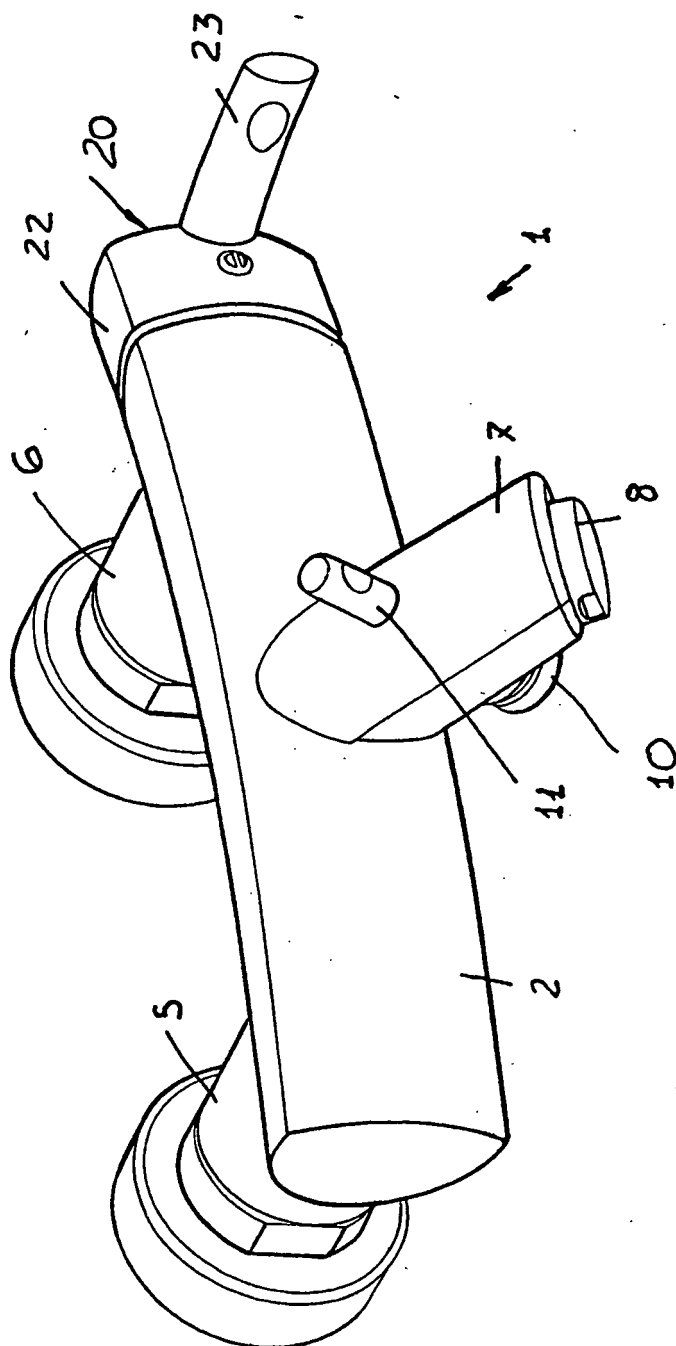


FIG. 1

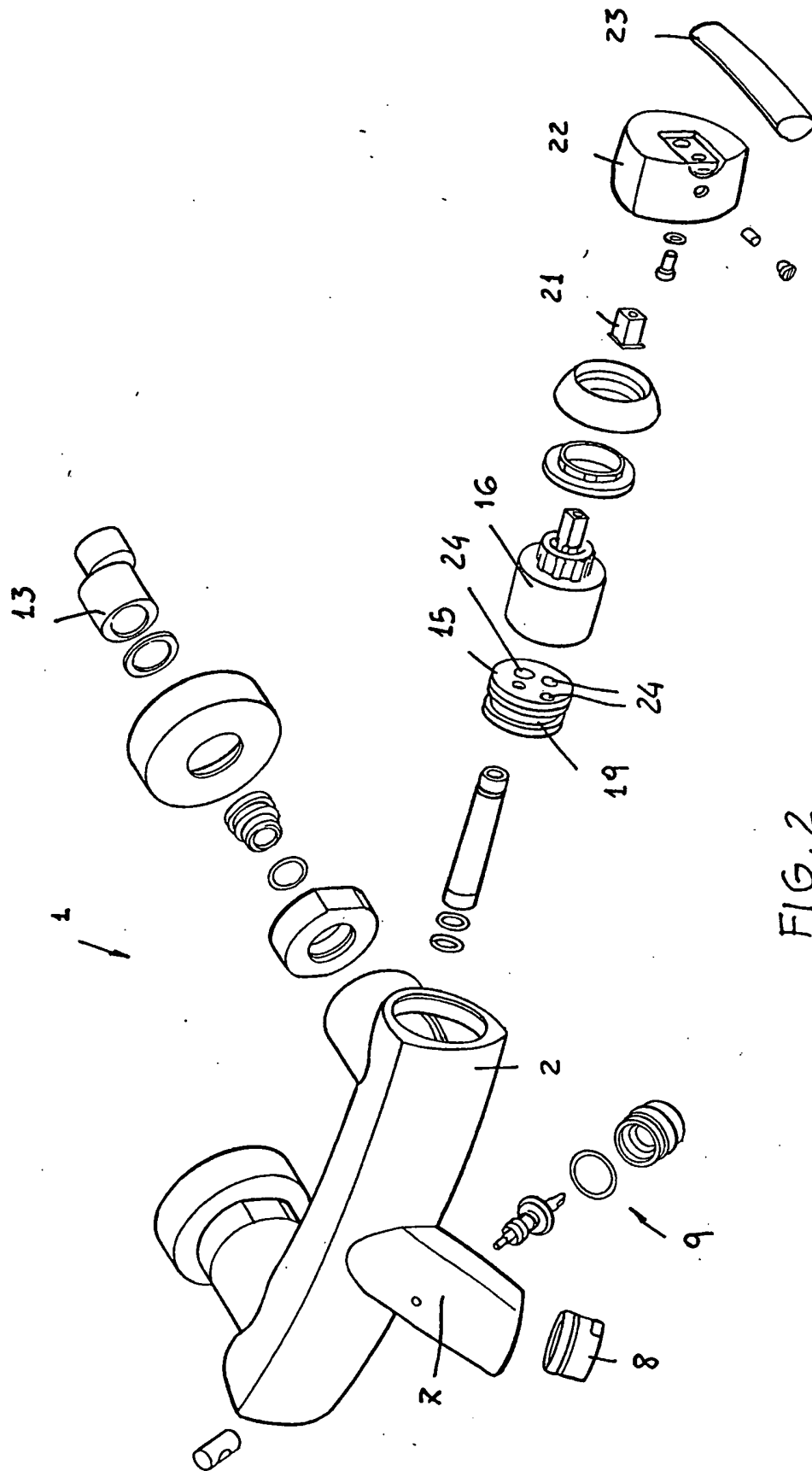


FIG. 2

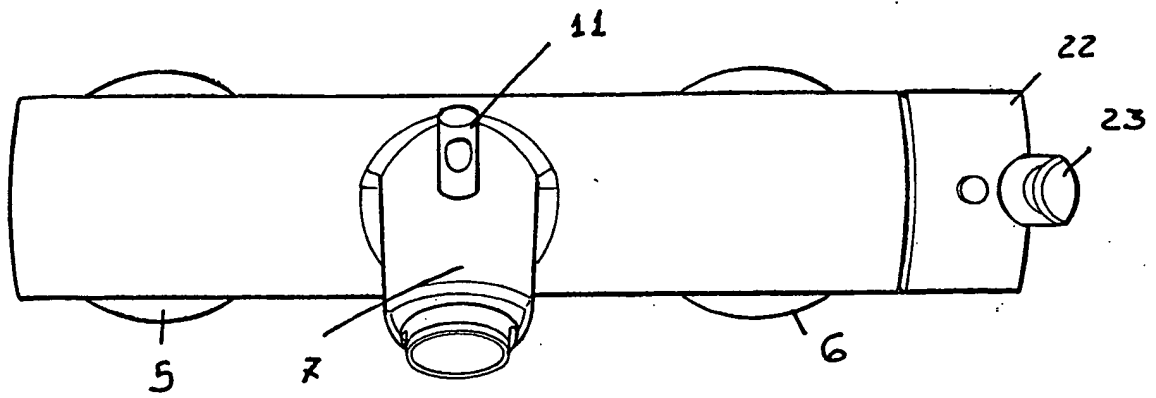


FIG. 3

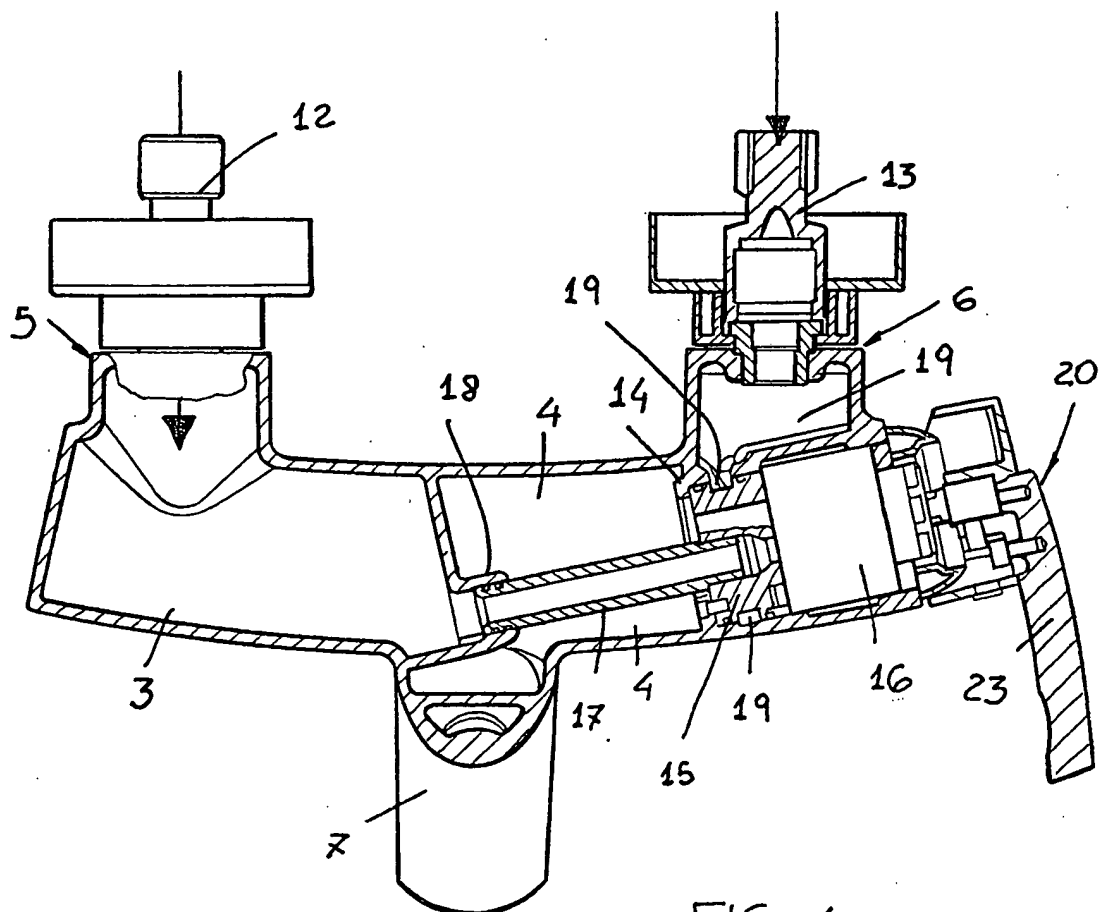


FIG. 4

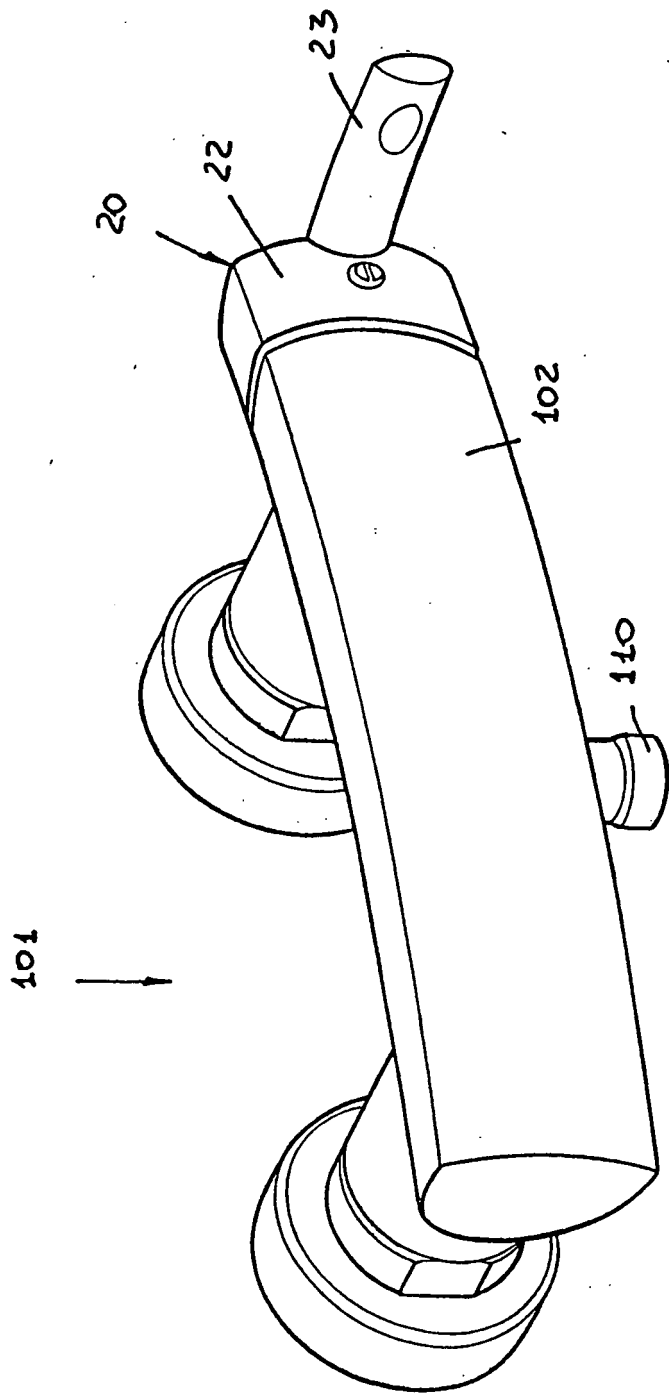


FIG. 5